

# Ohio Public Employees Retirement System

Actuarial Valuation Of Defined Benefit Allowances –  
Traditional, Combined And Member Directed Plans  
December 31, 2017



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August 27, 2018

The Retirement Board  
Ohio Public Employees Retirement System  
Columbus, Ohio

Ladies and Gentlemen:

The results of the **December 31, 2017 Annual Actuarial Valuation of Defined Benefit Allowances** of the Ohio Public Employees Retirement System (OPERS), based upon Chapter 145 of the Code as amended, are presented in this report. The gain/loss analysis of experience by division, the annual actuarial valuation of retiree health and Medicare benefits, projections of defined benefit allowances and projections of retiree health and Medicare benefits are covered in separate reports. The purposes of the valuation are as follows:

- Measure the financial position of OPERS,
- Assist the Board in establishing employer and employee contribution rates necessary to fund the pension defined benefits provided by OPERS,
- Determine the number of years required to amortize the unfunded actuarial accrued liabilities based upon established contribution rates,
- Provide actuarial reporting and disclosure information for the System's financial report; and
- Analyze the experience of the System over the past year.

This report should not be relied on for any purpose other than those described above. It was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The signing actuaries are independent of the plan sponsor.

The individual member statistical data required for the valuations was furnished by your Executive Director and Staff, together with pertinent data on financial operations. Their cooperation in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data.

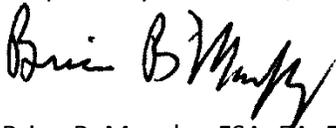
Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

The actuarial assumptions used in the valuations are summarized in Section X of this report. The assumptions are established by the Retirement Board after consulting with the actuary.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the Ohio Public Employees Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Brian B. Murphy and Mita D. Drazilov are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Mita D. Drazilov, ASA, FCA, MAAA

BBM/MDD:bd



## **SECTION I**

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### **EXECUTIVE SUMMARY**

# Introduction

Section 145.22 of the Revised Code of Ohio (ORC) provides in part as follows:

“(A) The public employees retirement board shall have prepared annually by or under the supervision of an actuary an actuarial valuation of the pension assets, liabilities, and funding requirements of the public employees retirement system as established pursuant to this chapter.”

This report presents the results of the December 31, 2017 annual actuarial valuation of the Ohio Public Employees Retirement System (OPERS) Defined Benefit Allowances of the Traditional, Combined and Member Directed Plans. In conjunction with Chapter 145 of the ORC, the purposes of performing the annual valuation are as follows:

- Measure the financial position of OPERS,
- Assist the Board in establishing employer and employee contribution rates necessary to fund the pension defined benefits provided by OPERS,
- Determine the number of years required to amortize the unfunded actuarial accrued liabilities based upon established contribution rates,
- Provide actuarial reporting and disclosure information for the System’s financial report; and
- Analyze the experience of the System over the past year.

The report is presented as follows:

Section I	-	Executive Summary
Section II	-	Financial Information
Section III	-	Benefits and Conditions Evaluated
Section IV	-	Recommendations for Reserve Transfers
Section V	-	Active and Inactive Vested Valuation Results for State
Section VI	-	Active and Inactive Vested Valuation Results for Local Government
Section VII	-	Active and Inactive Vested Valuation Results for Public Safety
Section VIII	-	Active and Inactive Vested Valuation Results for Law Enforcement
Section IX	-	Allowances Being Paid to Retirees and Beneficiaries
Section X	-	Actuarial Methods and Assumptions
Section XI	-	Financial Principles
Section XII	-	Governmental Accounting Standards Board (GASB) Reporting

There have been no significant benefit changes since the last valuation. Please see Section III for a detailed description of the benefit provisions.

A summary of the primary valuation results as of December 31, 2017 are presented on the following pages.

# Summary of Pension Defined Benefit Valuation Results

## Traditional, Combined, and Member Directed Plans

### December 31

#### (\$ in Millions)

	2017						2016	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
<b>A. Demographic Information</b>								
1. Active Number Counts								
a. Traditional Plan	118,280	196,924	315,204	75	8,039	8,114	323,318	323,179
b. Combined Plan	2,919	5,029	7,948	0	0	0	7,948	7,803
c. Total	121,199	201,953	323,152	75	8,039	8,114	331,266	330,982
2. Active Payroll								
a. Traditional Plan	\$ 5,112	\$ 7,684	\$ 12,796	\$ 4	\$ 528	\$ 532	\$ 13,328	\$ 13,046
b. Combined Plan	173	245	419	0	0	0	419	400
c. Total	\$ 5,285	\$ 7,929	\$ 13,214	\$ 4	\$ 528	\$ 532	\$ 13,746	\$ 13,446
3. Retired Number Counts	74,208	137,409	211,617	186	5,175	5,361	216,978	214,167
4. Deferred/Inactive Number Counts	244,038	300,691	544,729	43	1,022	1,065	545,794	524,439
5. Member Directed Active Number Counts	4,217	7,465	11,682	0	0	0	11,682	11,497
6. Total Number Counts	443,662	647,518	1,091,180	304	14,236	14,540	1,105,720	1,081,085
<b>B. Defined Benefit Assets</b>								
1. Market Value (MV)	\$ 33,422	\$ 49,621	\$ 83,043	\$ 43	\$ 4,019	\$ 4,062	\$ 87,105	\$ 77,514
2. Rate of Return on MV							16.71 %	8.22 %
3. Funding Value (FV)	\$ 31,959	\$ 47,449	\$ 79,408	\$ 41	\$ 3,843	\$ 3,884	\$ 83,292	\$ 80,280
4. Rate of Return on FV							7.76 %	6.89 %
5. Ratio of FV to MV							95.6%	103.6%
<b>C. Defined Benefit Actuarial Results</b>								
1. Normal Cost as a % of Payroll	13.68%	13.53%	13.60%	17.42%	19.79%	19.79%	13.83%	13.80%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 13,172	\$ 20,028	\$ 33,199	\$ 8	\$ 1,835	\$ 1,843	\$ 35,043	\$ 34,673
b. Retired	26,062	36,177	62,239	50	2,585	2,635	64,874	62,830
c. Deferred/Inactive	1,127	1,576	2,703	1	35	36	2,739	2,664
d. Total	\$ 40,360	\$ 57,781	\$ 98,141	\$ 59	\$ 4,456	\$ 4,515	\$102,656	\$ 100,167
3. Unfunded AAL (UAAL) (FV Basis)	\$ 8,401	\$ 10,332	\$ 18,733	\$ 18	\$ 613	\$ 631	\$ 19,364	\$ 19,887
4. Unfunded AAL (UAAL) (MV Basis)	\$ 6,938	\$ 8,160	\$ 15,098	\$ 16	\$ 437	\$ 453	\$ 15,551	\$ 22,653
5. Funded Ratio (FV Basis)	79.2 %	82.1 %	80.9 %	69.2 %	86.3 %	86.0 %	81.1 %	80.1 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>	<b>23</b>	<b>16</b>	<b>18</b>	<b>N/A</b>	<b>12</b>	<b>12</b>	<b>18</b>	<b>19</b>
<b>E. Contribution Rates</b>								
	CY 2020						CY 2019	
1. Pension Contributions								
a. Employer Normal Cost	4.07%	3.89%	3.97%	5.42%	6.79%	6.80%	4.07%	4.04%
b. Member Contribution Rate #	9.61%	9.64%	9.63%	12.00%	13.00%	12.99%	9.76%	9.76%
c. UAAL Contribution Rate	9.93%	10.11%	10.03%	12.68%	11.31%	11.30%	10.09%	10.12%
d. Total	23.61%	23.64%	23.63%	30.10%	31.10%	31.09%	23.92%	23.92%
2. Retiree Health Contribution Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3. Total Employer Contribution Rate	14.00%	14.00%	14.00%	18.10%	18.10%	18.10%	14.16%	14.16%

\* Based on i) schedule of employer and member contribution rates shown on page III-3. For the 2017 results, the amortization years shown are from December 31, 2018. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2020. See page XII-10 for additional explanation, and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions.

# 2016 and 2017 results reflect 0% for Combined Plan members.

# Summary of Pension Defined Benefit Valuation Results

## Traditional Plan

### December 31

#### (\$ in Millions)

	2017						2016	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
<b>A. Demographic Information</b>								
1. Active Number Counts	118,280	196,924	315,204	75	8,039	8,114	323,318	323,179
2. Active Payroll	\$ 5,112	\$ 7,684	\$ 12,796	\$ 4	\$ 528	\$ 532	\$ 13,328	\$ 13,046
3. Retired Number Counts	74,014	136,885	210,899	186	5,175	5,361	216,260	213,550
4. Deferred/Inactive Number Counts	243,264	299,653	542,917	43	1,022	1,065	543,982	522,713
5. Total Number Counts	435,558	633,462	1,069,020	304	14,236	14,540	1,083,560	1,059,442
<b>B. Defined Benefit Assets</b>								
1. Market Value (MV)	\$ 33,210	\$ 49,314	\$ 82,524	\$ 43	\$ 4,019	\$ 4,062	\$ 86,586	\$ 77,110
2. Rate of Return on MV							16.71 %	8.22 %
3. Funding Value (FV)	\$ 31,757	\$ 47,156	\$ 78,913	\$ 41	\$ 3,843	\$ 3,884	\$ 82,797	\$ 79,865
4. Rate of Return on FV							7.76 %	6.89 %
5. Ratio of FV to MV							95.6%	103.6%
<b>C. Defined Benefit Actuarial Results</b>								
1. Normal Cost as a % of Payroll	13.90%	13.73%	13.81%	17.42%	19.79%	19.79%	14.04%	14.01%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 13,032	\$ 19,840	\$ 32,873	\$ 8	\$ 1,835	\$ 1,843	\$ 34,716	\$ 34,370
b. Retired	26,048	36,151	62,199	50	2,585	2,635	64,834	62,798
c. Deferred/Inactive	1,120	1,567	2,687	1	35	36	2,723	2,650
d. Total	\$ 40,200	\$ 57,559	\$ 97,759	\$ 59	\$ 4,456	\$ 4,515	\$ 102,274	\$ 99,818
3. Unfunded AAL (UAAL) (FV Basis)	\$ 8,443	\$ 10,403	\$ 18,846	\$ 18	\$ 613	\$ 631	\$ 19,477	\$ 19,953
4. Unfunded AAL (UAAL) (MV Basis)	\$ 6,990	\$ 8,245	\$ 15,235	\$ 16	\$ 437	\$ 453	\$ 15,688	\$ 22,708
5. Funded Ratio (FV Basis)	79.0 %	81.9 %	80.7 %	69.2 %	86.3 %	86.0 %	81.0 %	80.0 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>	<b>23</b>	<b>16</b>	<b>19</b>	<b>N/A</b>	<b>12</b>	<b>12</b>	<b>19</b>	<b>20</b>
<b>E. Contribution Rates</b>								
	CY 2020						CY 2019	
1. Pension Contributions								
a. Employer Normal Cost	3.90%	3.73%	3.81%	5.42%	6.79%	6.80%	3.92%	3.89%
b. Member Contribution Rate	10.00%	10.00%	10.00%	12.00%	13.00%	12.99%	10.12%	10.12%
c. UAAL Contribution Rate	10.10%	10.27%	10.19%	12.68%	11.31%	11.30%	10.25%	10.28%
d. Total	24.00%	24.00%	24.00%	30.10%	31.10%	31.09%	24.29%	24.29%
2. Retiree Health Contribution Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3. Total Employer Contribution Rate	14.00%	14.00%	14.00%	18.10%	18.10%	18.10%	14.17%	14.17%

\* Based on i) schedule of employer and member contribution rates shown on page III-3. For the 2017 results, the amortization years shown are from December 31, 2018. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2020. See page XII-10 for additional explanation, and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions.

# Summary of Pension Defined Benefit Valuation Results

## Combined Plan

### December 31

#### (\$ in Millions)

	2017			2016
	General		Grand Total	Grand Total
	State	Local		
<b>A. Demographic Information</b>				
1. Active Number Counts	2,919	5,029	7,948	7,803
2. Active Payroll	\$ 173	\$ 245	\$ 419	\$ 400
3. Retired Number Counts	128	348	476	398
4. Deferred/Inactive Number Counts	774	1,038	1,812	1,726
5. Total Number Counts	3,821	6,415	10,236	9,927
<b>B. Defined Benefit Assets</b>				
1. Market Value (MV)	\$ 205	\$ 296	\$ 501	\$ 392
2. Rate of Return on MV			16.65 %	8.23 %
3. Funding Value (FV)	\$ 196	\$ 283	\$ 479	\$ 402
4. Rate of Return on FV			8.44 %	6.94 %
5. Ratio of FV to MV			96%	103%
<b>C. Defined Benefit Actuarial Results</b>				
1. Normal Cost as a % of Payroll	7.13%	7.27%	7.22%	7.39%
2. Actuarial Accrued Liability (AAL)				
a. Active	\$ 139	\$ 187	\$ 326	\$ 304
b. Retired	8	16	23	18
c. Deferred/Inactive	7	8	16	14
d. Total	\$ 154	\$ 211	\$ 365	\$ 336
3. Unfunded AAL (UAAL) (FV Basis)	\$ (42)	\$ (71)	\$ (113)	\$ (66)
4. Unfunded AAL (UAAL) (MV Basis)	\$ (51)	\$ (85)	\$ (136)	\$ (56)
5. Funded Ratio (FV Basis)	127.2 %	133.7 %	131.0 %	119.6 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>				
	0	0	0	0
<b>E. Contribution Rates</b>				
	CY 2020		CY 2019	
1. Total Normal Cost	7.13%	7.27%	7.22%	7.39%
2. Member Contribution Rate	0.00%	0.00%	0.00%	0.00%
3. Employer Normal Cost	7.13%	7.27%	7.22%	7.39%
4. Other Contributions #	6.87%	6.73%	6.78%	6.61%
5. Total Employer Contribution Rate	14.00%	14.00%	14.00%	14.00%

\* Based on i) schedule of employer and member contribution rates shown on page III-3. For the 2017 results, the amortization years shown are from December 31, 2018. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2020. See page XII-10 for additional explanation, and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions.

# Other contributions include: amortization payments for the pension UAAL, mitigating contributions, and contributions to the retiree health care fund.

# Summary of Pension Defined Benefit Valuation Results

## Member Directed Plan

### December 31

	2017			2016	
	General		Total General	Grand Total	Grand Total
	State	Local			
<b>A. Demographic Information</b>					
1. Active Number Counts	4,217	7,465	11,682	11,682	11,497
2. Retired Number Counts	66	176	242	242	219
3. Deferred / Inactive Number Counts	0	0	0	0	0
4. Total Number Counts	4,283	7,641	11,924	11,924	11,716
<b>B. Defined Benefit Assets</b>					
1. Market Value (MV)	\$ 6,457,301	\$ 11,301,707	\$ 17,759,008	\$ 17,759,008	\$ 12,665,279
2. Rate of Return on MV				18.32 %	8.57 %
3. Funding Value (FV)	\$ 6,097,706	\$ 10,672,335	\$ 16,770,041	\$ 16,770,041	\$ 12,961,105
4. Rate of Return on FV				8.91 %	6.67 %
5. Ratio of FV to MV				94.4%	102.3%
<b>C. Defined Benefit Actuarial Results</b>					
1. Normal Cost as a % of Payroll					
2. Actuarial Accrued Liability (AAL)					
a. Active	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
b. Retired	6,097,706	10,672,335	16,770,041	16,770,041	12,961,105
c. Deferred/Inactive	0	0	0	0	0
d. Total	6,097,706	10,672,335	16,770,041	16,770,041	12,961,105
3. Unfunded AAL (UAAL) (FV Basis)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
4. Unfunded AAL (UAAL) (MV Basis)	\$ (359,595)	\$ (629,372)	\$ (988,967)	\$ (988,967)	\$ 295,826
5. Funded Ratio (FV Basis)				100.0 %	100.0 %

## Comments and Conclusion

**The December 31, 2017 actuarial valuations of members indicate** the following about the portion of employer contribution rates allocated to financing retirement allowances:

- The employer rates are sufficient to fully fund the cost of benefit commitments being made to members for service currently being rendered.
- After satisfying current cost requirements, the remaining portion of the employer rates provides sufficient funds to amortize unfunded actuarial accrued liabilities over a period of 18 years for the System in total.

**Experience.** The computed amortization period, taking into account all scheduled increases in contribution rates (currently none), is 18 years compared with the 19-year period that had been reported in the December 31, 2016 valuation. In aggregate, experience was near expectations during the 2017 calendar year. Primary factors which typically would contribute to changes in the amortization years were:

- Measured on a funding value basis, investment return was 7.76%. This figure is based upon an actuarial calculation and may not agree with figures reported elsewhere. The return on the funding value was significantly lower than 2017 market experience due to continued partial recognition of the overall net market loss during 2015. Since the return on funding value of assets was greater than the 7.50% assumed return, there was a slight downward pressure to the amortization period.
- The number of members to leave active membership as a result of retirement, disability, and death-in-service were less than expected during calendar year 2017 resulting in an overall liability gain, placing downward pressure on the amortization period.
- The number of retiree deaths was higher than expected during calendar year 2017 resulting in liability gain, placing downward pressure on the amortization period.

Information concerning 2017 experience including other sources of gains and losses is presented on pages I-15 through I-17.

**Conclusion.** Based on the results of the December 31, 2017 regular annual actuarial valuation, it is our opinion that the Ohio Public Employees Retirement System continues to operate in accordance with actuarial principles of level percent of payroll financing.

## Other Observations

### General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), it is expected that:

- (1) The employer normal cost as a percentage of pay will decrease to the level of the Group C normal cost as time passes as the majority of the active population is comprised of Group C members,
- (2) The unfunded actuarial accrued liabilities will be fully amortized after 18 years, and
- (3) The funded status of the plan will increase gradually towards a 100% funded ratio.

When selecting a contribution allocation procedure, the following three items should be considered, including the balance amongst the three items: (1) benefit security, (2) intergenerational equity, and (3) contribution stability and predictability. Generally, given the nature of public employee retirement systems (e.g., level contribution financing objective and perceived ongoing nature of the plan or plan sponsor), intergenerational equity and contribution stability and predictability have received more consideration than benefit security when contribution allocation procedures are selected. However, given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

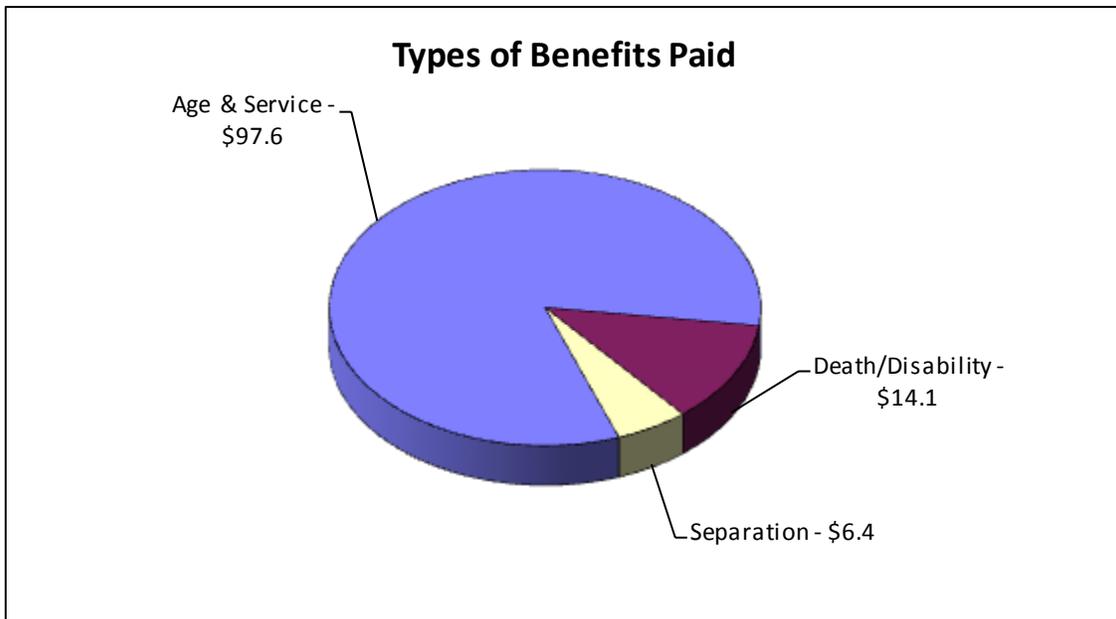
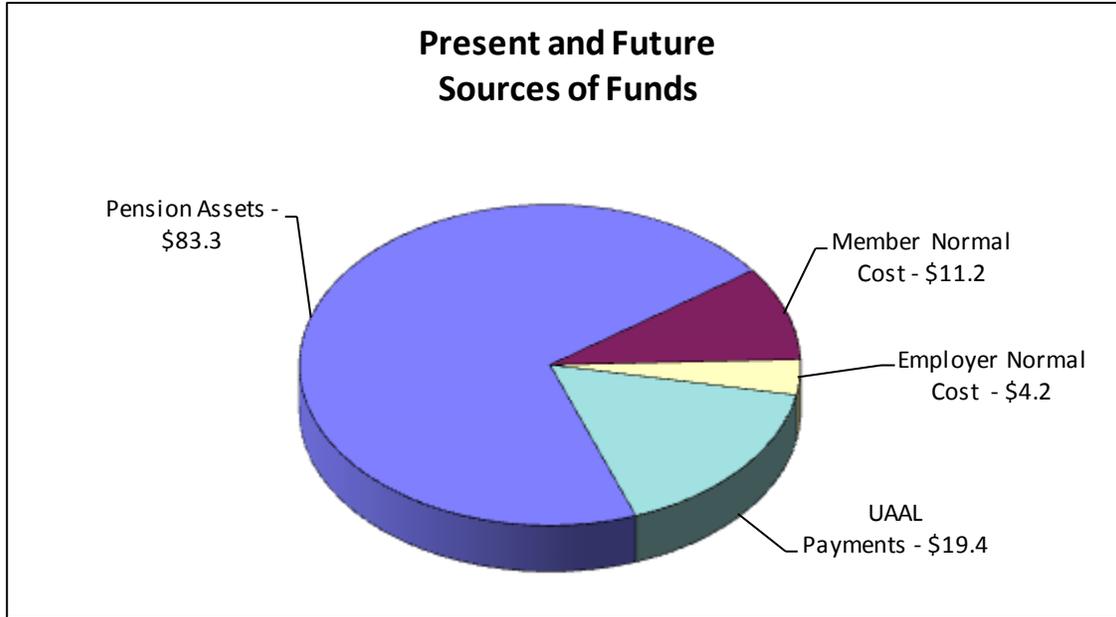
This valuation assumes the continuing ability of the System to make the contributions necessary to fund the System. A determination regarding whether or not the System is actually able to do so is outside our scope of expertise and was not performed.

### Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, for transferring the obligations to an unrelated third party (e.g., insurance company) in a market value type transaction. In addition, the measurement is inappropriate for assessing benefit security for the membership.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

# Financing \$118.1 Billion\* of Defined Benefit Promises for Present Active and Retired Members December 31, 2017 (Dollar Amounts in Billions)



\* Present value of future benefits – all divisions combined.

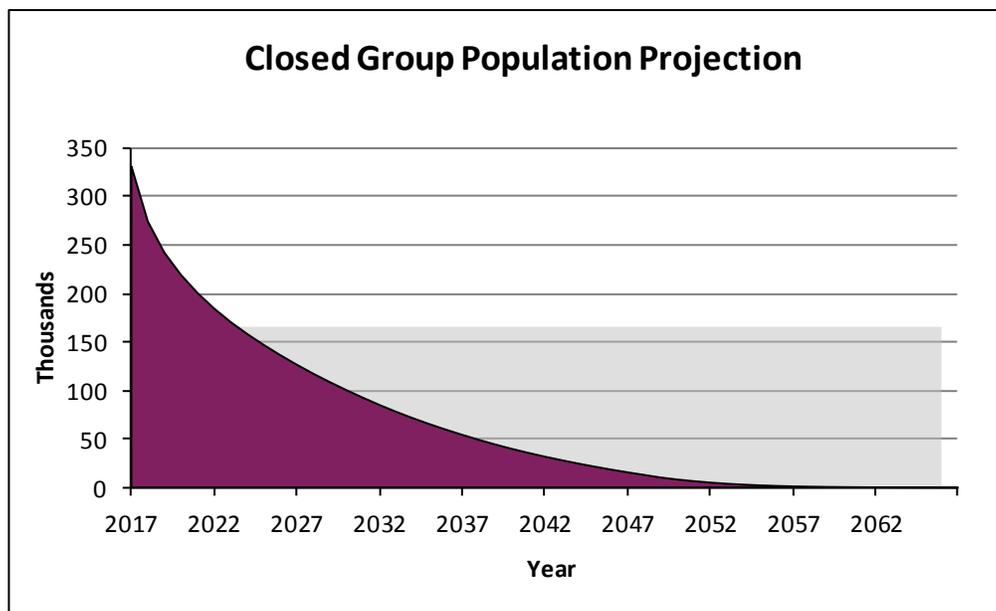
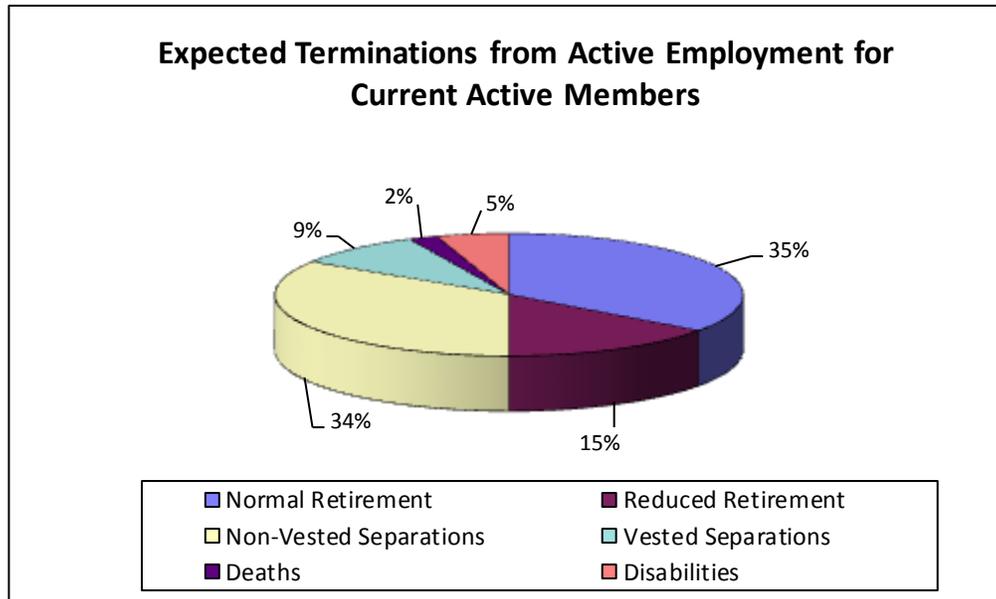
## Defined Benefit Active Members in Valuation Group Averages - Comparative Statement

Valuation Group	Dec. 31	No. of Active Members	Group Averages				
			Attained Age	Accrued Service Yrs.	Annual Payroll		
					Average	Increase	
STATE	1975	83,220	40.6 yrs.	6.5 yrs.	\$ 9,441	6.4 %	@
	1980	92,872	39.4	7.3	13,934	8.1 %	@
	1985	89,256	39.2	8.4	18,677	6.0 %	@
	1990	98,939	40.7	8.1	25,281	6.2 %	@
	1995	114,596	40.4	8.8	27,962	2.0 %	@
	2000	113,099	41.6	9.7	34,201	4.1 %	@
	2005	114,620	42.0	10.1	37,858	2.1 %	@
	2010	118,240	41.0	9.6	40,691	1.5 %	@
	2015	118,372	39.9	8.9	41,911	0.6 %	@
	2017	121,199	39.5	8.6	43,610	1.3 %	
LOCAL GOV'T	1975	149,557	40.8 yrs.	6.1 yrs.	8,771	4.3 %	@
	1980	160,797	40.7	7.4	13,035	8.2 %	@
	1985	158,285	40.1	8.3	15,983	4.2 %	@
	1990	173,220	41.5	7.9	19,506	4.1 %	@
	1995	223,431	41.2	7.6	20,384	0.9 %	@
	2000	245,831	41.8	8.1	24,401	3.7 %	@
	2005	236,073	43.3	9.2	29,933	4.2 %	@
	2010	215,144	44.6	10.1	33,447	2.2 %	@
	2015	202,779	44.4	10.0	37,008	2.0 %	@
	2017	201,953	44.4	9.9	39,263	2.6 %	
LAW * (Includes Public Safety and Law Enforcement)	1975	2,111	35.0 yrs.	4.9 yrs.	10,467	-	
	1980	3,019	36.1	6.8	16,846	10.0 %	@
	1985	4,207	36.5	8.4	20,103	3.6 %	@
	1990	5,804	38.6	9.9	26,936	6.0 %	@
	1995	6,605	39.3	11.1	32,441	3.8 %	@
	2000	8,045	39.3	11.7	40,387	4.5 %	@
	2005	8,111	39.9	12.6	49,472	4.1 %	@
	2010	7,790	41.2	14.0	56,801	2.8 %	@
	2015	7,858	41.3	14.2	61,710	1.7 %	@
	2017	8,114	41.2	14.1	65,522	1.7 %	
TOTAL	2005	358,804	42.8 yrs.	9.5 yrs.	32,906	3.5 %	@
	2010	341,174	43.3	10.0	36,491	2.1 %	@
	2015	329,009	42.7	9.7	39,362	1.5 %	@
	2016	330,982	42.7	9.6	40,624	3.2 %	
	2017	331,266	42.6	9.5	41,497	2.1 %	

@ 5-year annual compound rate.

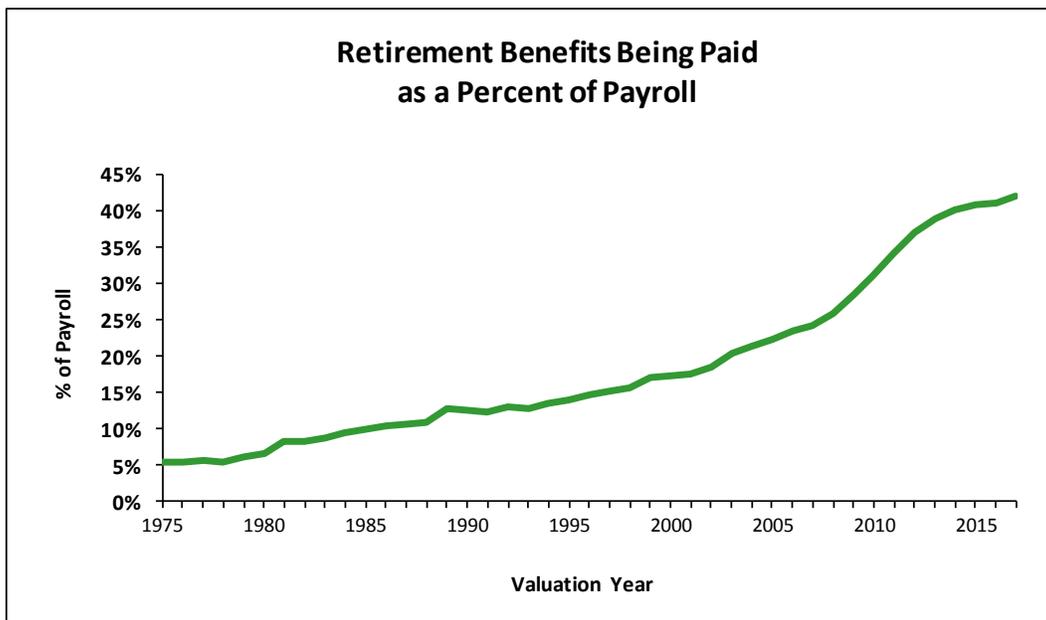
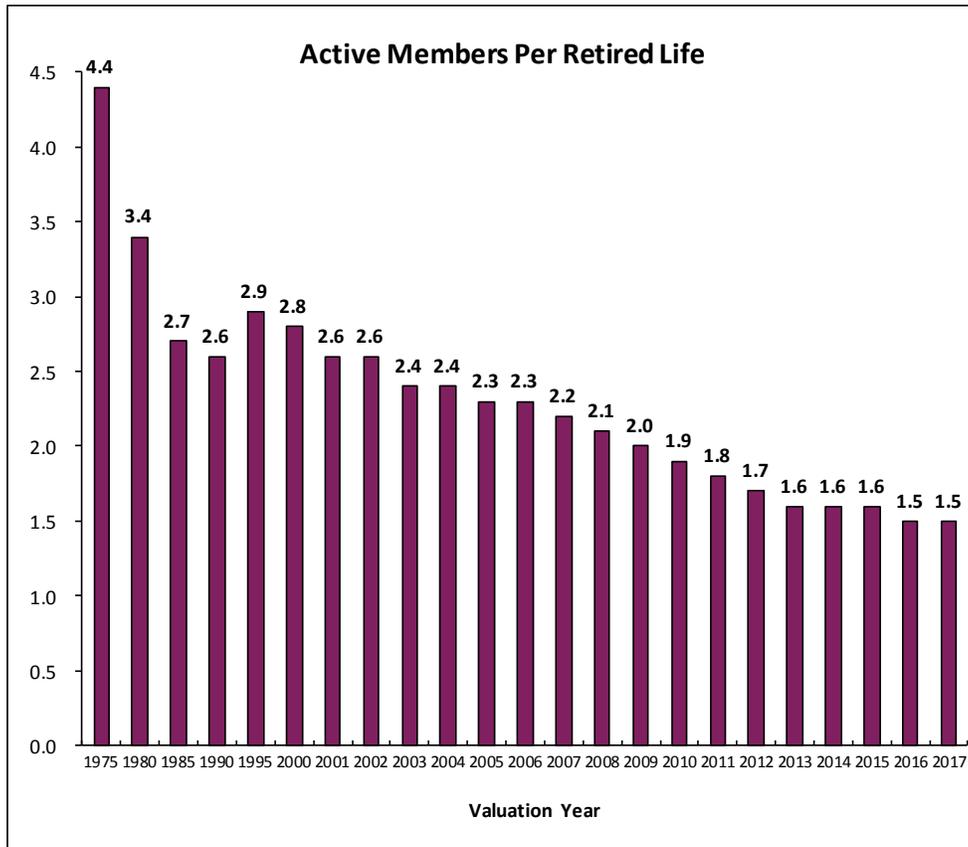
\* Beginning with the December 31, 2005 valuation report, valuation results for the Law division are shown separately for Public Safety and Law Enforcement.

