

Mesa Fire Dept.  
(017)

# Arizona Public Safety Personnel Retirement System

June 30, 2018



December 12, 2018

Board of Trustees  
Arizona Public Safety Personnel Retirement System  
Phoenix, Arizona

**Re: Mesa Fire Dept.**

The results of the June 30, 2018 annual actuarial valuation of members covered by the Arizona Public Safety Personnel Retirement System (PSPRS) are presented in this report.

This report 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 purpose of the valuation was to measure the Retirement System's funding progress and to determine the employer contribution for the 2019-2020 fiscal year. The funding objective is stated in Article 4, Chapter 5, Title 38, Section 843B of the Arizona Revised Statutes. In addition, this consolidated report provides summary information for PSPRS participating employers. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The computed contribution rate shown on page A-2 should be considered as a minimum contribution rate that complies with the Board's funding policy and Arizona Statutes. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. 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.

The findings in this report are based on data and other information through June 30, 2018. 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 scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

This valuation assumes the continuing ability of the participating employers to make the contributions necessary to fund this plan. A determination regarding whether or not the participating employers are actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

The valuation was based upon information furnished by the Retirement System, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Retirement System.

In addition, this report was prepared using certain assumptions approved by the Board as described in the section of this report entitled Methods and Assumptions.

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 Arizona Public Safety Personnel Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

Mark Buis, James D. Anderson and Francois Pieterse are Members of the American Academy of Actuaries (MAAA). These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,

GABRIEL, ROEDER, SMITH & COMPANY



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# Executive Summary/Board Summary

## 1. Required Employer Contributions to Support Retirement Benefits

The funded status as of June 30, 2018 and the computed employer contribution for the fiscal year beginning July 1, 2019 are shown below:

### Tier 1 & Tier 2 Members:

Averages	Pension	Health	Total
Employer Contribution Rate	51.12%	0.41%	51.53%
Funded Status	49.6%	92.8%	50.5%

### Tier 3 members (hired on or after July 1, 2017) – pension only:

- Employer contribution for Tier 3 benefits: 10.59%
- Employer contribution for Tier 1 and Tier 2 unfunded liability: 35.61%
- Total employer contribution as a percentage of Tier 3 payroll: 46.20%

## 2. Contribution Rate Comparison

The chart below compares the results for this valuation of the Retirement System with the results of the prior year's valuation:

Valuation Date	Tier 1 & 2			Tier 3*	
	Pension	Health	Total	Pension	Health
6/30/2017	48.17%	0.37%	48.54%	10.59%	0.25%
6/30/2018	51.12%	0.41%	51.53%	10.59%	0.25%

\* At the November 28, 2018 Board of Trustees meeting, the PSPRS Board of Trustees decided not to change the Tier 3 Pension and Health Rates for Employers and Employees, calculated with the June 30, 2017 valuation, for the fiscal year beginning July 1, 2019. In addition to the Tier 3 Pension and Health rates above, the employer must also contribute 35.75% of Tier 3 payroll for Legacy UAL.

The PSPRS aggregate pension contribution rate increased slightly from the June 30, 2017 valuation due to asset experience and payroll growth different from expected, which impacted all employers; offset by the impact of certain employers lengthening the amortization period used for financing unfunded accrued liabilities. It is very important to note that the impact of these changes vary significantly from one employer to another, depending on plan demographics and other factors. In addition, those hired on or after July 1, 2017 (Tier 3) have a different level of benefit promise, which is financed on a 50/50 basis between Employer/Employee. Pursuant to ARS 38-843, Subsection B, existing unfunded accrued liabilities for Tier 1 & 2 are financed over all employer payroll (including Tier 3).

## Executive Summary/Board Summary

### 3. Reasons for Change

Changes in the contribution rate are illustrated on the following chart. The impact of each change will be different for each employer.

Contribution Rate	Pension	Health	Total
Contribution Rate Last Valuation	48.17%	0.37%	48.54%
Asset Losses	0.46%	0.00%	0.46%
Tier 2	(0.05)%	(0.01)%	(0.06)%
Payroll Base	1.87%	0.01%	1.88%
COLA	0.09%	0.00%	0.09%
Amortization Method Change	0.00%	0.00%	0.00%
Other	0.58%	0.04%	0.62%
Contribution Rate This Valuation	51.12%	0.41%	51.53%

Funded Status	Pension	Health	Total
Funded Status Last Valuation	49.9%	95.2%	50.9%
Asset Losses	(0.3)%	(0.1)%	(0.3)%
Payroll Base	0.1%	0.0%	0.1%
COLA	(0.1)%	0.0%	(0.1)%
Hall/Parker Settlement	(0.6)%	0.0%	(0.6)%
Other	0.6%	(2.3)%	0.5%
Funded Status This Valuation	49.6%	92.8%	50.5%

**Asset Losses** – Asset gains and losses (relative to the assumed investment return) are smoothed over 7-years. The return on market value was 7.0% for the year ending June 30, 2018. However, based on funding value, the average return for the last 7 years is approximately 5.9%

## Executive Summary/Board Summary

**Tier 2** – The decrease in the contribution rate is due to the fact that as current members retire, they are replaced by new members who have a less costly Tier of Benefits (for members hired on or after January 1, 2012). This will typically result in a declining normal cost rate that will occur gradually over time as the population mix (Tier 1 / Tier 2) changes. Occasionally, the normal cost rate may change if there has been a shift in demographics during the year.

**Payroll Base** – Under the current amortization policy, the contribution rate is developed based on a percentage of payroll. To the extent that overall payroll is lower/greater than last year's payroll projected payroll growth, the contribution rate will increase/decrease as a result. For example, if there were two active members in the Plan last year and one of the members retired, the existing unfunded liability would now be spread over the payroll of one member instead of two members and the resulting contribution rate would be much higher. Therefore, it is important to consider the overall dollar level of the contribution along with the contribution rate. The dollar contributions are also shown on Page A-2. The change in the funded status is primarily due to gains or losses on the overall salary assumption, which includes both the wage base assumption and the merit and longevity components of the salary assumption. To the extent that payroll is lower/greater than last year's payroll projected payroll growth, the funded status rate will increase/decrease as a result.

**COLA** – A Cost of Living adjustment of 2% impacts benefits as of July 1, 2018 for eligible retirees, which exceeds the 1.75% assumption.

**Amortization Method Changes** – Some employers elected to extend the amortization period to 30 years. It is important to note that even if all assumptions are realized, including asset return at 7.4% per year -- under the 30 year level percent of payroll amortization method the unfunded liability is projected to grow for the next 10 years before declining (sometimes referred to as "negative amortization").

**Hall/Parker Settlement** – Final disposition of liabilities related to these court cases served to decrease funded status.

**Other** – This is the combination of all factors other than those listed above and primarily reflect demographic gains and losses (i.e., service purchases, retirement, turnover, disability, etc. experience that differs from the actuarial assumptions). While this number is small on a combined plan basis, it will vary considerably from employer to employer, especially for employers with a smaller number of members.

### 4. Amortization Period

Unfunded liabilities were amortized as level percent-of-payroll over a closed period of 28 years. If the actuarial value of assets exceeded the actuarial accrued liability, the excess was amortized over an open period of 20 years and applied as a credit to reduce the normal cost which otherwise would be payable.



## Executive Summary/Board Summary

### 5. Looking Ahead

The continuing effect of prior asset losses was dampened by the 7-year smoothing period, and further offset by the effect of lower than expected pay increases. There remains unrecognized investment losses that will, in the absence of other gains, put upward pressure on the contribution rate next year.

If the June 30, 2018 pension valuation results were based on market value instead of smoothed funding value, the pension funded percent of the plan would be 48.5% (instead of 49.6%), and the pension employer contribution requirement would be 51.92% of payroll (instead of 51.12%).

### 6. Conclusion

The recent changes in benefit structure and actuarial assumptions increased contribution rates for most employers. For some employers, this was offset by lengthening the amortization period. Additionally, the changes to the historical PBI structure will help dampen the volatility of contribution rates in the future and provide more predictable benefit increases to retirees.

For some plans, after accounting for active member contributions, the retired lives are less than fully funded on a funding value of assets basis. It is most important that this Plan receive contributions at least equal to the rates shown in this report.

# SECTION A

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## INTRODUCTION

## Funding Objective

The purpose of the annual actuarial valuation of the Arizona Public Safety Personnel Retirement System as of June 30, 2018 is to:

- Compute the liabilities associated with benefits likely to be paid on behalf of current retired and active members. This information is contained in Section B.
- Compare accrued assets with accrued liabilities to assess the funded condition. This information is contained in Section B.
- Compute the employers' recommended contribution rates for the Fiscal Year beginning July 1, 2019. This information is contained in Section A.

This objective is stated in Article 4, Chapter 5, Title 38, Section 843B of the Arizona Revised Statutes.

## Contribution Rates

The Retirement System is supported by member contributions, employer contributions and investment income from Retirement System assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

- (1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section E (the normal cost); and
- (2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (the unfunded actuarial accrued liability).

**Computed contribution rates** for the fiscal year beginning July 1, 2019 are shown on pages A-2 and A-3.

# Contribution Requirements

## Development of Employer Contributions for the Indicated Valuation Date

Valuation Date	June 30, 2017		June 30, 2018	
Contribution for Fiscal Year ending	2019		2020	
TIERS 1 & 2 MEMBERS				
Pension	Rate	Dollar	Rate	Dollar
Normal Cost				
Service Pension	20.66%	\$ 7,110,868	20.61%	\$ 6,455,992
Disability Pension	1.14%	392,371	1.15%	360,232
Survivors of Active Members	0.88%	302,883	0.87%	272,524
Refund of Member Accumulated Contributions	0.53%	182,418	0.53%	166,020
Total Normal Cost	23.21%	\$ 7,988,540	23.16%	\$ 7,254,768
Total Employee Cost*	(7.65%)	\$ (2,633,017)	(7.65%)	\$ (2,396,329)
Employer Normal Cost	15.56%	5,355,523	15.51%	4,858,439
Employer Amortization of Unfunded Liabilities (Legacy)	32.61%	11,223,882	35.61%	11,949,169
Total Employer Cost (Pension)	48.17%	\$ 16,579,405	51.12%	\$ 16,807,608
* Tier 2 Members contribute 11.65%, but statutory requirements dictate only 7.65% is applied toward employer costs.				
Health	Rate	Dollar	Rate	Dollar
Total Normal Cost	0.28%	\$ 96,372	0.27%	\$ 84,576
Employer Amortization of Unfunded Liabilities (Legacy)	0.09%	\$ 30,977	0.14%	\$ 46,978
Total Employer Cost (Health)	0.37%	\$ 127,349	0.41%	\$ 131,554
Tiers 1 & 2 Required Total Employer Cost (Pension + Health)	48.54%	\$ 16,706,754	51.53%	\$ 16,939,162
Total Minimum Contribution Requirement (if applicable)	0.00%		0.00%	
Alternate Contribution Rate (ACR)**	32.70%		35.75%	

\*\* The Alternate Contribution Rate is the sum of the positive amortization payments for Tiers 1 & 2 Pension and Health, required for when retirees return to active status.

