



OBRA 1990 Retirement System of the County of Milwaukee

Actuarial Valuation and Review as of January 1, 2018

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June 1, 2018

Board of Trustees
OBRA 1990 Retirement System of the County of Milwaukee
901 North 9th Street
Milwaukee, Wisconsin 53233

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2018, of the OBRA 1990 Retirement System of the County of Milwaukee. This report summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and, as required by the Retirement Code, is the basis for the Actual Funding Contribution for fiscal year 2018 and the Budget Contribution for fiscal year 2019.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the Retirement Plan Services (RPS) office. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Kim Nicholl, Matthew Strom, and Geoff Bridges. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report and to answering any questions at an upcoming Board meeting.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: 

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of January 1, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. 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; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements Nos. 67 and 68 as of December 31, 2017, for the System and the County is provided in Section 4.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as outlined in Chapter 203 of the County Code and administered by the Board;
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of January 1, 2018, provided by RPS;
- The unaudited assets of the Plan as of December 31, 2017, provided by RPS;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The System's funding policy.

Valuation Highlights

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The System's funding policy meets this standard.
2. Actual employer contributions made during the fiscal year ending December 31, 2017, were \$833,000. When combined with interest to the end of the year, the total contributions exceeded the actuarially determined contribution (referred to as the Actual Funding Contribution) for 2017 by \$54,667.
3. The results of this January 1, 2018, actuarial valuation are used to determine the Actual Funding Contribution for the fiscal year ending December 31, 2018, and the Budget Contribution for the fiscal year ending December 31, 2019. The Actual Funding Contribution for the year ending December 31, 2018 is \$577,392, a decrease of \$226,889 from the Actual Funding Contribution for the year ending December 31, 2017. The amortization bases of the unfunded actuarial accrued liability are shown in *Section 2, Exhibit F* of this report.
4. The 2019 Budget Contribution, expected to be contributed in 2019, is \$519,000.
5. The System uses an actuarial value of assets that is equal to market value. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 40.9%, compared to the prior year's funded ratio of 34.6%. Before reflecting any assumption or plan changes, this year's funded ratio is 42.4%. This ratio is one measure of funding status, and its history is a measure of funding progress. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
6. The rate of return on the actuarial/market value of assets was 13.87% for the January 1, 2017 to December 31, 2017 plan year. This resulted in an actuarial gain when measured against the assumed rate of return of 8.00% (applicable for the year ending December 31, 2017). Given the low fixed income interest rate environment, the System's target asset allocation, and expectations of future investment returns for various classes, the Board lowered the investment return assumption to 7.75% effective for this January 1, 2018 actuarial valuation. This is the first step in phasing in a reduction from 8.00% to 7.50% that is scheduled to be completed January 1, 2020. We advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments.
7. The unfunded actuarial accrued liability is \$3,190,545, which is an increase of \$324,535 since the prior valuation.
8. The actuarial gain from investment experience is \$102,634.
9. The net experience loss from sources other than investment experience was approximately 8.1% of the actuarial accrued liability prior to reflection of assumption changes. Additional detail regarding this loss is shown in *Section 2, Exhibit C*.

10. The following changes in actuarial assumptions were approved by the Board:

- The investment return assumption was lowered from 8.00% to 7.75%.
- The inflation assumption was lowered from 3.00% to 2.50%.
- The mortality assumption for healthy participants was updated as follows:
 - Post-commencement – the RP-2014 Healthy Annuitant tables (102% of male rates and 107% of female rates), with generational projection using Scale MP-2016;
 - Pre-commencement – the RP-2014 Employee tables with generational projection using Scale MP-2016.

As a result of these assumption changes, the total normal cost at beginning of year increased by \$5,376 and the actuarial accrued liability increased by \$197,805. The total impact was an increase in the Actual Funding Contribution of \$23,193.

11. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of December 31, 2017, and December 31, 2018, is shown in Section 4 of this report. The Actual Funding Contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial reporting.
12. This actuarial report as of January 1, 2018, is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the Plan.

Summary of Key Valuation Results

		2018	2017*
Actuarially determined contributions:	• Actual Funding Contribution for fiscal 2018 (and 2017)	\$577,392	\$804,281
	• Amount actually contributed (scheduled) for fiscal 2018 (and 2017)	836,000	833,000
	• Budget Contribution for fiscal 2019 (and 2018)	519,000	836,000
Actuarial accrued liability for plan year beginning January 1:	• Retired participants and beneficiaries	\$1,017,026	\$673,825
	• Inactive vested participants	3,930,452	3,203,412
	• Active participants	448,338	502,359
	• Total	5,395,816	4,379,596
	• Employer normal cost for plan year beginning January 1 (as of January 1)	90,558	84,354
Assets for plan year beginning January 1:	• Market value of assets (MVA)	\$2,205,271	\$1,513,586
	• Actuarial value of assets (AVA)	2,205,271	1,513,586
	• Actuarial value of assets as a percentage of market value of assets	100.00%	100.00%
Funded status for plan year beginning January 1:	• Unfunded actuarial accrued liability based on AVA	\$3,190,545	\$2,866,010
	• Funded percentage on AVA basis	40.9%	34.6%
	• Remaining amortization period (average)	19	21
Key assumptions:	• Interest rate for determining liability as of January 1	7.75%	8.00%
	• Inflation rate	3.00%	3.00%
	• Interest rate for Budget Contribution for fiscal 2019 (and 2018)	7.75%	7.75%
Demographic data for plan year beginning January 1:	• Number of retired members	53	55
	• Number of vested former members	5,371	5,961
	• Number of active members	288	354
	• Total payroll	\$3,282,100	\$3,640,233
	• Average pay	11,396	10,283

* All valuation results shown throughout this report for January 1, 2017 and prior years and all figures in this column were calculated by the prior actuary.

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the Plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Membership data	An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by the System.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the System and Board of Trustees. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to its other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

A. Membership Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active members, inactive members, retired members and beneficiaries. This section presents a summary of significant statistical data on these participant groups.

As shown below, the ratio of non-active members to active members has been increasing. This increases the risks associated with the plan as the liabilities and costs are larger relative to the payroll of the active members in the plan.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A and B*.

MEMBER POPULATION: 2009 – 2018

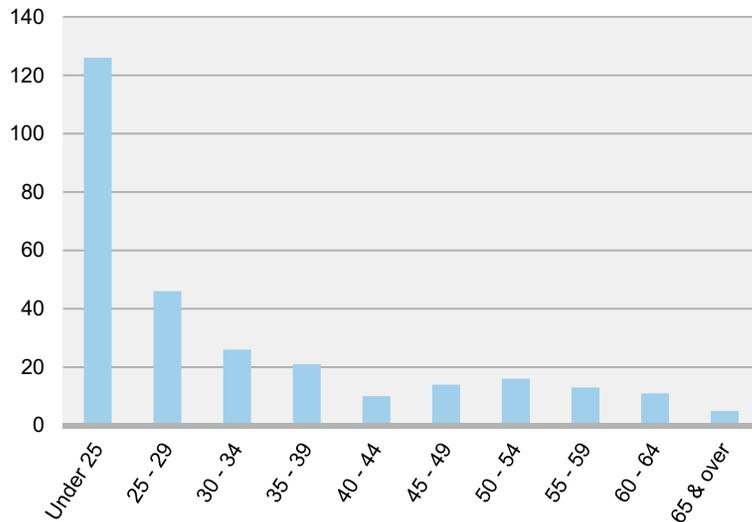
As of January 1	Active Members	Vested Terminated Members	Retired Members	Total Non-Actives	Ratio of Non-Actives to Actives
2009	1,726	9,211	2	9,213	5.34
2010	1,173	10,134	2	10,136	8.64
2011	1,540	9,997	2	9,999	6.49
2012	1,530	1,944	28	1,972	1.29
2013	1,297	1,945	38	1,983	1.53
2014	326	4,434	39	4,473	13.72
2015	394	4,783	47	4,830	12.26
2016	386	5,073	48	5,121	13.27
2017	354	5,961	55	6,016	16.99
2018	288	5,371	53	5,424	18.83