## Development of Present Defined Benefit Population December 31, 2017

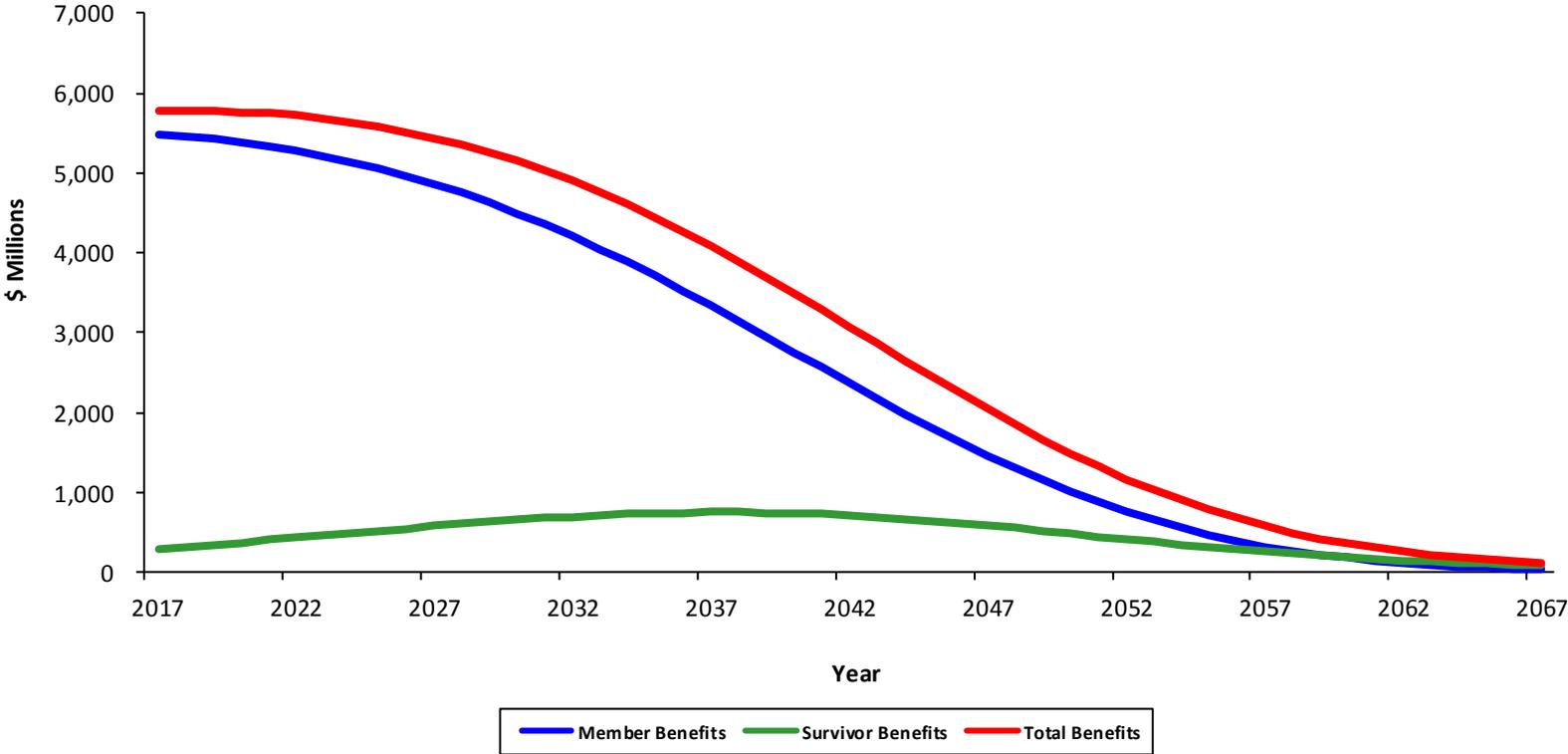


The charts above show the expected future development of the present population in simplified terms. The defined benefit portion of the Retirement System presently covers 331,266 active members. Eventually, 34% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for a monthly benefit. 59% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service without withdrawing contributions. 7% of the present population is expected to become eligible for death-in-service or disability benefits. Within 7 years, over half of the covered membership is expected to consist of new hires.

# Active/Retired Member Statistics December 31, 2017



# Projected Future Benefit Payments on Behalf of Present Retired Lives



Total future payments:	\$155.1 billion
From present assets:	\$ 64.9 billion
From future earnings:	\$ 90.2 billion

**All Divisions**  
**Defined Benefit Active Members in Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	12,075							12,075
Tot. Pay	\$114,407,322							\$114,407,322
Avg. Pay	\$9,475							\$9,475
20-24	38,529	202						38,731
Tot. Pay	\$571,814,465	\$5,634,807						\$577,449,272
Avg. Pay	\$14,841	\$27,895						\$14,909
25-29	26,748	3,855	159					30,762
Tot. Pay	\$824,632,746	\$167,888,622	\$6,582,689					\$999,104,057
Avg. Pay	\$30,830	\$43,551	\$41,401					\$32,479
30-34	18,047	8,327	3,254	158				29,786
Tot. Pay	\$634,407,894	\$410,498,433	\$169,398,733	\$7,540,227				\$1,221,845,287
Avg. Pay	\$35,153	\$49,297	\$52,059	\$47,723				\$41,021
35-39	12,989	6,474	7,545	3,197	164			30,369
Tot. Pay	\$472,714,308	\$325,541,513	\$423,201,964	\$182,554,049	\$8,894,296			\$1,412,906,130
Avg. Pay	\$36,393	\$50,284	\$56,090	\$57,102	\$54,234			\$46,525
40-44	10,173	5,107	5,877	6,975	2,469	109		30,710
Tot. Pay	\$360,824,256	\$257,966,262	\$334,563,138	\$428,302,758	\$150,656,514	\$6,143,297		\$1,538,456,225
Avg. Pay	\$35,469	\$50,512	\$56,928	\$61,405	\$61,019	\$56,361		\$50,096
45-49	10,044	5,269	5,646	6,789	7,074	2,886	92	37,800
Tot. Pay	\$349,657,551	\$255,724,604	\$311,608,085	\$406,550,760	\$460,812,178	\$189,545,060	\$5,571,411	\$1,979,469,649
Avg. Pay	\$34,813	\$48,534	\$55,191	\$59,884	\$65,142	\$65,677	\$60,559	\$52,367
50-54	8,327	4,725	5,265	5,905	5,905	6,476	1,778	38,381
Tot. Pay	\$274,687,251	\$219,037,383	\$272,763,318	\$334,945,336	\$371,150,842	\$437,109,490	\$122,658,137	\$2,032,351,757
Avg. Pay	\$32,988	\$46,357	\$51,807	\$56,722	\$62,854	\$67,497	\$68,987	\$52,952
55-59	7,191	4,318	5,150	5,916	5,533	5,810	3,364	37,282
Tot. Pay	\$220,679,801	\$186,471,243	\$253,200,162	\$314,643,750	\$317,296,397	\$377,420,748	\$239,807,191	\$1,909,519,292
Avg. Pay	\$30,688	\$43,185	\$49,165	\$53,185	\$57,346	\$64,961	\$71,286	\$51,218
60-64	5,112	3,255	3,936	4,692	4,218	3,900	2,461	27,574
Tot. Pay	\$130,630,006	\$132,353,284	\$185,507,490	\$237,450,930	\$234,439,241	\$238,663,958	\$169,763,753	\$1,328,808,662
Avg. Pay	\$25,554	\$40,662	\$47,131	\$50,608	\$55,581	\$61,196	\$68,982	\$48,191
65-69	2,965	1,446	1,525	1,661	1,429	1,333	1,094	11,453
Tot. Pay	\$49,074,008	\$48,369,632	\$67,354,025	\$81,003,201	\$75,799,381	\$78,508,070	\$76,030,036	\$476,138,353
Avg. Pay	\$16,551	\$33,451	\$44,167	\$48,768	\$53,044	\$58,896	\$69,497	\$41,573
70 & Over	2,389	1,068	870	630	513	413	460	6,343
Tot. Pay	\$28,969,347	\$18,916,618	\$21,800,850	\$21,469,669	\$20,387,142	\$19,352,307	\$25,122,195	\$156,018,128
Avg. Pay	\$12,126	\$17,712	\$25,058	\$34,079	\$39,741	\$46,858	\$54,613	\$24,597
<b>Totals</b>	154,589	44,046	39,227	35,923	27,305	20,927	9,249	331,266
<b>Tot. Pay</b>	\$4,032,498,955	\$2,028,402,401	\$2,045,980,454	\$2,014,460,680	\$1,639,435,991	\$1,346,742,930	\$638,952,723	\$13,746,474,134
<b>Avg. Pay</b>	\$26,085	\$46,052	\$52,157	\$56,077	\$60,042	\$64,354	\$69,083	\$41,497

**All Divisions**  
**Defined Benefit Active Members in Valuation**  
**December 31, 2017**  
**by Gender and Years of Service**

Service Years	Active Member Count			Active Member Pays	
	Males	Females	Total	Total	Average
0	34,071	39,405	73,476	\$ 1,248,046,891	\$16,986
1	13,509	16,373	29,882	866,689,203	29,004
2	9,476	11,641	21,117	727,843,945	34,467
3	7,485	8,579	16,064	616,033,859	38,349
4	6,591	7,459	14,050	573,885,057	40,846
5	5,482	6,505	11,987	525,276,833	43,821
6	4,613	4,794	9,407	426,913,686	45,383
7	3,910	4,290	8,200	387,175,649	47,217
8	3,370	3,306	6,676	314,693,174	47,138
9	3,484	4,292	7,776	374,343,059	48,141
10	4,087	4,699	8,786	437,857,135	49,836
11	4,034	4,668	8,702	452,440,425	51,993
12	3,600	4,274	7,874	407,763,366	51,786
13	3,324	3,900	7,224	385,940,668	53,425
14	3,195	3,446	6,641	361,978,860	54,507
15 & Up	44,936	48,468	93,404	5,639,592,324	60,378
<b>Totals</b>	<b>155,167</b>	<b>176,099</b>	<b>331,266</b>	<b>\$ 13,746,474,134</b>	<b>\$41,497</b>

## Summary of Pension Experience

### Traditional, Combined, and Member Directed Plans

(\$ in Millions)

	2017		2016	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Accrued Liabilities	\$ 100,167.12	100.0 %	\$ 97,176.83	100.0 %
2. Valuation Assets	80,279.74	80.1 %	78,060.95	80.3 %
3. Unfunded Actuarial Accrued Liabilities	\$ 19,887.38	19.9 %	\$ 19,115.88	19.7 %
<b>Experience Gains(Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$ 420.47	0.4 %	\$ (44.05)	0.0 %
b. Investment return	207.71	0.2 %	(469.94)	(0.5)%
c. Total	\$ 628.18	0.6 %	\$ (513.99)	(0.5)%
5. Gains (losses) from decrement experience				
a. Service retirement	62.43	0.1 %	55.63	0.1 %
b. Disability retirement	77.08	0.1 %	65.03	0.1 %
c. Death-in-service	35.93	0.0 %	42.19	0.0 %
d. Other separations	(7.21)	0.0 %	4.80	0.0 %
e. Total	\$ 168.23	0.2 %	\$ 167.65	0.2 %
6. Gains (losses) from retiree mortality	\$ 82.38	0.1 %	\$ 31.78	0.0 %
<b>7. Total experience gains (losses): (4c) + (5e) + (6)</b>	<b>\$ 878.79</b>	<b>0.9 %</b>	<b>\$ (314.56)</b>	<b>(0.3)%</b>
<b>End of Year</b>				
8. Total Actuarial Accrued Liabilities	\$ 102,656.14	100.0 %	\$ 100,167.12	100.0 %
9. Valuation Assets	83,292.23	81.1 %	80,279.74	80.1 %
10. Unfunded Actuarial Accrued Liabilities	\$ 19,363.91	18.9 %	\$ 19,887.38	19.9 %

## Summary of Pension Experience Traditional Plan (\$ in Millions)

	2017		2016	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Accrued Liabilities	\$ 99,817.93	100.0 %	\$ 96,863.38	100.0 %
2. Valuation Assets	79,864.58	80.0 %	77,699.90	80.2 %
3. Unfunded Actuarial Accrued Liabilities	\$ 19,953.35	20.0 %	\$ 19,163.48	19.8 %
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$ 410.58	0.4 %	\$ (48.14)	0.0 %
b. Investment return	203.52	0.2 %	(467.82)	(0.5)%
c. Total	614.10	0.6 %	(515.96)	(0.5)%
5. Gains (losses) from decrement experience				
a. Service retirement	62.21	0.1 %	55.57	0.1 %
b. Disability retirement	72.78	0.1 %	61.20	0.1 %
c. Death-in-service	35.98	0.0 %	41.25	0.0 %
d. Other separations	(6.05)	0.0 %	5.24	0.0 %
e. Total	\$ 164.92	0.2 %	\$ 163.26	0.2 %
6. Gains (losses) from retiree mortality	\$ 82.40	0.1 %	\$ 31.91	0.0 %
<b>7. Total experience gains (losses): (4c) + (5e) + (6)</b>	<b>\$ 861.42</b>	<b>0.9 %</b>	<b>\$ (320.79)</b>	<b>(0.3)%</b>
<b>End of Year</b>				
8. Total Actuarial Accrued Liabilities	\$ 102,273.91	100.0 %	\$ 99,817.93	100.0 %
9. Valuation Assets	82,796.83	81.0 %	79,864.58	80.0 %
10. Unfunded Actuarial Accrued Liabilities	\$ 19,477.08	19.0 %	\$ 19,953.35	20.0 %

## Summary of Pension Experience Combined Plan (\$ in Millions)

	2017		2016	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Accrued Liabilities	\$ 336.23	100.0 %	\$ 303.16	100.0 %
2. Valuation Assets	402.20	119.6 %	350.43	115.6 %
3. Unfunded Actuarial Accrued Liabilities	\$ (65.97)	(19.6)%	\$ (47.27)	(15.6)%
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$ 9.89	2.9 %	\$ 4.09	1.3 %
b. Investment return	3.99	1.2 %	(2.02)	(0.7)%
c. Total	13.88	4.1 %	2.07	0.6 %
5. Gains (losses) from decrement experience				
a. Service retirement	0.21	0.1 %	0.06	0.0 %
b. Disability retirement	4.30	1.3 %	3.82	1.3 %
c. Death-in-service	(0.04)	0.0 %	0.94	0.3 %
d. Other separations	(1.16)	(0.3)%	(0.44)	(0.1)%
e. Total	\$ 3.31	1.1 %	\$ 4.38	1.5 %
6. Gains (losses) from retiree mortality	\$ 0.02	0.0 %	\$ (0.03)	0.0 %
<b>7. Total experience gains (losses): (4c) + (5e) + (6)</b>	<b>\$ 17.21</b>	<b>5.2 %</b>	<b>\$ 6.42</b>	<b>2.1 %</b>
<b>End of Year</b>				
8. Total Actuarial Accrued Liabilities	\$ 365.46	100.0 %	\$ 336.23	100.0 %
9. Valuation Assets	478.63	131.0 %	402.20	119.6 %
10. Unfunded Actuarial Accrued Liabilities	\$ (113.17)	(31.0)%	\$ (65.97)	(19.6)%

# Summary of Risk Measures

## Traditional Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2008	75 %	67 %	30	1.4	4.4	5.8	33 %
2009	75	75	30	1.5	4.7	6.2	47
2010	79	79	25	1.4	5.2	6.6	56
2011	77	73	30	1.6	5.4	7.0	57
2012	81	81	26	1.3	5.7	7.0	74
2013	82	86	25	1.3	5.9	7.2	80
2014	84	86	21	1.2	6.1	7.2	83
2015	80	77	20	1.5	6.2	7.7	83
2016	80	77	20	1.5	6.1	7.7	72
2017	81	85	19	1.5	6.2	7.7	78

## Combined Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2008	71 %	63 %	4	0.1	0.3	0.5	2 %
2009	74	70	3	0.1	0.4	0.6	4
2010	76	75	3	0.2	0.5	0.6	5
2011	79	75	2	0.1	0.5	0.7	6
2012	86	87	1	0.1	0.6	0.7	8
2013	100	105	0	0.0	0.7	0.7	9
2014	111	115	0	-0.1	0.8	0.7	11
2015	116	111	0	-0.1	0.9	0.8	13
2016	120	117	0	-0.2	1.0	0.8	12
2017	131	137	0	-0.3	1.1	0.9	14

## DB Portion of Member Directed Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2008	89 %	79 %	N/A	0.0	0.0	0.0	N/A
2009	81	82	N/A	0.0	0.0	0.0	N/A
2010	92	92	N/A	0.0	0.0	0.0	N/A
2011	99	95	N/A	0.0	0.0	0.0	N/A
2012	95	97	N/A	0.0	0.0	0.0	N/A
2013	99	103	N/A	0.0	0.0	0.0	N/A
2014	106	107	N/A	0.0	0.0	0.0	N/A
2015	103	99	N/A	0.0	0.0	0.0	N/A
2016	100	98	N/A	0.0	0.0	0.0	N/A
2017	100	106	N/A	0.0	0.0	0.0	N/A

## **SECTION II**

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### **FINANCIAL INFORMATION**

# Financial Data for Calendar Year 2017

## Consolidated Asset Reconciliation

### All Plans, All Divisions

	Traditional Pension Plan	DB Portion of Combined Pension Plan	DB Portion of Member- Directed Plan	2017 Total Defined Pension Benefit	Total Health Care	DC Portion of Combined Pension Plan	DC Portion of Member Directed	2017 Total Defined Contribution	Total 2017
Beginning Market Value @ 12/31/16									
Assets Held in Trust for Benefits	\$ 76,986,628,289	\$ 391,845,583	\$ 12,664,364	\$ 77,391,138,236	\$ 11,880,487,863	\$ 423,969,820	\$ 792,185,581	\$ 1,216,155,401	\$ 90,487,781,500
Gain/Loss on Security Lending	10,890,115	36,614	913	10,927,642	-	-	-	-	10,927,642
Rounding	-	-	-	-	-	-	-	-	-
Assets Held for Upcoming Year Budget	112,115,080	-	-	112,115,080	-	-	-	-	112,115,080
<b>Total Beginning Market Value @ 12/31/16</b>	<b>77,109,633,484</b>	<b>391,882,197</b>	<b>12,665,277</b>	<b>77,514,180,958</b>	<b>11,880,487,863</b>	<b>423,969,820</b>	<b>792,185,581</b>	<b>1,216,155,401</b>	<b>90,610,824,222</b>
External Cash Flows:									
Revenues:									
Member Contributions / Deposits	1,324,457,501	-	-	1,324,457,501	-	41,265,878	56,030,917	97,296,795	1,421,754,296
Employer Contributions	1,722,856,378	53,636,897	-	1,776,493,275	157,417,888	-	52,939,791	52,939,791	1,986,850,954
Employer Contributions - Administrative Expenses	-	-	3,090,731	3,090,731	-	-	-	-	3,090,731
Contract and Other Receipts	90,937,696	285,515	-	91,223,211	857,541	402,869	577,914	980,783	93,061,535
Refund from HC Vendors (Guarantees)	-	-	-	-	117,285	-	-	-	117,285
Other Income / Cancelled Warrants	2,516,572	-	-	2,516,572	597	2,135	4,511	6,646	2,523,815
<b>Total Revenues</b>	<b>3,140,768,147</b>	<b>53,922,412</b>	<b>3,090,731</b>	<b>3,197,781,290</b>	<b>158,393,311</b>	<b>41,670,882</b>	<b>109,553,133</b>	<b>151,224,015</b>	<b>3,507,398,616</b>
Disbursements:									
Refunds of Member Accounts	(384,615,309)	(3,690,814)	(1,119,045)	(389,425,168)	-	(12,529,327)	(41,266,203)	(53,795,530)	(443,220,698)
Retirement Benefits	(5,835,175,379)	(1,864,006)	(1,132,153)	(5,838,171,538)	-	(1,225,533)	(392,738)	(1,618,271)	(5,839,789,809)
Health Care Expenses	-	-	-	-	(725,887,587)	-	-	-	(725,887,587)
Retiree-Paid Health Care & Formulary Rebates	-	-	-	-	231,147,462	-	-	-	231,147,462
Federal Subsidies	-	-	-	-	812,170	-	-	-	812,170
ER Paid PCORI	-	-	-	-	(350,306)	-	-	-	(350,306)
ER Paid Medicare	-	-	-	-	(23,597,598)	-	-	-	(23,597,598)
Wellness RMA Claims	-	-	-	-	(6,546,463)	-	-	-	(6,546,463)
MD-RMA Claims	-	-	-	-	(4,185,648)	-	-	-	(4,185,648)
HRA Claims	-	-	-	-	(423,393,603)	-	-	-	(423,393,603)
Administrative Expenses	(85,175,581)	-	-	(85,175,581)	(24,855,807)	(3,534,275)	(2,908,418)	(6,442,693)	(116,474,081)
<b>Total Disbursements</b>	<b>(6,304,966,269)</b>	<b>(5,554,820)</b>	<b>(2,251,198)</b>	<b>(6,312,772,287)</b>	<b>(976,857,380)</b>	<b>(17,289,135)</b>	<b>(44,567,359)</b>	<b>(61,856,494)</b>	<b>(7,351,486,161)</b>
<b>Net External Cash Flow</b>	<b>(3,164,198,122)</b>	<b>48,367,592</b>	<b>839,533</b>	<b>(3,114,990,997)</b>	<b>(818,464,069)</b>	<b>24,381,747</b>	<b>64,985,774</b>	<b>89,367,521</b>	<b>(3,844,087,545)</b>
Inter-Plan Activity									
Member Balance Transfers & Plan Switches	6,381,123	(2,359,006)	-	4,022,117	-	(724,785)	(3,297,332)	(4,022,117)	-
Mitigation Rate	14,580,633	(6,185,591)	-	8,395,042	-	-	(8,395,042)	(8,395,042)	-
Intraplan Transfer (DC to DB)	-	920,056	1,700,987	2,621,043	-	(920,056)	(1,700,987)	(2,621,043)	-
<b>Total Inter-Plan Activity</b>	<b>20,961,756</b>	<b>(7,624,541)</b>	<b>1,700,987</b>	<b>15,038,202</b>	<b>-</b>	<b>(1,644,841)</b>	<b>(13,393,361)</b>	<b>(15,038,202)</b>	<b>-</b>
Investment Income:									
Gross Investment Income	12,731,980,313	69,242,487	2,576,123	12,803,798,923	1,774,483,332	74,783,927	137,792,006	212,575,933	14,790,858,188
Unrealized Income on Security Lending	2,163,199	11,765	438	2,175,402	-	-	-	-	2,175,402
External Asset Management Fees	(114,689,606)	(627,616)	(23,350)	(115,340,572)	(17,673,461)	(324,508)	(611,890)	(936,398)	(133,950,431)
Rounding	-	-	-	-	-	-	-	-	-
<b>Net Investment Income</b>	<b>12,619,453,906</b>	<b>68,626,636</b>	<b>2,553,211</b>	<b>12,690,633,753</b>	<b>1,756,809,871</b>	<b>74,459,419</b>	<b>137,180,116</b>	<b>211,639,535</b>	<b>14,659,083,159</b>
<b>Ending Market Value @ 12/31/17</b>	<b>86,585,851,024</b>	<b>501,251,884</b>	<b>17,759,008</b>	<b>87,104,861,916</b>	<b>12,818,833,665</b>	<b>521,166,145</b>	<b>980,958,110</b>	<b>1,502,124,255</b>	<b>101,425,819,836</b>

## Development of Funding Value of Pension Defined Benefit Assets Traditional, Combined, and Member Directed Plans

Year Ended December 31	2016	2017	2018	2019	2020
A. Funding Value Beginning of Year	\$ 78,060,951,567	\$ 80,279,739,832			
B. Market Value End of Year	77,514,180,960	87,104,861,916			
C. Market Value Beginning of Year	74,560,055,753	77,514,180,960			
D. Non-Investment/Administrative Net Cash Flow					
D1. Member Contributions	1,294,853,664	1,324,457,501			
D2. Employer and other Non-Member Contributions Net of Admin Expenses	1,686,838,968	1,881,718,831			
D3. Refund of Member Accounts	(355,967,912)	(389,425,168)			
D4. Retirement Benefits	(5,586,888,120)	(5,838,171,538)			
D5. Member Balance Transfers / Intraplan Transfers	(4,708,011)	6,643,160			
D6. Admin Expenses	(85,546,284)	(85,175,581)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,051,417,695)	(3,099,952,795)			
E. Investment Return					
E1. Market Total: B-C-D7	6,005,542,902	12,690,633,751			
E2. Assumed Rate of Return	7.50%	7.50%			
E3. Assumed Amount of Return	5,740,143,204	5,904,732,258			
E4. Amount Subject to Phase-In: E1-E3	265,399,698	6,785,901,493			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	66,349,925	1,696,475,373			
F2. First Prior Year	(1,409,495,105)	66,349,925	\$ 1,696,475,373		
F3. Second Prior Year	(145,618,437)	(1,409,495,105)	66,349,925	\$ 1,696,475,373	
F4. Third Prior Year	1,018,826,373	(145,618,435)	(1,409,495,105)	66,349,923	\$ 1,696,475,374
F5. Total Phase-Ins	(469,937,244)	207,711,758	353,330,193	1,762,825,296	1,696,475,374
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 80,279,739,832	\$ 83,292,231,053			
G2. Upper Corridor Limit: 112% x B	86,815,882,675	97,557,445,346			
G3. Lower Corridor Limit: 88% x B	68,212,479,245	76,652,278,486			
G4. Funding Value End of Year	\$ 80,279,739,832	\$ 83,292,231,053			
H. Difference Between Market and Funding Value	(2,765,558,872)	3,812,630,863	3,459,300,670	1,696,475,374	-
I. Recognized Rate of Return	6.89 %	7.76 %			
J. Market Rate of Return	8.22 %	16.71 %			
K. Ratio of Funding Value to Market Value	104 %	96 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

## Development of Funding Value of Pension Defined Benefit Assets Traditional Plan

Year Ended December 31	2016	2017	2018	2019	2020
A. Funding Value Beginning of Year	\$ 77,699,901,543	\$ 79,864,578,167			
B. Market Value End of Year	77,109,633,485	86,585,851,024			
C. Market Value Beginning of Year	74,213,320,352	77,109,633,485			
D. Non-Investment/Administrative Net Cash Flow					
D1. Member Contributions	1,294,853,664	1,324,457,501			
D2. Employer and other Non-Member Contributions Net of Admin Expenses	1,641,042,886	1,830,891,279			
D3. Refund of Member Accounts	(352,362,641)	(384,615,309)			
D4. Retirement Benefits	(5,584,517,896)	(5,835,175,379)			
D5. Member Balance Transfers / Intraplan Transfers	7,016,203	6,381,123			
D6. Admin Expenses	(85,546,284)	(85,175,581)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,079,514,068)	(3,143,236,366)			
E. Investment Return					
E1. Market Total: B-C-D7	5,975,827,201	12,619,453,905			
E2. Assumed Rate of Return	7.50%	7.50%			
E3. Assumed Amount of Return	5,712,010,838	5,871,972,000			
E4. Amount Subject to Phase-In: E1-E3	263,816,363	6,747,481,905			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	65,954,091	1,686,870,476			
F2. First Prior Year	(1,403,501,407)	65,954,091	\$ 1,686,870,476		
F3. Second Prior Year	(145,804,137)	(1,403,501,407)	65,954,091	\$ 1,686,870,476	
F4. Third Prior Year	1,015,531,307	(145,804,137)	(1,403,501,410)	65,954,090	\$ 1,686,870,477
F5. Total Phase-Ins	(467,820,146)	203,519,023	349,323,157	1,752,824,566	1,686,870,477
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 79,864,578,167	\$ 82,796,832,824			
G2. Upper Corridor Limit: 112% x B	86,362,789,503	96,976,153,147			
G3. Lower Corridor Limit: 88% x B	67,856,477,467	76,195,548,901			
G4. Funding Value End of Year	\$ 79,864,578,167	\$ 82,796,832,824			
H. Difference Between Market and Funding Value	(2,754,944,682)	3,789,018,200	3,439,695,043	1,686,870,477	-
I. Recognized Rate of Return	6.89 %	7.76 %			
J. Market Rate of Return	8.22 %	16.71 %			
K. Ratio of Funding Value to Market Value	104 %	96 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

## Development of Funding Value of Pension Defined Benefit Assets Combined Plan

Year Ended December 31	2016	2017	2018	2019	2020
A. Funding Value Beginning of Year	\$ 350,427,967	\$ 402,200,560			
B. Market Value End of Year	391,882,196	501,251,884			
C. Market Value Beginning of Year	336,586,070	391,882,196			
D. Non-Investment/Administrative Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions Net of Admin Expenses	43,436,788	47,736,821			
D3. Refund of Member Accounts	(3,605,271)	(3,690,814)			
D4. Retirement Benefits	(1,443,631)	(1,864,006)			
D5. Member Balance Transfers / Intraplan Transfers	(11,869,579)	(1,438,950)			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	26,518,307	40,743,051			
E. Investment Return					
E1. Market Total: B-C-D7	28,777,819	68,626,637			
E2. Assumed Rate of Return	7.50%	7.50%			
E3. Assumed Amount of Return	27,276,534	31,692,906			
E4. Amount Subject to Phase-In: E1-E3	1,501,285	36,933,731			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	375,321	9,233,433			
F2. First Prior Year	(5,827,247)	375,321	\$ 9,233,433		
F3. Second Prior Year	210,163	(5,827,247)	375,321	\$ 9,233,433	
F4. Third Prior Year	3,219,515	210,164	(5,827,245)	375,322	\$ 9,233,432
F5. Total Phase-Ins	(2,022,248)	3,991,671	3,781,509	9,608,755	9,233,432
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 402,200,560	\$ 478,628,188			
G2. Upper Corridor Limit: 112% x B	438,908,060	561,402,110			
G3. Lower Corridor Limit: 88% x B	344,856,332	441,101,658			
G4. Funding Value End of Year	\$ 402,200,560	\$ 478,628,188			
H. Difference Between Market and Funding Value	(10,318,364)	22,623,696	18,842,187	9,233,432	-
I. Recognized Rate of Return	6.94 %	8.44 %			
J. Market Rate of Return	8.23 %	16.65 %			
K. Ratio of Funding Value to Market Value	103 %	95 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

## Development of Funding Value of Pension Defined Benefit Assets DB Portion of Member Directed Plan

Year Ended December 31	2016	2017	2018	2019	2020
A. Funding Value Beginning of Year	\$ 10,622,057	\$ 12,961,105			
B. Market Value End of Year	12,665,279	17,759,008			
C. Market Value Beginning of Year	10,149,331	12,665,279			
D. Non-Investment/Administrative Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions Net of Admin Expenses	2,359,294	3,090,731			
D3. Refund of Member Accounts	-	(1,119,045)			
D4. Retirement Benefits	(926,593)	(1,132,153)			
D5. Member Balance Transfers / Intraplan Transfers	145,365	1,700,987			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	1,578,066	2,540,520			
E. Investment Return					
E1. Market Total: B-C-D7	937,882	2,553,209			
E2. Assumed Rate of Return	7.50%	7.50%			
E3. Assumed Amount of Return	855,832	1,067,352			
E4. Amount Subject to Phase-In: E1-E3	82,050	1,485,857			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	20,513	371,464			
F2. First Prior Year	(166,451)	20,513	\$ 371,464		
F3. Second Prior Year	(24,463)	(166,451)	20,513	\$ 371,464	
F4. Third Prior Year	75,551	(24,462)	(166,450)	20,511	\$ 371,465
F5. Total Phase-Ins	(94,850)	201,064	225,527	391,975	371,465
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 12,961,105	\$ 16,770,041			
G2. Upper Corridor Limit: 112% x B	14,185,112	19,890,089			
G3. Lower Corridor Limit: 88% x B	11,145,446	15,627,927			
G4. Funding Value End of Year	\$ 12,961,105	\$ 16,770,041			
H. Difference Between Market and Funding Value	(295,826)	988,967	763,440	371,465	-
I. Recognized Rate of Return	6.67 %	8.91 %			
J. Market Rate of Return	8.57 %	18.32 %			
K. Ratio of Funding Value to Market Value	102 %	94 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2017

