

# Maryland State Retirement and Pension System

Annual Actuarial Valuation Report for  
Maryland Municipal Corporations  
as of June 30, 2017



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December 5, 2017

Board of Trustees for the  
Maryland State Retirement and Pension System  
120 East Baltimore Street, 16<sup>th</sup> Floor  
Baltimore, Maryland 21202

Dear Members of the Board:

The results of the **June 30, 2017 annual actuarial valuation** of the Maryland State Retirement and Pension System ("MSRPS") for participating Municipal Corporations in the Employees' Combined System Municipal ("ECS" Municipal), Correctional Officers' Retirement System ("CORS") and the Municipal Law Enforcement Officers Pension System ("LEOPS" Municipal) are presented in this report. Participating Municipal Corporations which are the responsibility of the State for funding purposes have been excluded, and certain previously withdrawn Municipal Corporations have been valued as part of the State valuation, and are therefore excluded from this valuation. The State acts as guarantor to the extent the present value of their future payments are in excess of or less than the present value of their future liabilities for previously withdrawn municipal corporations. Municipal employers who withdraw on or after June 30, 1997 will have their employees' benefits guaranteed by the other municipalities covered by this plan.

This report was prepared at your request and is intended for use by the Maryland State Retirement Agency ("SRA") and the Board of Trustees of the MSRPS and those designated or approved by the SRA or the Board. This report may be provided to other parties only in its entirety and only with the permission of the SRA or the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are as follows:

- Measure the financial position of Municipal Corporation Systems of MSRPS, and
- Assist the Board in establishing basic or pooled employer contribution rates necessary to fund the benefits provided by MSRPS.

Additional statistical and actuarial reporting and disclosure information covering the MSRPS Municipal Corporations can be found in the combined State and Municipal MSRPS actuarial valuation report and the GASB Statement Nos. 67 and 68 report.

The individual member data required for the valuations was furnished by the SRA, together with pertinent data on financial operations (unaudited) and Participating Governmental Unit ("PGU") schedules. The cooperation and collaboration of SRA staff in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by SRA.

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopts these assumptions after considering the advice of the actuary and other professionals.

Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. GRS performed an experience study of MSRPS for the period 2010-2014 after completion of the June 30, 2014 valuations. Assumptions from the experience study including investment return, inflation, COLA increases, mortality rates, retirement rates, withdrawal rates, disability rates, and rates of salary increase were adopted by the Board for first use in the actuarial valuation as of June 30, 2015. The Board adopted the use of an investment return assumption of 7.50% and an inflation assumption of 2.65% for the June 30, 2017 valuation. It is our opinion that the actuarial assumptions used for the valuation are reasonable.

The benefit provisions valued in the actuarial valuation as of June 30, 2017, are the same as the provisions from the last actuarial valuation as of June 30, 2016.

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 actuary did not perform an analysis of the potential range of such future measurements in this actuarial valuation report.

Based on recent legislation, effective with the valuation as of June 30, 2016, the amortization method for ECS Municipal was changed to a closed amortization period starting in FY 2018 and ending in FY 2043.

The computed contribution rates shown on page 5 may be considered as a minimum contribution rate that complies with the funding policy stated in the Code. 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.

This valuation assumes the continuing ability of the participating employers to make the contributions necessary to fund this system. 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.



This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. We certify that, to the best of our knowledge, this report is complete and accurate and has been prepared in accordance with Maryland's Annotated Code and generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice as promulgated by the Actuarial Standards Board.

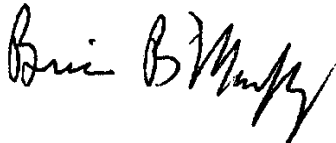
This report should not be relied on for any purpose other than the purposes previously described. Determinations of the financial values associated with benefits described in this report for a purpose other than the intended purpose may produce results that differ significantly from those presented in this report.

The signing actuaries are independent of the plan sponsor.

This is one of multiple documents comprising the actuarial report. The other documents comprising the actuarial report are the PowerPoint presentation presented to the Board on September 19, 2017.

Brian B. Murphy, Brad L. Armstrong and Amy Williams are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



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



Brad L. Armstrong, ASA, EA, FCA, MAAA



Amy Williams, ASA, FCA, MAAA

BBM/BLA/AW:rmn



## SECTION I

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### BOARD SUMMARY

## Board Summary

During the 1996 legislative session, legislation was passed which changed the contribution calculations for participating employers in the Municipal Pension Plan. Commencing with the June 30, 1996 actuarial valuation, the ongoing funding requirements for all Municipal Corporations consist of four components. The first two components are the same for all Corporations. The last two components, which vary by individual Corporation, are based on some characteristics unique to those Corporations.

The shared components are:

- (1) **Normal Cost Rate** based upon Pension System provisions.
- (2) **Unfunded Liability Rate** based upon all plan provisions.