The results above are shown both prior to and after the application of the statutory minimum contribution requirement of 8% of payroll (5% of payroll if the actual employer contribution rate is less than 5% for the 2006/2007 Fiscal Year) and are based on the current amortization schedule approved by the Board of Trustees for your individual plan (see page E-1).

A.R.S. 38-843, subsection I allows for the employer to request a one-time increase in the amortization period up to a maximum of 30 years. The following costs are being provided to facilitate that decision. If the current approved amortization period on page E-1 is greater than those below, that request has already been made for this plan where the following is provided to facilitate earlier payoff, if desired.

	Rate	Dollar
Total Pension Employer Cost (18-year amortization)	62.76%	\$ 20,713,487
Total Pension Employer Cost (23-year amortization)	55.60%	\$ 18,310,902

# Contribution Requirements

## Development of Employer Contributions for the Indicated Valuation Date

Valuation Date	June 30, 2017	June 30, 2018
Contribution for Fiscal Year ending	2019	2020
<b>TIER 3 MEMBERS - DEFINED BENEFIT (DB) PLAN</b>		
<b>Pension</b>	<b>Rate</b>	<b>Rate      Dollar</b>
Total Normal Cost	21.18%	21.18% \$ -
Amortization of Unfunded Liabilities	0.00%	0.00% -
<b>Total Pension Cost</b>	<b>21.18%</b>	<b>21.18% \$ -</b>
Employee (EE) Pension Cost	10.59%	10.59% \$ -
Employer (ER) Pension Cost	10.59%	10.59% \$ -
<b>Health</b>	<b>Rate</b>	<b>Rate      Dollar</b>
Total Normal Cost	0.50%	0.50% \$ -
Amortization of Unfunded Liabilities	0.00%	0.00% -
<b>Total Health Cost</b>	<b>0.50%</b>	<b>0.50% \$ -</b>
Employee (EE) Health Cost	0.25%	0.25% \$ -
Employer (ER) Health Cost	0.25%	0.25% \$ -
<b>Total Calculated Tier 3 Required EE/ER Individual Cost (before Legacy)</b>	<b>10.84%</b>	<b>10.84% \$ -</b>
<b>Total Board Approved Tier 3 Required EE/ER Individual Cost (before Legacy)</b>	<b>10.84%</b>	<b>10.84% \$ -</b>
<b>ER Legacy Cost of Tier 1 &amp; 2 Amort of Unfunded Liabilities*</b>	<b>32.70%</b>	<b>35.75% \$ -</b>
<b>Total Calculated Tier 3 Required Employer Defined Benefit Cost</b>	<b>43.54%</b>	<b>46.59% \$ -</b>
<b>Total Board Approved Tier 3 Required Employer Defined Benefit Cost</b>	<b>43.54%</b>	<b>46.59% \$ -</b>

The PSPRS Board of Trustees decided to keep Tier 3 Rates level (as calculated with the June 30, 2017 valuation), for the fiscal year beginning July 1, 2019.  
 Note: Due to Tier 3 beginning July 1, 2017, equivalent dollar amounts are not available until actual payroll data is experienced in order to provide accurate projections.

<b>Defined Contribution (DC) Retirement Plan</b>	<b>Rate</b>	<b>Rate      Dollar</b>
Tiers 2 & 3 DB Member, Non-Soc Sec Participant - Employee**	3.00%	3.00% \$ -
Tiers 2 & 3 DB Member, Non-Soc Sec Participant - Employer**	3.00%	3.00% \$ -
<i>(Employer rate is 4% for Tier 2 members for a period of time depending on the individual's membership date.)</i>		
Tier 3 DC Only - Employee**	9.00%	9.00% \$ -
Tier 3 DC Only - Employee Disability Program***	1.51%	1.51% -
<b>Tier 3 DC Only - Total Employee</b>	<b>10.51%</b>	<b>10.51% \$ -</b>
Tier 3 DC Only - Employer**	9.00%	9.00% \$ -
Tier 3 DC Only - Employer Disability Program***	1.51%	1.51% -
<b>Tier 3 DC Only - Total Employer (before Legacy)</b>	<b>10.51%</b>	<b>10.51% \$ -</b>
Tier 3 DC Only - Employer Tier 1 & 2 Legacy Cost*	32.70%	35.75% \$ -
<b>Tier 3 DC Only - Total Employer Cost</b>	<b>43.21%</b>	<b>46.26% \$ -</b>

\* Pursuant to A.R.S. 38-843, subsection B, the amortization of unfunded liabilities for Tiers 1 & 2 shall be applied to all Tier 3 payroll on a level percent basis. However, while it is statutorily required to present the rates in this manner, these are the minimums where alternate methods for paying down that unfunded liability is at the discretion of each employer. Further, to understand the effects of reform in relation to Tier 3, compare the total rate of Tier 3 before application of those legacy costs.

\*\* Paid directly to third-party DC administrator, currently Nationwide

\*\*\* Paid directly to PSPRS along with the legacy cost

## Impact of Extra Contributions

Extra Contribution in \$(000)	\$0	\$1,000	\$2,000	\$3,000	\$4,000	\$5,000	\$6,000	\$7,000	\$8,000	\$9,000	\$10,000
Impact on:											
- June 30, 2018 Funded Status	49.6%	49.9%	50.1%	50.4%	50.6%	50.9%	51.2%	51.4%	51.7%	51.9%	52.2%
- FYE 2020 Contribution Rate	51.12%	50.93%	50.74%	50.55%	50.36%	50.17%	49.98%	49.78%	49.59%	49.40%	49.21%

Based on the June 30, 2018 actuarial valuation, the table above shows the hypothetical change in the funded status and contribution rate due to each additional \$1,000,000 in market value.

## Historical Summary of Employer Pension Rates - Tier 1 & 2

Valuation Date June 30	Fiscal Year Ending June 30	Normal Cost	Unfunded Actuarial Accrued Liability	Total
2011	2013	12.49 %	15.13 %	27.62 %
2012	2014	13.60	17.66	31.26
2013	2015	12.92	19.67	32.59
2014* (before phase-in)	2016	12.37	28.16	40.53
2014* (after phase-in)	2016	12.37	21.80	34.17
2015 (before phase-in)	2017	12.19	28.78	40.97
2015 (after phase-in)	2017	12.19	25.45	37.64
2016	2018	16.39	35.50	51.89
2017	2019	15.56	32.61	48.17
<b>2018</b>	<b>2020</b>	<b>15.51</b>	<b>35.61</b>	<b>51.12</b>

\* Beginning with the June 30, 2014 valuation, the rates are for pension only.

## Historical Summary of Employer Health Rates - Tier 1 & 2

Valuation Date June 30	Fiscal Year Ending June 30	Normal Cost	Unfunded Actuarial Accrued Liability	Total
2014	2016	0.27 %	(0.04)%	0.23 %
2015	2017	0.27	0.00	0.27
2016	2018	0.29	0.08	0.37
2017	2019	0.28	0.09	0.37
<b>2018</b>	<b>2020</b>	<b>0.27</b>	<b>0.14</b>	<b>0.41</b>

## Historical Summary of Employer Pension Rates - Tier 3

Valuation Date June 30	Fiscal Year Ending June 30	Normal Cost	Unfunded Actuarial Accrued Liability	Total
2017	2019	10.59 %		10.59 %
<b>2018*</b>	<b>2020</b>	<b>10.59</b>	<b>0.00 %</b>	<b>10.59</b>
<b>2018**</b>	<b>2020</b>	<b>10.59</b>	<b>0.00</b>	<b>10.59</b>

\* Calculated Tier 3 EE/ER rates

\*\* Board approved Tier 3 EE/ER rates

## Historical Summary of Employer Health Rates - Tier 3

Valuation Date June 30	Fiscal Year Ending June 30	Normal Cost	Unfunded Actuarial Accrued Liability	Total
2017	2019	0.25 %		0.25 %
<b>2018*</b>	<b>2020</b>	<b>0.25</b>	<b>0.00 %</b>	<b>0.25</b>
<b>2018**</b>	<b>2020</b>	<b>0.25</b>	<b>0.00</b>	<b>0.25</b>

\* Calculated Tier 3 EE/ER rates

\*\* Board approved Tier 3 EE/ER rates



## **SECTION B**

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### **FUNDING RESULTS**

## Present Value of Future Benefits and Accrued Liability – Tier 1 & 2

	<u>June 30, 2017</u>	<u>June 30, 2018</u>
<b>Pension</b>		
A. Accrued Liability		
1. For retirees and beneficiaries	\$ 187,368,570	\$ 193,123,477
2. For DROP members	56,555,773	69,936,848
3. For inactive/vested members	344,675	715,759
4. For present active members		
a. Value of expected future benefit payments	196,989,046	194,131,236
b. Value of future normal costs	<u>(65,694,601)</u>	<u>(62,283,799)</u>
c. Active member accrued liability: (a) - (b)	<u>131,294,445</u>	<u>131,847,437</u>
5. Total accrued liability	375,563,463	395,623,521
B. Present Assets (Funding Value)	187,577,956	196,253,304
C. Unfunded Accrued Liability: (A.5) - (B)	187,985,507	199,370,217
D. Stabilization Reserve	<u>-</u>	<u>-</u>
E. Net Unfunded Accrued Liability: (C) + (D)	<u>\$ 187,985,507</u>	<u>\$ 199,370,217</u>
F. Funding Ratio: (B) / (A.5)	<u>49.9%</u>	<u>49.6%</u>
<b>Health</b>		
A. Accrued Liability		
1. For retirees and beneficiaries	\$ 4,675,227	\$ 4,635,471
2. For DROP members	774,998	968,504
3. For present active members		
a. Value of expected future benefit payments	3,551,060	3,473,278
b. Value of future normal costs	<u>(815,357)</u>	<u>(748,621)</u>
c. Active member accrued liability: (a) - (b)	<u>2,735,703</u>	<u>2,724,657</u>
4. Total accrued liability	8,185,928	8,328,632
B. Present Assets (Funding Value)	<u>7,794,646</u>	<u>7,728,511</u>
C. Net Unfunded Accrued Liability: (A.4) - (B)	<u>\$ 391,282</u>	<u>\$ 600,121</u>
D. Funding Ratio: (B) / (A.4)	<u>95.2%</u>	<u>92.8%</u>