### Traditional, Combined and Member Directed Plans

	Total DB System				Total
	State	Local	Public Safety	Law Enforcement	
<b>(1) Employer Accumulation Fund</b>					
<b>(a) Allocated Amounts</b>	\$ 3,901,783,708	\$ 7,935,588,897	\$ (5,805,509)	\$ 962,804,687	\$ 12,794,371,783
<b>(b) Unallocated Amounts Allocated by (1)(a)</b>	11,127,063	22,980,529	(17,402)	2,886,082	36,976,272
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	<u>\$ 3,912,910,771</u>	<u>\$ 7,958,569,426</u>	<u>\$ (5,822,911)</u>	<u>\$ 965,690,769</u>	<u>\$ 12,831,348,055</u>
<b>(2) Employee Savings Fund (ESF)</b>					
<b>(a) Total Member Deposits</b>	\$ 5,720,927,967	\$ 8,829,081,695	\$ 3,896,554	\$ 720,879,059	\$ 15,274,785,275
<b>(b) ESF Allocated by (2)(a)</b>	\$ 5,356,142,952	\$ 8,265,752,148	\$ 3,647,420	\$ 674,788,180	\$ 14,300,330,700
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 24,105,064,023	\$ 33,267,507,445	\$ 45,157,317	\$ 2,372,577,221	\$ 59,790,306,006
<b>(b) Additional and DC Annuities</b>	234,529	58,391,626	0	0	58,626,155
<b>(c) Total Retiree Assets</b>	<u>\$ 24,105,298,552</u>	<u>\$ 33,325,899,071</u>	<u>\$ 45,157,317</u>	<u>\$ 2,372,577,221</u>	<u>\$ 59,848,932,161</u>
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	\$ 33,374,352,275	\$ 49,550,220,645	\$ 42,981,826	\$ 4,013,056,170	\$ 86,980,610,916
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	47,656,844	70,765,363	61,768	5,767,025	124,251,000
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 33,422,009,119</u>	<u>\$ 49,620,986,008</u>	<u>\$ 43,043,594</u>	<u>\$ 4,018,823,195</u>	<u>\$ 87,104,861,916</u>
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(1,462,914,481)	(2,171,968,090)	(1,883,598)	(175,864,694)	(3,812,630,863)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	<u>\$ 31,959,094,638</u>	<u>\$ 47,449,017,918</u>	<u>\$ 41,159,996</u>	<u>\$ 3,842,958,501</u>	<u>\$ 83,292,231,053</u>

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2017

### Traditional Plan

	Traditional Plan				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1) Employer Accumulation Fund (EAF)</b>					
<b>(a) Allocated Amounts</b>	\$ 3,703,739,229	\$ 7,654,203,926	\$ (5,805,509)	\$ 962,804,687	\$ 12,314,942,333
<b>(b) Unallocated Amounts Allocated by (1)(a)</b>	11,102,245	22,944,068	(17,402)	2,886,082	36,914,993
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	<u>\$ 3,714,841,474</u>	<u>\$ 7,677,147,994</u>	<u>\$ (5,822,911)</u>	<u>\$ 965,690,769</u>	<u>\$ 12,351,857,326</u>
<b>(2) Employee Savings Fund (ESF)</b>					
<b>(a) Total Member Deposits</b>	\$ 5,720,602,810	\$ 8,828,706,527	\$ 3,896,554	\$ 720,879,059	\$ 15,274,084,950
<b>(b) ESF Allocated by (2)(a)</b>	\$ 5,354,844,357	\$ 8,264,225,100	\$ 3,647,420	\$ 674,788,180	\$ 14,297,505,057
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 24,092,685,741	\$ 33,243,191,207	\$ 45,157,317	\$ 2,372,577,221	\$ 59,753,611,486
<b>(b) Additional Annuities</b>	234,529	58,391,626	0	0	58,626,155
<b>(c) Total Retiree Assets</b>	<u>\$ 24,092,920,270</u>	<u>\$ 33,301,582,833</u>	<u>\$ 45,157,317</u>	<u>\$ 2,372,577,221</u>	<u>\$ 59,812,237,641</u>
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	\$ 33,162,606,101	\$ 49,242,955,927	\$ 42,981,826	\$ 4,013,056,170	\$ 86,461,600,024
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	47,656,844	70,765,363	61,768	5,767,025	124,251,000
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 33,210,262,945</u>	<u>\$ 49,313,721,290</u>	<u>\$ 43,043,594</u>	<u>\$ 4,018,823,195</u>	<u>\$ 86,585,851,024</u>
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(1,453,289,299)	(2,157,980,609)	(1,883,598)	(175,864,694)	(3,789,018,200)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	<u>\$ 31,756,973,646</u>	<u>\$ 47,155,740,681</u>	<u>\$ 41,159,996</u>	<u>\$ 3,842,958,501</u>	<u>\$ 82,796,832,824</u>

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2017

### Combined Plan

	Combined Plan				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1) Employer Accumulation Fund</b>					
<b>(a) Allocated Amounts</b>	\$ 197,008,275	\$ 279,835,282	\$0	\$0	\$ 476,843,557
<b>(b) Unallocated Amounts Allocated by (1)(a)</b>	8,725	12,393	0	0	21,118
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	<u>\$ 197,017,000</u>	<u>\$ 279,847,675</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 476,864,675</u>
<b>(2) Employee Savings Fund</b>					
<b>(a) Total Member Deposits</b>	\$ 431,573	\$ 505,578	\$0	\$0	\$ 937,151
<b>(b) ESF Allocated by (2)(a)</b>	\$ 1,191,667	\$ 1,396,011	\$0	\$0	\$ 2,587,678
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 7,080,206	\$ 14,719,325	\$0	\$0	\$ 21,799,531
<b>(b) DC Annuities</b>	0	0	0	0	0
<b>(c) Total Retiree Assets</b>	<u>\$ 7,080,206</u>	<u>\$ 14,719,325</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 21,799,531</u>
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	<u>\$ 205,288,873</u>	<u>\$ 295,963,011</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 501,251,884</u>
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	0	0	0	0	0
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 205,288,873</u>	<u>\$ 295,963,011</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 501,251,884</u>
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(9,265,587)	(13,358,109)	0	0	(22,623,696)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	<u>\$ 196,023,286</u>	<u>\$ 282,604,902</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 478,628,188</u>

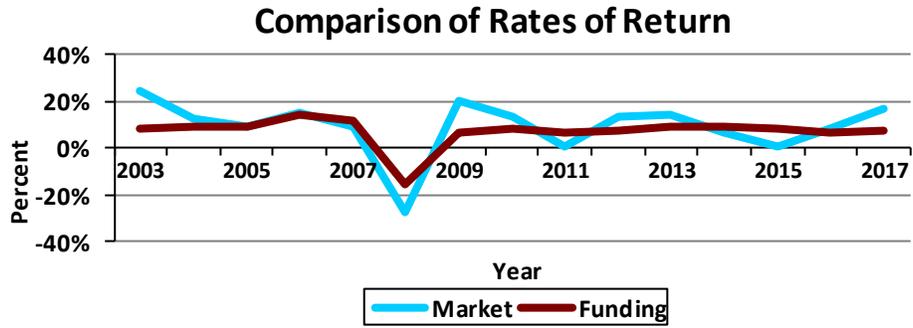
# Allocation of Funding Value of Assets Among Divisions

## December 31, 2017

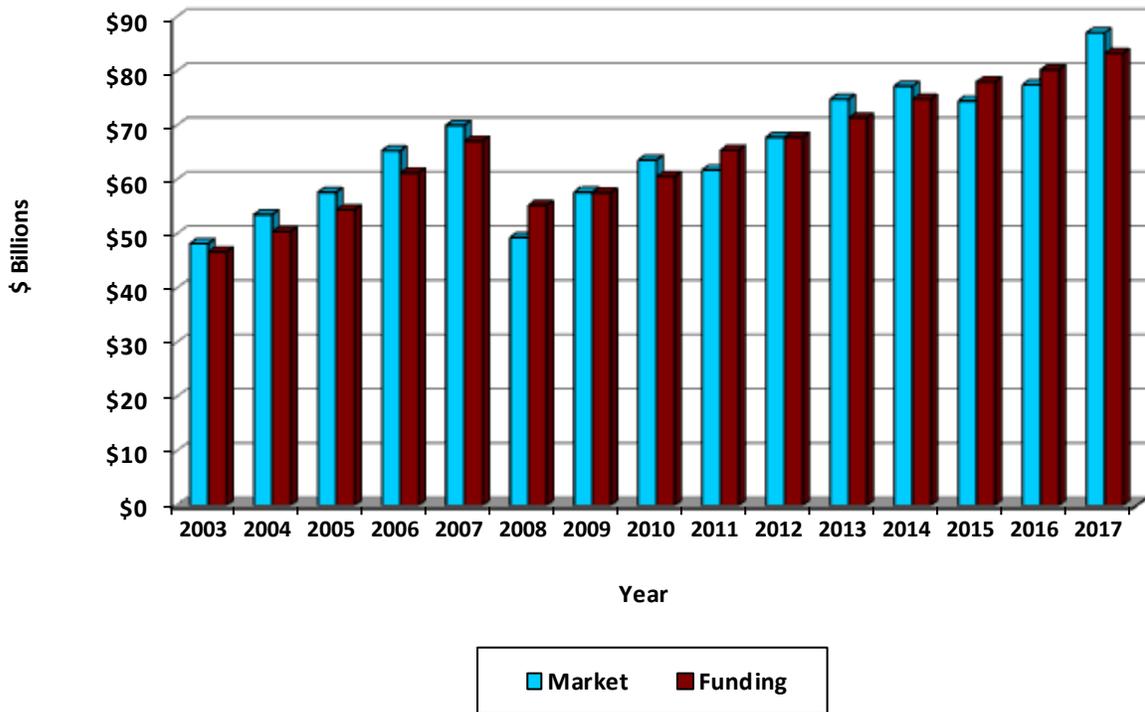
### Member Directed Plan

	Member-Directed Plan				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1) Employer Accumulation Fund</b>					
<b>(a) Allocated Amounts</b>	\$ 1,036,204	\$ 1,549,689	\$0	\$0	\$ 2,585,893
<b>(b) Unallocated Amounts Allocated by 1(a)</b>	16,093	24,068	0	0	40,161
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	<u>\$ 1,052,297</u>	<u>\$ 1,573,757</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 2,626,054</u>
<b>(2) Employee Savings Fund</b>					
<b>(a) Total Member Deposits</b>	\$ (106,416)	\$ (130,410)	\$0	\$0	\$ (236,826)
<b>(b) ESF Allocated by (2)(a)</b>	\$ 106,928	\$ 131,037	\$0	\$0	\$ 237,965
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 5,298,076	\$ 9,596,913	\$0	\$0	\$ 14,894,989
<b>(b) No Division</b>	0	0	0	0	0
<b>(c) Total Retiree Assets</b>	<u>\$ 5,298,076</u>	<u>\$ 9,596,913</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 14,894,989</u>
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	\$ 6,457,301	\$ 11,301,707	\$0	\$0	\$ 17,759,008
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	0	0	0	0	0
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 6,457,301</u>	<u>\$ 11,301,707</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 17,759,008</u>

# Comparison of Defined Benefit Pension Assets



## Comparison of Defined Benefit Pension Asset Values



## SECTION III

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### BENEFITS AND CONDITIONS EVALUATED

# Benefits and Conditions Evaluated

## Plans

**Traditional Pension Plan.** The Traditional Pension Plan is a defined benefit plan under which a member's retirement benefit is based on a formula. The formula is determined by years of contributing service and the average of the three (or five if a member of Group C as defined on page III-4) highest years of earnable salary (or final average salary). OPERS investment professionals manage the investment of employee and employer contributions to ensure that funds are available to pay the formula benefit.

**Combined Plan.** The Combined Plan is a retirement plan with both a defined benefit and a defined contribution component. Under the defined benefit portion of the Combined Plan, the member's benefit is determined by a reduced formula (similar to the Traditional Pension Plan). OPERS investment professionals manage the investment of employer contributions to ensure that funds are available to pay the reduced formula benefit. Under the defined contribution portion of the Combined Plan, employee contributions are deposited into the member's individual defined contribution account and invested as directed by the member. The member's retirement benefit under this portion of the Combined Plan is based on employee contributions and the gains and losses on those contributions. The member directs the investment by selecting from among the nine professionally-managed OPERS Investment Options.

**Member-Directed Plan.** The Member-Directed Plan is a defined contribution plan under which employee and employer contributions are deposited into a member's individual defined contribution account and invested as directed by the member. The member's retirement benefit is based on employee and employer contributions and the gains and losses on those contributions. Under the Member-Directed Plan, the member directs the investment by selecting from several professionally-managed OPERS Investment Options.

# Benefits and Conditions Evaluated

## Terms

**Final Average Salary** (“FAS”) means the average of the annual earnings for the 3 highest calendar years of compensation for Transition Group A and B members. The highest 5 calendar years is used for Transition Group C members.

**Participant Contribution Account** is the account for each Participant in the Combined or Member-Directed Plan to which shall be credited the employee contributions.

**Miscellaneous Contribution Account** is the account to which shall be credited any voluntary after-tax contributions for members in the Combined and Member-Directed Plans.

**Rollover Account** is the account to which shall be credited any rollover amounts for members in the Combined or Member-Directed Plans.

**Employers’ Accumulation Fund** is the fund to which shall be credited employer contributions for members in the Traditional or Combined Plan. There are separate accounts in the Employers’ Accumulation Fund for the Combined Plan and the Traditional Pension Plan.

**Employer Contribution Account** is the fund to which shall be credited a portion of the employer contributions for members in the Member-Directed Plan.

## Contributions

**Member Contributions.** Member contribution rates as a % of earnable salary are presented on page III-3.

**Employer Contributions.** Each employer contributes the remaining amounts necessary to finance OPERS benefits. Employer contributions are expressed as percents of member-covered payroll. The maximum statutory rate for state and local government employers is 14.0%. The maximum statutory rate for law enforcement employers is 18.1% (H.B. 416, effective 1/1/2001).

## Benefits and Conditions Evaluated

### Contributions (Concluded)

**Health Care Preservation Plan (HCPP).** The following table shows total scheduled employer contribution rates (includes contributions for both the pension and retiree health programs):

Year	State	Local Government	Law Enforcement	Public Safety
2018 and Thereafter	14.00%	14.00%	18.10%	18.10%

The portion of the above employer contribution rates scheduled to be allocated to the retiree health program are as follows:

Year	All Divisions
2018 and Thereafter	0.0%

Health care funding portion of contribution rates are according to the Board adopted schedule.

Member contribution rates scheduled to be allocated to the pension program are as follows:

Year	State	Local Government	Law Enforcement	Public Safety
2018 and Later	10.00%	10.00%	13.00%	12.00%

## Senate Bill 343

**Senate Bill 343.** Senate Bill (SB) 343 became effective January 7, 2013. The benefit changes enacted by SB 343 do not apply to members who retired with an effective date of January 1, 2013 or earlier. The benefit provisions enumerated on pages III-9 through the end of Section III are the provisions that were applicable prior to the enactment of SB 343. Changes to the benefit provisions resulting from Senate Bill 343 are enumerated on pages III-4 through III-8.

**Transition Groups.** A transition plan was developed as part of the SB 343 benefit changes. The transition group to which a member belongs is dependent upon the date at which that member is first eligible to retire with a reduced or unreduced benefit.

A member is in Group A if the member is eligible to retire under the retirement eligibility conditions in place prior to the passage of SB 343 on or before January 7, 2018.

A member is in Group B if the member is not in Group A and satisfies either of the following conditions:

- (1) The member has 20 years of service credit as of January 7, 2013, or
- (2) The member is eligible to retire under the retirement eligibility conditions in place prior to the passage of SB 343 on or before January 7, 2023.

A member is in Group C if the member satisfies either of the following conditions:

- (1) The member was hired prior to January 7, 2013 but was not in Group A or Group B, or
- (2) The member was hired on or after January 7, 2013.

**Key Benefit Changes.** There are five key components that were affected by SB 343:

- (1) Age and service retirement eligibility conditions,
- (2) Benefit formula,
- (3) Cost-of-living Allowance (COLA),
- (4) Final Average Salary (FAS) period, and
- (5) Early retirement reduction factors

# Senate Bill 343

## Key Benefit Changes for Transition Group A

**COLAs.** COLAs provided up to December 31, 2018 will be based upon a simple (i.e., not compound), 3 percent COLA. COLAs provided after December 31, 2018 continue to be simple, but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the Consumer Price Index (CPI), but not greater than 3%.

## Key Benefit Changes for Transition Group B

**Retirement Eligibility.** The table below shows retirement eligibility conditions for Group B members:

Valuation Group	Unreduced		Reduced	
	Age	Service	Age	Service
State / Local Government	52	31	55	25
	Any	32		
	66	5	60	5
Law Enforcement	50	25	48	25
	64	15	52	15
Public Safety	54	25	48	25
	64	15	52	15

**Early Retirement Reduction Factors.** Presented below are the reduction factors, expressed as a percentage of the base amount, applicable to a Group B member who retires with a reduced benefit:

### State and Local Government:

Service	Ages										
	55	56	57	58	59	60	61	62	63	64	65
30	75%	76%	78%	79%	80%	82%	83%	85%	86%	88%	89%
29	69	70	72	73	74	75	76	78	79	80	89
28	64	65	66	67	68	69	70	71	72	80	89
27	59	60	61	62	62	63	64	65	72	80	89
26	55	55	56	57	57	58	59	65	72	80	89
25	50	51	51	52	52	53	59	65	72	80	89
24 & Under						53	59	65	72	80	89

## Senate Bill 343

### Law Enforcement and Public Safety:

Law Enforcement		Public Safety	
Age	Factor	Age	Factor
48	84%	48	58%
49	92	49	64
50	100	50	70
		51	76
		52	83
		53	91
		54	100

**COLAs.** COLAs continue to be simple (i.e., not compound), but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the Consumer Price Index (CPI), but not greater than 3%.

### Key Benefit Changes for Transition Group C

**Retirement Eligibility.** The table below shows retirement eligibility conditions for Group C members:

Valuation Group	Unreduced		Reduced	
	Age	Service	Age	Service
State / Local Government	55	32	57	25
	67	5	62	5
Law Enforcement	52	25	48	25
	64	15	56	15
Public Safety	56	25	52	25
	64	15	56	15

## Senate Bill 343

**Early Retirement Reduction Factors.** Presented below are the reduction factors, expressed as a percentage of the base amount, applicable to a Group C member that retires with a reduced benefit:

### State and Local Government:

Service	Ages									
	57	58	59	60	61	62	63	64	65	66
31	80%	80%	81%	82%	83%	85%	86%	87%	88%	89%
30	73	74	75	75	76	77	78	79	80	89
29	67	68	68	69	70	70	71	72	80	89
28	61	62	62	63	63	64	64	72	80	89
27	56	57	57	57	58	58	64	72	80	89
26	51	52	52	52	52	58	64	72	80	89
25	47	47	47	47	52	58	64	72	80	89
24 & Under						58	64	72	80	89

### Law Enforcement and Public Safety:

Law Enforcement		Public Safety	
Age	Factor	Age	Factor
48	70%	52	69%
49	76	53	76
50	84	54	83
51	91	55	91
52	100	56	100

**COLAs.** COLAs continue to be simple (i.e., not compound), but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the Consumer Price Index (CPI), but not greater than 3%.

## Senate Bill 343

**FAS Period.** Final average salary is based on the average of the annual earnings for the 5 highest calendar years of compensation.

**Benefit Formula.** Service breakpoint for the 2.50% benefit multiplier in the Traditional Plan or 1.25% benefit multiplier in the Combined Plan for State and Local Government members increased from 30 years to 35 years.

### Other Benefit Changes for All Transition Groups

**Minimum Benefit.** The \$86 minimum benefit provision has been eliminated.

**Long Interest Calculation.** The minimum allowance calculation based upon twice the member's savings funding balance at retirement together with interest credits, annuitized with unisex factors that reflect plan interest and mortality assumptions, but not the plan's COLA, has been eliminated.

**Disability Program.** The definition of disability was changed to a more restrictive definition which is expected to result in a reduction in future disability cases.

# Traditional Pension Plan – Pre Senate Bill 343

## Age & Service Benefits - State and Local Government Members

**Age and service eligibility.** A member who (i) has attained age 60 years and has 5 or more years of service credit or 60 contributing months, or (ii) has attained age 55 years and has 25 or more years of service credit, or (iii) has 30 or more years of service credit, may retire with an age and service retirement allowance.

**Age and service allowance.** A retiring member’s age and service allowance is equal to Ohio service credit times the greater of \$86, or 2.2% of FAS for the first 30 years of service plus 2.5% for years of service over 30 years (H.B. 628). The allowance is then adjusted by factors based on attained age or years of service (whichever yields the higher percentage) as determined in the following schedule:

Attained Age	OR	Years of Service Credit	Percentage of Base Amount
58		25	75%
59		26	80
60		27	85
61		N/A	88
N/A		28	90
62		N/A	91
63		N/A	94
N/A		29	95
64		N/A	97
65		30 or more	100

Maximum allowance is 100% of FAS or the limits under IRC Section 415(b). Minimum allowance is based upon twice the member’s savings funding balance at retirement together with interest credits, annuitized with unisex factors that reflect plan interest and mortality assumptions, but not the plan’s COLA.

## Traditional Pension Plan – Pre Senate Bill 343

### Age & Service Benefits – Law Members (Public Safety) Eligible to Retire under Ohio Revised Code Section 145.33(B)(2)(b)

**Age and service eligibility.** A law member whose secondary duties are to preserve the peace, to protect life and property, and to enforce the laws of the state and who (i) has attained age 52 and has 25 or more years of credited service, or (ii) has attained age 62 and has 15 or more years of credited service, or (iii) has attained age 52 and has 15 or more years of credited service, may retire with an age and service allowance. A member covered by these provisions may retire early at age 48 with 25 or more years of service and receive the following percentage of the base benefit: 75%, 80%, 86%, or 93% at retirement ages 48, 49, 50 and 51 respectively.

**Age and service allowance.** A retiring member's age and service allowance under eligibility (i) or (ii) above is equal to 2.5% of FAS times the first 25 years of service credit plus 2.1% of FAS times service credit in excess of 25 years (H.B. 628). Maximum allowance is 90% of FAS or the limits under IRC Section 415(b). A retiring member's age and service allowance under eligibility (iii) above is equal to 1.5% of FAS times years of service credit. Minimum allowance for all law members is based upon twice the member's savings fund balance at retirement together with interest credits.

### Age & Service Benefits - Law Members (Law Enforcement) Eligible to Retire under Ohio Revised Code Section 145.33(B)(2)(a)

**Age and service eligibility.** A law member whose primary duties are to preserve the peace, to protect life and property, and to enforce the laws of the state and who (i) has attained age 48 and has 25 or more years of credited service, or (ii) has attained age 62 and has 15 or more years of credited service, or (iii) has attained age 52 and has 15 or more years of credited service, may retire with an age and service allowance.

**Age and service allowance.** A retiring member's age and service allowance under eligibility (i) or (ii) above is equal to 2.5% of FAS times the first 25 years of service credit plus 2.1% of FAS times service credit in excess of 25 years (H.B. 628). Maximum allowance is 90% of FAS or the limits under IRC Section 415(b). A retiring member's age and service allowance under eligibility (iii) above is equal to 1.5% of FAS times years of service credit. Minimum allowance for all law members is based upon twice the member's savings fund balance at retirement together with interest credits.

# Traditional Pension Plan – Pre Senate Bill 343

## Disability Retirement

The disability program was revised in 1992, in order to comply with the Older Workers Benefit Protection Act. Employees becoming members after July 29, 1992 are covered by the post July 29, 1992 program. Other members were able to elect coverage under the pre July 29, 1992 program (original plan) or elect to be covered by the post July 29, 1992 program (revised plan).

Features of the original plan are:

- a) Upon becoming permanently disabled after completion of at least 5 years or 60 contributing months of service but before attaining age 60, a member is eligible for a disability allowance. The service requirement is waived for Law Enforcement members with an on-duty illness or injury.
- b) The amount of the allowance is the service the member would have had if employment had continued to age 60 times (i) 2.2% of FAS (H.B. 628), or (ii) \$86, whichever produces the greater benefit.
- c) Maximum allowance is 75% of FAS, minimum allowance is 30% of FAS.

Features of the revised plan are:

- a) A member may apply at any age after completion of 5 years or 60 contributing months of service. The service requirement is waived for Law Enforcement members with an on-duty illness or injury.
- b) A disability benefit equal to the greater of 45% of FAS or the actual service credit times 2.2% of FAS (H.B. 628) with no early retirement reduction (maximum 60% of FAS). The disability benefit period is to age 65 if the member is disabled prior to age 60. The benefit period declines gradually from 60 months for members disabled at ages 60 and 61, to 12 months for members disabled at age 69 or older.
- c) After the disability benefit ends, a service retirement benefit equal to the greater of (i) the accrued benefit based on actual service, or (ii) 2.2% of FAS (H.B. 628) times service credit including the period of disability (maximum 45% of FAS). In addition, an amount equal to the cost-of-living increases the member would have received had the member retired on the basis of age and service is paid.

# Traditional Pension Plan – Pre Senate Bill 343

## Survivor Benefits

**Death while eligible to retire.** If a member dies in service after becoming eligible to retire with an age and service allowance and leaves a surviving spouse or other sole dependent beneficiary, the survivor receives the same amount that would have been paid had the member retired the last day of the month of death and elected the 100% joint and survivor form of payment.

**Survivor (death-in-service) allowances.** If a deceased member had at least 1-1/2 years of contributing service credit, with at least 1/4 year of such service occurring within the 2-1/2 years prior to death, or was receiving a disability benefit, qualified survivors may receive the following monthly benefits. The benefit paid will be the greater of the applicable benefits paid under the following two schedules (H.B. 628):

### Schedule 1

Number of Qualified Survivors Affecting the Benefit	Annual Benefit as a % of Deceased Member's FAS	Minimum Monthly Benefit
1	25%	\$250
2	40%	\$400
3	50%	\$500
4	55%	\$500
5 or more	60%	\$500

### Schedule 2

Years of Service	Annual Benefit as a % of Deceased Member's FAS
20	29%
21	33%
22	37%
23	41%
24	45%
25	48%
26	51%
27	54%
28	57%
29 or more	60%

Qualifying survivors who are paid benefits under Schedule 2 share equally in the benefits, except that if there is a surviving spouse, the spouse receives the greater of 25% of FAS or \$250.

## Traditional Pension Plan – Pre Senate Bill 343

A **qualified spouse** is the surviving spouse of a deceased member who is age 62 or at any age if the deceased member had 10 or more years of Ohio service credit or if the surviving spouse is caring for a qualified child or is adjudged physically or mentally incompetent.

A **qualified child** is a child who has never been married and under the age of 18 (or 22 if attending an approved school), or regardless of age is adjudged physically or mentally incompetent at the time of the member's death.

A **qualified parent** is a dependent parent aged 65 or older (earlier if mentally or physically incompetent) who received at least one-half support from the member during the 12-month period immediately preceding the member's death.

Qualified **survivors of disability benefit recipients** have the FAS used in calculating their benefits adjusted for each year between the effective date of the disability benefit and the recipient's date of death. The FAS is adjusted by the lesser of (1) 3% or (2) the actual average percentage change in the CPI.

### Benefits at Retirement

**Optional Benefit Forms.** Retiring members may elect to have benefits paid in straight life form, in a form that guarantees a minimum number of monthly payments, or in a form that provides a continuation of all or a portion of the monthly benefit to a beneficiary after the death of the retiree. If a retiring member elects benefits in other than straight life form, the monthly amount is adjusted. The adjustment is based upon interest, COLA, and mortality assumptions (with a blend of male and female mortality rates to produce unisex election factors consistent with the gender distribution of members electing optional forms of payment).

## Traditional Pension Plan – Pre Senate Bill 343

**PLOP.** Effective 01/01/2004, retiring members may also elect to receive a Partial Lump Sum Option Payment (PLOP) (S.B.247). The PLOP is an option that allows a retiree to initially receive a partial lump sum benefit payment along with a reduced monthly retirement allowance. The lump sum payment cannot be less than 6 times or more than 36 times the monthly amount that would be payable to the member under the plan of payment selected and shall not result in a monthly allowance that is less than 50% of the monthly benefit. The total amount paid as a lump sum and monthly benefit shall be the actuarial equivalent of the amount that would have been paid had the lump sum not been selected.

**QEBA.** Qualified Excess Benefit Arrangement was established 01/01/2004 (H.B.190). The QEBA is operated in accordance with Internal Revenue Code Section 415(m). Under this arrangement the recipient may be paid the portion of his/her retirement benefit that was previously limited due to IRC Section 415(b).

**Post-retirement increases.** Each July after June 30, 1971 or the annual anniversary established 12 months after the initial date of retirement, each allowance is increased by 3.0% of the corresponding base allowance, except that no allowance shall exceed the limits established by Section 415 of the Internal Revenue Code.

**Post-retirement death benefit.** Upon the death of an age and service or disability retiree, a death benefit in the following amount is payable:

Service Credit at Retirement	Amount of Death Benefit
5 to 9 years	\$ 500
10 to 14 years	1,000
15 to 19 years	1,500
20 to 24 years	2,000
25 or more years	2,500

**Deferred benefits.** A member with at least 5 years of service credit who leaves service before being eligible for an immediate allowance and who does not withdraw accumulated contributions will be entitled to a deferred allowance at age 60. For law members, the age at which benefits commence depends on the amount of service credit. The amount of the allowance will be based on credited service and final average salary at time of leaving service.

# Traditional Pension Plan – Pre Senate Bill 343

## Refund of Members Accumulated Contributions

In the event a member leaves service prior to retirement, the member may elect to receive a refund of contributions with interest and may be eligible to receive an additional amount as described below. These refund provisions are available to all members. If a member dies prior to retirement and survivor benefits are not payable, the member's contributions with interest are paid to a designated beneficiary or other survivor. Interest is credited annually to member contribution balances. The rate of interest credited is determined by the OPERS Board and will not be greater than 6%. At the present time, 1% interest is credited to member contribution balances.

If the member has, or had at the time of death, at least 5 years but less than 10 years of qualified service, an additional 33% of the member's eligible contributions will be paid to the member or survivor. If the member has, or had at the time of death, at least 10 years of qualified service credit, an additional 67% of the member's eligible contributions will be paid to the member or survivor. The additional amount is not paid if the member is a re-employed retiree, or in the case of a deceased member, was receiving disability benefits at the time of death.

## Supplemental Benefits

**Health Care Coverage.** Health care coverage is available to persons meeting retiree health care eligibility requirements. Members retiring with a normal or early service retirement allowance after January 1, 2015 must have 20 or more years of qualified service credit to be eligible for this benefit.

# Traditional Pension Plan – Pre Senate Bill 343

## Additional Annuity Program

The additional annuity program provides Traditional Plan and re-employed retiree members the opportunity of supplementing their retirement income. Members make additional contributions (independent of the contributions described on page III-2) to an account that earns investment income based upon the return of the OPERS Stable Value Fund. At termination, the member may take the additional annuity account balance either as a lump sum or annuitized in monthly payments.

## Re-Employed Retirees

Re-employed age and service retirees contribute to the “Money Purchase Plan”. In most instances, re-employed retirees will continue to receive their retirement allowance during re-employment. Upon termination of re-employment, members are eligible to apply for either a refund of contributions prior to age 65 or a Money Purchase Plan benefit as a lump sum or annuity after age 65. The Money Purchase Plan benefit is equal to member contributions and allowable interest plus an additional 67% matching amount. If monthly benefits are elected, joint and survivor options are also available.

## Combined Plan – Pre Senate Bill 343

### Age & Service Benefits - State and Local Government Members\*

**Eligibility.** A member who (i) has attained age 60 years and has 5 or more years of service credit in the Plan or 60 contributing months in the Plan, or (ii) has attained age 55 years and has 25 or more years of service credit, or (iii) has 30 or more years of service credit, may retire under the Combined Plan with an age and service retirement allowance under the defined benefit portion of the Plan and with a retirement benefit under the defined contribution portion of the Plan.

*\*Law Enforcement and Public Safety members must contribute to the Traditional Pension Plan only.*

**Age and service retirement allowance (Defined Benefit portion of the Plan).** A retiring member’s age and service retirement allowance is equal to Ohio service credit in the Plan times 1.0% of FAS for the first 30 years of service plus 1.25% for years of service over 30 years. The allowance is then adjusted by factors based on attained age or years of service (whichever yields the higher percentage) as determined in the following schedule:

Attained Age	OR	Years of Service Credit	Percentage of Base Amount
58		25	75%
59		26	80
60		27	85
61		N/A	88
N/A		28	90
62		N/A	91
63		N/A	94
N/A		29	95
64		N/A	97
65		30 or more	100

Maximum allowance is 100% of FAS or the limits under IRC Section 415(b).

**Retirement benefit (Defined Contribution portion of the Plan).** The member’s retirement benefit under this portion of the Combined Plan is based on the amounts credited to the Participant Contribution Account, Rollover Account, and Miscellaneous Account and the gains and losses on the amounts in those Accounts.