Active Members

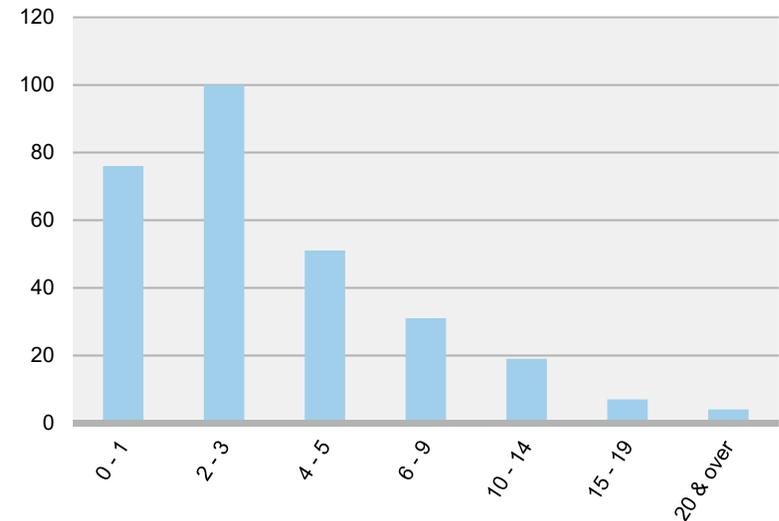
Plan costs are affected by the age, years of creditable service and payroll of active members. In this year’s valuation, there were 288 active members with an average age of 32.03, average years of creditable service of 4.17 years and average pay of \$11,396. The 354 active members in the prior valuation had an average age of 30.40, average service of 4.10 years and average pay of \$10,283.

Distribution of Active Members as of January 1, 2018

ACTIVES BY AGE



ACTIVES BY YEARS OF CREDITABLE SERVICE



Inactive Members

In this year's valuation, there were 5,371 members with a vested right to a deferred or immediate benefit. Average monthly annuities for members with a deferred benefit is \$212. The average lump sum benefit for members with an immediate benefit is \$116.

For comparison, in the previous valuation, there were 5,961 members with a vested right to a deferred or immediate benefit. Average monthly annuities for all members were \$295.

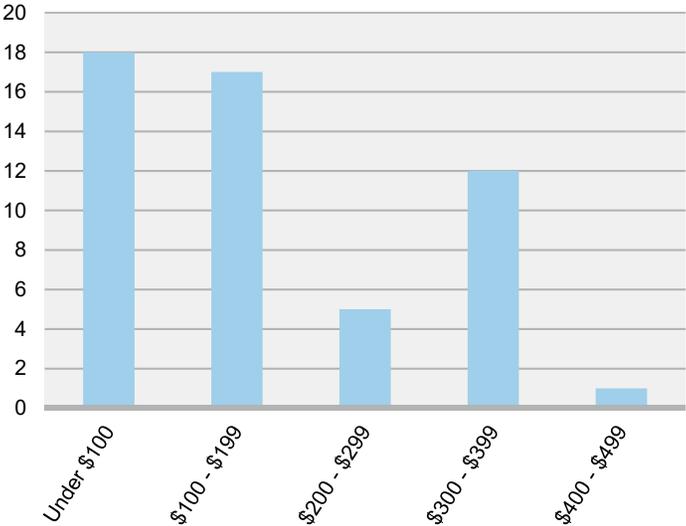
Retired Members and Beneficiaries

As of January 1, 2018, 53 retired members were receiving total monthly benefits of \$9,628. For comparison, in the previous valuation, there were 55 retired members receiving monthly benefits of \$6,440.

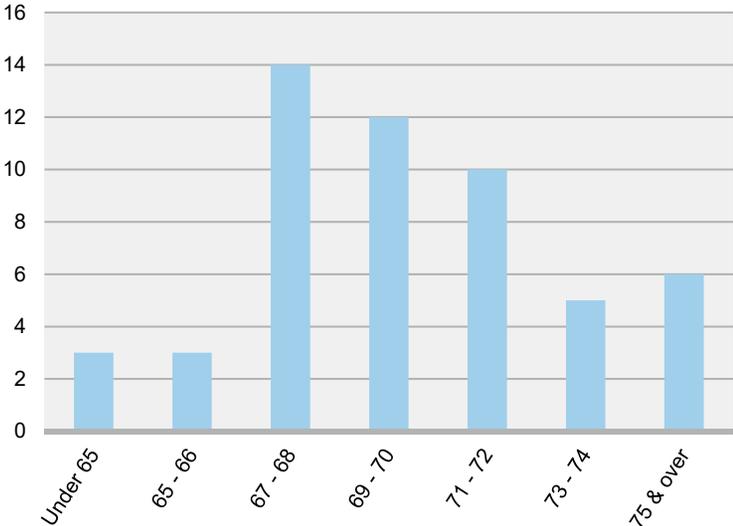
As of January 1, 2018, the average monthly benefit for retired members is \$182, compared to \$117 in the previous valuation. The average age for retired members is 70.45 in the current valuation, compared with 69.53 in the prior valuation.

Distribution of Pensioners as of January 1, 2018

PENSIONERS BY MONTHLY AMOUNT



PENSIONERS BY AGE



Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBERSHIP DATA STATISTICS: 2009 – 2018

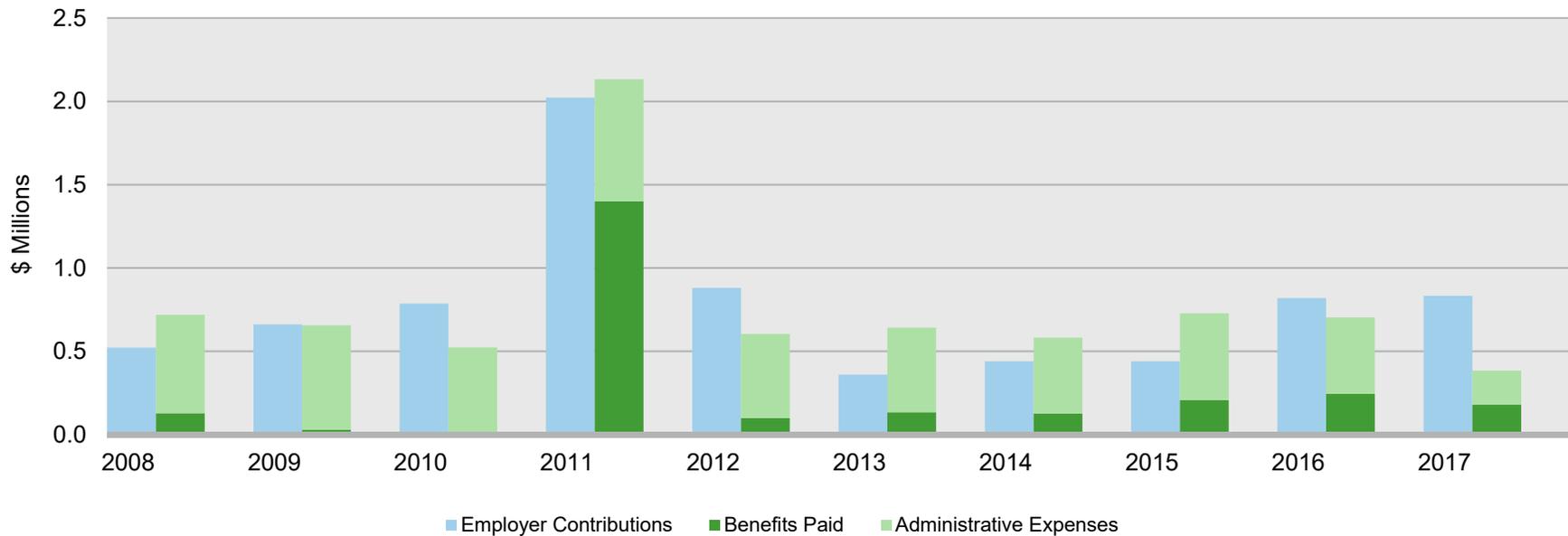
As of January 1	Active Members			Retired Members		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	1,726	26.5	3.3	2	N/A	\$160
2010	1,173	26.6	3.7	2	N/A	160
2011	1,540	28.8	3.3	2	N/A	160
2012	1,530	27.9	2.9	28	N/A	110
2013	1,297	27.0	3.5	38	N/A	135
2014	326	33.0	4.2	39	N/A	142
2015	394	29.0	3.5	47	N/A	151
2016	386	29.2	4.1	48	N/A	124
2017	354	30.4	4.1	55	69.5	117
2018	288	32.0	4.2	53	70.4	182