## Present Value of Future Benefits and Accrued Liability – Tier 3\*

	<u>June 30, 2017</u>	<u>June 30, 2018</u>
<b>Pension</b>		
A. Accrued Liability		
1. For retirees and beneficiaries	\$ -	\$ -
2. For inactive/vested members	-	-
3. For present active members		
a. Value of expected future benefit payments	-	-
b. Value of future normal costs	-	-
c. Active member accrued liability: (a) - (b)	-	-
4. Total accrued liability	-	-
B. Present Assets (Funding Value)	-	-
C. Unfunded Accrued Liability: (A.4) - (B)	\$ -	\$ -
D. Funding Ratio: (B) / (A.4)	-	-
<b>Health</b>		
A. Accrued Liability		
1. For retirees and beneficiaries	\$ -	\$ -
2. For present active members		
a. Value of expected future benefit payments	-	-
b. Value of future normal costs	-	-
c. Active member accrued liability: (a) - (b)	-	-
3. Total accrued liability	-	-
B. Present Assets (Funding Value)	-	-
C. Unfunded Accrued Liability: (A.3) - (B)	\$ -	\$ -
D. Funding Ratio: (B) / (A.3)	-	-

\* The liabilities shown on this page are the liabilities for Mesa Fire Dept. Tier 3 members only.

## Derivation of Experience Gain/(Loss) Tier 1 & 2

Actual experience will never (except by coincidence) exactly match assumed experience. Gains and losses often cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain/(loss) is shown below, along with a year-by-year comparative schedule.

	2018
(1) UAAL* at start of year	\$187,985,507
(2) Normal cost from last valuation	7,270,431
(3) Actual contributions	19,768,400
(4) Interest accrual	13,639,063
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	189,126,601
(6) Changes from benefit increases, methods and assumptions	5,150,286
(7) Change in reserve for future pension increases	-
(8) Expected UAAL after changes: (5) + (6) + (7)	194,276,887
(9) Actual UAAL at end of year	199,370,217
(10) Experience Gain/(Loss): (8) - (9)	\$ (5,093,330)

\* *Unfunded Actuarial Accrued Liability*

## Pension Contribution Projection

<b>Fiscal Year Ending June 30</b>	<b>Contribution Rate</b>	<b>Contribution Amount (Estimate)</b>
2020	51.12 %	\$ 16,807,608
2021	51.01	17,715,826
2022	51.00	18,332,285
2023	51.16	19,033,441
2024	51.18	19,707,312
2025	50.93	20,297,434
2026	50.85	20,974,846
2027	50.73	21,657,735
2028	50.60	22,358,313
2029	50.44	23,067,682
2030	50.31	23,813,517

Contribution Amount estimated based on June 30, 2018 valuation data, methods, and assumptions, including 7.40% investment return and 3.50% payroll growth. Future years incorporated emerging Tier 3 normal cost.

## SECTION C

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### FUND ASSETS

## Development of Tier 1 & 2 Pension Funding Value of Assets (7-Year Smoothing)

Year Ended June 30:	2018	2019	2020	2021	2022	2023	2024
A. Funding Value Beginning of Year	\$ 7,062,649,989						
B. Market Value End of Year	7,284,786,674						
C. Market Value Beginning of Year	6,841,326,541						
D. Non Investment Net Cash Flow	(34,051,612)						
E. Investment Income							
E1. Total: B-C-D	477,511,745						
E2. Amount for Immediate Recognition: (7.40%)	521,376,190						
E3. Amount for Phased-in Recognition: E1-E2	(43,864,445)						
F. Phased-in Recognition of Investment Income							
F1. Current Year: E3 / 7	(6,266,349)						
F2. First Prior Year	33,380,149	\$ (6,266,349)					
F3. Second Prior Year	(64,250,729)	33,380,149	\$ (6,266,349)				
F4. Third Prior Year	(36,894,248)	(64,250,729)	33,380,149	\$ (6,266,349)			
F5. Fourth Prior Year	33,458,496	(36,894,248)	(64,250,729)	33,380,149	\$ (6,266,349)		
F6. Fifth Prior Year	9,542,555	33,458,496	(36,894,248)	(64,250,729)	33,380,149	\$ (6,266,349)	
F7. Sixth Prior Year	(72,234,303)	9,542,556	33,458,496	(36,894,251)	(64,250,726)	33,380,148	\$ (6,266,351)
F8. Total Recognized Investment Gain	(103,264,429)	(31,030,125)	(40,572,681)	(74,031,180)	(37,136,926)	27,113,799	(6,266,351)
G. Funding Value End of Year							
G1. Preliminary Funding Value End of Year: (A+D+E2+F1:F7)	7,446,710,138						
G2. Upper Corridor: (120% x B)	8,741,744,009						
G3. Lower Corridor: (80% x B)	5,827,829,339						
G4. End of Year: (G1 subject to max of G2 and min of G3)	7,446,710,138						
H. Difference Between Market Value & Funding Value: (B-G4)	(161,923,464)	(130,893,339)	(90,320,658)	(16,289,478)	20,847,448	(6,266,351)	0
I. Market Rate of Return	7.0%						
J. Recognized Rate of Return	5.9%						
K. Ratio of Funding Value to Market Value	102.2%						
L. Market Value of Assets for Division	191,985,914						
M. Funding Value of Assets for Division	196,253,304						

The funding value of assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment return (line E3) are phased-in over a closed 7-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. The funding value of assets is **unbiased** with respect to market value. At any time it may be either greater or less than market value. If actual and assumed rates of investment return are exactly equal for 7 consecutive years, the funding value will become equal to market value.

## Development of Tier 1 & 2 Health Funding Value of Assets (7-Year Smoothing)

Year Ended June 30:	2018	2019	2020	2021	2022	2023	2024
A. Funding Value Beginning of Year	\$ 332,916,139						
B. Market Value End of Year	328,284,037						
C. Market Value Beginning of Year	321,261,466						
D. Non Investment Net Cash Flow	(14,928,302)						
E. Investment Income							
E1. Total: B-C-D	21,950,873						
E2. Amount for Immediate Recognition: (7.40%)	24,083,447						
E3. Amount for Phased-in Recognition: E1-E2	(2,132,574)						
F. Phased-in Recognition of Investment Income							
F1. Current Year: E3 / 7	(304,653)						
F2. First Prior Year	1,532,136	\$ (304,653)					
F3. Second Prior Year	(3,221,043)	1,532,136	\$ (304,653)				
F4. Third Prior Year	(1,796,589)	(3,221,043)	1,532,136	\$ (304,653)			
F5. Fourth Prior Year	1,653,381	(1,796,589)	(3,221,043)	1,532,136	\$ (304,653)		
F6. Fifth Prior Year	451,741	1,653,381	(1,796,589)	(3,221,043)	1,532,136	\$ (304,653)	
F7. Sixth Prior Year	(3,419,544)	451,740	1,653,381	(1,796,586)	(3,221,044)	1,532,136	\$ (304,656)
F8. Total Recognized Investment Gain	(5,104,571)	(1,685,028)	(2,136,768)	(3,790,146)	(1,993,561)	1,227,483	(304,656)
G. Funding Value End of Year							
G1. Preliminary Funding Value End of Year: (A+D+E2+F1:F7)	336,966,713						
G2. Upper Corridor: (120% x B)	393,940,844						
G3. Lower Corridor: (80% x B)	262,627,230						
G4. End of Year: (G1 subject to max of G2 and min of G3)	336,966,713						
H. Difference Between Market Value & Funding Value: (B-G4)	(8,682,676)	(6,997,648)	(4,860,880)	(1,070,734)	922,827	(304,656)	0
I. Market Rate of Return	7.0%						
J. Recognized Rate of Return	5.8%						
K. Ratio of Funding Value to Market Value	102.6%						
L. Market Value of Assets for Division	7,529,369						
M. Funding Value of Assets for Division	7,728,511						

The funding value of assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment return (line E3) are phased-in over a closed 7-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. The funding value of assets is **unbiased** with respect to market value. At any time it may be either greater or less than market value. If actual and assumed rates of investment return are exactly equal for 7 consecutive years, the funding value will become equal to market value.



## Development of Tier 3 Pension Funding Value of Assets (5-Year Smoothing)

Year Ended June 30:	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 0				
B. Market Value End of Year	3,198,018				
C. Market Value Beginning of Year	0				
D. Non Investment Net Cash Flow	3,091,661				
E. Investment Income					
E1. Total: B-C-D	106,357				
E2. Amount for Immediate Recognition: (7.00%)	108,208				
E3. Amount for Phased-in Recognition: E1-E2	(1,851)				
F. Phased-in Recognition of Investment Income					
F1. Current Year: E3 / 7	(370)				
F2. First Prior Year	0 \$	(370)			
F3. Second Prior Year	0	0 \$	(370)		
F4. Third Prior Year	0	0	0 \$	(370)	
F5. Fourth Prior Year	0	0	0	0 \$	(371)
F6. Total Recognized Investment Gain	(370)	(370)	(370)	(370)	(371)
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: (A+D+E2+F1:F5)	3,199,499				
G2. Upper Corridor: (120% x B)	3,837,622				
G3. Lower Corridor: (80% x B)	2,558,414				
G4. End of Year: (G1 subject to max of G2 and min of G3)	3,199,499				
H. Difference Between Market Value & Funding Value: (B-G4)	(1,481)	(1,111)	(741)	(371)	0
I. Market Rate of Return	6.9%				
J. Recognized Rate of Return	7.0%				
K. Ratio of Funding Value to Market Value	100.0%				
L. Market Value of Assets for Division	0				
M. Funding Value of Assets for Division	0				

The funding value of assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment return (line E3) are phased-in over a closed 5-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. The funding value of assets is **unbiased** with respect to market value. At any time it may be either greater or less than market value. If actual and assumed rates of investment return are exactly equal for 5 consecutive years, the funding value will become equal to market value.