# Combined Plan – Pre Senate Bill 343

## Disability Retirement

A Combined Plan member may apply after completion of 5 years in the Plan or 60 contributing months of service in the Plan. Combined Plan members may be covered under the original or revised disability plan. Combined Plan members who apply for disability may:

- 1) Take a lump sum distribution of the Participant Contribution Account, Rollover Account, and Miscellaneous Account and any additional amount they are entitled to from the Employers' Accumulation Fund, or
- 2) Transfer all service credit and the Participant's Accounts (as listed above) in the Combined Plan to the Traditional Pension Plan to be paid a disability benefit under the Traditional Pension Plan guidelines.

## Survivor Benefits

Combined Plan members are eligible for the same survivor benefits as those listed under the Traditional Pension Plan and must qualify for survivor benefits under the same guidelines as those members in the Traditional Pension Plan.

## Benefits at Retirement

**Optional Benefit Forms under the Defined Benefit portion of the Plan.** Retiring members may elect to have their age and service retirement allowance in straight life form, in a form that guarantees a minimum number of monthly payments, or in a form that provides a continuation of all or a portion of the monthly benefit to a beneficiary after the death of the retiree. If a retiring member elects benefits in other than straight life form, the monthly amount is adjusted. The adjustment is based upon interest, COLA, and mortality assumptions (with a blend of male and female mortality rates to produce unisex election factors consistent with the gender distribution of members electing optional forms of payment).

## Combined Plan – Pre Senate Bill 343

**Optional Benefit Forms under the Defined Contribution portion of the Plan.** Retiring members may elect to have retirement benefits paid in a partial lump sum, subject to any rules adopted by the Board; monthly annuity payments (with joint and survivor options) similar to those offered under the defined benefit portion of the Plan; periodic payments over a period certain; periodic payments of a specific monthly amount; payments with a deferred start date; or a combination of these options.

**QEBA.** Qualified Excess Benefit Arrangement was established 01/01/2004 (H.B.190). The QEBA is operated in accordance with Internal Revenue Code Section 415(m). Under this arrangement the recipient may be paid the portion of his/her retirement benefit that was previously limited due to IRC Section 415(b). The QEBA is available to Combined Plan members for the age and service retirement allowance under the defined benefit portion of the Plan.

**Post-retirement increases.** Each July after June 30, 1971 or the annual anniversary established 12 months after the initial date of retirement, each age and service retirement allowance under the defined benefit portion of the plan is increased by 3.0% of the corresponding base allowance, except that no allowance shall exceed the limits established by Section 415 of the Internal Revenue Code.

**Post-retirement death benefit.** Upon the death of an age and service retiree, a death benefit in the following amount is payable:

Service Credit at Retirement	Amount of Death Benefit
5 to 9 years	\$ 500
10 to 14 years	1,000
15 to 19 years	1,500
20 to 24 years	2,000
25 or more years	2,500

## Combined Plan – Pre Senate Bill 343

### Refunds and Vesting

A participant in the Combined Plan shall at all times be 100% vested in the Participant Contribution Account, Miscellaneous Contribution Account, and the Rollover Account.

If the member has at least 5 years but less than 10 years of qualified service credit in the Plan, an additional 33% of the member's eligible contributions will be paid from the Employers' Accumulation Fund. If the member has at least 10 years of qualified service credit in the Plan, an additional 67% of the member's eligible contributions will be paid to the member. Amounts paid to purchase service credit earn interest at the same rates as the Traditional Pension Plan and are payable as a refund.

In the event a member leaves service prior to retirement, the member may elect to receive a refund of their Participant Contribution Account, the Rollover Account, the Miscellaneous Account, and any additional amounts they are entitled to from the Employers' Accumulation Fund (as described above).

### Supplemental Benefits

**Health Care Coverage.** Health care coverage is available to persons meeting retiree health care eligibility requirements. Members retiring with a normal or early service retirement allowance after January 1, 2015 must have 20 or more years of qualified service credit to be eligible for this benefit.

# Member-Directed Plan

**AGE & SERVICE BENEFITS - STATE AND LOCAL GOVERNMENT MEMBERS.** (Law Enforcement and Public Safety members must contribute to the Traditional Pension Plan Only.)

**Eligibility.** A participant who has attained age fifty-five (55) may retire under the Member-Directed Plan.

**Retirement Benefits.** The member's retirement benefit is based on the value of the Participant Contribution Account, the Rollover Account, the Miscellaneous Account, and any vested portion of the Employer Contribution Account.

## Disability Retirement

Not available under the Member-Directed Plan. Members may:

- 1) If age fifty-five (55), terminate employment and begin receiving retirement benefits, or
- 2) Take a lump sum distribution of their Participant Contribution Account, Rollover Account, Miscellaneous Account and any vested portion of the Employer Contribution Account.

## Survivor Benefits

Not available under the Member-Directed Plan. Survivors must take a lump sum distribution of the member's Participant Contribution Account, Rollover Account, Miscellaneous Account and any vested portion of the Employer Contribution Account.

## Benefits at Retirement

**Optional Benefit Forms.** Retiring members may elect to have retirement benefits paid in a partial lump sum, subject to any rules adopted by the Board; monthly annuity payments (with joint and survivor options) similar to those offered under the defined benefit portion of the Combined Plan; periodic payments over a period certain; periodic payments of a specific monthly amount; payments with a deferred start date; or a combination of these options.

# Member-Directed Plan

## Refunds and Vesting.

A participant shall at all times be 100% vested in the Participant Contribution Account, Miscellaneous Contribution Account, and the Rollover Account. A participant shall vest in the Employer Contribution Account according to the Participant's attained years of participation in the Plan as follows:

One year of participation	20%
Two years of participation	40%
Three years of participation	60%
Four years of participation	80%
Five years of participation	100%

In the event a member leaves service prior to retirement, the member may elect to receive a refund of their Participant Contribution Account, Rollover Account, and Miscellaneous Account and any vested amounts in the Employer Contribution Account (as described above).

## Supplemental Benefits

**Health Care Coverage.** A portion of the employer contribution for Member-Directed participants is credited to a Retiree Medical Account (RMA). Amounts contributed to the RMA may be used after separation from service and a refund or retirement distribution is made to pay qualified health, dental and vision care expenses. Beginning January 1, 2009, members vest in their RMA based on their attained years of participation in the Plan as follows:

Less than 1 year	0%
1 year	20%
2 years	40%
3 years	60%
4 years	80%
5 years	100%

# Sample Benefit Computation – Traditional Plan

## State or Local Member (Transition Group A) - Normal Retirement

### Retiring December 31, 2017

### Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	33	Years of Credited Service
C.	59	Age of Retiree
D.	56	Age of Spouse
E.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$(0.022 \times 30 \text{ years} + 0.025 \times 3 \text{ years}) \times \$32,000 =$	\$ 23,520
G.	Reduction for Line E Election: #	$(1 - 0.84697) \times (F) =$	3,599
H.	Benefit Payable to Retiree while Spouse is Alive: (F) - (G) =		19,921
I.	Benefit Payable to Spouse after Retiree's Death		19,921
J.	Benefit Payable to Retiree after Spouse's Death		23,520

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2018	\$ 19,921	\$ 19,921	\$ 23,520
2019	20,519	20,519	24,226
2020	21,116	21,116	24,931
2021	21,714	21,714	25,637
2022	22,312	22,312	26,342
2023	22,909	22,909	27,048
2024	23,507	23,507	27,754
2025	24,104	24,104	28,459
2026	24,702	24,702	29,165
2027	25,300	25,300	29,870

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2017.

# Sample Benefit Computation – Traditional Plan State or Local Member (Transition Group A) - Early Retirement Retiring December 31, 2017 Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	26	Years of Credited Service
C.	59	Age of Retiree
D.	56	Age of Spouse
E.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$0.022 \times 26 \text{ years} \times \$32,000 =$	\$ 18,304
G.	Adjustment Factor for Early Retirement (from schedule)		80%
H.	Adjusted Benefit:	$(F) \times (G) =$	14,643
I.	Reduction for Line E Election: # $(1 - 0.84697) \times (H) =$		2,241
J.	Benefit Payable to Retiree while Spouse is Alive: $(H) - (I)$		12,402
K.	Benefit Payable to Spouse after Retiree's Death		12,402
L.	Benefit Payable to Retiree after Spouse's Death		14,643

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2018	\$ 12,402	\$ 12,402	\$ 14,643
2019	12,774	12,774	15,082
2020	13,146	13,146	15,522
2021	13,518	13,518	15,961
2022	13,890	13,890	16,400
2023	14,263	14,263	16,840
2024	14,635	14,635	17,279
2025	15,007	15,007	17,718
2026	15,379	15,379	18,158
2027	15,751	15,751	18,597

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2017.

**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(b) Public Safety  
Member (Transition Group A) - Normal Retirement  
Retiring December 31, 2017  
Under Benefit Provisions Evaluated**

**Data:**

A.	<u>\$38,000</u>	Final Average Earnings
B.	<u>28</u>	Years of Credited Service
C.	<u>49</u>	Age of Retiree
D.	<u>46</u>	Age of Spouse
E.	<u>100%</u>	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$(0.025 \times 25 \text{ years} + 0.021 \times 3 \text{ years}) \times \$38,000 \times 80\% =$	\$ 20,915
G.	Reduction for Line E Election: # $(1 - 0.89936) \times (F) =$		<u>2,105</u>
H.	Benefit Payable to Retiree while Spouse is Alive: $(F) - (G) =$		18,810
I.	Benefit Payable to Spouse after Retiree's Death		18,810
J.	Benefit Payable to Retiree after Spouse's Death		20,915

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2018	\$ 18,810	\$ 18,810	\$ 20,915
2019	19,374	19,374	21,542
2020	19,939	19,939	22,170
2021	20,503	20,503	22,797
2022	21,067	21,067	23,425
2023	21,632	21,632	24,052
2024	22,196	22,196	24,680
2025	22,760	22,760	25,307
2026	23,324	23,324	25,935
2027	23,889	23,889	26,562

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.  
# Based on conversion factors for optional forms of payment in effect December 31, 2017.

**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(a) Law Enforcement  
Member (Transition Group A) - Normal Retirement  
Retiring December 31, 2017  
Under Benefit Provisions Evaluated**

**Data:**

A.	<u>\$38,000</u>	Final Average Earnings
B.	<u>28</u>	Years of Credited Service
C.	<u>49</u>	Age of Retiree
D.	<u>46</u>	Age of Spouse
E.	<u>100%</u>	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$(0.025 \times 25 \text{ years} + 0.021 \times 3 \text{ years}) \times \$38,000 =$	\$ 26,144
G.	Reduction for Line E Election: # $(1 - 0.89936) \times (F) =$		<u>2,631</u>
H.	Benefit Payable to Retiree while Spouse is Alive: $(F) - (G) =$		23,513
I.	Benefit Payable to Spouse after Retiree's Death		23,513
J.	Benefit Payable to Retiree after Spouse's Death		26,144

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2018	\$ 23,513	\$ 23,513	\$ 26,144
2019	24,218	24,218	26,928
2020	24,924	24,924	27,713
2021	25,629	25,629	28,497
2022	26,335	26,335	29,281
2023	27,040	27,040	30,066
2024	27,745	27,745	30,850
2025	28,451	28,451	31,634
2026	29,156	29,156	32,419
2027	29,862	29,862	33,203

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2017.

# Sample Benefit Computation – Traditional Plan

## State or Local Member (Transition Group C) – Termination Benefit

### Terminating December 31, 2017

### Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	15	Years of Credited Service
C.	45	Age of Member
D.	42	Age of Spouse
E.	62:59	Ages at Which Benefits are Payable
F.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)
G.	\$44,000	Accumulated Contributions with Interest at Termination Date

**Computations:**

H.	Formula Benefit: $(0.022 \times 15 \text{ years} + 0.025 \times 0 \text{ years}) \times \$32,000 =$	\$ 10,560
I.	Adjustment Factor for Early Retirement (from schedule)	58%
J.	Adjusted Benefit: $(H) \times (I) =$	6,125
K.	Reduction for Line F Election: $\# (1 - 0.82672) \times (J) =$	<u>1,061</u>
L.	Benefit Payable to Retiree while Spouse is Alive: $(J) - (K) =$	5,064
M.	Benefit Payable to Spouse after Member's Death	5,064
N.	Benefit Payable to Retiree after Spouse's Death	6,125
O.	In lieu of a lifetime benefit, terminatee may elect to receive a refund of accumulated contributions with interest plus an additional 67% of eligible accumulated contributions because terminatee had more than 10 years of service.	73,480

**Projected Benefits:\***

Year Ended December 31,	Member's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Member's Benefit (After Spouse's Death)
2035	\$ 5,064	\$ 5,064	\$ 6,125
2036	5,216	5,216	6,309
2037	5,368	5,368	6,492
2038	5,520	5,520	6,676
2039	5,671	5,671	6,860
2040	5,823	5,823	7,044
2041	5,975	5,975	7,227
2042	6,127	6,127	7,411
2043	6,279	6,279	7,595
2044	6,431	6,431	7,778

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.  
 # Based on conversion factors for optional forms of payment in effect December 31, 2017.

**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(a) Public Safety/Law Enforcement Member  
(Transition Group C) – Termination Benefit  
Terminating December 31, 2017  
Under Benefit Provisions Evaluated**

**Data:**

A.	\$38,000	Final Average Earnings
B.	15	Years of Credited Service
C.	37	Age of Member
D.	34	Age of Spouse
E.	56:53	Ages at Which Benefits are Payable
F.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)
G.	\$46,000	Accumulated Contributions at Termination Date

**Computations:**

H.	Formula Benefit:	$(0.015 \times 15 \text{ years}) \times \$38,000 =$	\$ 8,550
I.	Reduction for Line F Election:	$\# (1 - 0.86503) \times (H) =$	1,154
J.	Benefit Payable to Retiree while Spouse is Alive:	$(H) - (I) =$	7,396
K.	Benefit Payable to Spouse after Member's Death		7,396
L.	Benefit Payable to Retiree after Spouse's Death		8,550
M.	In lieu of a lifetime benefit, terminatee may elect to receive a refund of accumulated contributions with interest plus an additional 67% of eligible accumulated contributions because terminatee had more than 10 years of service.		76,820

**Projected Benefits:\***

Year Ended December 31,	Member's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Member's Benefit (After Spouse's Death)
2037	\$ 7,396	\$ 7,396	\$ 8,550
2038	7,618	7,618	8,807
2039	7,840	7,840	9,063
2040	8,062	8,062	9,320
2041	8,284	8,284	9,576
2042	8,505	8,505	9,833
2043	8,727	8,727	10,089
2044	8,949	8,949	10,346
2045	9,171	9,171	10,602
2046	9,393	9,393	10,859

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2017.

## **SECTION IV**

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### **RECOMMENDATIONS FOR RESERVE TRANSFERS**

## December 31, 2017 Retired Life Valuation Reserve Transfers

Reserve transfers from the Employer Accumulation Fund to the A & PR Fund and/or Survivor Benefit Funds are recommended in the following instances.

- Whenever the December 31 valuation shows unfunded accrued liabilities or assets in excess of computed liabilities in any of the retired life funds.
- To cover the cost of ad-hoc postretirement benefit increases.
- To adjust retired life reserves for any changes in computed liabilities resulting from assumption changes.

By making these annual adjustments in addition to the regular transfers when allowances are added to the rolls, the ratio of assets to liabilities for retired members and beneficiaries will stay at 100%. Year to year changes in this ratio before recommended transfers will normally be isolated to mortality experience within the retired life group.

In 1992, OPERS began making interim benefit payments for certain retirements to shorten the delay between the retirement effective date and receipt of the first monthly check. However, reserve transfers are not made until benefit amounts are final. Transfers for these cases have been accrued based upon supplemental information supplied by OPERS staff and are shown on the following page. The accruals, when added to other assets, are intended to put retired life reserves in the same position they would have been in if reserve transfers for the interim benefit cases had been coincident with benefit commencement.

It is recommended that the transfers shown on the following page be made from the Employer Accumulation Fund to the Annuity & Pension Reserve Fund and Survivor Benefit Funds as indicated. The Accrued Transfers is an estimate of pending future transfers for interim cases, and does not require a year end transfer. Any accrued transfers that have been made prior to OPERS' extract date and hence are not included in the "Accrued Transfers" column on pages IV-2 through IV-5 should be netted off the "Other" column on pages IV-2 through IV-5.

## Traditional Plan

### Reserve Transfers Affecting the Employer Accumulation Fund

### December 31, 2017

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
SR	\$ 20,531,466,535	\$ 141,898,549	\$ 1,521,288,291	\$ 22,194,653,375	\$ 22,194,653,375	
MP	58,060,294	0	2,628,154	60,688,448	60,688,448	
AA	234,529	0	(35,025)	199,504	199,504	
JR	2,030	0	(2,030)	0	0	
CR	130,776,957	0	27,635,184	158,412,141	158,412,141	
DR	2,156,781,573	1,070,232	143,860,929	2,301,712,734	2,301,712,734	
BD	579,236,407	9,591,797	35,002,091	623,830,295	623,830,295	
<b>TOTAL A&amp;PR</b>	<b>\$ 23,456,558,325</b>	<b>\$ 152,560,578</b>	<b>\$ 1,730,377,594</b>	<b>\$ 25,339,496,497</b>	<b>\$ 25,339,496,497</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	123,579,159	8,425,834	6,576,082	138,581,075	138,581,075	
S-2	512,782,786	14,153,688	43,020,699	569,957,173	569,957,173	
<b>TOTAL SBF</b>	<b>\$ 636,361,945</b>	<b>\$ 22,579,522</b>	<b>\$ 49,596,781</b>	<b>\$ 708,538,248</b>	<b>\$ 708,538,248</b>	<b>100.0%</b>
<b>TOTAL STATE</b>	<b>\$ 24,092,920,270</b>	<b>\$ 175,140,100</b>	<b>\$ 1,779,974,375</b>	<b>\$ 26,048,034,745</b>	<b>\$ 26,048,034,745</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
SR	\$ 28,491,672,461	\$ 259,758,166	\$ 2,189,248,194	\$ 30,940,678,821	\$ 30,940,678,821	
MP	147,361,156	214,175	6,153,208	153,728,539	153,728,539	
AA	58,391,626	373,039	4,450,147	63,214,812	63,214,812	
JR	3,438	0	(3,438)	0	0	
CR	176,230,611	0	38,910,635	215,141,246	215,141,246	
DR	2,658,945,728	3,797,891	172,328,273	2,835,071,892	2,835,071,892	
BD	733,383,681	13,282,358	42,610,624	789,276,663	789,276,663	
<b>TOTAL A&amp;PR</b>	<b>\$ 32,265,988,701</b>	<b>\$ 277,425,629</b>	<b>\$ 2,453,697,643</b>	<b>\$ 34,997,111,973</b>	<b>\$ 34,997,111,973</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	183,182,915	10,552,755	14,606,011	208,341,681	208,341,681	
S-2	852,411,216	16,294,069	76,630,666	945,335,951	945,335,951	
<b>TOTAL SBF</b>	<b>\$ 1,035,594,131</b>	<b>\$ 26,846,824</b>	<b>\$ 91,236,677</b>	<b>\$ 1,153,677,632</b>	<b>\$ 1,153,677,632</b>	<b>100.0%</b>
<b>TOTAL LOCAL</b>	<b>\$ 33,301,582,832</b>	<b>\$ 304,272,453</b>	<b>\$ 2,544,934,320</b>	<b>\$ 36,150,789,605</b>	<b>\$ 36,150,789,605</b>	<b>100.0%</b>

## Traditional Plan

### Reserve Transfers Affecting the Employer Accumulation Fund

### December 31, 2017

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>Public Safety</b>						
A&PR FUND						
SR	\$ 9,038,082	\$ 0	\$ 774,052	\$ 9,812,134	\$ 9,812,134	
MP	0	0	0	0	0	
AA	0	0	0	0	0	
JR	0	0	0	0	0	
CR	0	0	0	0	0	
DR	14,110,194	0	1,356,197	15,466,391	15,466,391	
BD	1,895,580	0	191,423	2,087,003	2,087,003	
<b>TOTAL A&amp;PR</b>	<b>\$ 25,043,856</b>	<b>\$ 0</b>	<b>\$ 2,321,672</b>	<b>\$ 27,365,528</b>	<b>\$ 27,365,528</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	1,151,001	0	892,887	2,043,888	2,043,888	
S-2	18,962,460	973,373	1,146,497	21,082,330	21,082,330	
<b>TOTAL SBF</b>	<b>\$ 20,113,461</b>	<b>\$ 973,373</b>	<b>\$ 2,039,384</b>	<b>\$ 23,126,218</b>	<b>\$ 23,126,218</b>	<b>100.0%</b>
<b>TOTAL PUBLIC SAFETY</b>	<b>\$ 45,157,317</b>	<b>\$ 973,373</b>	<b>\$ 4,361,056</b>	<b>\$ 50,491,746</b>	<b>\$ 50,491,746</b>	<b>100.0%</b>
<b>Law Enforcement</b>						
A&PR FUND						
SR	\$ 1,630,855,920	\$ 15,407,477	\$ 126,557,336	\$ 1,772,820,733	\$ 1,772,820,733	
MP	430	0	(430)	0	0	
AA	0	0	0	0	0	
JR	0	0	0	0	0	
CR	1,476,812	0	324,816	1,801,628	1,801,628	
DR	556,931,131	0	45,399,651	602,330,782	602,330,782	
BD	132,682,800	2,269,687	15,441,115	150,393,602	150,393,602	
<b>TOTAL A&amp;PR</b>	<b>\$ 2,321,947,093</b>	<b>\$ 17,677,164</b>	<b>\$ 187,722,488</b>	<b>\$ 2,527,346,745</b>	<b>\$ 2,527,346,745</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	12,132,820	0	697,995	12,830,815	12,830,815	
S-2	38,497,308	1,984,481	4,263,516	44,745,305	44,745,305	
<b>TOTAL SBF</b>	<b>\$ 50,630,128</b>	<b>\$ 1,984,481</b>	<b>\$ 4,961,511</b>	<b>\$ 57,576,120</b>	<b>\$ 57,576,120</b>	<b>100.0%</b>
<b>TOTAL LAW ENFORCEMENT</b>	<b>\$ 2,372,577,221</b>	<b>\$ 19,661,645</b>	<b>\$ 192,683,999</b>	<b>\$ 2,584,922,865</b>	<b>\$ 2,584,922,865</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 59,812,237,640</b>	<b>\$ 500,047,571</b>	<b>\$ 4,521,953,750</b>	<b>\$ 64,834,238,961</b>	<b>\$ 64,834,238,961</b>	<b>100.0%</b>

**Combined Plan**  
**Reserve Transfers Affecting the Employer Accumulation Fund**  
**December 31, 2017**

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
CA	\$ 2,574,651	\$ 0	\$ 81,132	\$ 2,655,783	\$ 2,655,783	
CA RESERVE FOR FUTURE ADVERSE EXPERIENCE	0	0	0	0	0	
CA TOTAL (DC)	\$ 2,574,651	\$ 0	\$ 81,132	\$ 2,655,783	\$ 2,655,783	
CB TOTAL (DB)	4,505,555	68,933	272,088	4,846,576	4,846,576	
TOTAL A&PR	\$ 7,080,206	\$ 68,933	\$ 353,220	\$ 7,502,359	\$ 7,502,359	100.0%
<b>TOTAL STATE</b>	<b>\$ 7,080,206</b>	<b>\$ 68,933</b>	<b>\$ 353,220</b>	<b>\$ 7,502,359</b>	<b>\$ 7,502,359</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
CA	\$ 5,957,001	\$ 55,985	\$ (342,896)	\$ 5,670,090	\$ 5,670,090	
CA RESERVE FOR FUTURE ADVERSE EXPERIENCE	0	0	342,896	342,896	342,896	
CA TOTAL (DC)	\$ 5,957,001	\$ 55,985	\$ 0	\$ 6,012,986	\$ 6,012,986	
CB TOTAL (DB)	8,762,324	230,824	738,599	9,731,747	9,731,747	
TOTAL A&PR	\$ 14,719,325	\$ 286,809	\$ 738,599	\$ 15,744,733	\$ 15,744,733	100.0%
<b>TOTAL LOCAL</b>	<b>\$ 14,719,325</b>	<b>\$ 286,809</b>	<b>\$ 738,599</b>	<b>\$ 15,744,733</b>	<b>\$ 15,744,733</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 21,799,531</b>	<b>\$ 355,743</b>	<b>\$ 1,091,818</b>	<b>\$ 23,247,092</b>	<b>\$ 23,247,092</b>	<b>100.0%</b>

**Member Directed Plan**  
**Reserve Transfers Affecting the Employer Accumulation Fund**  
**December 31, 2017**

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
MD	\$ 5,298,076	\$ 153,926	\$ (564,922)	\$ 4,887,080	\$ 4,887,080	
RESERVE FOR FUTURE ADVERSE EXPERIENCE*	799,630	0	410,996	1,210,626	1,210,626	
<b>TOTAL STATE</b>	<b>\$ 6,097,706</b>	<b>\$ 153,926</b>	<b>\$ (153,926)</b>	<b>\$ 6,097,706</b>	<b>\$ 6,097,706</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
MD	\$ 9,596,913	\$ 0	\$ (215,141)	\$ 9,381,772	\$ 9,381,772	
RESERVE FOR FUTURE ADVERSE EXPERIENCE*	1,075,422	0	215,141	1,290,563	1,290,563	
<b>TOTAL LOCAL</b>	<b>\$ 10,672,335</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 10,672,335</b>	<b>\$ 10,672,335</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 16,770,041</b>	<b>\$ 153,926</b>	<b>\$ (153,926)</b>	<b>\$ 16,770,041</b>	<b>\$ 16,770,041</b>	<b>100.0%</b>

\* Includes funds for pending retirements.

## **SECTION V**

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### **STATE DIVISION**

## STATE DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Defined Benefit Active Members in Valuation December 31, 2017*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
<b>Traditional Plan</b>					
Men	53,666	\$ 2,371,389,536	\$ 44,188	39.7 yrs.	8.9 yrs.
Women	64,614	2,740,699,617	42,416	39.2	8.4
Traditional Plan Total	118,280	\$ 5,112,089,153	\$ 43,220	39.4 yrs.	8.6 yrs.
<b>Combined Plan</b>					
Men	1,145	\$ 68,646,386	\$ 59,953	42.9 yrs.	7.9 yrs.
Women	1,774	104,734,376	59,039	42.9	7.5
Combined Plan Total	2,919	\$ 173,380,762	\$ 59,397	42.9 yrs.	7.7 yrs.
<b>Grand Total</b>	<b>121,199</b>	<b>\$ 5,285,469,915</b>	<b>\$ 43,610</b>	<b>39.5 yrs.</b>	<b>8.6 yrs.</b>

Also included in the valuation were 244,038 inactive members and 4,198 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2017*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
<b>Traditional Plan</b>			
A & PR Fund			
Superannuation Retirement	60,390	\$ 165,332,151	\$ 22,353,265,020
Disability Retirement	8,145	21,287,870	2,925,543,029
Money Purchase	955	494,228	60,688,448
Total A & PR Fund	69,490	\$ 187,114,249	\$ 25,339,496,497
Total SBF	4,524	5,884,824	708,538,248
Traditional Plan Total	74,014	\$ 192,999,073	\$ 26,048,034,745
<b>Combined Plan</b>			
A & PR Fund			
CB (DB)	80	\$ 33,762	\$ 4,846,576
CA (DC)	48	18,524	2,655,783
Total A & PR Fund	128	\$ 52,286	\$ 7,502,359
Combined Plan Total	128	\$ 52,286	\$ 7,502,359
<b>Member Directed Plan</b>			
A & PR Fund	66	\$ 33,022	\$ 4,887,080
Reserve for Future Adverse Experience			1,210,626
Member Directed Plan Total	66	\$ 33,022	\$ 6,097,706
<b>Grand Total</b>	<b>74,208</b>	<b>\$ 193,084,381</b>	<b>\$ 26,061,634,810</b>

**STATE DIVISION**  
**Employer Contributions to Support**  
**Defined Benefit Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2017			2016
Contributions for	2020			2019
Normal Cost	<u>Traditional Plan</u>	<u>Combined Plan</u>	<u>Traditional and Combined Plans</u>	<u>Traditional and Combined Plans</u>
Age and Service Allowances*	7.88 %	4.41 %	7.76 %	7.72 %
Disability Allowances	1.59 %	1.51 %	1.59 %	1.59 %
Survivor's Benefits	0.32 %	0.26 %	0.32 %	0.32 %
Separation Benefits	4.11 %	0.95 %	4.01 %	4.01 %
Total Normal Cost	13.90 %	7.13 %	13.68 %	13.64 %
(Member Contributions)	10.00 %	0.00 %	9.61 %	9.61 %
Employer Normal Cost	3.90 %	7.13 %	4.07 %	4.03 %
<b>Unfunded Actuarial Accrued Liabilities</b>				
Total Available Contribution	10.10 %	6.87 %	9.93 %	9.97 %
Amortization Years	23	0	23	24
<b>Total Pension Employer Contribution Rate</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>

*\*Includes contributions for administrative expenses.*

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## STATE DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Defined Benefit Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
2003##	2006	108,249	(\$Millions) \$ 4,079	\$ 37,679	0.4 %	5.70 %	3.34 %	9.04 %	4.50 %	13.54 %
2004	2007	110,207	4,165	37,794	0.3 %	5.67 %	2.60 %	8.27 %	5.50 %	13.77 %
2005@	2008	114,620	4,339	37,858	0.2 %	5.43 %	1.57 %	7.00 %	7.00 %	14.00 %
2006	2009	115,930	4,522	39,005	3.0 %	4.97 %	2.03 %	7.00 %	7.00 %	14.00 %
2007	2010	118,466	4,703	39,695	1.8 %	5.44 %	1.56 %	7.00 %	7.00 %	14.00 %
2008	2011	114,925	4,780	41,590	4.8 %	5.44 %	4.56 %	10.00 %	4.00 %	14.00 %
2009	2012	117,008	4,763	40,704	(2.1)%	5.45 %	4.55 %	10.00 %	4.00 %	14.00 %
2010@	2013	118,240	4,811	40,691	0.0 %	5.36 %	7.64 %	13.00 %	1.00 %	14.00 %
2011	2014	118,273	4,844	40,952	0.6 %	5.37 %	8.63 %	14.00 %	0.00 %	14.00 %
2012#	2015	117,430	4,690	39,938	(2.5)%	3.49 %	7.51 %	11.00 %	3.00 %	14.00 %
2013	2016	117,370	4,746	40,433	1.2 %	3.49 %	6.51 %	10.00 %	4.00 %	14.00 %
2014	2017	118,114	4,826	40,862	1.1 %	3.40 %	6.60 %	10.00 %	4.00 %	14.00 %
2015@	2018	118,372	4,961	41,911	2.6 %	4.09 %	9.91 %	14.00 %	0.00 %	14.00 %
2016	2019	119,223	5,131	43,037	2.7 %	4.03 %	9.97 %	14.00 %	0.00 %	14.00 %
2017	2020	121,199	5,285	43,610	1.3 %	4.07 %	9.93 %	14.00 %	0.00 %	14.00 %

# After benefit changes.

@ Revised actuarial assumptions.

## Combined Plan members are included beginning with the December 31, 2003 valuation.

**STATE DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2017**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 25,353,096,562	\$ -	\$ 25,353,096,562
Allowances currently being paid from the Survivors Benefit Fund	708,538,248	-	708,538,248
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	15,613,048,681	3,241,597,233	12,371,451,448
Disability allowances likely to be paid present active members who become permanently disabled	1,523,013,045	663,560,258	859,452,787
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	384,716,012	126,509,723	258,206,289
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,540,863,686	1,731,112,156	809,751,530
Total	\$ 46,123,276,234	\$ 5,762,779,370	\$ 40,360,496,864
Actuarial Value of Assets			31,959,094,638
Unfunded Actuarial Accrued Liability			\$ 8,401,402,226

*\*Includes contributions for administrative expenses.*

**STATE DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed Total	Valuation Assets	Unfunded	Amortization Years	
	Total	Average					
2003##	4,079	\$37,679	\$ 12,230	\$ 9,030	\$ 3,200	43	0.78
2004	4,165	37,794	12,441	9,664	2,777	34	0.67
2005@	4,339	37,858	13,326	10,296	3,030	39	0.70
2006	4,522	39,005	14,006	12,131	1,875	35	0.41
2007	4,703	39,695	14,526	13,442	1,084	20	0.23
2008	4,780	41,590	14,872	7,488	7,384	N/A	1.54
2009	4,763	40,704	14,843	6,648	8,195	N/A	1.71
2010@	4,811	40,691	14,903	7,113	7,790	48	1.62
2011	4,844	40,952	14,754	6,616	8,138	37	1.68
2012#	4,690	39,938	13,135	5,270	7,865	37	1.68
2013	4,746	40,433	13,125	6,572	6,553	32	1.38
2014	4,826	40,862	12,951	5,631	7,320	40	1.52
2015@	4,961	41,911	13,788	5,550	8,238	24	1.66
2016	5,131	43,037	14,090	5,587	8,503	24	1.66
2017	5,285	43,610	14,300	5,899	8,401	23	1.59

# After benefit changes.

@ Revised actuarial assumptions.