B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components. The negative cash flow in 2017 also affects expected investment returns.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3, Exhibits C, D and E*.

COMPARISON OF CONTRIBUTIONS TO BENEFITS AND EXPENSES PAID FOR YEARS ENDED DECEMBER 31, 2008 – 2017



C. Actuarial Experience

To calculate the actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The net experience loss is \$205,933 which includes \$102,634 from investment gains and \$308,567 in losses from all other sources. The net experience variation from individual sources other than investments was 8.1% of the actuarial accrued liability prior to reflection of the assumption changes. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2017

1	Net gain/(loss) from investments*	\$102,634
2	Net gain/(loss) from other experience	(308,567)
3	Net experience gain/(loss): 1 + 2	(\$205,933)

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the System’s investment policy. The rate of return on the market value of assets was 13.87% for the year ended December 31, 2017.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 8.00% (changed to 7.75%, effective January 1, 2018). Since the actual return for the year was more than the assumed return, the Plan experienced an actuarial gain during the year ended December 31, 2017 with regard to its investments.

INVESTMENT EXPERIENCE

	Year Ended December 31, 2017	Year Ended December 31, 2016*
1 Investment income	\$242,489	\$87,752
2 Average value of assets	1,748,194	1,253,563
3 Rate of return: $1 \div 2$	13.87%	7.00%
4 Assumed rate of return	8.00%	8.00%
5 Expected investment income: 2×4	\$139,855	\$100,285
6 Actuarial gain/(loss): $1 - 5$	<u>\$102,634</u>	<u>(\$12,533)</u>

* Estimated based on numbers in prior actuary's January 1, 2017 report.

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The table below shows the rate of return on an actuarial basis compared to the market value investment return for the last 14 years, including averages over select time periods.

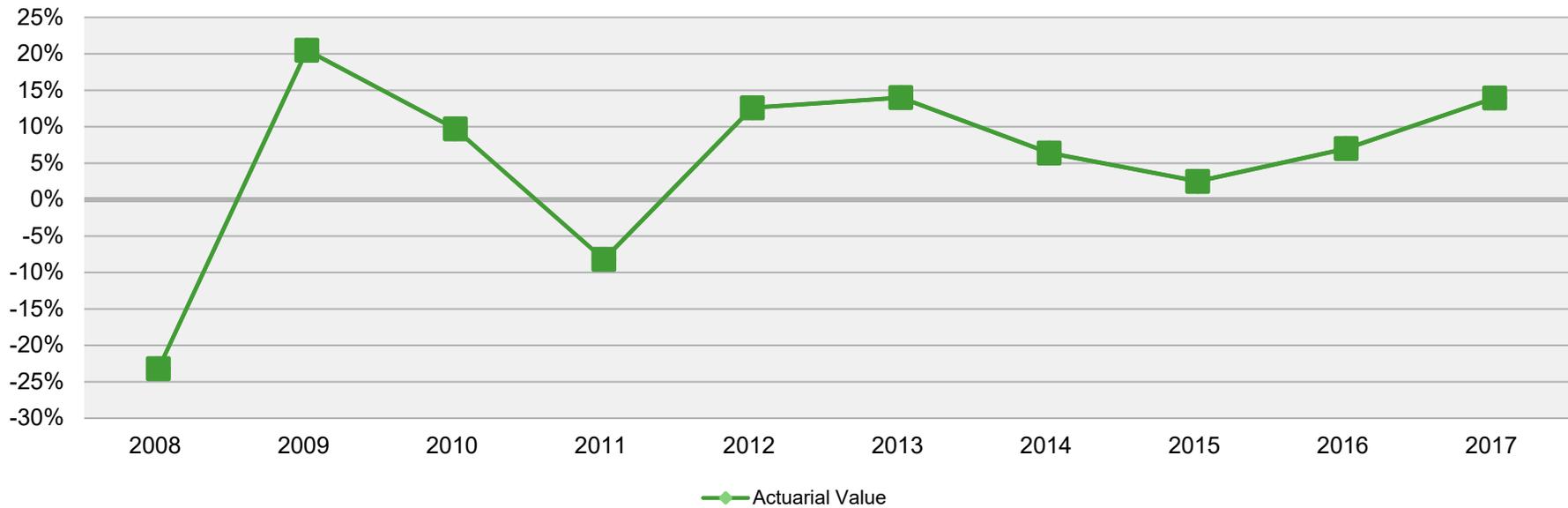
INVESTMENT RETURN: 2004 - 2017

Year Ended Dec. 31	Investment Return		Year Ended Dec. 31	Investment Return	
	Amount	Percent		Amount	Percent
			2008	(\$298,101)	(23.2%)
			2009	173,545	20.5
			2010	100,815	9.7
			2011	(56,201)	(8.2)
			2012	150,022	12.6
			2013	223,162	14.0
2004	\$87,400	11.4%	2014	98,786	6.4
2005	108,300	11.8	2015	37,449	2.5
2006	117,675	11.3	2016	87,752	7.0
2007	68,780	5.6	2017	242,489	13.9
Most recent five-year average return					9.04%
Most recent ten-year average return					5.99%

Note: Each year's yield is weighted by the average asset value in that year.

The following graph shows a history of the investment return for the Plan over the past ten years.

ACTUARIAL RATES OF RETURN FOR YEARS ENDED DECEMBER 31, 2008 - 2017



Administrative Expenses

Administrative expenses payable by the System to the County for the year ended December 31, 2017, totaled \$204,323 compared to the assumption of \$459,362. This resulted in a gain of \$255,039 for the year.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended December 31, 2017, amounted to \$308,567, which is 5.9% of the actuarial accrued liability prior to reflection of the assumption changes.

EXPERIENCE GAIN/(LOSS) DUE TO DEMOGRAPHICS FOR YEAR ENDED DECEMBER 31, 2017

Net turnover	\$60,267
Retirement (less retirements than expected)	(311,205)
Mortality (more deaths than expected)	30,217
Salary increase for continuing actives	(2,401)
Miscellaneous/methodology differences	<u>(85,445)</u>
Total	(\$308,567)

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of January 1, 2018, is \$5,395,816, an increase of \$1,016,220, or 23.2%, from the actuarial accrued liability as of the prior valuation date. The liability is expected to grow each year with normal cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

- The assumption changes reflected in this report are:
 - The investment return assumption was lowered from 8.00% to 7.75%.
 - The inflation assumption was lowered from 3.00% to 2.50%.
 - The mortality assumption for healthy participants was updated as follows:
 - Post-commencement – the RP-2014 Healthy Annuitant tables (102% of male rates and 107% of female rates), with generational projection using Scale MP-2016;
 - Pre-commencement – the RP-2014 Employee tables with generational projection using Scale MP-2016.
- These changes increased the actuarial accrued liability by 3.8% and increased the total normal cost by 6.3%.
- Details on actuarial assumptions and methods are in *Section 5, Exhibit I*.

Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 5, Exhibit II*.

E. Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED ACTUARIAL ACCRUED LIABILITY FOR YEAR ENDED DECEMBER 31, 2017

1	Unfunded actuarial accrued liability at beginning of year	\$2,866,010
2	Normal cost at beginning of year (includes expenses)	509,689
3	Total contributions	(833,000)
4	Interest	
	• For whole year on 1 + 2	\$270,056
	• For partial year on 3 (See Exhibit J)	<u>-25,948</u>
	Total interest	<u>244,108</u>
5	Expected unfunded actuarial accrued liability	\$2,786,807
6	Changes due to:	
	• Experience (gain)/loss	205,933
	• Assumptions	197,805
	• Funding method	0
	• Plan provisions	<u>0</u>
	Total changes	<u>\$403,738</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$3,190,545</u>

F. Amortization Schedule for Funding

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability (UAAL). Payments towards the UAAL are determined by amortizing sources of UAAL over various time periods, with amounts determined as a level percentage of payroll. The UAAL payment was reestablished on January 1, 2014 and amortized over 21 years. Future unanticipated increases in UAAL are amortized over closed 20-year periods. UAAL arising from contribution variances are amortized over closed 5-year periods. Amortization payments are assumed to increase by the payroll growth assumption of 1.75%, which reflects the payroll increase assumption of 3.5%, limited to reflect the anticipated increases in the County's tax base.

ACTUAL FUNDING CONTRIBUTION AMORTIZATION SCHEDULE FOR 2018

Type	Date Established	Initial Period	Initial Amount	Annual Payment*	Years Remaining	Outstanding Balance
Reestablished UAAL	01/01/2015	21	\$1,923,320	\$161,583	18	\$1,867,168
Increase to UAAL	01/01/2016	20	585,698	49,555	18	572,622
Actuarial loss	01/01/2017	20	455,010	37,825	19	450,579
Contribution variance	01/01/2017	5	(58,942)	(13,624)	4	(48,895)
Actuarial loss	01/01/2018	20	205,933	16,813	20	205,933
Contribution variance	01/01/2018	5	(54,667)	(12,623)	5	(54,667)
Change in assumptions	01/01/2018	20	197,805	<u>16,149</u>	20	<u>197,805</u>
Total				\$255,678		\$3,190,545

* Level percentage, except contribution variances

Amortization Schedule for Funding (continued)

Payments for the subsequent year Budget Contribution are determined by rolling forward the outstanding balance and payment amounts for existing amortization bases, and estimating the amounts of any new sources of UAAL.

BUDGET CONTRIBUTION AMORTIZATION SCHEDULE FOR 2019

Type	Date Established	Initial Period	Initial Amount	Annual Payment*	Years Remaining	Outstanding Balance
Reestablished UAAL	01/01/2015	21	\$1,923,320	\$164,411	17	1,837,768
Increase to UAAL	01/01/2016	20	585,698	50,421	17	563,606
Loss	01/01/2017	20	455,010	38,488	18	444,742
Contribution variance	01/01/2017	5	(58,942)	(13,624)	3	(38,004)
Actuarial gain	01/01/2018	20	205,933	17,107	19	203,777
Contribution variance	01/01/2018	5	(54,667)	(12,623)	4	(45,302)
Change in assumptions	01/01/2018	20	197,805	16,431	19	195,734
Contribution variance	01/01/2019	5	(285,757)	(65,985)	5	<u>(285,757)</u>
Total				\$194,626		\$2,876,566

* Level percentage, except contribution variances

For the 2018 Budget Contribution, a base for a contribution variance for 2019 is added and amortized over 5 years. This variance is based on the difference between the County's anticipated contribution and the Actual Funding Contribution for 2018.

G. Gross Contribution Requirements

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability (as shown in *Section 2, Exhibit F*). The contribution requirements shown in this report are gross contribution amounts. It is our understanding that County staff will net out the amount of employee contributions that are collected to arrive at a net County contribution.

GROSS CONTRIBUTION REQUIREMENTS

		Year Beginning January 1		
		2019	2018	
		Budget	Actual	Budget
1	Total normal cost, adjusted to end of year	\$101,000	\$97,576	\$104,000
2	Net annual amortizations, adjusted to end of year	210,000	275,493	265,000
3	Expenses	<u>208,000</u>	<u>204,323</u>	<u>467,000</u>
4	Total contribution: 1 + 2 + 3, not less than zero	519,000	577,392	836,000

The Actual Funding Contribution and 2019 Budget Contribution are based on participant data as of January 1, 2018.

For the 2019 Budget Contribution, the Normal Cost for 2019 is assumed to be 3.0% higher than the 2018 Normal Cost. The 2019 reimbursable expenses are assumed to be 1.75% higher than the estimated reimbursable expenses for 2018.

H. Reconciliation of Budget Contribution Requirement

The chart below details the changes in the Budget Contribution requirement from the prior valuation to the current year's valuation.

RECONCILIATION OF BUDGET CONTRIBUTION REQUIREMENT FROM 2018 TO 2019

	Amount
1 2018 Budget Contribution	\$836,000
2 Increase/(decrease) during 2017 due to:	
a) Unanticipated liability loss/(gain)	\$19,000
b) Asset experience different than expected	-8,000
c) 2017 expenses other than assumed	-263,000
d) 2017 contribution variance other than assumed	-6,000
e) Change due to assumption/method/plan changes	-1,000
f) Total	<u>-259,000</u>
3 2018 Actual Contribution: 1 + 2	\$577,000
4 Expected increase/(decrease) during 2018 due to:	
a) Normal cost and existing amortization bases	\$4,000
b) Phase-in of deferred investment (gains) losses	0
c) Increase in expenses	4,000
d) Expected contribution variance for 2018	-66,000
e) Full recognition of bases	0
f) Change due to assumption/method/plan changes	0
g) Total	<u>-58,000</u>
5 2019 Budget Contribution: 3 + 4	\$519,000

I. Contribution for Prior Year and Variance from the Funding Calculation Contribution

Differences between the Actual Funding Contribution and the County's actual contributions with interest are amortized over five year periods using a level dollar basis. The following exhibit shows the calculation of the contribution variance for the 2017 plan year.