## Development of Tier 3 Health Funding Value of Assets (5-Year Smoothing)

Year Ended June 30:	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 0				
B. Market Value End of Year	77,352				
C. Market Value Beginning of Year	0				
D. Non Investment Net Cash Flow	74,738				
E. Investment Income					
E1. Total: B-C-D	2,614				
E2. Amount for Immediate Recognition: (7.00%)	2,616				
E3. Amount for Phased-in Recognition: E1-E2	(2)				
F. Phased-in Recognition of Investment Income					
F1. Current Year: E3 / 7	0				
F2. First Prior Year	0	\$ 0			
F3. Second Prior Year	0	0	\$ 0		
F4. Third Prior Year	0	0	0	\$ 0	
F5. Fourth Prior Year	0	0	0	0	\$ (2)
F6. Total Recognized Investment Gain	0	0	0	0	(2)
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: (A+D+E2+F1:F5)	77,354				
G2. Upper Corridor: (120% x B)	92,822				
G3. Lower Corridor: (80% x B)	61,882				
G4. End of Year: (G1 subject to max of G2 and min of G3)	77,354				
H. Difference Between Market Value & Funding Value: (B-G4)	(2)	(2)	(2)	(2)	0
I. Market Rate of Return	7.0%				
J. Recognized Rate of Return	7.0%				
K. Ratio of Funding Value to Market Value	100.0%				
L. Market Value of Assets for Division	0				
M. Funding Value of Assets for Division	0				

The funding value of assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment return (line E3) are phased-in over a closed 5-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. The funding value of assets is **unbiased** with respect to market value. At any time it may be either greater or less than market value. If actual and assumed rates of investment return are exactly equal for 5 consecutive years, the funding value will become equal to market value.

**SECTION D**

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**CENSUS DATA**

## June 30, 2018 Valuation Data Summary

For purposes of the June 30, 2018 valuation, information on covered persons was furnished by the Board of Trustees. These people may be briefly described as follows. (In addition there were 0 defined contribution members with \$0 in payroll.)

### Tier 1 & 2:

	No.	Averages		
		Age	Service	Annual Pay or Retirement Allowance
Actives	355	41.0	13.0	\$88,238
Retirees & Beneficiaries	245			62,483
DROP	56			72,878
Inactive/Vested	18			
	674			

### Tier 3:

	No.	Averages		
		Age	Service	Annual Pay or Retirement Allowance
Actives	0	0.0	0.0	\$0
Retirees & Beneficiaries	0			0
DROP	0			0
Inactive/Vested	0			
	0			

## Active Members Tier 1 & 2

**Members in Active Service as of June 30, 2018  
by Years of Service**

Age	Years of Service							Total Count	Total Pay	Average Pay
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & Up			
Under 25	3							3	\$ 188,512	\$ 62,837
25 - 29	17	4						21	1,350,303	64,300
30 - 34	31	20	12					63	4,492,518	71,310
35 - 39	13	16	36	7				72	6,131,302	85,157
40 - 44	7	7	26	27	3			70	6,416,943	91,671
45 - 49	3	4	11	30	28	4		80	8,050,285	100,629
50 - 54			3	12	9	3		27	2,768,298	102,530
55 - 59				8		6	3	17	1,750,498	102,970
60 - 64				2				2	175,904	87,952
65 and over									0	0
<b>Total</b>	<b>74</b>	<b>51</b>	<b>88</b>	<b>86</b>	<b>40</b>	<b>13</b>	<b>3</b>	<b>355</b>	<b>\$ 31,324,563</b>	<b>\$ 88,238</b>

## Active Members Tier 3

**Members in Active Service as of June 30, 2018  
by Years of Service**

Age	Years of Service							Total Count	Total Pay	Average Pay
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & Up			
Under 25									\$ 0	\$ 0
25 - 29									0	0
30 - 34									0	0
35 - 39									0	0
40 - 44									0	0
45 - 49									0	0
50 - 54									0	0
55 - 59									0	0
60 - 64									0	0
65 and over									0	0
Total									\$ 0	\$ 0

## Inactive/Vested Members Tier 1 & 2

Inactive/Vested Members as of June 30, 2018  
by Years of Service

Age	Years of Service					Total Count
	0 - 4	5 - 9	10 - 14	15 - 19	20 & Up	
Under 30	1					1
30 - 39	4	2				6
40 - 44	3			1		4
45 - 49	2	1	3			6
50 - 54						0
55 - 59		1				1
60 - 69						0
70 and over						0
Total	10	4	3	1	0	18

## Inactive/Vested Members Tier 3

Inactive/Vested Members as of June 30, 2018  
by Years of Service

Age	Years of Service					Total Count
	0 - 4	5 - 9	10 - 14	15 - 19	20 & Up	
Under 30						0
30 - 39						0
40 - 44						0
45 - 49						0
50 - 54						0
55 - 59						0
60 - 69						0
70 and over						0
Total	0	0	0	0	0	0

## Retirees and Beneficiaries Tier 1 & 2

### All Retirants and Beneficiaries June 30, 2018 by Attained Ages

Attained Ages	Males		Females		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 25	0	\$ 0	0	\$ 0	0	\$ 0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	2	126,783	1	34,653	3	161,436
45-49	4	201,163	0	0	4	201,163
50-54	14	786,251	2	105,713	16	891,964
55-59	37	2,559,948	4	209,150	41	2,769,098
60-64	63	4,132,695	3	209,604	66	4,342,299
65-69	47	2,864,601	3	182,104	50	3,046,705
70-74	30	1,867,366	5	261,097	35	2,128,463
75-79	14	986,961	2	106,726	16	1,093,687
80-84	3	175,248	3	126,244	6	301,492
85-89	3	140,649	3	137,826	6	278,475
90-94	1	47,790	1	45,819	2	93,609
95-99	0	0	0	0	0	0
100 and Over	0	0	0	0	0	0
<b>Totals</b>	<b>218</b>	<b>\$ 13,889,455</b>	<b>27</b>	<b>\$ 1,418,936</b>	<b>245</b>	<b>\$ 15,308,391</b>

Pension Being Paid		Number	Annual Pensions	Average Pensions
Retired Members	Service Pensions	188	\$ 12,270,449	\$65,268
	Disability Pensions	34	1,818,522	53,486
Totals		222	14,088,971	63,464
Survivors of Members	Spouses	22	1,160,903	52,768
	Children with Guardians	1	58,517	58,517
Total		23	1,219,420	53,018
<b>Total Pension being Paid</b>		<b>245</b>	<b>\$15,308,391</b>	<b>\$62,483</b>

	Average Age	Average Service	Average Age at Retirement
Normal Retired Members	65.2	24.1	53.6
Disability Retired Members	60.3	19.0	46.5
Spouse Beneficiaries	73.8	21.8	46.8



## DROP Members Tier 1 & 2

**DROP Members as of June 30, 2018  
by Attained Ages**

Attained Ages	Males		Females		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	0	\$ 0	0	\$ 0	0	\$ 0
45-49	7	423,025	0	0	7	423,025
50-54	18	1,246,047	0	0	18	1,246,047
55-59	28	2,208,750	1	54,427	29	2,263,177
60-64	2	148,928	0	0	2	148,928
65 and Over	0	0	0	0	0	0
<b>Totals</b>	<b>55</b>	<b>\$4,026,750</b>	<b>1</b>	<b>\$54,427</b>	<b>56</b>	<b>\$4,081,177</b>

## Pension Being Paid Historical Schedule

Valuation Date June 30	No.	Annual Pensions	% Incr. in Annual Pensions	Average Pension	Present Value of Pensions	
					Total	Average
2009	199	\$ 10,547,597	0.0 %	\$ 53,003	\$ 115,727,788	\$ 581,547
2010	210	11,613,777	10.1	55,304	126,841,172	604,006
2011	227	13,024,590	12.1	57,377	141,793,875	624,643
2012	236	13,937,315	7.0	59,056	156,822,738	664,503
2013	241	14,233,690	2.1	59,061	162,708,283	675,138
2014	249	15,174,695	6.6	60,943	190,551,723	765,268
2015	265	16,370,117	7.9	61,774	201,089,398	758,828
2016	274	16,989,304	3.8	62,005	216,312,751	789,463
2017	286	18,074,236	6.4	63,197	243,924,343	852,882
<b>2018</b>	<b>301</b>	<b>19,389,568</b>	<b>7.3</b>	<b>64,417</b>	<b>263,060,325</b>	<b>873,955</b>

## SECTION E

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### **METHODS AND ASSUMPTIONS**

## Valuation Methods

**Actuarial Cost Method** - Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an individual entry-age actuarial cost method having the following characteristics:

- (i) the annual normal costs for each individual active member, payable from the date of hire to the date of retirement, are sufficient to accumulate to the value of the member's benefits.
- (ii) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

The entry-age actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's compensation between the entry age of the member and the assumed exit ages.

**Actuarial Accrued Liability** - The actuarial accrued liability is the portion of actuarial present value allocated to service rendered prior to the valuation date, including experience gains and losses. The actuarial accrued liability was computed using the assumptions summarized in this report.

**Actuarial Value of System Assets – Tier 1 & 2** - The actuarial value of assets recognizes assumed investment income fully each year. Differences between actual and assumed investment income are phased-in over a closed seven-year period subject to a 20% corridor. During periods when investment performance exceeds the assumed rate, actuarial value of assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, the actuarial value of assets will tend to be greater than market value.

**Actuarial Value of System Assets – Tier 3** - The actuarial value of assets recognizes assumed investment income fully each year. Differences between actual and assumed investment income are phased-in over a closed five-year period subject to a 20% corridor. During periods when investment performance exceeds the assumed rate, actuarial value of assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, the actuarial value of assets will tend to be greater than market value.

**Financing of Unfunded Actuarial Accrued Liabilities – Tier 1 & 2** - The actuarial value of assets were subtracted from the computed actuarial accrued liability. Any unfunded amount would be amortized as level percent-of-payroll over a closed period of 28 years. If the actuarial value of assets exceeded the actuarial accrued liability, the excess was amortized over an open period of 20 years and applied as a credit to reduce the normal cost which otherwise would be payable.