## Combined Plan members are included beginning with the December 31, 2003 valuation.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll ("UNFUNDED/PAYROLL" above) is significant. Unfunded actuarial accrued liabilities represent plan debt, while active member payroll represents the plan's capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**STATE DIVISION**  
**Male Active Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	970							970
Tot. Pay	\$9,238,176							\$9,238,176
Avg. Pay	\$9,524							\$9,524
20-24	10,484	18						10,502
Tot. Pay	\$138,145,550	\$474,122						\$138,619,672
Avg. Pay	\$13,177	\$26,340						\$13,199
25-29	5,762	626	8					6,396
Tot. Pay	\$165,287,534	\$28,861,569	\$335,444					\$194,484,547
Avg. Pay	\$28,686	\$46,105	\$41,931					\$30,407
30-34	3,357	1,535	512	16				5,420
Tot. Pay	\$123,820,979	\$81,962,930	\$28,507,421	\$806,862				\$235,098,192
Avg. Pay	\$36,884	\$53,396	\$55,679	\$50,429				\$43,376
35-39	2,052	1,101	1,305	421	6			4,885
Tot. Pay	\$81,970,529	\$62,458,937	\$79,990,146	\$26,150,642	\$369,026			\$250,939,280
Avg. Pay	\$39,947	\$56,729	\$61,295	\$62,116	\$61,504			\$51,369
40-44	1,437	819	930	1,055	323	6		4,570
Tot. Pay	\$56,599,536	\$47,529,418	\$59,316,957	\$71,303,602	\$21,076,318	\$465,520		\$256,291,351
Avg. Pay	\$39,387	\$58,033	\$63,782	\$67,586	\$65,252	\$77,587		\$56,081
45-49	1,306	810	822	984	1,217	435	6	5,580
Tot. Pay	\$53,512,559	\$45,577,937	\$54,341,793	\$64,727,645	\$86,790,270	\$33,859,354	\$424,149	\$339,233,707
Avg. Pay	\$40,974	\$56,269	\$66,109	\$65,780	\$71,315	\$77,838	\$70,692	\$60,795
50-54	1,035	684	753	757	993	1,246	322	5,790
Tot. Pay	\$38,377,624	\$38,938,733	\$46,949,142	\$48,839,456	\$69,660,434	\$95,289,531	\$25,639,504	\$363,694,424
Avg. Pay	\$37,080	\$56,928	\$62,349	\$64,517	\$70,151	\$76,476	\$79,626	\$62,814
55-59	870	509	607	722	785	983	717	5,193
Tot. Pay	\$31,729,502	\$28,350,806	\$38,481,296	\$45,584,537	\$52,865,447	\$73,179,039	\$57,676,644	\$327,867,271
Avg. Pay	\$36,471	\$55,699	\$63,396	\$63,136	\$67,345	\$74,445	\$80,442	\$63,136
60-64	575	390	494	516	565	552	485	3,577
Tot. Pay	\$16,840,462	\$22,566,693	\$31,017,604	\$32,547,420	\$38,796,790	\$39,969,269	\$38,549,631	\$220,287,869
Avg. Pay	\$29,288	\$57,863	\$62,789	\$63,076	\$68,667	\$72,408	\$79,484	\$61,585
65-69	312	139	171	171	174	171	210	1,348
Tot. Pay	\$6,607,883	\$7,302,071	\$11,692,947	\$11,730,025	\$12,141,866	\$12,701,181	\$17,310,514	\$79,486,487
Avg. Pay	\$21,179	\$52,533	\$68,380	\$68,597	\$69,781	\$74,276	\$82,431	\$58,966
70 & Over	246	66	61	54	53	44	56	580
Tot. Pay	\$3,592,634	\$2,730,399	\$2,696,241	\$3,541,026	\$3,604,965	\$3,437,832	\$5,191,849	\$24,794,946
Avg. Pay	\$14,604	\$41,370	\$44,201	\$65,575	\$68,018	\$78,133	\$92,712	\$42,750
<b>Totals</b>	28,406	6,697	5,663	4,696	4,116	3,437	1,796	54,811
<b>Tot. Pay</b>	\$725,722,968	\$366,753,615	\$353,328,991	\$305,231,215	\$285,305,116	\$258,901,726	\$144,792,291	\$2,440,035,922
<b>Avg. Pay</b>	\$25,548	\$54,764	\$62,393	\$64,998	\$69,316	\$75,328	\$80,619	\$44,517

**STATE DIVISION**  
**Female Active Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1,478							1,478
Tot. Pay	\$12,893,105							\$12,893,105
Avg. Pay	\$8,723							\$8,723
20-24	13,262	16						13,278
Tot. Pay	\$172,059,856	\$431,851						\$172,491,707
Avg. Pay	\$12,974	\$26,991						\$12,991
25-29	6,619	804	11					7,434
Tot. Pay	\$208,291,788	\$39,379,256	\$462,949					\$248,133,993
Avg. Pay	\$31,469	\$48,979	\$42,086					\$33,378
30-34	4,180	1,879	554	9				6,622
Tot. Pay	\$152,366,604	\$98,919,915	\$32,006,297	\$387,493				\$283,680,309
Avg. Pay	\$36,451	\$52,645	\$57,773	\$43,055				\$42,839
35-39	2,632	1,393	1,513	473	14			6,025
Tot. Pay	\$107,386,221	\$76,831,767	\$92,269,238	\$28,662,017	\$933,152			\$306,082,395
Avg. Pay	\$40,800	\$55,156	\$60,984	\$60,596	\$66,654			\$50,802
40-44	1,877	1,105	1,111	1,118	347	12		5,570
Tot. Pay	\$77,168,769	\$63,360,604	\$71,084,529	\$73,274,327	\$22,866,615	\$748,501		\$308,503,345
Avg. Pay	\$41,113	\$57,340	\$63,982	\$65,541	\$65,898	\$62,375		\$55,387
45-49	1,772	1,032	1,051	1,064	1,120	472	20	6,531
Tot. Pay	\$74,009,693	\$60,306,717	\$65,057,849	\$69,056,737	\$77,662,686	\$33,565,618	\$1,233,377	\$380,892,677
Avg. Pay	\$41,766	\$58,437	\$61,901	\$64,903	\$69,342	\$71,114	\$61,669	\$58,321
50-54	1,346	899	1,002	974	1,031	1,182	399	6,833
Tot. Pay	\$55,805,990	\$50,492,871	\$61,277,753	\$58,723,963	\$66,367,398	\$85,320,374	\$29,657,764	\$407,646,113
Avg. Pay	\$41,461	\$56,166	\$61,155	\$60,292	\$64,372	\$72,183	\$74,330	\$59,658
55-59	1,002	818	980	1,011	955	1,082	626	6,474
Tot. Pay	\$40,118,731	\$44,941,077	\$56,032,163	\$59,105,857	\$59,675,534	\$73,301,491	\$47,362,142	\$380,536,995
Avg. Pay	\$40,039	\$54,940	\$57,176	\$58,463	\$62,487	\$67,746	\$75,658	\$58,779
60-64	531	472	713	807	666	699	391	4,279
Tot. Pay	\$18,446,236	\$25,524,894	\$41,532,960	\$46,530,752	\$40,220,033	\$45,806,522	\$27,279,712	\$245,341,109
Avg. Pay	\$34,739	\$54,078	\$58,251	\$57,659	\$60,390	\$65,532	\$69,769	\$57,336
65-69	168	156	203	268	225	223	174	1,417
Tot. Pay	\$3,726,652	\$8,165,382	\$11,729,444	\$16,039,972	\$13,774,832	\$14,236,595	\$12,437,191	\$80,110,068
Avg. Pay	\$22,182	\$52,342	\$57,781	\$59,851	\$61,221	\$63,841	\$71,478	\$56,535
70 & Over	101	42	57	67	50	53	77	447
Tot. Pay	\$1,682,766	\$1,374,529	\$2,351,469	\$3,204,956	\$2,991,778	\$3,111,325	\$4,405,354	\$19,122,177
Avg. Pay	\$16,661	\$32,727	\$41,254	\$47,835	\$59,836	\$58,704	\$57,212	\$42,779
<b>Totals</b>	34,968	8,616	7,195	5,791	4,408	3,723	1,687	66,388
<b>Tot. Pay</b>	\$923,956,411	\$469,728,863	\$433,804,651	\$354,986,074	\$284,492,028	\$256,090,426	\$122,375,540	\$2,845,433,993
<b>Avg. Pay</b>	\$26,423	\$54,518	\$60,293	\$61,300	\$64,540	\$68,786	\$72,540	\$42,861

**STATE DIVISION**  
**Inactive Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20	215							215
20-24	20,729							20,729
25-29	45,037	184						45,221
30-34	59,782	804	47					60,633
35-39	34,718	1,073	262	29				36,082
40-44	25,579	865	349	92	6	1		26,892
45-49	17,715	920	420	184	61	7		19,307
50-54	9,885	974	577	236	134	42	1	11,849
55-59	7,996	1,014	705	377	182	37	6	10,317
60-64	6,178	725	478	237	87	13	3	7,721
65-69	3,381	272	94	35	22	8	5	3,817
70 & Over	1,161	57	31	4		1	1	1,255
<b>Totals</b>	<b>232,376</b>	<b>6,888</b>	<b>2,963</b>	<b>1,194</b>	<b>492</b>	<b>109</b>	<b>16</b>	<b>244,038</b>

## **SECTION VI**

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### **LOCAL GOVERNMENT DIVISION**

## LOCAL GOVERNMENT DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Defined Benefit Active Members in Valuation December 31, 2017*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
<b>Traditional Plan</b>					
Men	91,038	\$ 3,751,230,985	\$ 41,205	44.8 yrs.	10.0 yrs.
Women	105,886	3,932,973,083	37,143	44.1	10.0
Traditional Plan Total	196,924	\$ 7,684,204,068	\$ 39,021	44.4 yrs.	10.0 yrs.
<b>Combined Plan</b>					
Men	2,175	\$ 114,756,227	\$ 52,761	45.9 yrs.	8.4 yrs.
Women	2,854	130,399,923	45,690	44.7	8.0
Combined Plan Total	5,029	\$ 245,156,150	\$ 48,748	45.2 yrs.	8.2 yrs.
<b>Grand Total</b>	<b>201,953</b>	<b>\$ 7,929,360,218</b>	<b>\$ 39,263</b>	<b>44.4 yrs.</b>	<b>9.9 yrs.</b>

Also included in the valuation were 300,691 inactive members and 16,620 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2017*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
<b>Traditional Plan</b>			
A & PR Fund			
Superannuation Retirement	112,624	\$ 231,895,363	\$ 31,219,034,879
Disability Retirement	11,530	26,955,079	3,624,348,555
Money Purchase	3,061	1,265,499	153,728,539
Total A & PR Fund	127,215	\$ 260,115,941	\$ 34,997,111,973
Total SBF	9,670	9,704,484	1,153,677,632
Traditional Plan Total	136,885	\$ 269,820,425	\$ 36,150,789,605
<b>Combined Plan</b>			
A & PR Fund			
CB (DB)	203	\$ 67,730	\$ 9,731,747
CA (DC)	145	39,748	6,012,986
Total A & PR Fund	348	\$ 107,478	\$ 15,744,733
Combined Plan Total	348	\$ 107,478	\$ 15,744,733
<b>Member Directed Plan</b>			
A & PR Fund	176	\$ 64,776	\$ 9,381,772
Reserve for Future Adverse Experience			1,290,563
Member Directed Plan Total	176	\$ 64,776	\$ 10,672,335
<b>Grand Total</b>	<b>137,409</b>	<b>\$ 269,992,679</b>	<b>\$ 36,177,206,673</b>

**LOCAL GOVERNMENT DIVISION**  
**Employer Contributions to Support**  
**Defined Benefit Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2017			2016
Contributions for	2020			2019
Normal Cost	<u>Traditional Plan</u>	<u>Combined Plan</u>	<u>Traditional and Combined Plans</u>	<u>Traditional and Combined Plans</u>
Age and Service Allowances*	8.31 %	4.68 %	8.21 %	8.16 %
Disability Allowances	1.31 %	1.20 %	1.30 %	1.30 %
Survivor's Benefits	0.40 %	0.34 %	0.40 %	0.40 %
Separation Benefits	3.71 %	1.05 %	3.62 %	3.64 %
Total Normal Cost	13.73 %	7.27 %	13.53 %	13.50 %
(Member Contributions)	10.00 %	0.00 %	9.64 %	9.65 %
Employer Normal Cost	3.73 %	7.27 %	3.89 %	3.85 %
<b>Unfunded Actuarial Accrued Liabilities</b>				
Total Available Contribution	10.27 %	6.73 %	10.11 %	10.15 %
Amortization Years	16	0	16	17
<b>Total Pension Employer Contribution Rate</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>

*\*Includes contributions for administrative expenses.*

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## LOCAL GOVERNMENT DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Defined Benefit Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Millions)							
2003##	2006	237,082	\$ 6,702	\$ 28,269	4.0 %	5.66 %	3.54 %	9.20 %	4.50 %	13.70 %
2004	2007	236,907	6,896	29,110	3.0 %	5.57 %	2.78 %	8.35 %	5.50 %	13.85 %
2005@	2008	236,073	7,066	29,933	2.8 %	5.00 %	2.00 %	7.00 %	7.00 %	14.00 %
2006	2009	237,981	7,234	30,399	1.6 %	4.53 %	2.47 %	7.00 %	7.00 %	14.00 %
2007	2010	237,225	7,438	31,354	3.1 %	5.12 %	1.88 %	7.00 %	7.00 %	14.00 %
2008	2011	233,163	7,566	32,451	3.5 %	5.14 %	4.86 %	10.00 %	4.00 %	14.00 %
2009	2012	223,004	7,334	32,889	1.3 %	5.14 %	4.86 %	10.00 %	4.00 %	14.00 %
2010@	2013	215,144	7,196	33,447	1.7 %	5.12 %	7.88 %	13.00 %	1.00 %	14.00 %
2011	2014	209,452	7,115	33,968	1.6 %	5.14 %	8.86 %	14.00 %	0.00 %	14.00 %
2012#	2015	208,188	7,061	33,918	(0.1)%	3.13 %	7.87 %	11.00 %	3.00 %	14.00 %
2013	2016	207,416	7,134	34,396	1.4 %	3.16 %	6.84 %	10.00 %	4.00 %	14.00 %
2014	2017	203,955	7,360	36,087	4.9 %	3.06 %	6.94 %	10.00 %	4.00 %	14.00 %
2015@	2018	202,779	7,505	37,008	2.6 %	3.91 %	10.09 %	14.00 %	0.00 %	14.00 %
2016	2019	203,767	7,800	38,279	3.4 %	3.85 %	10.15 %	14.00 %	0.00 %	14.00 %
2017	2020	201,953	7,929	39,263	2.6 %	3.89 %	10.11 %	14.00 %	0.00 %	14.00 %

# After benefit changes.

@ Revised actuarial assumptions.

## Combined Plan members are included beginning with the December 31, 2003 valuation.

**LOCAL GOVERNMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2017**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 35,023,529,041	\$ -	\$ 35,023,529,041
Allowances currently being paid from the Survivors Benefit Fund	1,153,677,632	-	1,153,677,632
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	24,100,439,157	5,244,170,524	18,856,268,633
Disability allowances likely to be paid present active members who become permanently disabled	1,787,229,785	830,308,024	956,921,761
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	699,796,452	240,103,352	459,693,100
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	3,751,380,818	2,420,902,571	1,330,478,247
<b>Total</b>	<b>\$ 66,516,052,885</b>	<b>\$ 8,735,484,471</b>	<b>\$ 57,780,568,414</b>
Actuarial Value of Assets			47,449,017,918
Unfunded Actuarial Accrued Liability			<b>\$ 10,331,550,496</b>

*\*Includes contributions for administrative expenses.*

**LOCAL GOVERNMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization	
	Total	Average	Total	Assets		Years	
2003##	\$ 6,702	\$28,269	\$ 17,645	\$ 13,148	\$4,497	27	0.67
2004	6,896	29,110	18,269	14,223	4,046	23	0.59
2005@	7,066	29,933	19,484	14,921	4,563	25	0.65
2006	7,234	30,399	20,147	17,523	2,624	19	0.36
2007	7,438	31,354	20,838	19,656	1,182	9	0.16
2008	7,566	32,451	21,590	11,561	10,029	N/A	1.33
2009	7,334	32,889	21,620	11,599	10,021	N/A	1.37
2010@	7,196	33,447	21,668	13,212	8,456	22	1.18
2011	7,115	33,968	21,631	11,418	10,213	25	1.44
2012#	7,061	33,918	19,583	11,981	7,602	15	1.08
2013	7,134	34,396	19,586	11,440	8,146	20	1.14
2014	7,360	36,087	19,656	13,066	6,590	13	0.90
2015@	7,505	37,008	20,867	10,620	10,247	16	1.37
2016	7,800	38,279	21,422	10,699	10,723	17	1.37
2017	7,929	39,263	21,605	11,273	10,332	16	1.30

# After benefit changes.

@ Revised actuarial assumptions.

## Combined Plan members are included beginning with the December 31, 2003 valuation.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll ("UNFUNDED/PAYROLL" above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan's capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**LOCAL GOVERNMENT DIVISION**  
**Male Active Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	4,610							4,610
Tot. Pay	\$46,065,422							\$46,065,422
Avg. Pay	\$9,992							\$9,992
20-24	7,303	97						7,400
Tot. Pay	\$131,708,454	\$3,261,870						\$134,970,324
Avg. Pay	\$18,035	\$33,628						\$18,239
25-29	5,875	1,070	68					7,013
Tot. Pay	\$180,928,174	\$45,144,740	\$3,140,059					\$229,212,973
Avg. Pay	\$30,796	\$42,191	\$46,177					\$32,684
30-34	4,451	1,997	1,013	61				7,522
Tot. Pay	\$153,746,167	\$95,171,844	\$52,541,427	\$3,087,740				\$304,547,178
Avg. Pay	\$34,542	\$47,657	\$51,867	\$50,619				\$40,488
35-39	3,390	1,734	1,856	951	66			7,997
Tot. Pay	\$120,717,073	\$82,494,158	\$102,796,190	\$53,563,641	\$3,745,282			\$363,316,344
Avg. Pay	\$35,610	\$47,574	\$55,386	\$56,323	\$56,747			\$45,432
40-44	2,861	1,407	1,634	1,830	686	41		8,459
Tot. Pay	\$99,186,584	\$68,056,557	\$90,533,361	\$112,732,099	\$41,795,235	\$2,556,512		\$414,860,348
Avg. Pay	\$34,669	\$48,370	\$55,406	\$61,602	\$60,926	\$62,354		\$49,044
45-49	2,937	1,498	1,604	1,954	1,807	790	29	10,619
Tot. Pay	\$99,660,583	\$70,375,293	\$87,092,150	\$120,014,677	\$115,913,014	\$51,469,016	\$2,000,182	\$546,524,915
Avg. Pay	\$33,933	\$46,980	\$54,297	\$61,420	\$64,147	\$65,151	\$68,972	\$51,467
50-54	2,478	1,385	1,517	1,796	1,699	1,765	481	11,121
Tot. Pay	\$81,385,661	\$61,153,013	\$76,967,301	\$105,465,117	\$109,935,339	\$119,108,288	\$32,572,119	\$586,586,838
Avg. Pay	\$32,843	\$44,154	\$50,737	\$58,722	\$64,706	\$67,483	\$67,718	\$52,746
55-59	2,310	1,355	1,496	1,733	1,651	1,775	1,010	11,330
Tot. Pay	\$68,288,805	\$55,342,702	\$72,783,194	\$95,177,639	\$97,497,892	\$117,322,779	\$71,387,665	\$577,800,676
Avg. Pay	\$29,562	\$40,843	\$48,652	\$54,921	\$59,054	\$66,097	\$70,681	\$50,997
60-64	2,047	1,185	1,187	1,374	1,274	1,217	861	9,145
Tot. Pay	\$51,221,361	\$44,158,380	\$53,838,929	\$70,989,698	\$72,819,233	\$76,161,452	\$59,288,827	\$428,477,880
Avg. Pay	\$25,023	\$37,264	\$45,357	\$51,666	\$57,158	\$62,581	\$68,860	\$46,854
65-69	1,603	679	590	520	426	423	383	4,624
Tot. Pay	\$25,503,142	\$19,634,894	\$23,224,147	\$23,997,801	\$21,989,097	\$25,720,309	\$27,919,765	\$167,989,155
Avg. Pay	\$15,910	\$28,917	\$39,363	\$46,150	\$51,618	\$60,805	\$72,898	\$36,330
70 & Over	1,417	670	495	296	203	127	165	3,373
Tot. Pay	\$16,793,075	\$10,524,242	\$10,819,804	\$8,178,514	\$6,594,209	\$5,055,406	\$7,669,909	\$65,635,159
Avg. Pay	\$11,851	\$15,708	\$21,858	\$27,630	\$32,484	\$39,806	\$46,484	\$19,459
<b>Totals</b>	41,282	13,077	11,460	10,515	7,812	6,138	2,929	93,213
<b>Tot. Pay</b>	\$1,075,204,501	\$555,317,693	\$573,736,562	\$593,206,926	\$470,289,301	\$397,393,762	\$200,838,467	\$3,865,987,212
<b>Avg. Pay</b>	\$26,045	\$42,465	\$50,064	\$56,415	\$60,201	\$64,743	\$68,569	\$41,475

**LOCAL GOVERNMENT DIVISION**  
**Female Active Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	5,016							5,016
Tot. Pay	\$46,176,053							\$46,176,053
Avg. Pay	\$9,206							\$9,206
20-24	7,248	68						7,316
Tot. Pay	\$120,258,115	\$1,309,297						\$121,567,412
Avg. Pay	\$16,592	\$19,254						\$16,617
25-29	7,775	1,119	67					8,961
Tot. Pay	\$233,358,028	\$40,737,103	\$2,338,708					\$276,433,839
Avg. Pay	\$30,014	\$36,405	\$34,906					\$30,849
30-34	5,727	2,417	953	65				9,162
Tot. Pay	\$186,949,308	\$103,255,848	\$41,817,432	\$2,716,254				\$334,738,842
Avg. Pay	\$32,643	\$42,721	\$43,880	\$41,789				\$36,536
35-39	4,733	2,022	2,395	1,055	73			10,278
Tot. Pay	\$153,527,166	\$89,811,952	\$115,875,002	\$52,588,209	\$3,443,691			\$415,246,020
Avg. Pay	\$32,438	\$44,417	\$48,382	\$49,847	\$47,174			\$40,401
40-44	3,911	1,644	1,938	2,319	857	48		10,717
Tot. Pay	\$123,728,062	\$70,585,521	\$95,869,972	\$123,962,821	\$46,049,123	\$2,246,110		\$462,441,609
Avg. Pay	\$31,636	\$42,935	\$49,469	\$53,455	\$53,733	\$46,794		\$43,150
45-49	3,969	1,838	1,996	2,421	2,147	935	35	13,341
Tot. Pay	\$119,083,334	\$73,876,942	\$93,640,918	\$127,184,598	\$122,109,663	\$51,118,185	\$1,805,289	\$588,818,929
Avg. Pay	\$30,003	\$40,194	\$46,914	\$52,534	\$56,875	\$54,672	\$51,580	\$44,136
50-54	3,447	1,725	1,934	2,220	1,879	2,022	529	13,756
Tot. Pay	\$98,206,462	\$66,632,727	\$83,803,999	\$111,178,149	\$103,178,879	\$117,305,764	\$30,811,634	\$611,117,614
Avg. Pay	\$28,490	\$38,628	\$43,332	\$50,080	\$54,912	\$58,015	\$58,245	\$44,426
55-59	2,994	1,622	2,029	2,396	2,031	1,849	954	13,875
Tot. Pay	\$79,976,604	\$57,000,133	\$83,645,438	\$111,006,845	\$99,713,919	\$104,871,913	\$58,548,097	\$594,762,949
Avg. Pay	\$26,712	\$35,142	\$41,225	\$46,330	\$49,096	\$56,718	\$61,371	\$42,866
60-64	1,953	1,198	1,521	1,967	1,657	1,389	678	10,363
Tot. Pay	\$43,840,168	\$39,620,236	\$57,770,734	\$85,457,832	\$78,667,378	\$73,915,752	\$41,027,458	\$420,299,558
Avg. Pay	\$22,448	\$33,072	\$37,982	\$43,446	\$47,476	\$53,215	\$60,512	\$40,558
65-69	880	471	555	697	593	505	317	4,018
Tot. Pay	\$13,155,898	\$13,225,348	\$20,358,413	\$28,890,294	\$27,196,322	\$25,195,245	\$17,597,045	\$145,618,565
Avg. Pay	\$14,950	\$28,079	\$36,682	\$41,449	\$45,862	\$49,892	\$55,511	\$36,242
70 & Over	624	290	256	211	206	189	161	1,937
Tot. Pay	\$6,858,971	\$4,287,448	\$5,883,995	\$6,449,821	\$7,129,994	\$7,747,744	\$7,793,643	\$46,151,616
Avg. Pay	\$10,992	\$14,784	\$22,984	\$30,568	\$34,612	\$40,993	\$48,408	\$23,826
<b>Totals</b>	48,277	14,414	13,644	13,351	9,443	6,937	2,674	108,740
<b>Tot. Pay</b>	\$1,225,118,169	\$560,342,555	\$601,004,611	\$649,434,823	\$487,488,969	\$382,400,713	\$157,583,166	\$4,063,373,006
<b>Avg. Pay</b>	\$25,377	\$38,875	\$44,049	\$48,643	\$51,624	\$55,125	\$58,932	\$37,368

**LOCAL GOVERNMENT DIVISION**  
**Inactive Members in Defined Benefit Valuation**  
**December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20	2,096							2,096
20-24	27,385	6						27,391
25-29	37,767	381	4					38,152
30-34	43,574	1,055	109	2				44,740
35-39	38,523	1,389	408	66	1			40,387
40-44	32,600	1,454	624	229	27			34,934
45-49	26,694	1,763	849	396	140	15		29,857
50-54	20,076	1,880	1,093	519	299	83	3	23,953
55-59	19,401	2,136	1,428	752	377	76	9	24,179
60-64	16,805	1,707	1,093	479	215	31	6	20,336
65-69	9,698	684	228	105	42	8	10	10,775
70 & Over	3,531	229	76	36	12	5	2	3,891
<b>Totals</b>	<b>278,150</b>	<b>12,684</b>	<b>5,912</b>	<b>2,584</b>	<b>1,113</b>	<b>218</b>	<b>30</b>	<b>300,691</b>

## **SECTION VII**

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### **PUBLIC SAFETY DIVISION**

## PUBLIC SAFETY DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Active Members in Valuation December 31, 2017*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	62	\$ 2,973,010	\$ 47,952	39.0 yrs.	9.7 yrs.
Women	13	667,433	51,341	41.4	10.1
<b>Totals</b>	<b>75</b>	<b>\$ 3,640,443</b>	<b>\$ 48,539</b>	<b>39.4 yrs.</b>	<b>9.8 yrs.</b>

Also included in the valuation were 43 inactive members and 1 member active in the money purchase plan.

### *Retired Members in Valuation December 31, 2017*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	33	\$ 62,131	\$ 9,812,134
Disability Retirement	36	119,527	17,553,394
Money Purchase	0	0	0
Total A & PR Fund	69	\$ 181,658	\$ 27,365,528
Total SBF	117	162,529	23,126,218
<b>Grand Total</b>	<b>186</b>	<b>\$ 344,187</b>	<b>\$ 50,491,746</b>

**PUBLIC SAFETY DIVISION**  
**Employer Contributions to Support**  
**Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2017	2016
Contributions for	2020	2019
<b>Normal Cost</b>		
Age and Service Allowances*	8.98 %	9.02 %
Disability Allowances	3.04 %	3.19 %
Survivor's Benefits	0.44 %	0.50 %
Separation Benefits	4.96 %	4.74 %
Total Normal Cost	17.42 %	17.45 %
(Member Contributions)	12.00 %	12.00 %
Employer Normal Cost	5.42 %	5.45 %
<b>Unfunded Actuarial Accrued Liabilities</b>		
Total Available Contribution	12.68 %	12.65 %
Amortization Years	N/A	N/A
<b>Total Pension Employer Contribution Rate</b>	<b>18.10 %</b>	<b>18.10 %</b>

*\*Includes contributions for administrative expenses.*

*N/A The unfunded actuarial accrued liabilities are unable to be amortized based upon the total pension contribution rate.*

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## PUBLIC SAFETY DIVISION Comparative Statement \*

Valuation Date December 31	Contribution Rate Effective January 1	Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Thousands)							
2008	2011	127	\$ 6,219	\$ 48,969	4.2 %	8.32 %	5.78 %	14.10 %	4.00 %	18.10 %
2009	2012	94	4,061	43,205	(11.8)%	7.77 %	6.33 %	14.10 %	4.00 %	18.10 %
2010@	2013	88	3,650	41,480	(4.0)%	6.22 %	10.88 %	17.10 %	1.00 %	18.10 %
2011	2014	84	3,629	43,202	4.2 %	6.12 %	11.98 %	18.10 %	0.00 %	18.10 %
2012#	2015	87	3,751	43,119	(0.2)%	3.96 %	11.14 %	15.10 %	3.00 %	18.10 %
2013	2016	85	3,684	43,338	0.5 %	4.11 %	9.99 %	14.10 %	4.00 %	18.10 %
2014	2017	86	3,823	44,452	2.6 %	4.16 %	9.94 %	14.10 %	4.00 %	18.10 %
2015@	2018	79	3,620	45,817	3.1 %	5.24 %	12.86 %	18.10 %	0.00 %	18.10 %
2016	2019	76	3,401	44,752	(2.3)%	5.45 %	12.65 %	18.10 %	0.00 %	18.10 %
2017	2020	75	3,640	48,539	8.5 %	5.42 %	12.68 %	18.10 %	0.00 %	18.10 %

# After benefit changes.

\* Prior to 2005, Public Safety and Law Enforcement results were reported together. Historical information prior to 2005 may be found on page VIII-3.

@ Revised actuarial assumptions.

**PUBLIC SAFETY DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2017**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 27,365,528	\$ -	\$ 27,365,528
Allowances currently being paid from the Survivors Benefit Fund	23,126,218	-	23,126,218
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	9,647,470	2,750,017	6,897,453
Disability allowances likely to be paid present active members who become permanently disabled	1,933,505	893,175	1,040,330
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	287,672	121,411	166,261
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,450,780	1,567,651	883,129
<b>Total</b>	<b>\$ 64,811,173</b>	<b>\$ 5,332,254</b>	<b>\$ 59,478,919</b>
Actuarial Value of Assets			41,159,996
Unfunded Actuarial Accrued Liability			\$ 18,318,923

\* Includes contributions for administrative expenses.

**PUBLIC SAFETY DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement \***  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization	
	Total	Average	Total	Assets		Years	
2008	\$ 6	\$48,969	\$18	\$ 9	\$ 9	79	1.50
2009	4	43,205	12	0	12	N/A	3.00
2010@	4	41,480	7	(7)	14	N/A	3.50
2011	4	43,202	8	(1)	9	45	2.25
2012#	4	43,119	7	(14)	21	N/A	5.25
2013	4	43,338	7	1	6	19	1.50
2014	4	44,452	8	(15)	23	N/A	5.75
2015@	4	45,817	8	(4)	12	82	3.00
2016	3	44,752	8	(7)	15	N/A	5.00
2017	4	48,539	9	(9)	18	N/A	4.50

# After benefit changes.

N/A The unfunded actuarial accrued liabilities are unable to be amortized based upon the total pension contribution rate.

\* Prior to 2005, Public Safety and Law Enforcement results were reported together. Historical information prior to 2005 may be found on page VIII-5.