CALCULATION OF CONTRIBUTION VARIANCE

Item		Amount																									
1	Total Actual Funding Contribution, end-of-year basis, for 2017 plan year (from January 1, 2017 actuarial valuation report)	\$804,281																									
2	Total employer contributions made:																										
	<table border="0"> <thead> <tr> <th>Contribution Made</th> <th>Fraction of a Year Invested</th> <th>Contribution Amount</th> <th>Interest to Year End*</th> <th>End of Year Amount</th> </tr> </thead> <tbody> <tr> <td>Bi-weekly</td> <td>50.0%</td> <td>\$0</td> <td>\$0</td> <td>\$0</td> </tr> <tr> <td>06/15/2017</td> <td>54.5%</td> <td>318,000</td> <td>13,870</td> <td>331,870</td> </tr> <tr> <td>09/15/2017</td> <td>29.3%</td> <td><u>515,000</u></td> <td><u>12,078</u></td> <td><u>527,078</u></td> </tr> <tr> <td>Total</td> <td></td> <td>\$833,000</td> <td>\$25,948</td> <td>\$858,948</td> </tr> </tbody> </table>	Contribution Made	Fraction of a Year Invested	Contribution Amount	Interest to Year End*	End of Year Amount	Bi-weekly	50.0%	\$0	\$0	\$0	06/15/2017	54.5%	318,000	13,870	331,870	09/15/2017	29.3%	<u>515,000</u>	<u>12,078</u>	<u>527,078</u>	Total		\$833,000	\$25,948	\$858,948	
Contribution Made	Fraction of a Year Invested	Contribution Amount	Interest to Year End*	End of Year Amount																							
Bi-weekly	50.0%	\$0	\$0	\$0																							
06/15/2017	54.5%	318,000	13,870	331,870																							
09/15/2017	29.3%	<u>515,000</u>	<u>12,078</u>	<u>527,078</u>																							
Total		\$833,000	\$25,948	\$858,948																							
3	Total member contributions made:																										
	<table border="0"> <thead> <tr> <th>Contribution Made</th> <th>Fraction of a Year Invested</th> <th>Contribution Amount</th> <th>Interest to Year End*</th> <th>End of Year Amount</th> </tr> </thead> <tbody> <tr> <td>Bi-weekly</td> <td>50.0%</td> <td>\$0</td> <td>\$0</td> <td>\$0</td> </tr> </tbody> </table>	Contribution Made	Fraction of a Year Invested	Contribution Amount	Interest to Year End*	End of Year Amount	Bi-weekly	50.0%	\$0	\$0	\$0																
Contribution Made	Fraction of a Year Invested	Contribution Amount	Interest to Year End*	End of Year Amount																							
Bi-weekly	50.0%	\$0	\$0	\$0																							
4	Variance from funding calculation amount: $2 + 3 - 1$	\$54,667																									

* Interest to December 31, 2017 at 8.00% per annum.

J. History of Employer Contributions

A history of the most recent years of contributions is shown below. Amounts contributed do not reflect interest.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2008 – 2018

Fiscal Year Ended Dec. 31	Normal Cost with Interest	Net Amortization Payments	Expenses	Actuarially Determined Contribution	Amount Contributed	Percent Contributed
2008	\$176,532	\$381,281	N/A	\$557,813	\$522,000	93.60%
2009	167,791	493,134	N/A	660,925	660,925	100.00
2010	135,517	580,199	N/A	716,439	786,000	109.71
2011	189,929	617,199	N/A	807,028	2,022,000	250.55
2012	183,014	263,438	N/A	446,452	880,000	197.11
2013	163,337	225,288	N/A	388,625	360,000	92.63
2014	88,705	284,795	N/A	373,500	440,000	117.80
2015	92,281	168,351	509,752	770,384	440,000	57.11
2016	81,893	223,830	520,844	826,567	819,000	99.08
2017	91,102	253,817	459,362	804,281	833,000	103.57
2018	97,576	275,493	204,323	577,392	836,000*	144.79

*Per current contribution schedule.

K. Actuarial Balance Sheet

An overview of the Plan’s funding is provided by an Actuarial Balance Sheet, which compares the total liabilities (current and future) to the total assets (current and future). The liabilities are calculated by determining the amount and timing of all future payments that will be made by the Plan for current participants. These payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value of all benefits, referred to as the “liability” of the Plan.

Second, this liability is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	Valuation as of	
	January 1, 2018	January 1, 2017
Liabilities		
• Present value of benefits for retired participants	\$1,017,026	\$673,825
• Present value of benefits for inactive former participants	3,930,452	3,203,412
• Present value of benefits for active participants	<u>1,701,314</u>	<u>N/A*</u>
Total liabilities	\$6,648,792	\$N/A*
Assets		
• Total valuation value of assets	\$2,205,271	\$1,513,586
• Present value of future employer and employee contributions for:		
» Future Normal Costs	1,252,976	N/A*
» Unfunded actuarial accrued liability	<u>3,190,545</u>	<u>2,866,010</u>
Total of current and future assets	<u>\$6,648,792</u>	<u>\$N/A*</u>

* Not included in prior year’s valuation report.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of January 1		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	288	354	-18.6%
• Average age	32.0	30.4	1.6
• Average years of creditable service	4.2	4.1	0.1
• Total payroll	\$3,282,100	\$3,640,233	-16.4%
• Average pay	11,396	10,283	10.8%
Inactive members:			
• Number of terminated vested	5,371	5,961	-9.9%
• Average age	30.6	30.2	0.4
Retired members:			
• Number in pay status	53	55	-3.6%
• Average age	70.5	69.2	1.3
• Average monthly benefit	\$182	\$117	55.6%

EXHIBIT B – RECONCILIATION OF MEMBERSHIP DATA

	Active Members	Vested Terminated Members	Retired Members	Total
Number as of January 1, 2017	354	5,961	55	6,370
• New participants	67	N/A	N/A	67
• Terminations – with vested rights	-38	38	0	0
• Retirements	-6	0	6	0
• Return to work / Rehire	58	-58	0	0
• Deceased	0	-6	-1	-7
• Lump sum cash-outs	-147	-564	-12	-723
• Data adjustments	0	0	5	5
• Number as of January 1, 2018	288	5,371	53	5,712

EXHIBIT C – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended December 31, 2017	Year Ended December 31, 2016
Net assets at market value at the beginning of the year	\$1,513,586	\$1,310,545
Contribution income:		
• Employer contributions	\$833,000	\$819,000
• Member contributions	0	0
• Less administrative expenses payable to the County	<u>-204,323</u>	<u>-459,362</u>
<i>Net contribution income</i>	\$628,677	\$359,638
Investment income:		
• Prorata Share of Earnings	\$242,489	\$87,752
<i>Net investment income</i>	<u>\$242,489</u>	<u>\$87,752</u>
Total income available for benefits	\$871,166	\$447,390
Less benefit payments:		
• Benefits paid to retirees	-\$99,904	-\$121,180
• Account Withdrawals	<u>-79,577</u>	<u>-123,170</u>
<i>Net benefit payments</i>	-\$179,481	-\$244,349
Change in reserve for future benefits	\$691,685	\$203,041
Net assets at market value at the end of the year	\$2,205,271	\$1,513,586

EXHIBIT D – SUMMARY STATEMENT OF PLAN ASSETS

	December 31, 2017	December 31, 2016
Cash equivalents	\$69,994	\$77,617
Assets held by ERS Pension Plan	2,148,099	1,437,539
Contributions receivable	0	0
Total assets	\$2,218,093	\$1,515,156
Taxes Payable	-12,822	-1,570
Net assets at market value	\$2,205,271	\$1,513,586
Net assets at actuarial value	\$2,205,271	\$1,513,586

EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH DECEMBER 31, 2017

Year Ended Dec. 31	Employer Contributions	Member Contributions	Net Other Income	Net Investment Return*	Admin. Expenses	Benefit Payments**	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2007							\$1,354,805	\$1,354,805	100.00%
2008	\$522,000	\$0	\$0	-\$298,101	-\$590,678	-\$128,103	859,923	859,923	100.00%
2009	660,925	0	0	173,545	-627,953	-27,833	1,038,607	1,038,607	100.00%
2010	786,000	0	0	100,815	-519,351	-3,846	1,402,225	1,402,225	100.00%
2011	2,022,000	0	0	-56,201	-732,297	-1,400,202	1,235,525	1,235,525	100.00%
2012	880,000	0	0	150,022	-504,824	-99,116	1,661,607	1,661,607	100.00%
2013	360,000	0	0	223,162	-507,799	-133,976	1,602,994	1,602,994	100.00%
2014	440,000	0	0	98,786	-454,752	-126,636	1,560,392	1,560,392	100.00%
2015	440,000	0	0	37,449	-520,844	-206,452	1,310,545	1,310,545	100.00%
2016	819,000	0	0	87,752	-459,362	-244,349	1,513,586	1,513,586	100.00%
2017	833,000	0	0	242,489	-204,323	-179,481	2,205,271	2,205,271	100.00%

* On a market basis, net of investment fees

** Includes lump sum cashouts

EXHIBIT F – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners:	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge that may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <p>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</p> <p>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</p> <p>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</p>

Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Fund is calculated, including: <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;

	<p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more Actuarial Assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the

	fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: GASB 67 and 68 Information

Exhibit 1 – Net Pension Liability

The components of the net pension liability at were as follows:

	January 1, 2018	January 1, 2017
Total pension liability	\$5,806,199	\$4,605,852
Plan fiduciary net position	<u>(2,205,271)</u>	<u>(1,513,586)</u>
Net pension liability	\$3,600,928	\$3,092,266
Plan fiduciary net position as a percentage of the total pension liability	38.0%	32.9%

The net pension liability was measured as of December 31, 2017, and is determined based on the total pension liability from the January 1, 2018, actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of January 1, 2018.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of January 1, 2018, using the following actuarial assumptions, applied to all periods included in the measurement:

Actuarial cost method	Entry Age Normal – Level Percentage of Pay
Inflation	3.00%
Salary increases	4.50%
Investment rate of return	7.75%, net of pension plan investment expenses

Mortality

Pre-retirement:

Males – RP-2014 Employee male, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.