**Financing of Unfunded Actuarial Accrued Liabilities – Tier 3** - The actuarial value of assets were subtracted from the computed actuarial accrued liability. Any unfunded amount would be amortized as a level dollar amount over a closed period of 10 years. No credit to reduce the normal cost will be applied if the actuarial value of assets exceeded the actuarial accrued liability.

## Valuation Methods

Active member payroll was assumed to increase 3.5% annually for the purpose of computing the amortization payment (credit) as a level percent-of-payroll.

**Funded Ratio** - Unless otherwise indicated, a funded ratio 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, of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
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 amount of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon actuarial assumptions. A funded ratio measurement in this report of 100% is not synonymous with no required future contributions. If the funded ratio 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.

**Stabilization Reserve** - Beginning with the June 30, 2007 valuation and with each subsequent valuation, if the actuarial value of assets exceeds the actuarial accrued liabilities, one half of this excess in each year is allocated to a Stabilization Reserve. The Stabilization Reserve is excluded from the calculation of the employer contribution rates. The Stabilization Reserve continues to accumulate as long as the plan is over-funded. Once the plan becomes underfunded, the Stabilization Reserve will be used to dampen increases in the employer contribution rates. With the June 30, 2018 valuation, the Plan is underfunded and the Stabilization Reserve is zero.

## Valuation Assumptions

Assumptions for this valuation are based on the most recent experience study performed in 2017. As experience emerges for Tier 3 members, separate assumptions may be developed for that Tier.

**The rate of investment return – Tier 1 & 2** was 7.40% a year, compounded annually net of investment and administrative expenses.

The assumed real return is the rate of return in excess of wage growth. Considering other assumptions used in the valuation, the 7.40% nominal rate translates to a net real return over wage growth of 3.90% a year.

**The rate of investment return – Tier 3** was 7.00% a year, compounded annually net of investment and administrative expenses.

The assumed real return is the rate of return in excess of wage growth. Considering other assumptions used in the valuation, the 7.00% nominal rate translates to a net real return over wage growth of 3.50% a year.

**The rates of pay increase** used for individual members are shown below. This assumption is used to project a member's current pay to the pay upon which System benefits will be based. This assumption was first used for the June 30, 2017 valuation of the System.

Salary Increase Assumptions for an Individual Member													
Sample Ages	Merit & Seniority						Base (Economy)	Increase Next Year					
	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire		Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	4.00%	4.00%	4.00%	4.00%	4.00%	3.70%	3.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.20%
25	3.64%	2.74%	3.10%	3.85%	2.86%	3.10%	3.50%	7.14%	6.24%	6.60%	7.35%	6.36%	6.60%
30	2.50%	1.66%	1.75%	3.24%	1.98%	2.10%	3.50%	6.00%	5.16%	5.25%	6.74%	5.48%	5.60%
35	1.27%	1.05%	0.65%	2.06%	1.33%	1.46%	3.50%	4.77%	4.55%	4.15%	5.56%	4.83%	4.96%
40	0.40%	0.39%	0.10%	0.96%	0.53%	0.94%	3.50%	3.90%	3.89%	3.60%	4.46%	4.03%	4.44%
45	0.04%	0.06%	0.00%	0.24%	0.10%	0.28%	3.50%	3.54%	3.56%	3.50%	3.74%	3.60%	3.78%
50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
60	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%

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

## Valuation Assumptions

**Mortality Tables.** The mortality tables utilized are based upon the RP-2014 tables, as extended, and include a margin for future mortality improvement using a fully generational improvement scale. The tables used were as follows:

- **Healthy Pre-Retirement:** The RP-2014 Employee Mortality Tables, extended via cubic spline, projected backwards 1 year to 2013 with mortality improvement scale MP-2014. Future mortality improvements are assumed each year using 75% of scale MP-2016.
- **Healthy Post-Retirement:** The RP-2014 Healthy Annuitant Mortality Tables (110% for females), extended via cubic spline, projected backwards 1 year to 2013 with mortality improvement scale MP-2014. Future mortality improvements are assumed each year using 75% of scale MP-2016.
- **Disability Retirement:** The RP-2014 Disabled Mortality Tables, extended via cubic spline, projected backwards 1 year to 2013 with mortality improvement scale MP-2014. Future mortality improvements are assumed each year using 75% of scale MP-2016.

This assumption was first used for the June 30, 2017 valuation of the System.

Sample Ages in 2018	% Dying Next Year			
	Healthy Post-Retirement		Disability Retirement	
	Males	Females	Males	Females
40	0.1854%	0.1706%	1.2941%	0.6702%
45	0.2794%	0.2364%	1.7112%	0.9348%
50	0.4119%	0.3059%	2.0675%	1.1964%
55	0.5764%	0.3984%	2.3485%	1.4481%
60	0.7793%	0.5773%	2.6681%	1.7187%
65	1.1112%	0.9006%	3.1971%	2.1221%
70	1.7008%	1.4373%	4.0920%	2.8638%
75	2.7223%	2.3333%	5.5091%	4.1583%
80	4.5399%	3.8849%	7.7775%	6.1866%

Sample Ages in 2018	% Dying Next Year	
	Healthy Pre-Retirement	
	Males	Females
50	0.1368%	0.0553%
55	0.2242%	0.0837%
60	0.3762%	0.1234%
65	0.6681%	0.1880%

## Valuation Assumptions

### *Mortality Tables (continued)*

Sample Attained Ages	Healthy Post-Retirement		Healthy Pre-Retirement		Disabled Retirement	
	Future Life		Future Life		Future Life	
	Expectancy (Years)*		Expectancy (Years)*		Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	29.46	31.11	32.98	41.17	21.20	25.09
60	25.01	26.45	28.08	36.09	18.27	21.54
65	20.74	22.00	23.40	31.07	15.39	18.09
70	16.71	17.82	19.01	26.15	12.64	14.77
75	13.00	13.95	14.94	21.37	10.06	11.71
80	9.70	10.48	11.24	16.78	7.72	9.05

\* Based on retirements in 2018. Retirements in future years will reflect improvements in life expectancy.

**Retirement/DROP Rates:** Age-related rates for employees who were hired before January 1, 2012 are shown below, and was first used for the June 30, 2017 valuation of the System:

Age at Retirement	Rates					
	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
62	60%	60%	60%	60%	60%	60%
63	50%	50%	50%	50%	50%	50%
64	50%	50%	50%	50%	50%	50%
65	50%	50%	50%	50%	50%	50%
66	50%	50%	50%	50%	50%	50%
67	50%	50%	50%	50%	50%	50%
68	50%	50%	50%	50%	50%	50%
69	50%	50%	50%	50%	50%	50%
70	100%	100%	100%	100%	100%	100%

These retirement rates are applicable to employees attaining age 62 before attaining 20 years of service.



## Valuation Assumptions

Service-related rates for employees who were hired before January 1, 2012 are shown below:

Service at Retirement	Rates					
	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	27%	24%	35%	14%	18%	23%
21	18%	19%	30%	14%	18%	18%
22	14%	14%	23%	7%	11%	11%
23	10%	10%	10%	7%	7%	8%
24	8%	7%	10%	7%	7%	5%
25	38%	32%	36%	22%	22%	30%
26	36%	32%	30%	26%	26%	30%
27	29%	22%	30%	19%	19%	30%
28	29%	22%	30%	32%	25%	25%
29	29%	22%	30%	30%	25%	16%
30	34%	35%	30%	30%	30%	32%
31	34%	35%	30%	30%	30%	35%
32	65%	65%	70%	55%	55%	60%
33	65%	65%	70%	55%	55%	60%
34	100%	100%	100%	100%	100%	100%

These retirement rates are applicable to employees attaining 20 years of service before attaining age 62.

Age-related rates for employees who were hired after January 1, 2012 are shown below:

Age at Retirement	Rates					
	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
53	38%	32%	36%	22%	22%	30%
54	36%	32%	30%	26%	26%	30%
55	29%	22%	30%	19%	19%	30%
56	29%	22%	30%	32%	25%	25%
57	29%	22%	30%	30%	25%	16%
58	34%	35%	30%	30%	30%	32%
59	34%	35%	30%	30%	30%	35%
60	65%	65%	70%	55%	55%	60%
61	65%	65%	70%	55%	55%	60%
62	65%	65%	70%	55%	55%	60%
63	65%	65%	70%	55%	55%	60%
64	100%	100%	100%	100%	100%	100%

## Valuation Assumptions

**Rates of separation from active membership** used in the valuation are shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment. This assumption was first used for the June 30, 2017 valuation of the System.

Sample Ages	Service Index	% of Active Members Separating within Next Year					
		Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
All	1	14.00%	16.00%	16.00%	7.00%	10.00%	9.50%
	2	8.50%	9.00%	12.50%	4.50%	5.00%	9.00%
	3	6.50%	7.50%	11.50%	3.70%	5.00%	7.50%
	4	4.50%	6.00%	9.00%	3.00%	4.00%	7.50%
	5	3.60%	6.00%	8.00%	2.50%	4.00%	6.50%
	6	3.30%	4.50%	8.00%	1.70%	3.50%	4.50%
	7	3.30%	4.50%	7.00%	1.70%	3.00%	4.00%
	8	3.30%	3.20%	7.00%	1.70%	2.40%	3.50%
	9	2.70%	3.20%	6.50%	1.70%	2.40%	3.50%
	10	2.70%	3.20%	6.00%	1.50%	2.40%	3.00%
	11	2.70%	3.20%	5.00%	1.10%	2.40%	2.70%
	12	1.80%	1.40%	4.00%	0.70%	1.00%	2.00%
	13	1.30%	1.40%	3.50%	0.70%	1.00%	2.00%
	14	1.30%	1.40%	3.00%	0.70%	1.00%	1.70%
	15	1.30%	1.00%	3.00%	0.60%	1.00%	1.20%
	16	0.70%	1.00%	2.00%	0.50%	1.00%	1.20%
	17	0.70%	1.00%	1.75%	0.50%	0.50%	1.20%
	18	0.70%	1.00%	1.75%	0.40%	0.50%	1.20%
	19	0.50%	1.00%	1.75%	0.40%	0.50%	1.20%
	20	0.50%	1.00%	1.75%	0.40%	0.50%	0.50%
	21 & Over	0.50%	1.00%	1.75%	0.40%	0.50%	0.50%

## Valuation Assumptions

**Rates of disability** among active members used in the valuation are shown below, and were first used for the June 30, 2017 valuation of the System.