@ Revised actuarial assumptions.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll ("UNFUNDED/PAYROLL" above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan's capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**PUBLIC SAFETY DIVISION**  
**Male Active Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19								
Tot. Pay								
Avg. Pay								
20-24	10							10
Tot. Pay	\$402,051							\$402,051
Avg. Pay	\$40,205							\$40,205
25-29	5	2						7
Tot. Pay	\$225,089	\$118,487						\$343,576
Avg. Pay	\$45,018	\$59,244						\$49,082
30-34	5	2						7
Tot. Pay	\$248,191	\$97,951						\$346,142
Avg. Pay	\$49,638	\$48,976						\$49,449
35-39	1	4	2	2				9
Tot. Pay	\$41,246	\$177,188	\$96,752	\$116,886				\$432,072
Avg. Pay	\$41,246	\$44,297	\$48,376	\$58,443				\$48,008
40-44	2	1	3	4	1			11
Tot. Pay	\$73,203	\$56,926	\$145,148	\$211,042	\$57,121			\$543,440
Avg. Pay	\$36,602	\$56,926	\$48,383	\$52,761	\$57,121			\$49,404
45-49		1		4	2			7
Tot. Pay		\$36,799		\$204,414	\$102,007			\$343,220
Avg. Pay		\$36,799		\$51,104	\$51,004			\$49,031
50-54			1	1		2		4
Tot. Pay			\$46,919	\$64,311		\$92,059		\$203,289
Avg. Pay			\$46,919	\$64,311		\$46,030		\$50,822
55-59			1		1			2
Tot. Pay			\$67,136		\$44,516			\$111,652
Avg. Pay			\$67,136		\$44,516			\$55,826
60-64	1				2			3
Tot. Pay	\$36,404				\$104,070			\$140,474
Avg. Pay	\$36,404				\$52,035			\$46,825
65-69			2					2
Tot. Pay			\$107,094					\$107,094
Avg. Pay			\$53,547					\$53,547
70 & Over								
Tot. Pay								
Avg. Pay								
<b>Totals</b>	24	10	9	11	6	2		62
<b>Tot. Pay</b>	\$1,026,184	\$487,351	\$463,049	\$596,653	\$307,714	\$92,059		\$2,973,010
<b>Avg. Pay</b>	\$42,758	\$48,735	\$51,450	\$54,241	\$51,286	\$46,030		\$47,952

**PUBLIC SAFETY DIVISION**  
**Female Active Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date						Total	
	0-4	5-9	10-14	15-19	20-24	25-29		30+
15-19								
Tot. Pay								
Avg. Pay								
20-24	2							2
Tot. Pay	\$90,611							\$90,611
Avg. Pay	\$45,306							\$45,306
25-29	2							2
Tot. Pay	\$153,106							\$153,106
Avg. Pay	\$76,553							\$76,553
30-34		1	1					2
Tot. Pay		\$58,078	\$35,422					\$93,500
Avg. Pay		\$58,078	\$35,422					\$46,750
35-39								
Tot. Pay								
Avg. Pay								
40-44	1							1
Tot. Pay	\$34,205							\$34,205
Avg. Pay	\$34,205							\$34,205
45-49						1		1
Tot. Pay						\$91,591		\$91,591
Avg. Pay						\$91,591		\$91,591
50-54						1		1
Tot. Pay						\$58,879		\$58,879
Avg. Pay						\$58,879		\$58,879
55-59		1				1		2
Tot. Pay		\$36,799				\$38,808		\$75,607
Avg. Pay		\$36,799				\$38,808		\$37,804
60-64		1	1					2
Tot. Pay		\$35,770	\$34,164					\$69,934
Avg. Pay		\$35,770	\$34,164					\$34,967
65-69								
Tot. Pay								
Avg. Pay								
70 & Over								
Tot. Pay								
Avg. Pay								
<b>Totals</b>	5	3	2			3		13
<b>Tot. Pay</b>	\$277,922	\$130,647	\$69,586			\$189,278		\$667,433
<b>Avg. Pay</b>	\$55,584	\$43,549	\$34,793			\$63,093		\$51,341

**PUBLIC SAFETY DIVISION**  
**Inactive Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20								
20-24								
25-29	4	1						5
30-34	14							14
35-39	8	1						9
40-44	5	1	1					7
45-49	3							3
50-54	1		1					2
55-59	1							1
60-64	1			1				2
65-69								
70 & Over								
<b>Totals</b>	<b>37</b>	<b>3</b>	<b>2</b>	<b>1</b>				<b>43</b>

## **SECTION VIII**

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### **LAW ENFORCEMENT DIVISION**

## LAW ENFORCEMENT DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Active Members in Valuation December 31, 2017*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	7,081	\$ 468,539,353	\$ 66,169	41.3 yrs.	14.3 yrs.
Women	958	59,464,205	62,071	41.1	13.6
<b>Totals</b>	<b>8,039</b>	<b>\$ 528,003,558</b>	<b>\$ 65,680</b>	<b>41.2 yrs.</b>	<b>14.2 yrs.</b>

Also included in the valuation were 1022 inactive members and 19 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2017*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	3,196	\$ 11,567,455	\$ 1,774,622,361
Disability Retirement	1,604	5,323,430	752,724,384
Money Purchase	0	0	0
Total A & PR Fund	4,800	\$ 16,890,885	\$ 2,527,346,745
Total SBF	375	457,269	57,576,120
<b>Grand Total</b>	<b>5,175</b>	<b>\$ 17,348,154</b>	<b>\$ 2,584,922,865</b>

**LAW ENFORCEMENT DIVISION**  
**Employer Contributions to Support**  
**Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2017	2016
Contributions for	2020	2019
<b>Normal Cost</b>		
Age and Service Allowances*	13.58 %	13.52 %
Disability Allowances	3.32 %	3.32 %
Survivor's Benefits	0.48 %	0.49 %
Separation Benefits	2.41 %	2.42 %
Total Normal Cost	19.79 %	19.75 %
(Member Contributions)	13.00 %	13.00 %
Employer Normal Cost	6.79 %	6.75 %
<b>Unfunded Actuarial Accrued Liabilities</b>		
Total Available Contribution	11.31 %	11.35 %
Amortization Years	12	13
<b>Total Pension Employer Contribution Rate</b>	<b>18.10 %</b>	<b>18.10 %</b>

*\*Includes contributions for administrative expenses.*

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## LAW ENFORCEMENT DIVISION Comparative Statement \*

Valuation Date December 31	Contribution Rate Effective January 1	Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Thousands)							
2003	2006	8,253	\$ 384,388	\$ 46,576	4.9 %	8.65 %	3.78 %	12.43 %	4.50 %	16.93 %
2004	2007	8,173	392,672	48,045	3.2 %	8.63 %	3.04 %	11.67 %	5.50 %	17.17 %
2005@	2008	7,976	395,189	49,547	3.0 %	9.65 %	0.75 %	10.40 %	7.00 %	17.40 %
2006	2009	8,092	413,182	51,061	3.1 %	9.65 %	0.98 %	10.63 %	7.00 %	17.63 %
2007	2010	8,265	437,223	52,901	3.6 %	9.95 %	0.92 %	10.87 %	7.00 %	17.87 %
2008	2011	8,173	448,694	54,900	3.8 %	8.43 %	5.67 %	14.10 %	4.00 %	18.10 %
2009	2012	8,006	447,232	55,862	1.8 %	8.16 %	5.94 %	14.10 %	4.00 %	18.10 %
2010@	2013	7,702	438,830	56,976	2.0 %	7.56 %	9.54 %	17.10 %	1.00 %	18.10 %
2011	2014	7,545	437,605	57,999	1.8 %	7.18 %	10.92 %	18.10 %	0.00 %	18.10 %
2012#	2015	7,470	438,500	58,702	1.2 %	5.43 %	9.67 %	15.10 %	3.00 %	18.10 %
2013	2016	7,549	447,612	59,294	1.0 %	5.44 %	8.66 %	14.10 %	4.00 %	18.10 %
2014	2017	7,618	463,653	60,863	2.6 %	5.34 %	8.76 %	14.10 %	4.00 %	18.10 %
2015@	2018	7,779	481,296	61,871	1.7 %	6.70 %	11.40 %	18.10 %	0.00 %	18.10 %
2016	2019	7,916	511,457	64,610	4.4 %	6.75 %	11.35 %	18.10 %	0.00 %	18.10 %
2017	2020	8,039	528,004	65,680	1.7 %	6.79 %	11.31 %	18.10 %	0.00 %	18.10 %

# After benefit changes.

@ Revised actuarial assumptions.

\* Prior to 2005, Law Enforcement and Public Safety are combined for purposes of this schedule.

**LAW ENFORCEMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2017**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 2,527,346,745	\$ -	\$ 2,527,346,745
Allowances currently being paid from the Survivors Benefit Fund	57,576,120	-	57,576,120
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	2,314,616,733	679,011,826	1,635,604,907
Disability allowances likely to be paid present active members who become permanently disabled	343,971,846	163,526,241	180,445,605
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	52,604,922	22,586,465	30,018,457
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	145,464,820	120,856,041	24,608,779
<b>Total</b>	<b>\$ 5,441,581,186</b>	<b>\$ 985,980,573</b>	<b>\$ 4,455,600,613</b>
Actuarial Value of Assets			3,842,958,501
Unfunded Actuarial Accrued Liability			<b>\$ 612,642,112</b>

\*Includes contributions for administrative expenses.

**LAW ENFORCEMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement \***  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed Total	Valuation Assets	Unfunded	Amortization Years	
	Total	Average					
2003	\$384	\$46,576	\$ 1,170	\$ 838	\$ 332	41	0.86
2004	393	48,045	1,197	868	329	43	0.84
2005@	395	49,547	1,298	926	372	N/A	0.94
2006	413	51,061	1,356	1,069	287	N/A	0.69
2007	437	52,901	1,430	1,214	216	N/A	0.49
2008	449	54,900	1,500	771	729	N/A	1.62
2009	447	55,862	1,534	807	727	N/A	1.63
2010@	439	56,976	1,542	966	576	19	1.31
2011	438	57,999	1,546	813	733	23	1.67
2012#	439	58,702	1,480	945	535	14	1.22
2013	448	59,294	1,510	981	529	15	1.18
2014	464	60,863	1,550	1,062	488	13	1.05
2015@	481	61,871	1,706	1,087	619	13	1.29
2016	511	64,610	1,818	1,172	646	13	1.26
2017	528	65,680	1,871	1,258	613	12	1.16

# After benefit changes.

@ Revised actuarial assumptions.

\* Prior to 2005, Law Enforcement and Public Safety are combined for purposes of this schedule.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll ("UNFUNDED/PAYROLL" above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan's capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**LAW ENFORCEMENT DIVISION**  
**Male Active Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1							1
Tot. Pay	\$34,566							\$34,566
Avg. Pay	\$34,566							\$34,566
20-24	189	3						192
Tot. Pay	\$7,923,688	\$157,667						\$8,081,355
Avg. Pay	\$41,924	\$52,556						\$42,090
25-29	616	205	5					826
Tot. Pay	\$31,660,012	\$12,013,383	\$305,529					\$43,978,924
Avg. Pay	\$51,396	\$58,602	\$61,106					\$53,243
30-34	292	440	202	6				940
Tot. Pay	\$15,531,056	\$27,521,109	\$13,266,050	\$484,150				\$56,802,365
Avg. Pay	\$53,189	\$62,548	\$65,674	\$80,692				\$60,428
35-39	154	187	423	255	5			1,024
Tot. Pay	\$7,864,014	\$11,697,374	\$28,877,257	\$18,789,511	\$403,145			\$67,631,301
Avg. Pay	\$51,065	\$62,553	\$68,268	\$73,684	\$80,629			\$66,046
40-44	75	117	230	580	221	1		1,224
Tot. Pay	\$3,585,747	\$7,447,880	\$15,528,547	\$42,049,789	\$16,401,412	\$76,630		\$85,090,005
Avg. Pay	\$47,810	\$63,657	\$67,515	\$72,500	\$74,215	\$76,630		\$69,518
45-49	52	73	153	324	700	234	1	1,537
Tot. Pay	\$2,891,841	\$4,509,684	\$10,120,179	\$22,798,271	\$52,756,091	\$17,977,004	\$57,511	\$111,110,581
Avg. Pay	\$55,612	\$61,776	\$66,145	\$70,365	\$75,366	\$76,825	\$57,511	\$72,291
50-54	19	30	45	130	265	229	46	764
Tot. Pay	\$873,205	\$1,713,198	\$2,925,438	\$9,055,893	\$19,490,675	\$17,776,151	\$3,891,926	\$55,726,486
Avg. Pay	\$45,958	\$57,107	\$65,010	\$69,661	\$73,550	\$77,625	\$84,607	\$72,940
55-59	14	10	30	49	92	107	54	356
Tot. Pay	\$498,188	\$628,498	\$1,878,025	\$3,439,949	\$6,340,581	\$7,871,869	\$4,598,573	\$25,255,683
Avg. Pay	\$35,585	\$62,850	\$62,601	\$70,203	\$68,919	\$73,569	\$85,159	\$70,943
60-64	5	9	15	20	43	37	42	171
Tot. Pay	\$245,375	\$447,311	\$1,033,991	\$1,428,663	\$3,033,421	\$2,404,355	\$3,324,775	\$11,917,891
Avg. Pay	\$49,075	\$49,701	\$68,933	\$71,433	\$70,545	\$64,983	\$79,161	\$69,695
65-69	2	1	4	4	10	9	10	40
Tot. Pay	\$80,433	\$41,937	\$241,980	\$271,790	\$636,782	\$557,523	\$765,521	\$2,595,966
Avg. Pay	\$40,217	\$41,937	\$60,495	\$67,948	\$63,678	\$61,947	\$76,552	\$64,899
70 & Over	1		1	2	1		1	6
Tot. Pay	\$41,901		\$49,341	\$95,352	\$66,196		\$61,440	\$314,230
Avg. Pay	\$41,901		\$49,341	\$47,676	\$66,196		\$61,440	\$52,372
<b>Totals</b>	1,420	1,075	1,108	1,370	1,337	617	154	7,081
<b>Tot. Pay</b>	\$71,230,026	\$66,178,041	\$74,226,337	\$98,413,368	\$99,128,303	\$46,663,532	\$12,699,746	\$468,539,353
<b>Avg. Pay</b>	\$50,162	\$61,561	\$66,991	\$71,835	\$74,142	\$75,630	\$82,466	\$66,169

**LAW ENFORCEMENT DIVISION**  
**Female Active Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19								
Tot. Pay								
Avg. Pay								
20-24	31							31
Tot. Pay	\$1,226,140							\$1,226,140
Avg. Pay	\$39,553							\$39,553
25-29	94	29						123
Tot. Pay	\$4,729,015	\$1,634,084						\$6,363,099
Avg. Pay	\$50,309	\$56,348						\$51,733
30-34	35	56	19	1				111
Tot. Pay	\$1,745,589	\$3,510,758	\$1,224,684	\$57,728				\$6,538,759
Avg. Pay	\$49,874	\$62,692	\$64,457	\$57,728				\$58,908
35-39	27	33	51	40				151
Tot. Pay	\$1,208,059	\$2,070,137	\$3,297,379	\$2,683,143				\$9,258,718
Avg. Pay	\$44,743	\$62,731	\$64,654	\$67,079				\$61,316
40-44	9	14	31	69	34	1		158
Tot. Pay	\$448,150	\$929,356	\$2,084,624	\$4,769,078	\$2,410,690	\$50,024		\$10,691,922
Avg. Pay	\$49,794	\$66,383	\$67,246	\$69,117	\$70,903	\$50,024		\$67,670
45-49	8	17	20	38	81	19	1	184
Tot. Pay	\$499,541	\$1,041,232	\$1,355,196	\$2,564,418	\$5,478,447	\$1,464,292	\$50,903	\$12,454,029
Avg. Pay	\$62,443	\$61,249	\$67,760	\$67,485	\$67,635	\$77,068	\$50,903	\$67,685
50-54	2	2	13	27	38	29	1	112
Tot. Pay	\$38,309	\$106,841	\$792,766	\$1,618,447	\$2,518,117	\$2,158,444	\$85,190	\$7,318,114
Avg. Pay	\$19,155	\$53,421	\$60,982	\$59,942	\$66,266	\$74,429	\$85,190	\$65,340
55-59	1	3	7	5	18	13	3	50
Tot. Pay	\$67,971	\$171,228	\$312,910	\$328,923	\$1,158,508	\$834,849	\$234,070	\$3,108,459
Avg. Pay	\$67,971	\$57,076	\$44,701	\$65,785	\$64,362	\$64,219	\$78,023	\$62,169
60-64			5	8	11	6	4	34
Tot. Pay			\$279,108	\$496,565	\$798,316	\$406,608	\$293,350	\$2,273,947
Avg. Pay			\$55,822	\$62,071	\$72,574	\$67,768	\$73,338	\$66,881
65-69				1	1	2		4
Tot. Pay				\$73,319	\$60,482	\$97,217		\$231,018
Avg. Pay				\$73,319	\$60,482	\$48,609		\$57,755
70 & Over								
Tot. Pay								
Avg. Pay								
<b>Totals</b>	207	154	146	189	183	70	9	958
<b>Tot. Pay</b>	\$9,962,774	\$9,463,636	\$9,346,667	\$12,591,621	\$12,424,560	\$5,011,434	\$663,513	\$59,464,205
<b>Avg. Pay</b>	\$48,129	\$61,452	\$64,018	\$66,622	\$67,894	\$71,592	\$73,724	\$62,071

**LAW ENFORCEMENT DIVISION**  
**Inactive Members in Valuation December 31, 2017**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20								
20-24	6							6
25-29	109	5						114
30-34	106	30	2					138
35-39	87	29	15	4				135
40-44	97	24	18	12	7	1		159
45-49	112	27	23	17	11	2		192
50-54	84	9	15	11	9	2		130
55-59	46	11	7	7	2			73
60-64	30	3	4		2			39
65-69	24	1	1	1			1	28
70 & Over	8							8
<b>Totals</b>	<b>709</b>	<b>139</b>	<b>85</b>	<b>52</b>	<b>31</b>	<b>5</b>	<b>1</b>	<b>1,022</b>

## **SECTION IX**

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### **ALLOWANCES BEING PAID TO RETIREES AND BENEFICIARIES**

## Monthly Allowances of Retired Lives by Year of Retirement as of December 31, 2017

Year of Retirement	No.	Initial	Post-Ret. Increase	Total	Average
2017	8,979	\$20,329,240	\$ 114,226	\$ 20,443,466	\$ 2,277
2016	8,420	17,819,469	658,490	18,477,959	2,195
2015	7,608	15,499,457	1,024,959	16,524,416	2,172
2014	12,060	21,812,163	2,034,142	23,846,305	1,977
2013	11,868	23,224,817	3,057,944	26,282,761	2,215
2012	10,848	22,286,610	3,409,678	25,696,288	2,369
2011	11,910	26,513,289	4,858,224	31,371,513	2,634
2010	10,673	21,749,939	4,630,941	26,380,880	2,472
2009	10,459	21,859,434	5,271,597	27,131,031	2,594
2008	9,068	17,345,319	4,708,645	22,053,964	2,432
2007	8,632	15,937,925	4,808,019	20,745,944	2,403
2006	9,125	16,021,324	5,292,195	21,313,519	2,336
2005	8,415	15,237,287	5,483,985	20,721,272	2,462
2004	7,904	13,441,721	5,234,888	18,676,609	2,363
2003	7,393	12,736,636	5,322,851	18,059,487	2,443
2002	8,102	13,638,954	6,115,716	19,754,670	2,438
2001	6,521	10,330,494	4,921,514	15,252,008	2,339
1996-2000	25,909	35,292,063	18,901,563	54,193,626	2,092
1991-1995	15,849	17,217,682	11,426,704	28,644,386	1,807
1986-1990	9,996	9,058,952	7,572,081	16,631,033	1,664
1981-1985	4,590	2,936,334	2,958,057	5,894,391	1,284
1976-1980	1,884	839,402	1,172,895	2,012,297	1,068
1971-1975	554	157,076	290,493	447,569	808
1966-1970	139	33,633	107,059	140,692	1,012
Before 1966	72	15,801	57,514	73,315	1,018
<b>TOTAL</b>	<b>216,978</b>	<b>\$371,335,021</b>	<b>\$109,434,380</b>	<b>\$480,769,401</b>	<b>\$2,216</b>

## Monthly Allowances of Retired Lives by Years of Service as of December 31, 2017

Years of Service	No.	Initial	Post-Ret. Increase	Total	Average
<5 or n/a	8,654	\$ 3,173,113	\$ 473,039	\$ 3,646,152	\$ 421
5	4,117	1,592,488	523,783	2,116,271	514
6	3,401	1,500,848	459,145	1,959,993	576
7	3,261	1,571,529	478,922	2,050,451	629
8	3,191	1,701,395	522,392	2,223,787	697
9	2,503	1,522,994	393,857	1,916,851	766
10	9,398	4,855,935	1,563,521	6,419,456	683
11	5,793	3,605,978	1,065,979	4,671,957	806
12	5,825	3,859,022	1,128,244	4,987,266	856
13	5,522	4,164,035	1,194,703	5,358,738	970
14	5,275	4,208,589	1,201,687	5,410,276	1,026
15	5,696	4,910,001	1,423,522	6,333,523	1,112
16	5,448	4,920,645	1,461,553	6,382,198	1,171
17	5,009	5,033,022	1,481,531	6,514,553	1,301
18	5,001	5,210,452	1,576,389	6,786,841	1,357
19	4,724	5,165,487	1,623,960	6,789,447	1,437
20	6,385	7,840,635	2,214,294	10,054,929	1,575
21	5,292	6,880,660	2,072,962	8,953,622	1,692
22	5,109	7,177,620	2,139,009	9,316,629	1,824
23	5,026	7,497,994	2,207,966	9,705,960	1,931
24	4,731	7,503,720	2,237,557	9,741,277	2,059
25	10,319	18,088,084	5,384,664	23,472,748	2,275
26	6,138	11,547,391	3,578,716	15,126,107	2,464
27	6,056	12,104,627	3,930,734	16,035,361	2,648
28	6,650	14,833,996	4,941,693	19,775,689	2,974
29	6,335	15,266,028	4,828,227	20,094,255	3,172
30	32,500	86,240,434	23,193,941	109,434,376	3,367
31	9,227	25,522,732	7,383,402	32,906,134	3,566
32	7,004	20,082,442	5,968,126	26,050,568	3,719
33	5,330	15,901,776	4,689,422	20,591,198	3,863
34	4,174	12,807,713	3,950,624	16,758,337	4,015
35	3,804	11,907,148	3,679,222	15,586,370	4,097
36	2,681	8,457,381	2,619,460	11,076,841	4,132
37	2,146	6,883,197	2,129,770	9,012,967	4,200
38	1,516	4,830,690	1,513,262	6,343,952	4,185
39	1,175	3,712,216	1,281,414	4,993,630	4,250
40 & Over	2,562	9,253,004	2,917,687	12,170,691	4,750
<b>TOTAL</b>	<b>216,978</b>	<b>\$371,335,021</b>	<b>\$109,434,379</b>	<b>\$480,769,401</b>	<b>\$2,216</b>

# Annuity and Pension Reserve Fund

## Annual Allowance, Reported Assets and Actuarial Liabilities

### Comparative Statement

#### (\$ Millions)

Valuation Date	Annual Allowances			Reported Assets*	Actuarial Liabilities	Ratio of Assets to Liabilities	Ratio of DB Active to Retired
	No.	\$ Millions	% of DB Payroll				
12/31/1988	89,972	\$ 581	10.9 % **	\$ 6,182	\$ 6,173	100.1 %	2.9
12/31/1989@	92,504	661	12.4 % **	6,985	6,911	101.1 %	2.9
12/31/1990	94,088	706	11.7 % **	7,438	7,338	101.4 %	3.0
12/31/1991	95,843	762	11.5 % **	8,014	7,904	101.4 %	3.4
12/31/1992	98,609	835	12.1 % **	8,814	8,692	101.4 %	3.4
12/31/1993	100,651	901	12.5 % **	9,390	9,356	100.4 %	3.4
12/31/1994	102,587	958	12.6 % **	9,964	9,893	100.7 %	3.3
12/31/1995	104,806	1,036	13.0 % **	10,808	10,737	100.7 %	3.3
12/31/1996@	107,617	1,141	13.7 % **	11,819	11,762	100.5 %	3.3
12/31/1997	110,470	1,233	14.3 % **	12,843	12,755	100.7 %	3.2
12/13/1998	113,000	1,327	14.7 % **	13,885	13,751	101.0 %	3.1
12/31/1999+	115,431	1,530	16.1 % **	14,978	16,139	92.8 %	3.1
12/31/2000	118,620	1,641	16.1 % **	16,980	16,980	100.0 %	3.1
12/31/2001@	121,875	1,775	16.5 % **	18,001	18,001	100.0 %	3.0
12/31/2002	126,409	1,958	17.5 % **	20,085	20,085	100.0 %	2.9
12/31/2003	130,433	2,136	19.1 % **	22,535	22,535	100.0 %	2.7
12/31/2004	134,535	2,311	20.2 % **	24,470	24,470	100.0 %	2.6
12/31/2005@	138,996	2,508	21.2 % **	27,084	27,084	100.0 %	2.6
12/31/2006	144,037	2,710	22.3 % **	29,304	29,304	100.0 %	2.5
12/31/2007	148,493	2,916	23.2 % **	31,547	31,547	100.0 %	2.5
12/31/2008	153,931	3,148	24.6 % **	34,060	34,060	100.0 %	2.3
12/31/2009	159,518	3,419	27.2 % **	37,098	37,098	100.0 %	2.2
12/31/2010@	166,247	3,705	29.8 % **	40,184	40,818	100.0 %	2.1
12/31/2011	174,679	4,065	32.8 % **	45,001	45,001	100.0 %	1.9
12/31/2012	180,759	4,352	35.7 % **	48,044	48,044	100.0 %	1.8
12/31/2013	187,198	4,629	37.5 % **	50,754	50,754	100.0 %	1.8
12/31/2014	194,096	4,908	38.8 % **	53,432	53,432	100.0 %	1.7
12/31/2015@	196,709	5,115	39.5 % **	55,117	55,117	100.0 %	1.7
12/31/2016	199,662	5,344	39.7 % **	60,949	60,949	100.0 %	1.7
12/31/2017	202,292	5,575	40.6 % **	62,931	62,931	100.0 %	1.6

\* Including certain recommended transfers and accrued transfers.

@ Revised actuarial assumptions.

\*\* Excluding health insurance and Medicare payments.

+ Including estimated effect of legislated benefit changes.

**Annuity and Pension Reserve Fund**  
**Retirees and Beneficiaries December 31, 2017**  
**Type of Benefit, Monthly Amount and Actuarial Liabilities**

Type of Allowance	Number	Current Total	Actuarial Liabilities
Superannuation Retirement			
Plan A - Joint & 50%	19,085	\$ 52,411,107	\$ 7,262,721,506
Plan B - Straight Life / Straight Life Plan	86,731	189,102,227	23,485,596,530
Plan C - Special Joint & Survivor*	29,778	81,584,700	12,235,765,379
Plan D - Joint & 100%	21,432	57,392,985	9,235,961,037
Plan E - Life & 0 to 5 Years Guaranteed	304	635,937	79,051,403
- Life & 6 to 10 Years Guaranteed	444	910,478	111,790,543
- Life & 11 to 15 Years Guaranteed	625	1,115,105	139,450,461
- Life & 16 to 20 Years Guaranteed	65	161,325	24,379,440
Plan F - Multiple Continuing Beneficiaries (Includes Multiple Life Plan)	1,202	3,215,431	607,950,232
Reserve for Combined Plan Future Adverse Experience			342,896
Reserve for Member Directed Future Adverse Experience			2,501,189
Money Purchase	4,016	1,759,727	214,416,988
Survivor Beneficiary - Life Benefit	17,206	22,446,530	2,204,974,523
Survivor Beneficiary - Temporary Benefit	89	138,837	6,266,387
<b>Total Superannuation</b>	<b>180,977</b>	<b>\$ 410,874,389</b>	<b>\$ 55,611,168,514</b>
Disability Retirement	21,315	\$ 53,685,906	\$ 7,320,169,362
<b>Total from A &amp; PR</b>	<b>202,292</b>	<b>\$ 464,560,295</b>	<b>\$ 62,931,337,876</b>

*\*Includes post September 1, 2013 retirements that elected the Joint Life Plan.*

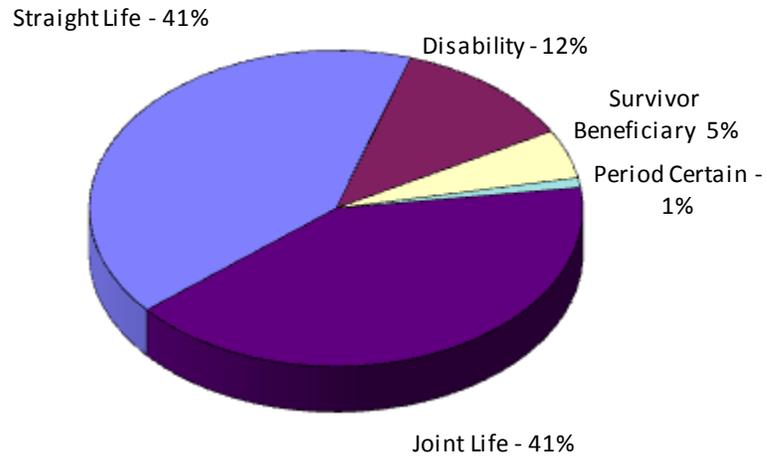
**Annuity and Pension Reserve Fund**  
**Retirees and Beneficiaries December 31, 2017**  
**Type of Benefit and Amount by Gender of Recipient**

Type of Allowance	Men		Women		Total	
	Number	Monthly Allowances	Number	Monthly Allowances	Number	Monthly Allowances
Superannuation Retirement						
Plan A - Joint & 50%	12,474	\$ 36,613,931	6,611	\$ 15,797,176	19,085	\$ 52,411,107
Plan B - Straight Life / Straight Life Plan	26,804	66,013,313	59,927	123,088,914	86,731	189,102,227
Plan C - Special Joint & Survivor*	15,706	47,438,384	14,072	34,146,316	29,778	81,584,700
Plan D - Joint & 100%	17,030	47,710,329	4,402	9,682,656	21,432	57,392,985
Plan E - Life & 0 to 5 Years Guaranteed	123	284,969	181	350,968	304	635,937
- Life & 6 to 10 Years Guaranteed	217	446,457	227	464,021	444	910,478
- Life & 11 to 15 Years Guaranteed	334	587,691	291	527,414	625	1,115,105
- Life & 16 to 20 Years Guaranteed	43	98,676	22	62,649	65	161,325
Plan F - Multiple Continuing Beneficiaries (Includes Multiple Life Plan)	460	1,488,386	742	1,727,045	1,202	3,215,431
Money Purchase	2,522	1,330,233	1,494	429,494	4,016	1,759,727
Survivor Beneficiary - Life Benefit	2,276	1,907,790	14,930	20,538,740	17,206	22,446,530
Survivor Beneficiary - Temporary Benefit	26	53,014	63	85,823	89	138,837
Total Superannuation	78,015	\$ 203,973,173	102,962	\$ 206,901,216	180,977	\$ 410,874,389
Disability Retirement	10,798	\$ 29,887,615	10,517	\$ 23,798,291	21,315	\$ 53,685,906
<b>Total from A &amp; PR</b>	<b>88,813</b>	<b>\$ 233,860,788</b>	<b>113,479</b>	<b>\$ 230,699,507</b>	<b>202,292</b>	<b>\$ 464,560,295</b>

\*Includes post September 1, 2013 retirements that elected the Joint Life Plan.