Females – RP-2014 Employee female, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.

Healthy Retiree:

Males – 102% of RP-2014 Healthy Annuitant male, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.

Females – 107% of RP-2014 Healthy Annuitant female, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.

The actuarial assumptions used were based on the results of an experience study dated October 12, 2017. They are the same as the assumptions used in the January 1, 2018 funding actuarial valuation.

The long-term expected rate of return on pension plan investments is 7.75% for calendar years 2018 and 2019, then 7.50% thereafter. The long-term expected rate of return was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

Discount rate: The discount rate used to measure the total pension liability was 7.75% as of December 31, 2017. The projection of cash flows used to determine the discount rate assumed employer contributions will be made at rates equal to those based on this January 1, 2018, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries are not included. Based on those assumptions, the pension plan’s fiduciary net position was projected to be available to make all projected future benefit payments of current plan members as of December 31, 2017. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of December 31, 2017.

Sensitivity of the net pension liability to changes in the discount rate: The following presents the net pension liability, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6.75%) or one-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount (7.75%)	1% Increase (8.75%)
Net pension liability as of December 31, 2017	\$ 4,564,006	\$ 3,600,928	\$ 2,852,346

Exhibit 2 – Schedules of Changes in Net Pension Liability

	Year Ending December 31, 2017	Year Ending December 31, 2016
Total pension liability		
Service cost	\$110,678	\$95,763
Interest	370,220	320,348
Change of benefit terms	0	0
Differences between expected and actual experience	676,340	405,683
Changes of assumptions	222,590	0
Benefit payments, including refunds of employee contributions	(179,481)	(244,349)
Net change in total pension liability	\$1,200,347	\$577,445
Total pension liability – beginning	<u>4,605,852</u>	<u>4,028,407</u>
Total pension liability – ending (a)	<u>5,806,199</u>	<u>\$4,605,852</u>
Plan fiduciary net position		
Contributions – employer	\$833,000	\$819,000
Contributions – employee	0	0
Net investment income	242,489	87,752
Benefit payments, including refunds of employee contributions	(179,481)	(244,349)
Administrative expense	(204,323)	(459,362)
Other	<u>0</u>	<u>0</u>
Net change in plan fiduciary net position	691,685	203,041
Plan fiduciary net position – beginning	<u>1,513,586</u>	<u>1,310,545</u>
Plan fiduciary net position – ending (b)	<u>2,205,271</u>	<u>\$1,513,586</u>
Net pension liability – ending (a) – (b)	<u>3,600,928</u>	<u>\$3,092,266</u>
Plan fiduciary net position as a percentage of the total pension liability	38.0%	32.9%
Covered employee payroll	\$3,640,233	\$3,926,027
Net pension liability as percentage of covered employee payroll	98.92%	78.76%

Exhibit 3 – Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

As shown in Exhibit 2, during the plan year that ended December 31, 2017, the changes in net pension liability due to differences between expected and actual demographic experience is an increase of \$676,340. The average expected remaining service lives of all members is 0.5 years, determined as of January 1, 2017 (the beginning of the measurement period ending December 31, 2017). Therefore, the full amount is recognized in pension expense in the current fiscal year. Of the \$222,590 liability increase attributable to the assumption changes, the full amount is recognized in pension expense in the current year.

Based on the assumed investment return of 8.00%, the expected net investment income for the year was \$139,055. As shown in Exhibit 4, the actual net investment income for the year was \$242,490. The difference between actual and expected investment experience is a decrease in net pension liability of \$103,435, which is recognized over a 5-year period. Of this amount, \$20,687 is reflected in the current year and \$82,748 is reflected as a deferred inflow of resources related to pensions.

	Year Established	Original Balance	Original Amortization Period	Amortization Amount During 2017	Outstanding Balance at December 31, 2017
Inflows					
Investments	2017	103,435	5.0 years	20,687	82,748
Total inflows				\$20,687	\$82,748
Outflows					
Investments	2014	24,486	5.0 years	4,898	4,894
Investments	2015	83,197	5.0 years	16,640	33,277
Investments	2016	12,533	5.0 years	2,507	7,519
Demographics	2017	676,340	0.5 years	676,340	0
Assumptions	2017	222,590	0.5 years	222,590	0
Total outflows				\$922,975	\$45,690

Exhibit 3 – Deferred Outflows of Resources and Deferred Inflows of Resources
Related to Pensions (continued)

	December 31, 2017	December 31, 2016
Deferred Outflows of Resources (Outstanding Balances)		
Difference between expected and actual experience in the Total Pension Liability	0	0
Changes of assumptions	0	0
Net difference between projected and actual earnings on pension plan investments	0	69,735
Total Deferred Outflows of Resources	\$0	\$69,735
Deferred Inflows of Resources (Outstanding Balances)		
Difference between expected and actual experience in the Total Pension Liability	0	0
Changes of assumptions	0	0
Net difference between projected and actual earnings on pension plan investments	37,058	0
Total Deferred Inflows of Resources	\$37,058	\$0
Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:		
Year Ended December 31:		
2017	N/A	24,045
2018	3,354	24,041
2019	(1,543)	19,144
2020	(18,182)	2,505
2021	(20,687)	0
2022	0	0
Thereafter	0	0

Exhibit 4 – Pension Expense

Exhibit 4 below shows the individual components of collective pension expense, which totaled \$1,448,454 for the fiscal year that ended December 31, 2017.

Annual pension expense for the year can also be viewed as the change in net pension liability, plus employer contributions for the year, less the change in outstanding balances of deferred outflows and deferred inflows of resources from the end of the prior fiscal year to end of the current fiscal year. The change in net pension liability during the year was \$508,661 and employer contributions were \$833,000. The net value of deferred outflows and deferred inflows of resources as of the end of the current fiscal year is (\$37,058) compared to the net value as of the end of the prior fiscal of \$69,735 for a change of (\$106,793) Therefore, the pension expense for the fiscal year that ended December 31, 2017, is $\$508,661 + \$833,000 - (\$106,793)$, or \$1,448,454.