Sample Ages	% of Active Members Becoming Disabled within Next Year					
	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	0.08%	0.08%	0.10%	0.03%	0.03%	0.03%
25	0.08%	0.08%	0.10%	0.03%	0.03%	0.03%
30	0.17%	0.16%	0.20%	0.04%	0.03%	0.03%
35	0.22%	0.21%	0.26%	0.09%	0.07%	0.08%
40	0.36%	0.35%	0.44%	0.17%	0.16%	0.17%
45	0.51%	0.49%	0.62%	0.17%	0.43%	0.48%
50	0.78%	0.75%	0.95%	0.43%	0.59%	0.65%
55	1.02%	0.98%	1.23%	1.00%	1.01%	1.13%

The Maricopa County Fire group assumptions were used for the Mesa Fire Dept. valuation.

# Summary of Assumptions Used

## June 30, 2018

### Miscellaneous and Technical Assumptions

<b>Marriage Assumption:</b>	85% of males and 60% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.
<b>Pay Increase Timing:</b>	Six months after the valuation date. This means that the pays received are assumed to be annual rates of pay on the valuation date as opposed to W-2 type earnings for the prior 12 months.
<b>Decrement Timing:</b>	Decrements of all types 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 turnover decrements do not operate during retirement eligibility.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year.
<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
<b>Normal Form of Benefit:</b>	A straight life payment is the assumed normal form of benefit for members who are not married, and the 80% Joint and Survivor form of payment with no reduction, for married members. 85% of males and 60% of females are assumed to be married at time of retirement.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Health Care Utilization:</b>	70% of future retirees are expected to utilize retiree health care. 85% of males and 60% of females are assumed to be married.
<b>Assumed Future Permanent Benefit Increases (PBI):</b>	The cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. We have assumed that to be 1.75% for this valuation.

## Summary of Assumptions Used June 30, 2018

### Miscellaneous and Technical Assumptions

**Financing of Unfunded  
Actuarial Accrued Liabilities  
(Money in the Pipes):**

The rate-setting valuation projects the unfunded actuarial accrued liability to the beginning of the applicable fiscal year to determine the applicable unfunded amortization rate.

**Maintenance of Effort:**

For Tier 1 & 2 members, the amount of member contributions that exceed 7.65% of the member's compensation will NOT be used to reduce the employer's contribution requirement. Therefore, this Maintenance of Effort is subtracted from assets prior to calculating the contribution rate.

## SECTION F

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### PLAN PROVISIONS

# Summary of Plan Provisions Valued and/or Considered

**Membership:** Persons who are employed in an eligible group, prior to attaining age 65 years, for at least 40 hours a week for more than six months per year.

## **Average Monthly Benefit Compensation:**

### **For members hired before January 1, 2012:**

One-thirty-sixth of total compensation paid to member during the three consecutive years, out of the last 20 years of credited service, in which the amount paid was highest. Compensation is the amount including base salary, overtime pay, shift and military differential pay, compensatory time used in lieu of overtime pay, and holiday pay, paid to an employee on a regular payroll basis and longevity pay paid at least every six months for which contributions are made to the System.

### **For members hired on or after January 1, 2012 and before July 1, 2017:**

One-sixtieth of total compensation paid to member during the five consecutive years, out of the last 20 years of credited service, in which the amount paid was highest. Compensation is the amount including base salary, overtime pay, shift and military differential pay, compensatory time used in lieu of overtime pay, and holiday pay, paid to an employee on a regular payroll basis and longevity pay paid at least every six months for which contributions are made to the System.

### **For members hired on or after July 1, 2017:**

One-sixtieth of total compensation paid to member during the five consecutive years, out of the last 15 years of credited service, in which the amount paid was highest. Compensation is the amount including base salary, overtime pay, shift and military differential pay, compensatory time used in lieu of overtime pay, and holiday pay, paid to an employee on a regular payroll basis and longevity pay paid at least every six months for which contributions are made to the System.

## **Normal Retirement:**

### **For members hired before January 1, 2012:**

First day of month following completion of 20 years of service or following 62<sup>nd</sup> birthday and completion of 15 years of service.

The amount of monthly normal pension is based on credited service and average monthly compensation as follows:

- **For retirement with 25 or more years of credited service,** 50% of average monthly compensation for the first 20 years of credited service, plus 2.5% of average monthly compensation for each year of credited service above 20 years.
- **For retirement with 20 years of credited service but less than 25 years of credited service,** 50% of average monthly compensation for the first 20 years of credited service, plus 2% of average monthly compensation for each year of credited service between 20 and 25 years.
- **For retirement with less than 20 years of credited service,** the percent of average monthly compensation is reduced at a rate of 4% for each year less than 20 years of credited service.

The maximum amount payable as a normal retirement pension is 80% of the average monthly compensation.

# Summary of Plan Provisions Valued and/or Considered

## **For members hired on or after January 1, 2012 and before July 1, 2017:**

First day of month following the attainment of age 52.5 and completion of 15 years of service.

The amount of monthly normal pension is based on credited service and average monthly compensation as follows:

- ***For retirement with 15 years of credited service, but less than 17 years of credited service,*** 1.5% of average monthly compensation for each credited year of service.
- ***For retirement with 17 years of credited service, but less than 19 years of credited service,*** 1.75% of average monthly compensation for each credited year of service.
- ***For retirement with 19 years of credited service, but less than 22 years of credited service,*** 2.0% of average monthly compensation for each credited year of service.
- ***For retirement with 22 years of credited service, but less than 25 years of credited service,*** 2.25% of average monthly compensation for each credited year of service.
- ***For retirement with 25 years of service or more,*** 62.5% of average monthly compensation for the first 25 years plus 2.5% of average monthly compensation for each year over 25 years of credited service.

The maximum amount payable as a normal retirement pension is 80% of the average monthly compensation.

## **For members hired on or after July 1, 2017:**

First day of month following the attainment of age 55 and completion of 15 years of service.

The amount of monthly normal pension is based on credited service and average monthly compensation as follows:

- ***For retirement with 15 years of credited service, but less than 17 years of credited service,*** 1.5% of average monthly compensation for each credited year of service.
- ***For retirement with 17 years of credited service, but less than 19 years of credited service,*** 1.75% of average monthly compensation for each credited year of service.
- ***For retirement with 19 years of credited service, but less than 22 years of credited service,*** 2.0% of average monthly compensation for each credited year of service.
- ***For retirement with 22 years of credited service, but less than 25 years of credited service,*** 2.25% of average monthly compensation for each credited year of service.
- ***For retirement with 25 or more years of credited service,*** 2.5% of average monthly compensation for each credited year of service.

The maximum amount payable as a normal retirement pension is 80% of the average monthly compensation.



# Summary of Plan Provisions Valued and/or Considered

## **Early Retirement:**

### **For members hired before July 1, 2017:**

Not eligible for an early retirement benefit.

### **For members hired on or after July 1, 2017:**

Members who have earned at least 15 years of credited service may retire at age 52.5 and will receive a benefit that is actuarially equivalent to their normal retirement benefit.

## **Vested Termination (deferred retirement):**

### **For members hired before January 1, 2012:**

Termination of covered position employment with 10 or more years of credited service. Annuity is calculated based on twice the member's accumulated contributions with payments commencing at age 62. This annuity is not a retirement benefit and annuitants are not entitled to survivor benefits, benefit increases, or the group health insurance subsidy.

### **For members hired on or after January 1, 2012 and before July 1, 2017:**

Termination of covered position employment with 15 or more years of credited service. Pension is payable if members leave contributions on account until reaching the age requirement. Pension is calculated in the same way as a normal retirement benefit. This annuity is a retirement benefit and annuitants are entitled to survivor benefits, benefit increases, and the group health insurance subsidy.

### **For members hired on or after July 1, 2017:**

Termination of covered position employment with 15 or more years of credited service. Pension is payable if members leave contributions on account until reaching the age requirement. Pension is calculated in the same way as a normal retirement benefit. This annuity is a retirement benefit and annuitants are entitled to survivor benefits, benefit increases, and the group health insurance subsidy.

## **Refunds:**

### **For members hired before January 1, 2012:**

Member will receive a lump-sum payment of accumulated contribution. Benefit is forfeited if accumulated contributions are refunded. The following schedule shows additional money which would be payable to members who receive a refund of their accumulated member contributions.

<u>Years of Credited Service</u>	<u>Additional Monies (% of Contributions)</u>
0-4	0%
5-6	25-40
7-8	55-70
9-10	85-100

### **For members hired on or after January 1, 2012:**

Member will receive a lump-sum payment of ONLY their accumulated contribution with interest at rate set by Board. Benefit is forfeited if accumulated contributions are refunded.

## Summary of Plan Provisions Valued and/or Considered

**Ordinary Disability Retirement (not duty-related):** Physical condition which totally and permanently prevents performance of a reasonable range of duties or a mental condition which totally and permanently prevents any substantial gainful employment. The amount of pension is a percentage of normal pension on employee's credited service (maximum of 20 years divided by 20).

**Accidental Disability Retirement (duty-related):** Total and presumably permanent disability, incurred in performance of duty, preventing performance of a reasonable range of duties within the employee's job classification. No credited service requirement. Pension is computed in the same manner as normal pension based on credited service and average monthly compensation at time of termination of employment. Pension is 50% of average monthly compensation, or normal pension amount, whichever is greater.

**Temporary Disability:** Termination of employment prior to normal retirement eligibility by reason of temporary disability. Pension is 1/12 of 50% of compensation during the year preceding the date disability was incurred. Payments terminate after 12 months of prior recovery.

**Catastrophic Disability:** Pension is 90% of average monthly compensation. After 60 months, the pension is the greater of 62.5% of average monthly compensation or the member's accrued normal pension.

**Survivor Pension:** Death while a member is employed by an employer, or death after retirement. No credited service requirement.

**Spouse Pension:** 80% of pension deceased active member would have been paid for accidental disability retirement or, in the case of retired member, 80% of the retired member's pension. Requires two years of marriage\*. Terminates upon death. For member killed in line of duty, 100% of average compensation, reduced by child's pension.