# Annuities Being Paid by Type December 31, 2017

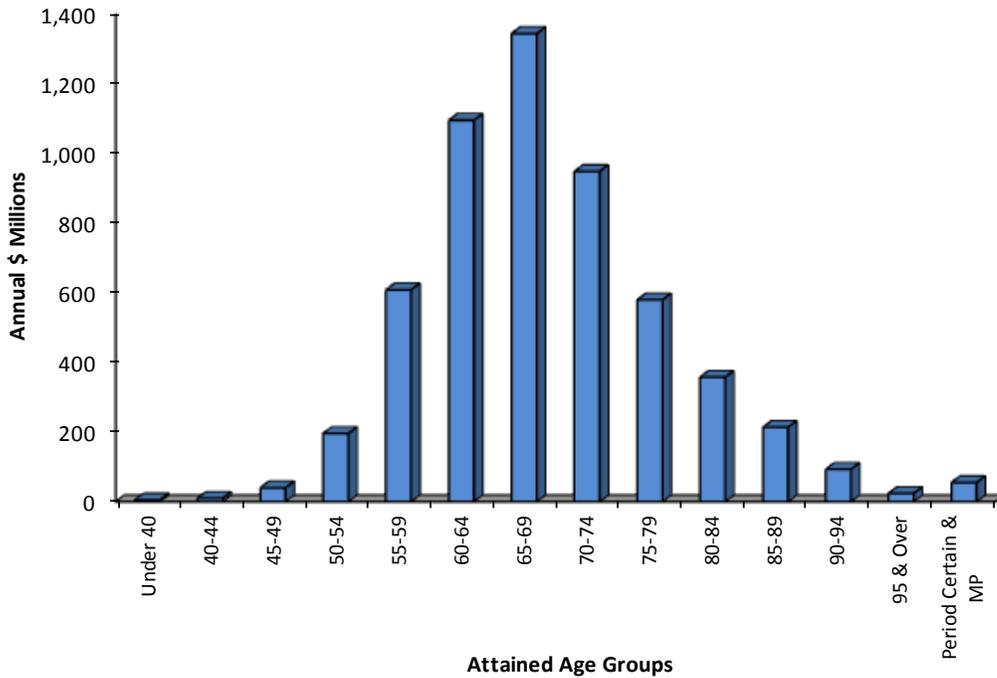
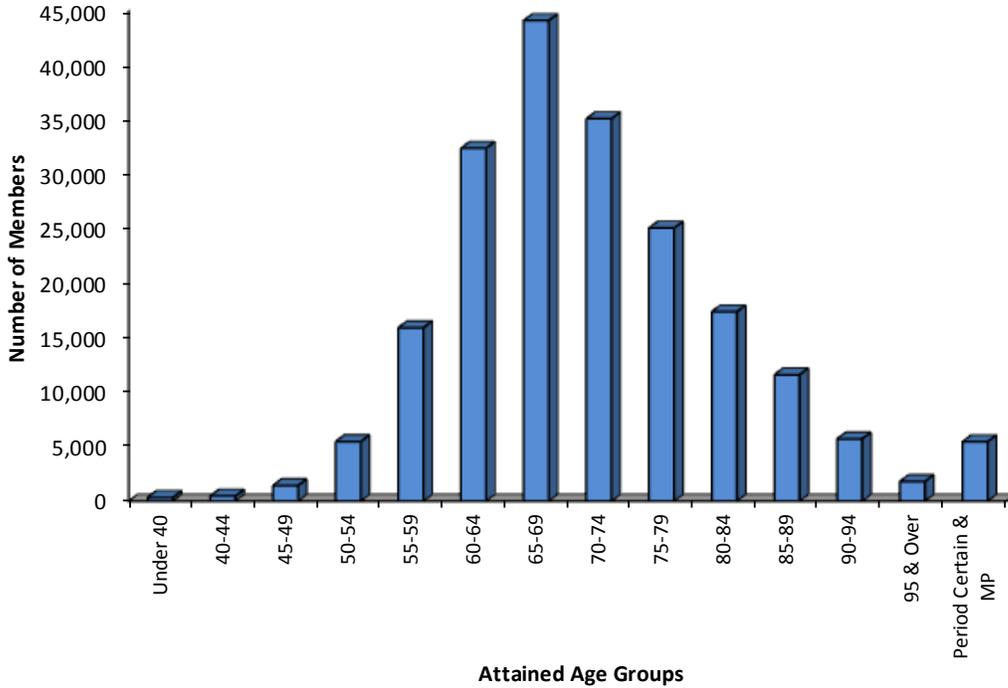
## Annuity and Pension Reserve Fund



**Annuity and Pension Reserve Fund  
Retirees and Beneficiaries December 31, 2017  
Current Monthly Total \$ by Attained Ages**

Attained Ages	Superannuation		Disability		Totals	
	No.	Monthly Total	No.	Monthly Total	No.	Monthly Total
Under 20	13	\$ 13,043			13	\$ 13,043
20-24	25	19,729			25	19,729
25-29	37	30,752	1	\$ 1,282	38	32,034
30-34	35	33,681	31	50,247	66	83,928
35-39	55	38,364	137	239,471	192	277,835
40-44	65	42,412	404	793,438	469	835,850
45-49	256	518,111	1,178	2,789,753	1,434	3,307,864
50-54	3,020	9,616,412	2,450	6,711,310	5,470	16,327,722
55-59	11,723	39,160,590	4,195	11,606,235	15,918	50,766,825
60-64	27,063	77,513,037	5,334	13,827,316	32,397	91,340,353
65-69	40,614	102,848,719	3,503	9,237,207	44,117	112,085,926
70-74	32,921	73,910,484	2,189	5,141,631	35,110	79,052,115
75-79	23,999	46,292,282	1,077	2,077,966	25,076	48,370,248
80-84	16,908	29,072,629	481	790,392	17,389	29,863,021
85-89	11,382	17,537,598	220	296,084	11,602	17,833,682
90-94	5,621	7,659,098	96	103,532	5,717	7,762,630
95 & Over	1,786	1,984,876	19	20,042	1,805	2,004,918
Period Certain & Money Purchase	5,454	4,582,572			5,454	4,582,572
<b>Totals</b>	<b>180,977</b>	<b>\$410,874,389</b>	<b>21,315</b>	<b>\$53,685,906</b>	<b>202,292</b>	<b>\$464,560,295</b>

# Annuity and Pension Reserve Fund Benefits Being Paid by Attained Ages December 31, 2017



## Annuity and Pension Reserve Fund Percent of Recipients by Age Groups and Year

Attained Age Group	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Under 30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
30-39	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%
40-49	0.9%	1.1%	1.1%	1.3%	1.5%	1.8%	2.0%	2.2%	2.5%	2.7%	2.9%	3.1%	3.3%	3.4%	3.5%
50-59	10.6%	11.5%	12.5%	13.7%	14.6%	15.4%	15.9%	15.9%	16.0%	15.9%	15.9%	16.1%	15.8%	14.7%	13.7%
60-69	37.9%	38.6%	38.8%	37.9%	36.5%	35.5%	34.8%	33.5%	32.6%	31.4%	30.7%	29.6%	28.9%	28.8%	28.6%
70-79	29.8%	27.9%	26.7%	26.2%	26.1%	25.8%	25.4%	25.7%	26.2%	26.7%	27.2%	27.7%	28.5%	29.4%	30.4%
80-89	14.3%	14.4%	14.4%	14.4%	14.8%	15.3%	15.8%	16.6%	16.9%	17.4%	17.7%	17.9%	18.0%	18.2%	18.3%
90 & Over	3.7%	3.7%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.4%	3.4%	3.3%	3.2%	3.2%	3.2%	3.2%
Period Certain & MP	2.7%	2.7%	2.7%	2.7%	2.7%	2.4%	2.3%	2.2%	2.1%	2.1%	1.9%	1.9%	1.8%	1.8%	1.8%
<b>TOTALS</b>	<b>100.0%</b>														
Average Age	70.9	70.6	70.4	70.2	70.0	69.9	69.9	70.0	70.0	70.1	70.1	70.2	70.2	70.4	70.6

**STATE DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	192	\$ 235,869	\$ 26,003,558
Women	605	1,009,473	112,577,518
<b>Totals</b>	<b>797</b>	<b>\$ 1,245,342</b>	<b>\$ 138,581,076</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	733	\$ 954,800	\$ 122,659,199
Parent	0	0	0
Other	2	1,374	255,673
Child	285	236,336	14,491,949
<b>Subtotals - Male</b>	<b>1,020</b>	<b>\$ 1,192,510</b>	<b>\$ 137,406,821</b>
<b>Females</b>			
Widow	2,165	\$ 2,989,062	\$ 397,581,638
Parent	0	0	0
Other	5	5,391	780,869
Child	303	248,783	14,317,357
<b>Subtotals - Female</b>	<b>2,473</b>	<b>\$ 3,243,236</b>	<b>\$ 412,679,864</b>
<b>Totals</b>	<b>3,493</b>	<b>\$ 4,435,746</b>	<b>\$ 550,086,685</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	1,212	\$ 1,428,379	\$ 163,410,379
Women	3,078	4,252,709	525,257,382
<b>Totals</b>	<b>4,290</b>	<b>\$ 5,681,088</b>	<b>\$ 688,667,761</b>

**LOCAL GOVERNMENT DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	288	\$ 281,473	\$ 29,910,614
Women	1,293	1,638,257	178,431,067
<b>Totals</b>	<b>1,581</b>	<b>\$ 1,919,730</b>	<b>\$ 208,341,681</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	1,232	\$ 1,145,353	\$ 143,236,728
Parent	0	0	0
Other	1	734	82,439
Child	572	385,940	26,965,027
<b>Subtotals - Male</b>	<b>1,805</b>	<b>\$ 1,532,027</b>	<b>\$ 170,284,194</b>
<b>Females</b>			
Widow	5,227	\$ 5,520,022	\$ 714,616,776
Parent	0	0	0
Other	14	11,632	1,150,069
Child	559	376,829	21,978,013
<b>Subtotals - Female</b>	<b>5,800</b>	<b>\$ 5,908,483</b>	<b>\$ 737,744,858</b>
<b>Totals</b>	<b>7,605</b>	<b>\$ 7,440,510</b>	<b>\$ 908,029,052</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	2,093	\$ 1,813,500	\$ 200,194,808
Women	7,093	7,546,740	916,175,925
<b>Totals</b>	<b>9,186</b>	<b>\$ 9,360,240</b>	<b>\$ 1,116,370,733</b>

**PUBLIC SAFETY DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	1	\$ 1,326	\$ 189,513
Women	9	12,913	1,854,375
<b>Totals</b>	<b>10</b>	<b>\$ 14,239</b>	<b>\$ 2,043,888</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	4	\$ 4,993	\$ 415,721
Other	0	0	0
Child	3	2,077	237,564
<b>Subtotals - Male</b>	<b>7</b>	<b>\$ 7,070</b>	<b>\$ 653,285</b>
<b>Females</b>			
Widow	91	\$ 134,756	\$ 19,558,439
Other	0	0	0
Child	3	2,966	477,529
<b>Subtotals - Female</b>	<b>94</b>	<b>\$ 137,722</b>	<b>\$ 20,035,968</b>
<b>Totals</b>	<b>101</b>	<b>\$ 144,792</b>	<b>\$ 20,689,253</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	8	\$ 8,396	\$ 842,798
Women	103	150,635	21,890,343
<b>Totals</b>	<b>111</b>	<b>\$ 159,031</b>	<b>\$ 22,733,141</b>

**LAW ENFORCEMENT DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	1	\$ 1,335	\$ 167,823
Women	52	104,454	12,662,992
<b>Totals</b>	<b>53</b>	<b>\$ 105,789</b>	<b>\$ 12,830,815</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	11	\$ 10,399	\$ 1,562,097
Other	0	0	0
Child	54	47,039	2,373,791
<b>Subtotals - Male</b>	<b>65</b>	<b>\$ 57,438</b>	<b>\$ 3,935,888</b>
<b>Females</b>			
Widow	196	\$ 247,438	\$ 38,433,018
Other	0	0	0
Child	59	44,956	2,236,735
<b>Subtotals - Female</b>	<b>255</b>	<b>\$ 292,394</b>	<b>\$ 40,669,753</b>
<b>Totals</b>	<b>320</b>	<b>\$ 349,832</b>	<b>\$ 44,605,641</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	66	\$ 58,773	\$ 4,103,711
Women	307	396,848	53,332,745
<b>Totals</b>	<b>373</b>	<b>\$ 455,621</b>	<b>\$ 57,436,456</b>

**STATE DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Male			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	61	68,631	6,270,964
Deferred to age 65	0	0	0
<b>Total - Male</b>	<b>61</b>	<b>\$ 68,631</b>	<b>\$ 6,270,964</b>
Widows - Female			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	173	135,105	13,599,523
Deferred to age 65	0	0	0
<b>Total - Female</b>	<b>173</b>	<b>\$ 135,105</b>	<b>\$ 13,599,523</b>
<b>Totals</b>	<b>234</b>	<b>\$ 203,736</b>	<b>\$ 19,870,487</b>

**LOCAL GOVERNMENT DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	121	88,937	9,116,451
Deferred to age 65	0	0	0
Total - Male	121	\$ 88,937	\$ 9,116,451
Widows - Female			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	363	255,307	28,190,448
Deferred to age 65	0	0	0
Total - Female	363	\$ 255,307	\$ 28,190,448
<b>Totals</b>	<b>484</b>	<b>\$ 344,244</b>	<b>\$ 37,306,899</b>

**PUBLIC SAFETY DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2017**

<b>Group</b>	<b>Number</b>	<b>Current Total</b>	<b>Actuarial Liabilities</b>
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Total - Male	0	\$ 0	\$ 0
Widows - Females			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	6	3,498	393,077
Total - Female	6	\$ 3,498	\$ 393,077
<b>Totals</b>	<b>6</b>	<b>\$ 3,498</b>	<b>\$ 393,077</b>

**LAW ENFORCEMENT DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2017**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	0	0	0
Total - Male	0	\$ 0	\$ 0
Widows - Females			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	2	1,648	139,664
Total - Female	2	\$ 1,648	\$ 139,664
<b>Totals</b>	<b>2</b>	<b>\$ 1,648</b>	<b>\$ 139,664</b>

## Survivor Benefit Fund Reported Assets and Liabilities Divisions Combined

Valuation Date	Monthly Allowances				\$ Millions		Ratio of Assets to Liabilities
	Current		Deferred		Reported Assets+	Actuarial Liabilities	
	No.	Amount	No.	Amount			
12/31/1983	10,132	\$ 2,812,639	1,020	\$ 225,475	\$ 454.7	\$ 352.8	129 %
12/31/1984*	11,819	3,119,531	990	248,373	492.2	451.1	109 %
12/31/1985	11,889	3,278,253	979	259,842	532.8	469.6	113 %
12/31/1986	12,054	3,489,915	960	268,931	575.5	451.2	128 %
12/31/1987	12,153	3,656,420	933	279,327	626.1	472.9	132 %
12/31/1988	12,237	3,822,085	941	283,026	490.8	490.8	100 %
12/31/1989@	12,198	4,177,540	941	320,792	525.3	522.1	101 %
12/31/1990	12,182	4,330,622	907	321,218	542.5	537.1	101 %
12/31/1991	12,268	4,528,326	860	314,414	567.9	557.1	102 %
12/31/1992	12,318	4,750,848	852	329,509	589.8	583.3	101 %
12/31/1993	12,437	4,985,681	862	345,937	620.7	607.7	102 %
12/31/1994	12,569	5,207,186	845	347,178	641.5	628.5	102 %
12/31/1995	12,608	5,408,577	866	376,573	668.9	652.4	103 %
12/31/1996@	12,724	5,822,113	878	395,594	711.6	710.6	100 %
12/31/1997	12,856	6,074,566	932	433,430	743.0	740.5	100 %
12/13/1998	13,079	6,337,739	1,060	500,514	780.2	779.6	100 %
12/31/1999#	13,236	7,345,740	989	550,153	801.4	910.9	88 %
12/31/2000	13,317	9,026,315	666	348,886	1,037.4	1,037.4	100 %
12/31/2001@	13,588	9,449,543	993	490,441	1,086.4	1,086.4	100 %
12/31/2002	13,708	9,764,826	902	470,284	1,120.2	1,120.2	100 %
12/31/2003	13,988	10,246,174	842	493,329	1,193.1	1,193.1	100 %
12/31/2004	13,903	10,503,169	858	524,733	1,227.1	1,227.1	100 %
12/31/2005@	14,108	10,948,727	831	528,162	1,289.3	1,289.3	100 %
12/31/2006	14,172	11,333,735	832	508,430	1,332.6	1,332.6	100 %
12/31/2007	14,186	11,714,551	832	510,846	1,375.9	1,375.9	100 %
12/31/2008	14,238	12,122,501	847	526,623	1,425.6	1,425.6	100 %
12/31/2009	14,301	12,576,956	840	527,032	1,479.4	1,479.4	100 %
12/31/2010@	14,407	13,047,857	829	524,242	1,545.7	1,545.7	100 %
12/31/2011	14,370	13,424,237	800	505,111	1,589.7	1,589.7	100 %
12/31/2012#	14,224	13,769,795	796	519,459	1,629.3	1,629.3	100 %
12/31/2013	14,187	14,152,417	751	480,335	1,663.5	1,663.5	100 %
12/31/2014	13,974	14,406,311	739	474,837	1,688.7	1,688.7	100 %
12/31/2015@	13,842	14,728,606	750	479,666	1,838.1	1,838.1	100 %
12/31/2016	13,790	15,119,687	715	462,896	1,881.1	1,881.1	100 %
12/31/2017	13,960	15,655,980	726	553,126	1,942.9	1,942.9	100 %

@ Revised actuarial assumptions.

\* Benefits increased.

# After benefit changes.

+ Includes certain recommended transfers and accrued transfers.

# Retirees and Beneficiaries December 31, 2017

## Historical Averages

All Retirees								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2017	216,978	57.7	23.0	\$20,993	70.4	\$27,161	\$23,652	\$42,486
2016	214,167	57.6	22.9	20,526	70.2	26,370	22,848	41,524
2015	211,301	57.6	22.8	20,076	69.9	25,579	22,056	40,604
2014	208,809	57.6	22.8	19,673	69.7	24,833	21,348	39,753
2013	202,136	57.4	22.8	19,290	69.5	24,209	20,784	38,763
2012	195,779	57.4	22.7	18,827	69.3	23,461	20,088	37,743
2011	189,849	57.3	22.6	18,218	69.3	22,611	19,212	36,552
2010	181,483	57.2	22.4	17,379	69.3	21,598	18,144	35,025
2009	174,659	57.2	22.2	16,724	69.3	20,730	17,256	33,808
2008	169,016	57.2	22.0	15,942	69.4	19,750	16,284	32,401
2007	163,511	57.2	21.9	15,318	69.4	18,917	15,480	31,214
2006	159,041	57.3	21.7	14,711	69.4	18,096	14,700	29,975
Traditional Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2017	216,260	57.7	23.1	\$21,016	70.4	\$27,192	\$23,688	\$42,479
2016	213,550	57.6	23.0	20,545	70.2	26,396	22,884	41,519
2015	210,792	57.6	22.9	20,092	69.9	25,600	22,080	40,600
2014	208,395	57.6	22.8	19,686	69.7	24,849	21,372	39,749
2013	201,841	57.4	22.8	19,299	69.5	24,220	20,796	38,760
2012	195,622	57.4	22.7	18,832	69.3	23,468	20,088	37,741
2011	189,753	57.3	22.6	18,221	69.3	22,614	19,224	36,549
2010	181,433	57.2	22.4	17,380	69.3	21,600	18,144	35,025
2009	174,637	57.2	22.2	16,725	69.3	20,731	17,256	33,808
2008	169,000	57.2	22.0	15,942	69.4	19,751	16,284	32,401
2007	163,505	57.2	21.9	15,318	69.4	18,917	15,480	31,214
2006	159,039	57.3	21.7	14,711	69.4	18,096	14,700	29,974
Combined Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2017	476	64.7	10.3	\$4,000	68.2	\$4,304	\$3,816	\$47,455
2016	398	64.8	10.0	3,709	67.9	3,956	3,528	46,614
2015	324	64.6	9.8	3,401	67.3	3,596	3,186	45,141
2014	259	64.7	9.7	3,284	66.8	3,421	3,030	44,349
2013	164	64.9	8.7	2,839	67.0	2,962	2,682	43,403
2012	95	64.2	8.5	2,785	66.2	2,891	2,556	45,218
2011	58	64.2	7.9	2,757	66.0	2,828	2,202	49,751
2010	32	64.3	7.9	2,158	65.9	2,219	1,962	40,548
2009	12	65.0	7.6	1,590	66.6	1,635	1,740	35,139
2008	12	64.0	7.4	1,239	64.8	1,260	1,092	29,454
2007	4	61.1	4.8	1,620	62.0	1,644	1,644	43,743
2006	2	62.1	3.8	1,656	62.3	1,656	1,656	50,116
DB Portion of Member Directed Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2017	242	NA	NA	NA	NA	NA	NA	NA
2016	219	NA	NA	NA	NA	NA	NA	NA
2015	185	NA	NA	NA	NA	NA	NA	NA
2014	155	NA	NA	NA	NA	NA	NA	NA
2013	131	NA	NA	NA	NA	NA	NA	NA
2012	62	NA	NA	NA	NA	NA	NA	NA
2011	38	NA	NA	NA	NA	NA	NA	NA
2010	18	NA	NA	NA	NA	NA	NA	NA
2009	10	NA	NA	NA	NA	NA	NA	NA
2008	4	NA	NA	NA	NA	NA	NA	NA
2007	2	NA	NA	NA	NA	NA	NA	NA
2006	NA							

## SECTION X

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### ACTUARIAL METHODS AND ASSUMPTIONS

# Summary of Actuarial Methods and Assumptions used for OPERS Actuarial Valuations Assumptions Adopted by the Retirement Board After Consulting with the Actuary

**The individual entry age actuarial cost method of valuation** was used in determining liabilities and normal cost. Differences in the past between assumed experience and actual experience (“actuarial gains and losses”) become part of actuarial accrued liabilities.

Unfunded actuarial accrued liabilities are amortized to produce payments (principal & interest) which are level percent of payroll contributions.

**The actuarial assumptions used** in the valuation are shown in this Section. Assumptions were established following the December 31, 2015 actuarial valuation based upon an Experience Study covering the period January 1, 2011 through December 31, 2015. The actuarial assumptions represent estimates of future experience.

## ECONOMIC ASSUMPTIONS

**The investment return rate** assumed in the valuations was 7.50% per year, compounded annually (net after investment expenses).

**The wage inflation rate** assumed in this valuation was 3.25% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes related to individual merit and seniority effects.

**The price inflation** component of the investment return rate and the wage inflation rate is assumed to be 2.50%.

**The assumed real rate of return** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 7.50% investment return rate translates to an assumed real rate of return over wage inflation of 4.25%. The assumed real rate of return over price inflation is 5.00%.

**The active member population** (the sum of the Traditional and Combined Plan active members) is assumed to remain constant. For purposes of financing the unfunded actuarial accrued liabilities, total payroll (the sum of the Traditional and Combined Plan active payroll) is assumed to grow at the wage inflation rate – 3.25% per year.

**Pay increase assumptions** for individual active members are shown for sample ages on pages X-8 through X-11. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.25% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.

## Non-Economic Assumptions

**The pre-retirement mortality tables**, for pre-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The healthy retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The disabled retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The probabilities of unreduced and reduced age and service retirement** are shown on pages X-3 through X-7. For State and Local Government members that satisfy the 30-year (31 & 32 years for Transition Groups B & C) unreduced retirement condition prior to age 65 (66 & 67 for Transition Groups B & C), the service-based unreduced retirement probabilities are used. For State and Local Government members that satisfy the 30-year (31 & 32 years for Transition Groups B & C) unreduced retirement condition on or after age 65 (66 & 67 for Transition Groups B & C), the age-based unreduced retirement probabilities are used.

**The probabilities of withdrawal from service, disability and death-in-service** are shown for sample ages on pages X-8 through X-11. For withdrawal from service it was assumed that members terminating before age 35, members terminating with less than 5 years of service, and a percentage of all other members would withdraw their contributions and forfeit their entitlement to an employer financed benefit. The percentage is 100% at age 35 and is reduced for each year of age after 35, becoming 0% at age 55 (age 45 for law members).

**For purposes of death-in-service and disability benefits**, it is assumed that Combined Plan members will take a benefit from the Traditional Plan, unless a lump sum distribution from the Combined Plan would have a greater value. It is assumed death-in-service members have 2 qualified survivor beneficiaries.

**The funding value of defined benefit assets** recognizes assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over a closed 4-year period. Funding value is not permitted to deviate from market value by more than 12%. Traditional and Combined Plan retiree health funding values of assets are developed independently beginning with the December 31, 2004 valuation.

**Present assets (cash & investments) at funding value** are shown on pages II-2 through II-9.

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The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA). Great care was taken in the production of this report, but there may be cases where schedules do not add, or where they do not exactly balance to other related schedules due to rounding.

# Probabilities of Unreduced Age and Service Retirement

## Transition Group A

Ages	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
65	22%	22%	20%	20%
66	22%	22%	20%	20%
67	20%	20%	15%	20%
68	20%	20%	15%	17%
69	20%	20%	15%	17%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	15%	20%	15%	17%
73	15%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	25%	15%	17%
78	15%	25%	15%	17%
79	15%	25%	15%	22%
80	25%	25%	20%	22%
81	25%	25%	20%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
	48	
49		20%
50		20%
51		20%
52	30%	20%
53	30%	20%
54	25%	20%
55	25%	20%
56	25%	23%
57	25%	23%
58	20%	25%
59	20%	25%
60	35%	30%
61	35%	25%
62	35%	25%
63	35%	25%
64	35%	25%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70 & Over	100%	100%
Ref	1334	2084

Service	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
30	37%	40%	35%	35%
31	28%	33%	26%	30%
32-39	24%	26%	23%	24%
40	35%	33%	32%	24%
41	35%	33%	32%	24%
42	35%	33%	32%	24%
43	35%	33%	32%	20%
44	35%	33%	32%	20%
45	25%	25%	32%	20%
46	25%	25%	25%	20%
47	25%	25%	25%	20%
48	25%	25%	25%	20%
49	25%	25%	25%	20%
50 & Over	100%	100%	100%	100%
Ref	2091	2093	2098	2099

# Probabilities of Unreduced Age and Service Retirement

## Transition Group B

Ages	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
66	22%	22%	20%	20%
67	22%	22%	20%	20%
68	20%	20%	15%	20%
69	20%	20%	15%	17%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	20%	20%	15%	17%
73	15%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	20%	15%	17%
78	15%	25%	15%	17%
79	15%	25%	15%	17%
80	15%	25%	15%	22%
81	25%	25%	20%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
	50	
51		20%
52		20%
53		20%
54	25%	20%
55	25%	20%
56	25%	20%
57	25%	20%
58	20%	23%
59	20%	23%
60	35%	25%
61	35%	25%
62	35%	30%
63	35%	25%
64	35%	25%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70	100%	25%
71	100%	25%
72 & Over	100%	100%
Ref	1334	2084

Service	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
31	37%	40%	35%	35%
32	28%	33%	26%	30%
33-40	24%	26%	23%	24%
41	35%	33%	32%	24%
42	35%	33%	32%	24%
43	35%	33%	32%	24%
44	35%	33%	32%	20%
45	35%	33%	32%	20%
46	25%	25%	32%	20%
47	25%	25%	25%	20%
48	25%	25%	25%	20%
49	25%	25%	25%	20%
50	25%	25%	25%	20%
51 & Over	100%	100%	100%	100%
Ref	2091	2093	2098	2099

# Probabilities of Unreduced Age and Service Retirement

## Transition Group C

67 & 5 Condition	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
Age				
67	22%	22%	20%	20%
68	22%	22%	20%	20%
69	20%	20%	15%	20%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	20%	20%	15%	17%
73	20%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	20%	15%	17%
78	15%	20%	15%	17%
79	15%	25%	15%	17%
80	15%	25%	15%	17%
81	15%	25%	15%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
52		20%
53		20%
54		20%
55		20%
56	25%	20%
57	25%	20%
58	20%	20%
59	20%	20%
60	35%	23%
61	35%	23%
62	35%	25%
63	35%	25%
64	35%	30%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70	100%	25%
71	100%	25%
72	100%	25%
73	100%	25%
74 & Over	100%	100%
Ref	1334	2084

55 & 32 Condition	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
Year of Eligibility				
1	37%	40%	35%	35%
2	28%	33%	26%	30%
3-10	24%	26%	23%	24%
11	35%	33%	32%	24%
12	35%	33%	32%	24%
13	35%	33%	32%	24%
14	35%	33%	32%	20%
15	35%	33%	32%	20%
16	25%	25%	32%	20%
17	25%	25%	25%	20%
18	25%	25%	25%	20%
19	25%	25%	25%	20%
20	25%	25%	25%	20%
21 & over	100%	100%	100%	100%
Ref	2091	2093	2098	2099

# Probabilities of Reduced Retirement

## Transition Group A

Ages	Percent of Eligible Active Members Retiring Within Next Year				
	State		Local Government		Public Safety
	Men	Women	Men	Women	
48					8%
49					8%
50					8%
51					8%
52					
53					
54					
55	10%	10%	9%	11%	
56	10%	10%	9%	11%	
57	10%	10%	9%	11%	
58	10%	10%	9%	11%	
59	10%	11%	9%	11%	
60	10%	12%	9%	11%	
61	10%	13%	9%	12%	
62	15%	15%	13%	13%	
63	15%	15%	14%	14%	
64	15%	15%	12%	15%	
Ref	2085	2086	2087	2088	1496

## Transition Group B

Ages	Percent of Eligible Active Members Retiring Within Next Year					
	State		Local Government		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48					8%	8%
49					8%	8%
50					8%	
51					8%	
52					8%	
53					8%	
54						
55	10%	10%	9%	11%		
56	10%	10%	9%	11%		
57	10%	10%	9%	11%		
58	10%	10%	9%	11%		
59	10%	11%	9%	11%		
60	10%	12%	9%	11%		
61	10%	13%	9%	12%		
62	15%	15%	13%	13%		
63	15%	15%	14%	14%		
64	15%	15%	12%	15%		
65	15%	15%	12%	15%		
Ref	2085	2086	2087	2088	469	1496

# Probabilities of Reduced Retirement

## Transition Group C

Ages	Percent of Eligible Active Members Retiring Within Next Year					
	State		Local Government		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48						8%
49						8%
50						8%
51						8%
52					8%	
53					8%	
54					8%	
55					8%	
56						
57	10%	10%	9%	11%		
58	10%	10%	9%	11%		
59	10%	10%	9%	11%		
60	10%	10%	9%	11%		
61	10%	11%	9%	11%		
62	10%	12%	9%	11%		
63	10%	13%	9%	12%		
64	15%	15%	13%	13%		
65	15%	15%	14%	14%		
66	15%	15%	12%	15%		
Ref	2085	2086	2087	2088	1496	1496

## STATE

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			50.00%	50.00%					
	1			35.00%	35.00%					
	2			20.00%	20.00%					
	3			15.00%	15.00%					
	4			12.00%	12.00%					
20	5 & Over	0.0471%	0.0155%	10.00%	10.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0510%	0.0160%	8.20%	9.28%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0447%	0.0208%	5.80%	7.30%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0537%	0.0307%	4.28%	5.10%	0.16%	0.16%	2.40%	3.25%	5.65%
40		0.0717%	0.0432%	3.14%	3.46%	0.29%	0.29%	1.90%	3.25%	5.15%
45		0.1140%	0.0647%	2.22%	2.42%	0.47%	0.47%	1.34%	3.25%	4.59%
50		0.1871%	0.1047%	1.84%	2.10%	0.67%	0.67%	0.92%	3.25%	4.17%
55		0.2879%	0.1715%	1.80%	2.10%	1.05%	1.05%	0.68%	3.25%	3.93%
60		0.4887%	0.2653%	1.80%	2.10%	1.25%	1.25%	0.42%	3.25%	3.67%
65		0.9317%	0.3968%	1.80%	2.10%	1.25%	1.25%	0.12%	3.25%	3.37%
70	1.6293%	0.6719%	1.80%	2.10%	1.25%	1.25%	0.00%	3.25%	3.25%	
Ref		#2133x1sb0	#2134x1sb0	1034 #1387x1	1034 #1389x1	#1092x1	#1092x1	476		

\*Applicable rates during the 2017 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## LOCAL GOVERNMENT

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			40.00%	40.00%					
	1			27.00%	27.00%					
	2			18.00%	18.00%					
	3			13.00%	13.00%					
	4			11.00%	11.00%					
20	5 & Over	0.0471%	0.0155%	10.00%	11.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0510%	0.0160%	7.78%	9.32%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0447%	0.0208%	5.34%	6.94%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0537%	0.0307%	3.86%	5.02%	0.13%	0.10%	2.34%	3.25%	5.59%
40		0.0717%	0.0432%	2.82%	3.52%	0.21%	0.16%	1.77%	3.25%	5.02%
45		0.1140%	0.0647%	2.26%	2.70%	0.37%	0.26%	1.28%	3.25%	4.53%
50		0.1871%	0.1047%	2.04%	2.50%	0.63%	0.42%	0.92%	3.25%	4.17%
55		0.2879%	0.1715%	2.00%	2.50%	0.90%	0.71%	0.68%	3.25%	3.93%
60		0.4887%	0.2653%	2.00%	2.50%	1.00%	0.85%	0.42%	3.25%	3.67%
65		0.9317%	0.3968%	2.00%	2.50%	1.00%	0.85%	0.12%	3.25%	3.37%
70	1.6293%	0.6719%	2.00%	2.50%	1.00%	0.85%	0.00%	3.25%	3.25%	
Ref		#2133x1sb0	#2134x1sb0	1035 #1391x1	1035 #1393x1	#1093x1	#1094x1	477		

\*Applicable rates during the 2017 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## PUBLIC SAFETY

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			20.00%	20.00%					
	1			19.00%	19.00%					
	2			15.00%	15.00%					
	3			15.00%	15.00%					
	4			10.00%	10.00%					
20	5 & Over	0.0471%	0.0155%	10.00%	10.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0510%	0.0160%	10.00%	10.00%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0447%	0.0208%	8.80%	8.80%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0537%	0.0307%	6.20%	6.20%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0717%	0.0432%	3.50%	3.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1140%	0.0647%	2.20%	2.20%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1871%	0.1047%	2.00%	2.00%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2879%	0.1715%	2.00%	2.00%	2.32%	2.65%	0.60%	3.25%	3.85%
60		0.4887%	0.2653%	2.00%	2.00%	2.60%	2.75%	0.40%	3.25%	3.65%
65		0.9317%	0.3968%	2.00%	2.00%	2.60%	2.75%	0.16%	3.25%	3.41%
70		1.6293%	0.6719%	2.00%	2.00%	2.60%	2.75%	0.00%	3.25%	3.25%
Ref		#2133x1sb0	#2134x1sb0	1036 #1211x1	1036 #1211x1	#1095x1	#1096x1	485		

\*Applicable rates during the 2017 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## LAW ENFORCEMENT

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			16.00%	20.00%					
	1			10.00%	12.00%					
	2			8.00%	9.00%					
	3			6.00%	6.00%					
	4			5.00%	6.00%					
20	5 & Over	0.0471%	0.0155%	4.50%	5.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0510%	0.0160%	3.54%	3.80%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0447%	0.0208%	2.66%	2.90%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0537%	0.0307%	2.14%	2.30%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0717%	0.0432%	1.48%	1.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1140%	0.0647%	1.20%	1.30%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1871%	0.1047%	1.20%	1.20%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2879%	0.1715%	1.20%	1.20%	2.32%	2.65%	0.60%	3.25%	3.85%
60		0.4887%	0.2653%	1.20%	1.20%	2.60%	2.75%	0.40%	3.25%	3.65%
65		0.9317%	0.3968%	1.20%	1.20%	2.60%	2.75%	0.16%	3.25%	3.41%
70	1.6293%	0.6719%	1.20%	1.20%	2.60%	2.75%	0.00%	3.25%	3.25%	
Ref		#2133x1sb0	#2134x1sb0	753 #876x1	1037 #575x1	#1095x1	#1096x1	485		

\*Applicable rates during the 2017 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## Single Life Retirement Values

Sample Attained Ages*	Present Value of \$1 Monthly for Life Increasing 3.0% Annually (First Increase After 1 Year)		Future Life Expectancy (Years)	
	Males	Females	Males	Females
50	\$186.24	\$194.56	33.63	37.11
55	174.53	183.88	28.91	32.16
60	160.21	170.85	24.33	27.37
65	143.33	155.29	19.97	22.79
70	124.23	137.08	15.92	18.45
75	103.51	116.64	12.25	14.44
80	82.31	94.88	9.05	10.87
Ref:	:#2135x1sb0	:#2136x1sb0		

\*Attained Age during the 2017 Calendar Year.