	Fiscal Year Ending December 31, 2017	Fiscal Year Ending December 31, 2016
Components of pension expense		
• Service Cost	110,678	95,763
• Interest on the total pension liability	370,220	320,348
• Projected earnings on plan investments	(139,055)	(100,285)
• Contributions - member	0	0
• Administrative expense	204,323	459,362
• Current year recognition of:		
Changes of assumptions	222,590	0
Difference between expected and actual experience	676,340	405,683
Difference between projected and actual earnings on pension plan investments	3,358	24,045
Change of benefit terms	0	0
Total pension expense	\$1,448,454	\$1,204,916

Section 5: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

Rationale for Assumptions	<p>The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study as of December 31, 2016 prepared by Conduent. Assumptions that were changed from the prior valuation include mortality rates and the net investment return assumption. Current data is reviewed in conjunction with each annual valuation. Based on professional judgment, no assumption changes are warranted at this time, beyond the assumption changes recommended by Conduent in the most recent Actuarial Experience Study.</p>
Net Investment Return:	<p>7.75%.</p> <p>The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.</p>
Salary Increases:	<p>4.50% per annum, compounded annually</p>
Payroll Growth:	<p>3.50%. For purposes of amortizing the unfunded actuarial accrued liability on a level percentage basis, the System uses 1.75%. This rate reflects the anticipated growth rate of the County's revenues.</p>
Mortality Rates:	<p><i>Healthy Annuitants:</i> For males, 102% of RP-2014 Healthy Annuitant male, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016. For females, 107% of RP-2014 Healthy Annuitant female, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.</p> <p><i>Death in Active Service:</i> For males, RP-2014 Employee male, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016. For females, RP-2014 Employee female, projected back to 2006 using scale MP-2014 and then projected forward with generational projection using scale MP-2016.</p> <p>The tables reasonably reflect the mortality experience of the Plan as of the measurement date.</p> <p>The generational projection of the mortality tables past the measurement date reflects future mortality improvement between the measurement date and those years.</p>

Termination Rates before Retirement:

Age	Withdrawal - Select Period Termination Rates + Ultimate (%)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Ultimate
20	0.3375	0.3150	0.2850	0.2400	0.1905	0.1500
25	0.3135	0.2946	0.2688	0.2286	0.1854	0.1425
30	0.2730	0.2547	0.2292	0.1899	0.1536	0.1200
35	0.2235	0.2064	0.1803	0.1401	0.1017	0.0600
40	0.1785	0.1626	0.1380	0.1026	0.0723	0.0390
45	0.1725	0.1485	0.1194	0.0843	0.0537	0.0252
50	0.1650	0.1338	0.1098	0.0789	0.0447	0.0107
55	0.1485	0.1245	0.0978	0.0693	0.0363	0.0023

The withdrawal rates were based on historical and current demographic data, adjusted to reflect estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual withdrawals and disability retirements by age based on the prior assumptions over the most recent experience study period.

Retirement Rates for all participants:

100% at Age 65

The retirement rates for all participants are based on historical and current demographic data, adjusted to reflect estimated future experience and professional judgment.

Unknown Data for Participants:	Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.
Actuarial Value of Assets:	Market value of assets
Actuarial Cost Method:	<p>For Funding purposes, liabilities and contributions are computed using the Unit Credit Cost Method</p> <p>The outstanding balance of the Unfunded Actuarial Accrued Liability as of January 1, 2015 is being amortized over a fixed 21 year period. Changes to the Unfunded Actuarial Accrued Liability arising from plan changes, assumption changes, and experience gains and losses are amortized as a level percentage of payroll over a 20-year period. For this purpose, the payroll growth assumption is limited to 1.75%.</p> <p>The administrative costs incurred by the County related to the System are payable by the System to the County. The County then reimburses the System for this payment in the annual contribution.</p> <p>The variance between the actual contribution and the contribution requirement for a year is amortized over a five year period on a level dollar basis.</p>

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	January 1 through December 31
Plan Status:	Ongoing
Membership:	Any person employed by the County for whom the County is not obligated to collect and withhold FICA taxes. However, such persons shall not include: 1) an employed hired to relieve him from unemployment; 2) an employee of a hospital, home, or institution where he is an inmate; 3) an employee who is a temporary employee to handle fire, storm, snow, earthquake or similar emergencies; 4) an employee paid on a fee basis as self-employed; or 5) an employee who is a member of a collective bargaining unit covered by an agreement which does not provide for his inclusion.
Vesting Service:	One year of service is credited on and after January 1, 1992 for each plan year during which the employees is employed at any time. However, the employee shall no receive credit for any plan year in which the County is obligated to collected and withhold FICA taxes. If, during such plan year, FICA taxes are withheld for only a portion of the year, the employees shall receive a pro rata credit for the portion of the year worked when no FICA taxes are withheld.
Benefit Service:	Same as vesting service.
Compensation:	Earnable compensation shall include the compensation earned during the period for which no FICA tax was withheld, exclusive of any amounts reimbursed for moving expenses. However, such compensation shall be limited to the Social Security taxable wage base for the plan year.
Final Average Salary (FAS):	Final average salary means the average of the total earnings accumulated during the plan years of employment with the County, with the exception of years prior to January 1, 1992.
Normal Retirement Eligibility:	Age 65
Normal Retirement Amount:	2% of the member's average compensation multiplied by years of service (not in excess of 30)
Deferred Vested Benefit	Upon termination of employment, a member is eligible for a deferred vested pension commencing at age 65. Such benefit shall be calculated the same as for normal retirement, considering average compensation and service termination.

Section 6: Additional Summary Tables of Member Data

TABLE 1 – SUMMARY OF MEMBERSHIP DATA AS OF JANUARY 1, 2018

Active Participants

	General Employees
Number of Participants	288
Average Annual Salaries*	\$11,396
Average Age	32.0
Average Service	4.2

* The salaries shown in the table above represent a rate of pay increased by the salary assumption

Inactive Participants

	Count	Annual Annuities	Average Annuities	Average Future Lump Sum
Participants with Deferred Benefits	5,371	\$1,141,153	212	116
Retired Participants	53	115,541	2,180	-
Total	5,424	\$1,256,695	232	

TABLE 2 – FIVE-YEAR HISTORY OF MEMBERSHIP DATA

Active Participants

Valuation as of January 1	Number of Active Participants	Percentage Change in Membership	Total Annual Payroll	Percentage Change in Payroll
2018	288	(18.64%)	\$3,282,100	(9.84%)
2017	354	(8.29%)	3,640,233	(7.28%)
2016	386	(2.03%)	3,926,027	0.02%
2015	394	20.86%	3,925,214	12.86%
2014	326	(74.87%)	3,477,968	(55.04%)

Retired Participants

Valuation as of January 1	Number on roll	Net Change	Percentage Change in Membership	Annual Annuities	Percentage Change in Annuities
2018	53	(2)	(3.64%)	\$115,541	49.56%
2017	55	7	14.58%	77,252	8.33%
2016	48	1	2.13%	71,310	(16.16%)
2015	47	8	20.51%	85,058	28.01%
2014	39	10	35.71%	66,446	8.37%

**TABLE 3 – PARTICIPANTS IN ACTIVE SERVICE AS OF DECEMBER 31, 2017
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

Age	Total	Years of Creditable Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	126	102	24	--	--	--	--	--	--	--
	\$9,693	\$8,421	\$15,096	--	--	--	--	--	--	--
25 - 29	46	22	15	9	--	--	--	--	--	--
	16,073	13,675	--	--	--	--	--	--	--	--
30 - 34	26	15	4	4	3	--	--	--	--	--
	12,549	--	--	--	--	--	--	--	--	--
35 - 39	21	13	3	1	3	1	--	--	--	--
	12,344	--	--	--	--	--	--	--	--	--
40 - 44	10	10	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
45 - 49	14	14	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
50 - 54	16	12	1	2	--	1	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
55 - 59	13	8	--	2	1	1	1	--	--	--
	--	--	--	--	--	--	--	--	--	--
60 - 64	11	10	--	1	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 & over	5	3	2	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	288	209	49	19	7	3	1	--	--	--
	\$11,396	\$9,484	\$14,689	--	--	--	--	--	--	--

TABLE 4A – DETAILED TABULATIONS OF THE DATA

The Number and Annual Salaries of Members in Active Service Distributed by Age as of January 1, 2018

(Compensation in cells with fewer than 20 records has been suppressed)