\* If retired.

**Child's Pension:** 20% of the pension each month based on the calculation for an accidental disability retirement. Payable to a dependent child under age 18 or until age 23 if a full-time student.

**Guardian's Pension:** Same amount as spouse's pension. Payable only during periods no spouse is being paid and there is at least one child under age 18 or until age 23 if a full-time student. 80% of the member's pension and the child's pension will be paid to the guardian.

**Other Termination of Employment:** Member is paid his/her accumulated contributions.

### **Cost-of-Living Adjustment:**

#### **For members hired before July 1, 2017:**

Each retired member or survivor of a retired member is eligible to receive a compounding cost-of-living adjustment in the base benefit. The first payment shall be made on July 1, 2018 and every July 1 thereafter.

## Summary of Plan Provisions Valued and/or Considered

The cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. The cost-of-living adjustment will not exceed 2% per year.

### **For members hired on or after July 1, 2017:**

Each retired member or survivor of a retired member is eligible to receive a compounding cost-of-living adjustment in the base benefit, beginning at the earlier of the first calendar year after the 7<sup>th</sup> anniversary of the retired member's retirement or when the retired member is or would have been sixty years of age.

A cost-of-living adjustment shall be paid on July 1 each year that the funded ratio for members hired on or after July 1, 2017 is 70% or more. The cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. The cost-of-living adjustment will not exceed:

- 2%, if funded ratio for members who are hired on or after July 1, 2017 is 90% or more;
- 1.5%, if funded ratio for members who are hired on or after July 1, 2017 is 80-90%; and
- 1%, if funded ratio for members who are hired on or after July 1, 2017 is 70-80%.

**Post-Retirement Health Insurance Subsidy:** Payable on behalf of retired members and survivors who elect coverage provided by the state or participating employer. The monthly amounts cannot exceed:

Member Only		With Dependents		
Not Medicare Eligible	Medicare Eligible	All Not Medicare Eligible	All Medicare Eligible	One with Medicare
\$150	\$100	\$260	\$170	\$215

**Deferred Retirement Option Plan (DROP):** A member hired before January 1, 2012 with 20 or more years of credited service under the System may enter into the DROP program with his employer. Under the DROP program, the member must voluntarily and irrevocably elect to enter into the program with his employer for a period of up to 60 months. During the DROP period, the member remains in the employ of the employer as a full-time paid Firefighter or full-time paid certified Peace Officer, but no member or employer contributions are made to the System, therefore no additional years of credited service are accrued on the member's behalf. The member's monthly pension is calculated based upon the years of credited service and average monthly compensation at the beginning of the DROP period. This monthly pension amount is credited to a DROP participation account with interest credited monthly to the account. The interest rate credited to the DROP account is 8.0% for the fiscal year beginning July 1, 2011, 7.85% for the fiscal years beginning July 1, 2012, July 1, 2013 and July 1, 2014, 7.50% for the fiscal year beginning July 1, 2015, 7.40% for the fiscal years beginning July 1, 2016 and July 1, 2017, and 7.30% for the fiscal year beginning July 1, 2018.

## Summary of Plan Provisions Valued and/or Considered

At the end of the DROP period or prior to that time if the member terminates employment, the monies in the DROP participation account will be paid in a lump-sum distribution to the Public Safety Personnel Defined Contribution Retirement Plan. The member will then begin receiving the monthly pension amount directly from the System in the same amount as was being credited to the DROP participation account.

For members with less than 20 years of credited service on January 1, 2012, the monthly pension amount is credited to a DROP participation account with interest calculated as the average return on the actuarial value of assets, with a minimum of 2% and maximum equal to the actuarial assumed rate. The interest credited to the DROP account is 4.40% for the fiscal year beginning July 1, 2012, 3.20% for the fiscal year beginning July 1, 2013, 3.40% for the fiscal year beginning July 1, 2014, 3.1% for the fiscal year beginning July 1, 2015, 4.50% for the fiscal year beginning July 1, 2016 and 6.6% for the fiscal year beginning July 1, 2017.

For members with less than 20 years of credited service on January 1, 2012, during the DROP period, the member remains in the employ of the employer as a full-time paid Firefighter or full-time paid certified Peace Officer and refundable member contributions are made to the System.

A member hired on or after January 1, 2012 may NOT enter into the DROP.

### ***Employer Contributions:***

#### **For members hired before July 1, 2017:**

Percent-of-payroll normal cost plus 30-year (20 years remaining as of June 30, 2016) amortization of unfunded actuarial accrued liability (20-year amortization for credit). The statutory minimum is 8% of payroll (5% of payroll if the actual employer contribution rate is less than 5% for the 2006/2007 fiscal year). Employer will contribute to the System when members return to work.

#### **For members hired on or after July 1, 2017:**

50% of both the Normal Cost and Actuarially determined amount required to amortize the total unfunded liability for those hired after July 1, 2017. Each year a new amortization base for gains or losses, smoothed over a period not more than 5 years, will be created on a level dollar basis over a period equal to the average expected remaining service lives, but not more than 10 years.

### ***Member Contributions:***

**For members hired before July 20, 2011:** 7.65%

**For members hired on or after July 20, 2011, but before January 1, 2012:** 11.65%

**For members hired on or after January 1, 2012, but before July 1, 2017:** 11.65%

## **SECTION G**

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### **FUNDING POLICY**

# Actuarial Funding Policy

## Introduction

The purpose of this Actuarial Funding Policy is to record the funding objectives and policy set by the Board for the Arizona Public Safety Personnel Retirement System (PSPRS). The Board establishes this Funding Policy to help ensure the systematic funding of future benefit payments for members of the Retirement System.

In 2012, the Governmental Accounting Standards Board (GASB) approved two new financial reporting standards. GASB Statement No. 67, "Financial Reporting for Pension Plans" replaces the requirements of Statement No. 25. GASB Statement No. 68, "Accounting and Financial Reporting for Pensions" replaces the requirements of Statements No. 27 and No. 50. Prior to the changes, the Annual Required Contribution (ARC) rate was used as a basis for funding decisions. The new GASB statements separate accounting cost (expense) from funding cost (contributions), necessitating the creation of this funding policy.

This funding policy shall be reviewed by the Board annually for several years following initial adoption until the next experience study. Subsequently, it shall be reviewed every five years in conjunction with the experience study.

## Funding Objectives

1. Maintain adequate assets so that current plan assets plus future contributions and investment earnings are sufficient to fund all benefits expected to be paid to members and their beneficiaries.
2. Maintain stability of employer contribution rates, consistent with other funding objectives.
3. Maintain public policy goals of accountability and transparency. Each policy element is clear in intent and effect, and each should allow an assessment of whether, how and when the funding requirements of the plan will be met.
4. Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring those costs to future members and employers.
5. Provide a reasonable margin for adverse experience to help offset risks.
6. Continue progress of systematic reduction of the Unfunded Actuarial Accrued Liabilities (UAAL).

# Actuarial Funding Policy

## Elements of Actuarial Funding Policy

### 1. Actuarial Cost Method

- a. The Individual Entry Age Normal level percent of pay actuarial cost method of valuation shall be used in determining Actuarial Accrued Liability (AAL) and Normal Cost. Differences in the past between assumed experience and actual experience ("actuarial gains and losses") shall become part of the AAL. The Normal Cost shall be determined on an individual basis for each active member.

### 2. Asset Smoothing Method

- a. The investment gains or losses of each valuation period, resulting from the difference between actual investment return and assumed investment return, shall be recognized annually in level amounts over 7 years in calculating the Funding Value of Assets.
- b. The Funding Value of Assets so determined shall be subject to a 20% corridor relative to Market Value of Assets.

### 3. Amortization Method

- a. The Funding Value of Assets are subtracted from the computed AAL. Any unfunded amount is amortized as a level percent of payroll over a closed period. If the Funding Value of Assets exceeds the AAL, the excess is amortized over an open period of 20 years and applied as a credit to reduce the Normal Cost otherwise payable.

### 4. Funding Target

- a. The targeted funded ratio shall be 100%.
- b. The maximum amortization period shall be 30 years.
- c. If the funded ratio is between 100% and 120%, a minimum contribution equal to the Normal Cost will be made.

# Actuarial Funding Policy

## Elements of Actuarial Funding Policy (Concluded)

### 5. Risk Management

#### a. Assumption Changes

- The actuarial assumptions used shall be those last adopted by the PSPRS Board based on the most recent experience study and upon the advice and recommendation of the actuary. In accordance with best practices, the actuary shall conduct an experience study every five years. The results of the study shall be the basis for the actuarial assumption changes recommended to the PSPRS Board.
- The actuarial assumptions can be updated during the five-year period if significant plan design changes or other significant events occur, as advised by the actuary.

#### b. Amortization Method

- The amortization method, Level Percent Closed, will ensure full payment of the UAAL over a finite, systematically decreasing period not to exceed 30 years. The amortization period will be reviewed once the period reaches 15 years.

#### c. Risk Measures

- The following risk measures will be annually determined to provide quantifiable measurements of risk and their movement over time.

##### (i) Classic measures currently determined

- Funded ratio (assets / liability)

##### (ii) UAAL / Total Payroll

- Measures the risk associated with contribution decreases relative impact on the ability to fund the UAAL. An increase in this measure indicates a increase in contribution risk.

##### (iii) Total Liability / Total Payroll

- Measures the risk associated with the ability to respond to liability experience through adjustments in contributions. An increase in this measure indicates an increase in experience risk.



# Actuarial Funding Policy

## Glossary

1. **Actuarial Accrued Liability (AAL):** 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”.
2. **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.
3. **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”.
4. **Actuarial 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. For example, if during a given year the assets earn more than the investment return assumption, the amount of earnings above the assumption will cause an unexpected reduction in UAAL, or “actuarial gain” as of the next valuation. These include contribution gains and losses that result from actual contributions made being greater or less than the level determined under the policy.
5. **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 (SOA) is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. The SOA administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.
6. **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.
7. **Entry Age Normal Actuarial Cost Method:** A funding method that calculates the Normal Cost as a level percentage of pay over the working lifetime of the plan’s members.
8. **Experience Study:** An actuarial investigation of demographic and economic experiences of the system during the period studied. The investigation is made for the purpose of updating the actuarial assumptions used in valuing the actuarial liabilities.