# Miscellaneous and Technical Assumptions

## December 31, 2017

<b>Marriage Assumption:</b>	70% of males and 60% of females are assumed to be married for purposes of death-in-service benefits for State and Local members. 90% of males and 90% of females are assumed to be married for purposes of death-in-service benefits for Law members. Male spouses are assumed to be three years older than female spouses for active member valuation purposes. In retired or inactive cases where spouse information is needed, but not available, the three year age difference is also assumed.
<b>Pay Increase Timing:</b>	Beginning of year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
<b>Final Average Salary:</b>	For present value of future benefit purposes, final average salary was calculated in accordance with pay increase assumptions, but was not permitted to fall below the final average salary reported in the data.
<b>Decrement Timing:</b>	Decrements are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Disability and mortality decrements do not operate during the first 5 years of service.
<b>Death after Disability:</b>	Death after disability benefits were approximated by assuming that the disability benefit would be paid as a joint and 35% survivor benefit for people in the original disability plan and as a joint and 20% survivor benefit for people in the post 1992 plan.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year. A (0.80)% factor is applied to State active member liabilities (other than for refunds) and a (1.00)% factor is applied to Local active member liabilities (other than for refunds) to recognize that a portion of the membership is part time.

## Miscellaneous and Technical Assumptions December 31, 2017 (Concluded)

<b>Miscellaneous Loads:</b>	<ul style="list-style-type: none"><li>• A load of approximately 0.40% of payroll is included in the computed normal cost to recognize subsidized service purchases.</li><li>• Law active accrued liabilities for retirement are reduced by 10% to recognize that total service reported is not entirely Law service, and that non-Law service cannot be used to satisfy Law eligibility conditions.</li><li>• A load of approximately 0.67% of Traditional Plan and 1.00% of Combined Plan payroll is included in the Traditional and Combined Plan computed normal costs to recognize expected administrative expenses.</li></ul>
<b>Transition Groups Under Senate Bill #343:</b>	A member's transition group (i.e., Group A, Group B, or Group C) was determined as of the valuation date based upon the assumption (for transition group determination only) that active members would continue in active service.
<b>Cost-of-Living Adjustments:</b>	For individuals retiring after January 7, 2013, cost-of-living adjustments were assumed to be 3% for calendar years 2013 through 2018 and 2.15% thereafter.
<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon contribution rates presented in the Summary of Benefits, and the actual payroll payable at the time contributions are made.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is a straight life benefit, except where otherwise noted.
<b>Missing Member Data and Member Data Adjustments:</b>	<p>Active and inactive records with missing dates of birth, if any, were given dates of birth that resulted in an entry age of 30 based upon the reported service. Active and inactive records with missing gender codes, if any, were assumed to be female. For active members with less than 6 months of service credit and a reported annualized salary greater than \$200,000, the annual salary used for valuation purposes was the greater of the member's reported FAS and non-annualized gross salary.</p> <p>Per direction from OPERS Staff, 121 members' reported non-annualized gross salaries were used in replacement of reported annualized salaries.</p>

## **SECTION XI**

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### **FINANCIAL PRINCIPLES**

# Financial Principles and Operational Techniques of OPERS

**Promises Made, and To Be Paid For.** As each year is completed, OPERS in effect hands an “IOU” to each member then acquiring a year of service credit --- the “IOU” says: “The Ohio Public Employees Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related *key financial questions* are:

***Which generation of taxpayers contributes the money to cover the IOU?***

***The present taxpayers***, who receive the benefit of the member’s present year of service? ***Or the future taxpayers***, who happen to be in Ohio at the time the IOU becomes a cash demand, years and often decades later?

***The law governing OPERS financing intends that this year’s taxpayers contribute the money to cover the IOUs being handed out this year.*** With this financial objective, ***the employer contribution rate is expected to remain approximately level from generation to generation of taxpayers.***

There are systems which have a design for deferring contributions to future taxpayers. Lured by a lower contribution rate now, they put aside the consequence that the contribution rate must then relentlessly grow to a level much higher than would be required if a level contribution pattern were followed.

An inevitable by-product of the level-cost design is the accumulation of reserve assets, for decades, and the income produced when the assets are invested. ***Investment income*** becomes ***the 3<sup>rd</sup> and largest contributor*** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members' service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded actuarial accrued liabilities are the difference between: liabilities for service already rendered; and the accrued assets of OPERS).

**Computing Contributions to Support Fund Benefits.** From a given schedule of benefits and from employee and asset data, the actuary calculates the contribution rates to support the benefits by means of ***an actuarial valuation and a funding method.***

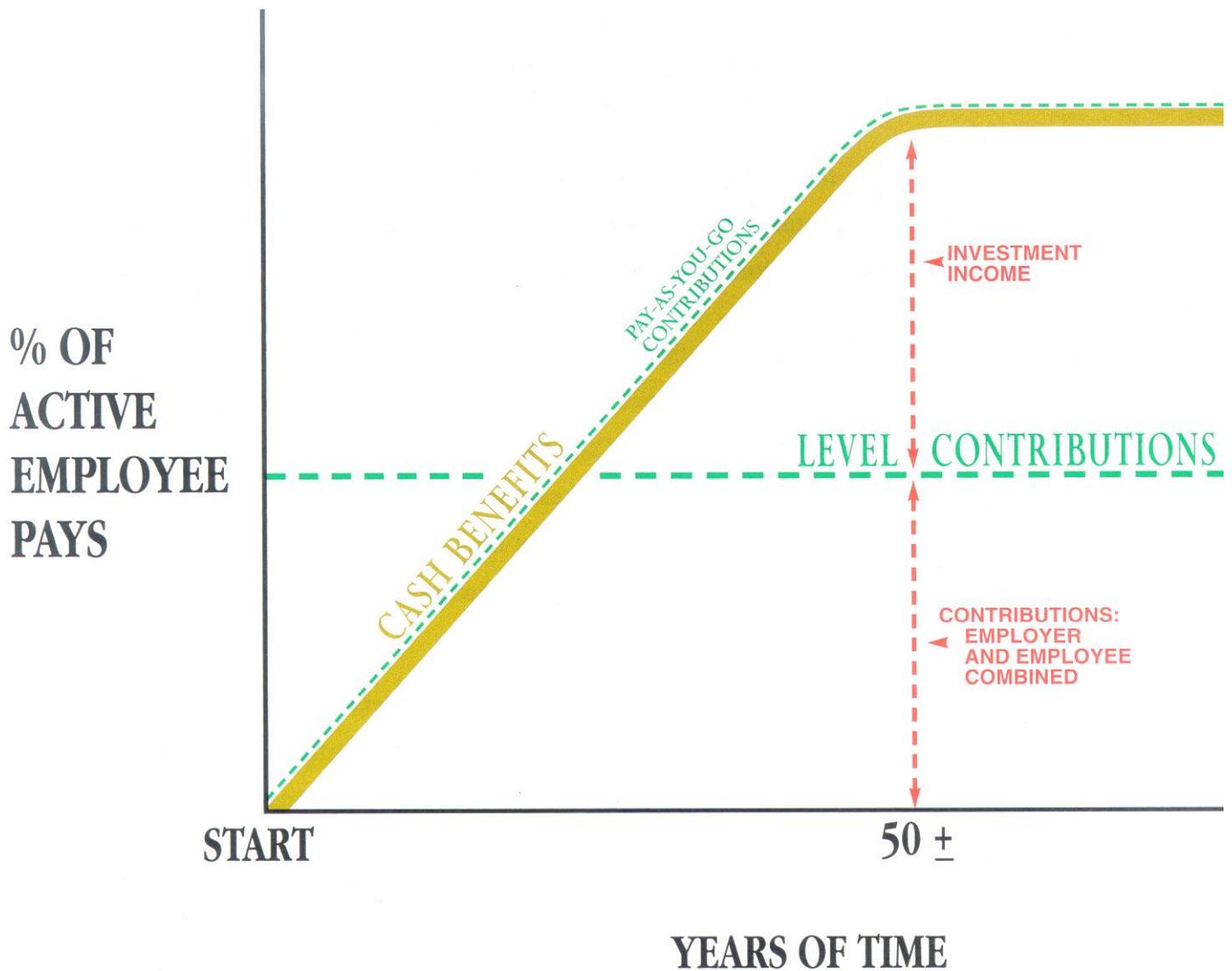
An actuarial valuation has a number of ingredients such as: the rate of investment return which plan assets will earn; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement.

In an actuarial valuation, assumptions must be made as to what the above rates will be for the next year and for decades in the future. The assumptions are established by the Retirement Board after receiving the advice of the actuary.

**Reconciling Differences Between Assumed Experience and Actual Experience.** Once actual experience has occurred and has been observed, it will not coincide exactly with assumed experience, regardless of the skill of the actuary and the many calculations made. The future can not be predicted with 100% precision.

OPERS copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is ***continuing adjustments in financial position.***

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**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

Economic Risk Areas

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

Non-Economic Risk Areas

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability

## The Actuarial Valuation Process

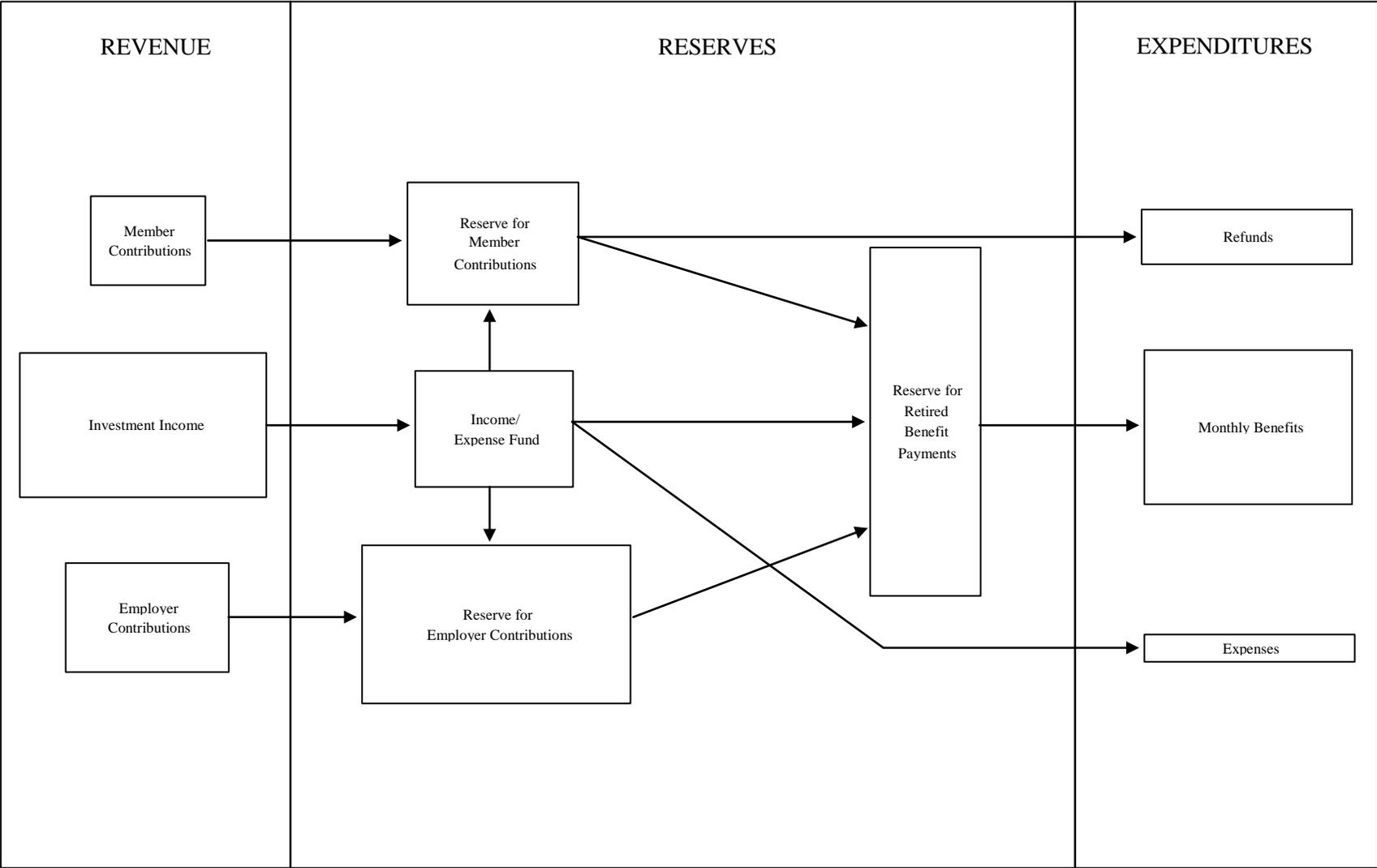
*The financing diagram* on the opposite page shows the relationship between *the two fundamentally different philosophies of paying* for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program) which is thus an *increasing contribution method*; and, the *level contribution method* which attempts to equalize contributions between the generations.

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*The actuarial valuation* is the mathematical process by which the level contribution rate is determined. The activity constituting the valuation may be summarized as follows:

- A. **Census Data**, including:
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
  
- B. + **Asset data** (cash & investments)
  
- C. + **Benefit provisions** that establish eligibility and amounts of payments to members
  
- D. + **Assumptions concerning future experience** in various risk areas
  
- E. + **The funding method** for employer contributions (the long-term, planned pattern for employer contributions)
  
- F. + **Mathematically combining the assumptions, the funding method, and the data**
  
- G. = Determination of:
  - Plan Financial Position; and/or
  - New Employer Contribution Rate

# Flow of Money Through the Retirement System



## Glossary

**Accrued Service.** The service credited under the plan which was rendered before the date of the actuarial valuation.

**Accumulated Benefit Obligation.** The actuarial present value of vested and non-vested benefits based on service to date and past and current salary levels.

**Actuarial Accrued Liability.** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

**Actuarial Equivalent.** A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Actuary.** A person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries (MAAA). The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

**Experience Gain (Loss).** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

**Funding Value of Assets.** The value of current plan assets recognized for valuation purposes. Generally based on a phased-in recognition of all or a portion of market related investment return. Sometimes referred to as Actuarial Value of Assets.

**Normal Cost.** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

**Plan Termination Liability.** The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a “going concern” basis and is not normally determined in a routine actuarial valuation.

**Reserve Account.** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

**Unfunded Actuarial Accrued Liability.** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

## Meaning of “Unfunded Actuarial Accrued Liabilities”

**“Actuarial accrued liabilities”** are **the present value of the portions of promised benefits that are not covered by future normal cost contributions** --- a liability has been established (“accrued”) because the service has been rendered but the resulting monthly cash benefit may not be payable until years in the future.

If “actuarial accrued liabilities” at any time exceed the plan’s accrued assets (cash & investments), the difference is **“unfunded actuarial accrued liabilities.”** This is the common condition. If the plan’s assets equaled the plan’s “actuarial accrued liabilities”, the plan would be termed “fully funded.” This is an unusual condition.

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Each time a plan adds a new benefit which applies to service already rendered, an “actuarial accrued liability” is created, which is also an “unfunded actuarial accrued liability” because the plan can’t print instant cash to cover the value of the new benefit promises. Payment for such unfunded actuarial accrued liabilities is spread over a period of years, commonly in the 15-30 year range.

Unfunded actuarial accrued liabilities can occur in another way: if actual plan experience is less favorable than assumed, the difference is added to unfunded actuarial accrued liabilities. For example, in plans where benefits are directly related to an employee’s pay near time of retirement, unfunded actuarial accrued liabilities increased rapidly during the 1970’s because unexpected rates of pay increase created additional actuarial accrued liabilities which could not be matched by reasonable investment results. Most of the unexpected pay increases were the direct result of inflation, which is a very destructive force on financial stability.

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The existence of unfunded actuarial accrued liabilities is not bad but the changes from year to year in the amount of unfunded actuarial accrued liabilities are important--- “bad” or “good” or somewhere in between.

Nor are unfunded actuarial accrued liabilities a bill payable immediately, but it is important that policy-makers prevent the amount from becoming unreasonably high and ***it is vital for plans to have a sound method for making payments toward them*** so that they are controlled.

## SECTION XII

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### ADDITIONAL SCHEDULES

**This information is presented in draft form for review by the System's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the System's financial statements.**

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Traditional, Combined, and Member Directed Plans

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll <sup>^</sup>	UAAL as a % of Covered Payroll
1997	\$34,971	\$33,846	\$ 1,125	97 %	\$ 8,640	13 %
1998	37,714	38,360	(646)	102 %	9,017	0 %
1999	43,070	43,060	10	100 %	9,477	0 %
2000	46,347	46,844	(497)	101 %	10,192	0 %
2001	49,095	48,748	347	99 %	10,782	3 %
2001*	47,492	48,748	(1,256)	103 %	10,782	0 %
2002	50,872	43,706	7,166	86 %	11,207	64 %
2003	54,774	46,746	8,028	85 %	11,165	72 %
2004	57,604	50,452	7,152	88 %	11,454	62 %
2005	61,146	54,473	6,673	89 %	11,807	57 %
2005*	62,498	54,473	8,025	87 %	11,807	68 %
2006	66,161	61,296	4,865	93 %	12,175	40 %
2007	69,734	67,151	2,583	96 %	12,583	21 %
2008	73,466	55,315	18,150	75 %	12,801	142 %
2009	76,555	57,629	18,926	75 %	12,548	151 %
2010	79,630	60,600	19,031	76 %	12,450	153 %
2010*	80,485	63,649	16,836	79 %	12,450	135 %
2011	84,530	65,436	19,094	77 %	12,399	154 %
2012	87,105	67,855	19,250	78 %	12,193	158 %
2012#	83,878	67,855	16,023	81 %	12,193	131 %
2013	86,645	71,411	15,234	82 %	12,331	124 %
2014	89,285	74,865	14,420	84 %	12,486	114 %
2015	91,832	78,061	13,771	85 %	12,688	106 %
2015*	97,177	78,061	19,116	80 %	12,688	148 %
2016	100,167	80,280	19,887	80 %	13,186	151 %
2017	102,656	83,292	19,364	81 %	13,498	143 %

@ Excludes reserve for Member Directed future adverse experience.

<sup>^</sup> In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented. The payroll amounts exclude Member Directed payroll.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Traditional Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll <sup>^</sup>	UAAL as a % of Covered Payroll
1997	\$34,971	\$33,846	\$ 1,125	97 %	\$ 8,640	13 %
1998	37,714	38,360	(646)	102 %	9,017	0 %
1999	43,070	43,060	10	100 %	9,477	0 %
2000	46,347	46,844	(497)	101 %	10,192	0 %
2001	49,095	48,748	347	99 %	10,782	3 %
2001*	47,492	48,748	(1,256)	103 %	10,782	0 %
2002	50,872	43,706	7,166	86 %	11,207	64 %
2003	54,756	46,737	8,019	85 %	11,056	73 %
2004	57,573	50,430	7,143	88 %	11,313	63 %
2005	61,099	54,433	6,666	89 %	11,633	57 %
2005*	62,447	54,433	8,014	87 %	11,633	69 %
2006	66,089	61,235	4,854	93 %	11,971	41 %
2007	69,639	67,067	2,572	96 %	12,347	21 %
2008	73,346	55,230	18,116	75 %	12,546	144 %
2009	76,407	57,519	18,888	75 %	12,290	154 %
2010	79,459	60,461	18,997	76 %	12,165	156 %
2010*	80,307	63,515	16,792	79 %	12,165	138 %
2011	84,325	65,274	19,052	77 %	12,103	157 %
2012	86,876	67,670	19,206	78 %	11,884	162 %
2012#	83,664	67,670	15,994	81 %	11,884	135 %
2013	86,407	71,175	15,232	82 %	12,000	127 %
2014	89,017	74,567	14,450	84 %	12,140	117 %
2015	91,535	77,700	13,835	85 %	12,321	110 %
2015*	96,863	77,700	19,163	80 %	12,321	152 %
2016	99,818	79,865	19,953	80 %	12,794	156 %
2017	102,274	82,797	19,477	81 %	13,085	149 %

<sup>^</sup> In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Combined Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll <sup>^</sup>	UAAL as a % of Covered Payroll
1997						
1998						
1999						
2000						
2001						
2001						
2002						
2003	\$ 18	\$ 9	\$ 9	50 %	\$109	8 %
2004	31	22	9	71 %	141	6 %
2005	47	40	7	85 %	174	4 %
2005*	51	40	11	78 %	174	6 %
2006	72	61	11	85 %	205	5 %
2007	95	84	11	88 %	236	5 %
2008	120	85	35	71 %	255	14 %
2009	148	110	38	74 %	258	15 %
2010	171	138	33	81 %	284	12 %
2010*	177	134	43	76 %	284	15 %
2011	203	161	42	79 %	296	14 %
2012	226	183	43	81 %	310	14 %
2012#	212	183	29	86 %	310	9 %
2013	230	229	1	100 %	331	0 %
2014	260	289	(29)	111 %	346	0 %
2015	288	350	(62)	122 %	367	0 %
2015*	303	350	(47)	116 %	367	0 %
2016	336	402	(66)	120 %	392	0 %
2017	365	479	(113)	131 %	413	0 %

<sup>^</sup> In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts) Member Directed Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll	UAAL as a % of Covered Payroll
1997						
1998						
1999						
2000						
2001						
2001						
2002						
2003						
2004						
2005						
2005*						
2006						
2007						
2008	\$ 166,354	\$ 147,976	\$ 18,378	89 %	NA	NA
2009	252,670	205,639	47,031	81 %	NA	NA
2010	489,792	438,982	50,810	90 %	NA	NA
2010*	496,004	454,025	41,979	92 %	NA	NA
2011	1,172,900	1,156,151	16,749	99 %	NA	NA
2012	2,665,552	2,523,879	141,673	95 %	NA	NA
2013	6,884,231	6,826,536	57,695	99 %	NA	NA
2014	8,291,077	8,771,712	(480,635)	106 %	NA	NA
2015	9,767,164	10,622,057	(854,893)	109 %	NA	NA
2015*	10,290,582	10,622,057	(331,475)	103 %	NA	NA
2016	12,961,105	12,961,105	0	100 %	NA	NA
2017	16,770,041	16,770,041	0	100 %	NA	NA

@ Excludes reserve for future adverse experience.

\* Revised actuarial assumptions.

## Schedule of Employer Contributions\*

Traditional Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2004	2006	8.44%
2005	2008	7.12%
2006	2009	7.13%
2007	2010	7.14%
2008	2011	13.33%
2009	2012	13.64%
2010	2013	13.52%
2011	2014	14.15%
2012	2015	11.16%
2013	2016	10.16%
2014	2017	10.16%
2015	2018	14.16%
2016	2019	14.17%
2017	2020	14.17%

Combined Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2004	2006	8.33%
2005	2008	7.29%
2006	2009	7.33%
2007	2010	7.22%
2008	2011	10.00%
2009	2012	10.00%
2010	2013	13.00%
2011	2014	14.00%
2012	2015	11.00%
2013	2016	10.00%
2014	2017	10.00%
2015	2018	14.00%
2016	2019	14.00%
2017	2020	14.00%

Member Directed Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2008	2011	\$ 1,570
2009	2012	4,019
2010	2013	4,342
2011	2014	1,669
2012	2015	14,121
2013	2016	5,751
2014	2017	0
2015	2018	0
2016	2019	0
2017	2020	0

\* The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

## Schedule of Unfunded Actuarial Accrued Liability@ Traditional, Combined and Member Directed Plans

	December 31, 2017					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 14,298,862,054	\$ 21,603,361,741	\$ 35,902,223,795	\$ 8,987,173	\$ 1,870,677,748	\$ 37,781,888,716
Retirees and Beneficiaries#	26,061,634,810	36,177,206,673	62,238,841,483	50,491,746	2,584,922,865	64,874,256,094
Total Accrued Liabilities	\$ 40,360,496,864	\$ 57,780,568,414	\$ 98,141,065,278	\$ 59,478,919	\$ 4,455,600,613	\$ 102,656,144,810
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 1,956,574,513	\$ 5,107,261,824	\$ 7,063,836,337	\$ (11,157,340)	\$ 753,345,125	\$ 7,806,024,122
ESF	5,356,142,952	8,265,752,148	13,621,895,100	3,647,420	674,788,180	14,300,330,700
Unallocated	47,656,844	70,765,363	118,422,207	61,768	5,767,025	124,251,000
Funding Value of Assets Adjustment	(1,462,914,481)	(2,171,968,090)	(3,634,882,571)	(1,883,598)	(175,864,694)	(3,812,630,863)
Total Active and Inactive Assets	\$ 5,897,459,828	\$ 11,271,811,245	\$ 17,169,271,073	\$ (9,331,750)	\$ 1,258,035,636	\$ 18,417,974,959
Retirees and Beneficiaries						
A & PR Fund*	\$ 25,351,885,936	\$ 35,022,238,478	\$ 60,374,124,414	\$ 27,365,528	\$ 2,527,346,745	\$ 62,928,836,687
SBF Fund*	708,538,248	1,153,677,632	1,862,215,880	23,126,218	57,576,120	1,942,918,218
Reserve for Future MD Adverse Experience^	1,210,626	1,290,563	2,501,189	0	0	2,501,189
Total R&B Assets	\$ 26,061,634,810	\$ 36,177,206,673	\$ 62,238,841,483	\$ 50,491,746	\$ 2,584,922,865	\$ 64,874,256,094
Total Assets	\$ 31,959,094,638	\$ 47,449,017,918	\$ 79,408,112,556	\$ 41,159,996	\$ 3,842,958,501	\$ 83,292,231,053
Unfunded Actuarial Accrued Liability	\$ 8,401,402,226	\$ 10,331,550,496	\$ 18,732,952,722	\$ 18,318,923	\$ 612,642,112	\$ 19,363,913,757

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

# Excludes reserve for Member Directed future adverse experience.

\* After reserve transfers.

## Schedule of Unfunded Actuarial Accrued Liability@ Traditional Plan

	December 31, 2017					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 14,152,239,506	\$21,407,768,963	\$35,560,008,469	\$ 8,987,173	\$1,870,677,748	\$37,439,673,390
Retirees and Beneficiaries	26,048,034,745	36,150,789,605	62,198,824,350	50,491,746	2,584,922,865	64,834,238,961
Total Accrued Liabilities	\$ 40,200,274,251	\$57,558,558,568	\$97,758,832,819	\$ 59,478,919	\$4,455,600,613	\$102,273,912,351
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 1,759,726,999	\$ 4,827,941,222	\$ 6,587,668,221	\$ (11,157,340)	\$ 753,345,125	\$ 7,329,856,006
ESF	5,354,844,357	8,264,225,100	13,619,069,457	3,647,420	674,788,180	14,297,505,057
Unallocated	47,656,844	70,765,363	118,422,207	61,768	5,767,025	124,251,000
Funding Value of Assets Adjustment	(1,453,289,299)	(2,157,980,609)	(3,611,269,908)	(1,883,598)	(175,864,694)	(3,789,018,200)
Total Active and Inactive Assets	\$ 5,708,938,901	\$11,004,951,076	\$16,713,889,977	\$ (9,331,750)	\$ 1,258,035,636	\$17,962,593,863
Retirees and Beneficiaries						
A & PR Fund*	\$25,339,496,497	\$34,997,111,973	\$60,336,608,470	\$ 27,365,528	\$2,527,346,745	\$62,891,320,743
SBF Fund*	708,538,248	1,153,677,632	1,862,215,880	23,126,218	57,576,120	1,942,918,218
Total R&B Assets	\$26,048,034,745	\$36,150,789,605	\$62,198,824,350	\$ 50,491,746	\$2,584,922,865	\$64,834,238,961
Total Assets	\$31,756,973,646	\$47,155,740,681	\$78,912,714,327	\$ 41,159,996	\$3,842,958,501	\$82,796,832,824
Unfunded Actuarial Accrued Liability	\$ 8,443,300,605	\$ 10,402,817,887	\$18,846,118,492	\$ 18,318,923	\$ 612,642,112	\$19,477,079,527

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

## Schedule of Unfunded Actuarial Accrued Liability@ Combined Plan

	December 31, 2017					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 146,622,548	\$195,592,778	\$342,215,326			\$342,215,326
Retirees and Beneficiaries	7,502,359	15,744,733	23,247,092			23,247,092
Total Accrued Liabilities	\$ 154,124,907	\$211,337,511	\$365,462,418			\$365,462,418
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 196,594,847	\$278,822,267	\$475,417,114			\$475,417,114
ESF	1,191,667	1,396,011	2,587,678			2,587,678
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(9,265,587)	(13,358,109)	(22,623,696)			(22,623,696)
Total Active and Inactive Assets	\$ 188,520,927	\$266,860,169	\$455,381,096			\$455,381,096
Retirees and Beneficiaries						
A & PR Fund*	\$ 7,502,359	\$ 15,744,733	\$ 23,247,092			\$ 23,247,092
SBF Fund*	0	0	0			0
Total R&B Assets	\$ 7,502,359	\$ 15,744,733	\$ 23,247,092			\$ 23,247,092
Total Assets	\$ 196,023,286	\$282,604,902	\$478,628,188			\$478,628,188
Unfunded Actuarial Accrued Liability	\$ (41,898,379)	\$ (71,267,391)	\$(113,165,770)			\$ (113,165,770)

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

## Schedule of Unfunded Actuarial Accrued Liability@ DB Portion of Member Directed Plan

	December 31, 2017					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries#	6,097,706	10,672,335	16,770,041			16,770,041
Total Accrued Liabilities	\$ 6,097,706	\$ 10,672,335	\$ 16,770,041			\$ 16,770,041
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 252,667	\$ 498,335	\$ 751,002			\$ 751,002
ESF	106,928	131,037	237,965			237,965
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(359,595)	(629,372)	(988,967)			(988,967)
Total Active and Inactive Assets	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries						
A & PR Fund*	\$ 4,887,080	\$ 9,381,772	\$ 14,268,852			\$ 14,268,852
SBF Fund*	0	0	0			0
Reserve for Future Adverse Experience^	1,210,626	1,290,563	2,501,189			2,501,189
Total R&B Assets	\$ 6,097,706	\$ 10,672,335	\$ 16,770,041			\$ 16,770,041
Total Assets	\$ 6,097,706	\$ 10,672,335	\$ 16,770,041			\$ 16,770,041
Unfunded Actuarial Accrued Liability	\$ 0	\$ 0	\$ 0			\$ 0

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

# Excludes reserve for future adverse experience.

\* After reserve transfers.

## Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest valuation date follows:

Valuation date	December 31, 2017		
Actuarial cost method	Individual entry age		
Amortization method for unfunded actuarial accrued liabilities	Level percent closed - Traditional and Combined Level dollar closed - Member-Directed		
Equivalent Single Amortization Period (Years from December 31, 2019)			
Traditional Plan	18		
Combined Plan	N/A	(Plan has funded ratio of at least 100%)	
Member-Directed Plan	N/A	(Plan has funded ratio of at least 100%)	
Asset valuation method	4-year smoothed market		
Actuarial assumptions:			
Investment rate of return	7.50%		
Projected salary increases including wage inflation at 3.25%	3.25% - 10.75%		
Cost-of-living adjustments	Pre 1/7/2013 Retirees: 3.0% simple Post 1/7/2013 Retirees: 3.0% simple through 2018, then 2.15% simple		

		Traditional	Combined	Member Directed	Total
Retirees and beneficiaries receiving benefits		216,260	476	242	216,978
Terminated plan members entitled to but not yet receiving benefits					
	Less than 5 years of service	510,190	1,134	0	511,324
	5 or more years of service	33,792	678	0	34,470
	<b>Total</b>	<b>543,982</b>	<b>1,812</b>	<b>0</b>	<b>545,794</b>
Active plan members					
	Less than 5 years of service	151,440	3,149	0	154,589
	5 or more years of service	171,878	4,799	0	176,677
	<b>Total</b>	<b>323,318</b>	<b>7,948</b>	<b>0</b>	<b>331,266</b>
Total					
	Less than 5 years of service	661,630	4,283	0	665,913
	5 or more years of service	421,930	5,953	242	428,125
	<b>Total</b>	<b>1,083,560</b>	<b>10,236</b>	<b>242</b>	<b>1,094,038</b>

August 27, 2018

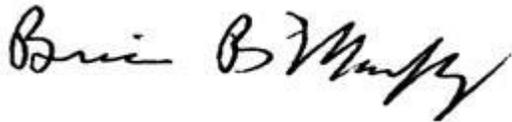
Ms. Karen E. Carraher  
Executive Director  
Ohio Public Employees Retirement System  
277 East Town Street  
Columbus, Ohio 43215

**Re: Report of the December 31, 2017 Actuarial Valuation**

Dear Karen:

Enclosed are the 20 bound copies of the final report.

Sincerely,



Brian B. Murphy, FSA, EA, MAAA, FCA

MD:bd  
Enclosures

cc: Mr. Tom Heseltine  
Clifton Larson Allen