Age	Men		Women		Total	
	Number	Compensation	Number	Compensation	Number	Compensation
16	2	--	3	--	5	--
17	6	--	3	--	9	--
18	10	--	3	--	13	--
19	11	--	6	--	17	--
20	7	--	5	--	12	--
21	18	--	5	--	23	\$268,392
22	10	--	9	--	19	--
23	9	--	8	--	17	--
24	6	--	5	--	11	--
25	5	--	4	--	9	--
26	10	--	2	--	12	--
27	7	--	2	--	9	--
28	3	--	6	--	9	--
29	4	--	3	--	7	--
30	5	--	3	--	8	--
31	5	--	1	--	6	--
32	3	--	3	--	6	--
33	4	--	--	--	4	--
34	1	--	1	--	2	--
35	1	--	3	--	4	--
36	2	--	3	--	5	--
37	3	--	1	--	4	--
38	3	--	5	--	8	--
40	1	--	--	--	1	--
41	3	--	--	--	3	--

Age	Men		Women		Total	
	Number	Compensation	Number	Compensation	Number	Compensation
42	1	--	--	--	1	--
43	2	--	1	--	3	--
44	2	--	--	--	2	--
45	2	--	--	--	2	--
46	3	--	--	--	3	--
47	3	--	3	--	6	--
48	1	--	--	--	1	--
49	1	--	1	--	2	--
50	2	--	4	--	6	--
51	1	--	1	--	2	--
52	3	--	--	--	3	--
53	1	--	1	--	2	--
54	1	--	2	--	3	--
55	1	--	--	--	1	--
56	3	--	1	--	4	--
57	2	--	4	--	6	--
58	1	--	--	--	1	--
59	1	--	--	--	1	--
60	3	--	1	--	4	--
61	2	--	4	--	6	--
63	--	--	1	--	1	--
69	4	--	--	--	4	--
77	--	--	1	--	1	--
Total	179	\$1,915,008	109	\$1,367,092	288	\$3,282,100

TABLE 4B – DETAILED TABULATIONS OF THE DATA

The Number and Annual Salaries of Members in Active Service Distributed by Years of Service as of January 1, 2018

(Compensation in cells with fewer than 20 records has been suppressed)

Service	Men		Women		Total	
	Number	Compensation	Number	Compensation	Number	Compensation
0	2	--	2	--	4	--
1	44	\$243,076	28	\$147,259	72	\$390,335
2	37	400,580	19	--	56	667,239
3	28	293,401	16	--	44	509,242
4	23	286,390	10	--	33	388,690
5	7	--	11	--	18	--
6	7	--	6	--	13	--
7	3	--	6	--	9	--
8	2	--	1	--	3	--
9	4	--	2	--	6	--
10	5	--	1	--	6	--
11	5	--	1	--	6	--
12	3	--	1	--	4	--
13	1	--	--	--	1	--
14	2	--	--	--	2	--
15	1	--	1	--	2	--
16	1	--	--	--	1	--
17	2	--	1	--	3	--
19	--	--	1	--	1	--
20	1	--	--	--	1	--
21	1	--	--	--	1	--
23	--	--	1	--	1	--
26	--	--	1	--	1	--
Total	179	\$1,915,008	109	\$1,367,092	288	\$3,282,100

TABLE 4C – DETAILED TABULATIONS OF THE DATA

The Number and Annual Benefits Payable to Participants with Deferred Benefits Distributed by Age as of January 1, 2018

Age	Men		Women		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
17	27	\$668	26	\$567	53	\$1,235
18	94	27,555	74	9,587	168	37,142
19	110	13,916	85	11,902	195	25,818
20	124	7,898	109	5,903	233	13,801
21	168	10,407	128	5,783	296	16,190
22	165	9,308	147	3,059	312	12,367
23	164	6,589	146	4,853	310	11,442
24	176	8,825	149	1,298	325	10,123
25	230	9,010	175	4,106	405	13,116
26	234	9,192	197	5,741	431	14,933
27	209	5,775	161	4,638	370	10,413
28	183	3,376	131	951	314	4,327
29	120	3,969	109	4,906	229	8,875
30	103	9,714	66	1,676	169	11,390
31	84	12,478	61	12,645	145	25,123
32	63	14,312	35	2,779	98	17,091
33	40	4,466	45	4,676	85	9,142
34	52	17,309	29	2,393	81	19,702
35	42	15,577	38	7,194	80	22,771
36	26	8,705	25	8,947	51	17,652
37	34	11,111	20	6,518	54	17,629
38	34	15,198	16	5,522	50	20,720
39	23	11,570	17	9,650	40	21,220
40	16	11,070	21	7,909	37	18,979
41	28	25,911	17	5,259	45	31,170
42	35	27,182	12	18,549	47	45,731
43	25	16,581	12	7,894	37	24,475
44	18	14,673	18	15,838	36	30,511

Age	Men		Women		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
45	18	22,394	12	8,163	30	30,557
46	18	16,526	11	12,790	29	29,316
47	26	14,891	13	15,490	39	30,381
48	18	11,876	11	8,509	29	20,385
49	23	13,615	12	4,128	35	17,743
50	16	10,036	14	13,372	30	23,408
51	17	3,538	11	13,644	28	17,182
52	15	11,937	10	9,551	25	21,488
53	18	5,643	15	21,312	33	26,955
54	23	31,139	10	3,133	33	34,272
55	20	16,752	6	6,292	26	23,044
56	16	12,519	13	7,436	29	19,955
57	26	13,199	9	5,520	35	18,719
58	20	16,467	15	16,169	35	32,636
59	14	19,389	9	5,802	23	25,191
60	13	7,724	10	8,018	23	15,742
61	17	23,858	10	8,424	27	32,282
62	18	14,997	6	7,977	24	22,974
63	24	23,408	5	4,856	29	28,264
64	15	16,601	6	3,392	21	19,993
65	11	12,119	4	2,221	15	14,340
66	7	5,004	1	2,400	8	7,404
67	5	6,276	6	9,619	11	15,895
68	8	16,804	3	7,200	11	24,004
69	6	15,094	4	7,232	10	22,326
70	5	7,922	3	6,244	8	14,166
71	6	7,449	1	2,400	7	9,849
72	2	2,404	1	2,400	3	4,804
73	4	6,726	1	2,400	5	9,126
74	1	2,400	1	2,400	2	4,800
75	1	26	1	1,354	2	1,380
76	1	13	--	--	1	13

Age	Men		Women		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
77	1	2,585	--	--	1	2,585
78	--	--	1	2,400	1	2,400
82	3	2,456	--	--	3	2,456
84	1	52	--	--	1	52
86	1	1	--	--	1	1
87	--	--	1	5	1	5
89	1	2,400	--	--	1	2,400
Total	3,066	\$728,585	2,305	\$412,996	5,371	\$1,141,581

TABLE 4D – DETAILED TABULATIONS OF THE DATA

The Number and Annual Benefits Payable to Members Receiving Benefits Distributed by Age as of January 1, 2018

Age	Men		Women		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
58	1	\$4,416	--	--	1	\$4,416
60	--	--	1	\$1,721	1	1,721
62	1	4,416	--	--	1	4,416
65	1	1,900	--	--	1	1,900
66	1	4,416	1	88	2	4,504
67	5	9,979	1	4,416	6	14,395
68	6	7,416	2	9,708	8	17,124
69	4	8,410	2	2,751	6	11,161
70	3	6,754	3	6,458	6	13,212
71	3	8,290	3	5,962	6	14,252
72	4	9,108	--	--	4	9,108
73	1	2,077	1	829	2	2,906
74	2	2,046	1	691	3	2,737
75	1	1,349	1	967	2	2,316
76	1	4,416	--	--	1	4,416
77	1	1,585	--	--	1	1,585
78	1	975	--	--	1	975
88	1	4,416	--	--	1	4,416
Total	37	81,969	16	\$33,591	53	\$115,560