# Actuarial Funding Policy

## Glossary (Concluded)

9. **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.
10. **Market Value of Assets:** The fair value of plan assets as reported in the plan's audited financial statements.
11. **Normal Cost (NC):** 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.
12. **Unfunded Actuarial Accrued Liability (UAAL):** The positive difference, if any, between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability".

## APPENDIX A

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### ACCOUNTING DISCLOSURES

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.

Please note that Employer Reporting Information under GASB Statement No. 27 is being replaced by GASB Statement No. 68. Employers will receive a separate report for accounting disclosures under GASB Statement No. 68.

Please note that Employer Reporting Information under GASB Statement No. 45 is being replaced by GASB Statement No. 75. Employers will receive a separate report for accounting disclosures under GASB Statement No. 75.

## Schedule of Funding Progress

Year Ended June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll* (c)	UAAL as a Percent of Covered Payroll [(b)-(a)]/(c)	AAL as a Percent of Covered Payroll (b)/(c)
2009	\$ 155,971,492	\$ 193,517,551	\$ 37,546,059	80.6 %	\$ 27,553,989	136.3 %	702.3 %
2010	156,842,989	205,749,451	48,906,462	76.2	26,743,003	182.9	769.4
2011	158,852,143	226,084,157	67,232,014	70.3	26,468,460	254.0	854.2
2012	166,996,344	252,197,254	85,200,910	66.2	28,075,010	303.5	898.3
2013	170,546,734	268,820,604	98,273,870	63.4	31,008,317	316.9	866.9
2014	164,241,457	299,681,376	135,439,919	54.8	30,782,411	440.0	973.5
2015	167,930,858	308,053,000	140,122,142	54.5	31,661,372	442.6	973.0
2016	175,860,147	347,179,542	171,319,395	50.7	32,453,269	527.9	1,069.8
2017	187,577,956	375,563,463	187,985,507	49.9	32,130,065	585.1	1,168.9
<b>2018</b>	<b>196,253,304</b>	<b>395,623,521</b>	<b>199,370,217</b>	<b>49.6</b>	<b>31,324,563</b>	<b>636.5</b>	<b>1,263.0</b>

\* Tier 1 & 2 defined benefit plan payroll only.

## Schedule of Employer Contributions

Fiscal Year Ended June 30	Annual Required Contribution
2011	\$ 5,756,436 (est.)
2012	6,387,704 (est.)
2013	7,569,675 (est.)
2014	9,180,570 (est.)
2015	10,493,790 (est.)
2016*	13,494,162 (est.)
2017*	14,030,152 (est.)
2018	18,214,145 (est.)
2019	16,579,405 (est.)
<b>2020</b>	<b>16,807,608 (est.)</b>

*\* This is the estimated Annual Required Contribution before the phase-in plan.*

Beginning with the 2011 fiscal year, this schedule shows the estimated annual required contribution (calculated based on the recommended contribution rate and the projected payroll for the fiscal year). Actual amounts reported in the employer's financial statements may be different, due to differences between the projected payroll and the actual payroll during the fiscal year.

## Supplementary Information

### Summary of Actuarial Methods and Assumptions

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 actuarial valuation follows:

Valuation date	June 30, 2018
Actuarial cost method	Entry Age Normal
Amortization method	Level percent of pay closed for Tier 1 & 2 Level dollar closed for Tier 3
Remaining amortization period	28 years for underfunded / 20 years for overfunded for Tier 1 & 2 10 years for Tier 3
Asset valuation method	7-year smoothed market; 80%/120% market for Tier 1 & 2 5-year smoothed market; 80%/120% market for Tier 3
Actuarial assumptions:	
Investment rate of return	7.40% for Tier 1 & 2 7.00% for Tier 3
Projected salary increases	3.50% - 7.50%
Payroll growth	3.50%
Permanent Benefit Increases	The cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. We have assumed that to be 1.75% for this valuation.

# Health Insurance Subsidy Supplementary Information

## Schedule of Funding Progress

Valuation Date June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Annual Covered Payroll* (c)	UAAL as a % of Covered Payroll ((b-a)/c)
2009	\$ 0	\$ 5,787,717	\$ 5,787,717	0.0 %	\$ 27,553,989	21.01 %
2010	0	6,091,253	6,091,253	0.0	26,743,003	22.78
2011	0	6,903,647	6,903,647	0.0	26,468,460	26.08
2012	0	7,129,364	7,129,364	0.0	28,075,010	25.39
2013	0	7,330,823	7,330,823	0.0	31,008,317	23.64
2014	7,363,855	7,578,263	214,408	97.2	30,782,411	0.70
2015	7,726,715	7,701,532	(25,183)	100.3	31,661,372	0.00
2016	7,770,233	8,153,285	383,052	95.3	32,453,269	1.18
2017	7,794,646	8,185,928	391,282	95.2	32,130,065	1.22
<b>2018</b>	<b>7,728,511</b>	<b>8,328,632</b>	<b>600,121</b>	<b>92.8</b>	<b>31,324,563</b>	<b>1.92</b>

\* Tier 1 & 2 defined benefit plan payroll only.

## Annual Required Contribution

Valuation Date June 30	Fiscal Year Ended June 30	Normal Cost (a)	Actuarial Accrued Liability (b)	Total (a+b)	Dollar Amount
2009	2011	0.51 %	1.02 %	1.53 %	\$ 469,225
2010	2012	0.51	1.15	1.66	494,109
2011	2013	0.28	1.40	1.68	490,249
2012	2014	0.25	1.35	1.60	495,243
2013	2015	0.25	1.35	1.60	541,790
2014	2016	0.27	(0.04)	0.23	76,577
2015	2017	0.27	0.00	0.27	92,461
2016	2018	0.29	0.08	0.37	129,875
2017	2019	0.28	0.09	0.37	127,349
<b>2018</b>	<b>2020</b>	<b>0.27</b>	<b>0.14</b>	<b>0.41</b>	<b>131,554</b>

Health Insurance Subsidy Payment Reported for FY 2018: \$532,352



**APPENDIX B**

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**CONTRIBUTION RATES**

## Contribution Rates

<b>017 MESA FIRE DEPT.</b>	<b>Tier 1</b>		<b>Tier 2</b>		<b>Tier 3</b>		
Membership Date on or after	07/01/1968	07/20/2011	01/01/2012		07/01/2017		
Participates in Social Security	n/a	n/a	Yes	No	Yes	No	n/a
Available Retirement Plan	<b>DB only</b>	<b>DB only</b>	<b>DB only</b>	<b>Hybrid<sup>6</sup></b>	<b>DB only</b>	<b>Hybrid<sup>6</sup></b>	<b>DC only</b>
<b>Employee Contribution Rate</b>							
PSPRS DB Rate	7.65%	11.65%	11.65%	11.65%	10.84% <sup>1</sup>	10.84% <sup>1</sup>	
PSPRS DC Rate				3.00%		3.00%	9.00%
PSPDCRP Disability Program Rate							1.51%
<b>Total EE Contribution Rate</b>	<b>7.65%</b>	<b>11.65%</b>	<b>11.65%</b>	<b>14.65%</b>	<b>10.84%</b>	<b>13.84%</b>	<b>10.51%</b>
<b>Employer Contribution Rate</b>							
PSPRS DB Normal Cost	15.78% <sup>2</sup>	15.78% <sup>2</sup>	15.78% <sup>2</sup>	15.78% <sup>2</sup>	10.84% <sup>1</sup>	10.84% <sup>1</sup>	
PSPRS DB Tier 1 & 2 Unfunded	35.75% <sup>3</sup>	35.75% <sup>3</sup>	35.75% <sup>3</sup>	35.75% <sup>3</sup>	35.75% <sup>4</sup>	35.75% <sup>4</sup>	35.75% <sup>4</sup>
PSPRS DC Rate				4.00% <sup>5</sup>		3.00%	9.00%
PSPDCRP Disability Program Rate							1.51%
<b>Total ER Contribution Rate</b>	<b>51.53%</b>	<b>51.53%</b>	<b>51.53%</b>	<b>55.53%</b>	<b>46.59%</b>	<b>49.59%</b>	<b>46.26%</b>

<sup>1</sup> At the November 28, 2018 Board of Trustees meeting, the PSPRS Board of Trustees decided not to change the Tier 3 Pension and Health Rates for Employers and Employees, calculated with the June 30, 2017 valuation, for the fiscal year beginning July 1, 2019. Tier 3 total DB rate of 10.84% equals 10.59% for Pension plus 0.25% for Health.

<sup>2</sup> Tiers 1 and 2 total DB Normal Cost of 15.78% equals 15.51% for Pension plus 0.27% for Health.

<sup>3</sup> Tiers 1 and 2 total DB Unfunded of 35.75% equals 35.61% for Pension plus 0.14% for Health.

<sup>4</sup> Per statute, any positive unfunded liability for Tiers 1 and 2 is to be applied to all Tier 3 (DB and DC) payrolls (ARS § 38-843(B)), where the total of 35.75% equals 35.61% for Pension plus 0.14% for Health.

<sup>5</sup> The 4.00% employer match for Tier 2 Hybrid members is for a short period of time depending on the membership date of the employee at which point the rate will change to 3%. (ARS § 38-868(C))

<sup>6</sup> Employers that pay into Social Security on behalf of their members do not participate in the Hybrid Plan.

## APPENDIX C

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### DETERMINATION OF TIER 3 AMORTIZATION PAYMENT

## Determination of Tier 3 Amortization Payment

### Pension

Type	Date Established	Original Balance	Original Amortization Period	Amounts for Fiscal Year Ending 6/30/2020		
				Outstanding UAL Balance	Remaining Amortization Period	Annual Amortization Rate
Initial	6/30/2018	\$ 0	10	\$ 0	10	0.00%
<b>Total</b>				<b>\$ 0</b>		<b>0.00%</b>

### Health

Type	Date Established	Original Balance	Original Amortization Period	Amounts for Fiscal Year Ending 6/30/2020		
				Outstanding UAL Balance	Remaining Amortization Period	Annual Amortization Rate
Initial	6/30/2018	\$ 0	10	\$ 0	10	0.00%
<b>Total</b>				<b>\$ 0</b>		<b>0.00%</b>

By Statute, negative amortization rates are not subtracted in Tier 3 rate calculations.