The varying components are:

- (3) Various **surcharges** on normal cost and unfunded liability, based on plan elections.
- (4) **Special Adjustments** to the final rate reflecting:
  - credits for "over-funded" Corporations as of 6/30/95,
  - charges for "under-funded" Corporations as of 6/30/95,
  - certain "special payments" called for under prior and future entry into the System, and
  - any withdrawal liability payments owed to the System for withdrawals after 6/30/96.

The normal cost rate is a single rate determined by the actuary, based upon the valuation year demographics of the participants.

The unfunded liability rate is determined annually by the actuary and is the rate that, when applied to current and future expected payrolls, is sufficient to pay for all future benefits of current and prior plan participants not funded by:

- current actuarial value of assets,
- the present value of all future normal costs (employer and employee),
- the present value of all future surcharge contributions,
- the net present value of all future "special adjustment" contributions, and
- the present value of all future withdrawal liability payments on behalf of withdrawn Corporations.

The special adjustments include a dollar amount credit or charge subtracted from, or added to, the other three pieces. In no event can the total credits exceed the sum of the otherwise called for contribution.

A charge applies to each Municipal Corporation which as of 6/30/95 was determined to be under-funded on the basis of having less assets in the Retirement System than would be needed to fund the present value of benefits **accrued** as of 6/30/95 for prior and current participants in the Retirement System. Once this "deficit" was determined as of 6/30/95, the actuary determined a series of charges increasing by 5% per year to the year 2020 with present value equal to the amount of the deficit. For a few Municipal Corporations, the deficit payment was calculated to be greater than 2% of payroll when using a 25-year amortization payment. These Corporations are amortizing their charges to the year 2035. Individual deficit amounts and December 2018 charges are displayed in Table III-2 (page 15).

## Board Summary

A credit applies to each Municipal Corporation which, as of 6/30/95, was determined to be over-funded on the basis of having assets which exceed the present value of all future benefits expected to be paid to current and prior participants of that employer. Once this "surplus" was determined as of 6/30/95, the actuary determined a series of credits increasing by 5% per year to the year 2020 with present value equal to the amount of the surplus. Individual surplus amounts and December 2018 credits are displayed in Table III-3 (page 16).

The un-pooled unfunded liability (the unfunded liability before reflecting the liabilities for special adjustments, withdrawals, and surcharges) increased from \$729 million to \$739 million for Employees' Combined System (ECS). The *pooled* unfunded liability increased from \$494 million to \$522 million for the ECS. This happened because the liabilities for special adjustments, withdrawals, and surcharges are amortized faster than the pooled unfunded liability. The pooled unfunded liability increased from \$138 million to \$154 million for LEOPS and increased from \$692 thousand to \$1 million for CORS. The increase in the unfunded liability is comprised of a liability loss when compared to the actuarial assumptions.

The combined Municipal System's market value of assets earned 9.99% based on our estimate and 10.02% as reported by State Street (using a slightly different computation method) for the year ended June 30, 2017, which is more than the 7.55% assumed rate of investment return for fiscal year 2017. However, the actuarial, or smoothed, rate of return measured from this past year was 6.96%, compared to the actuarial assumption of 7.55%, which resulted in an asset loss. The return of 6.96% was due to partial recognition of asset losses from FY 2015 and FY 2016 and partial recognition of asset gains from FY 2013, FY 2014 and FY 2017.

All of the Systems experienced losses on the liabilities due to higher salary increases than assumed. Salaries increased by more than the assumption in all systems which resulted in losses. Gains were experienced due to lower COLA increases on average than assumed. COLA increases of 1.262% were granted to eligible retirees who have a COLA cap of 3.00%, 5.00%, or no COLA cap compared to the actuarial assumptions of 2.29%, 2.68% and 2.70%, respectively.

In 2011, the General Assembly enacted pension reforms which were effective July 1, 2011, and affected both current actives and new hires. The member contribution rate was increased for members of the Employees' Pension System from 5% to 7%, and from 4% to 6% in fiscal year 2012 and 7% in fiscal year 2013 and beyond for LEOPS. In addition, the benefit attributable to service on or after July 1, 2011 will be subject to different cost-of-living adjustments (COLA) that is based on the increase in the Consumer Price Index and capped at 2.5% or 1.0% based on whether the market value investment return for the preceding calendar year was higher or lower than the investment return assumption used in the valuation (currently 7.50%).



## Board Summary

The basic or pooled contribution rate, which includes a normal cost rate and an unfunded liability rate, increased for ECS, LEOPS and CORS, from those calculated in the June 30, 2016 valuation to those calculated in the June 30, 2017 valuation (which determines the FY 2018 and FY 2019 contributions, respectively). The rate increased from 5.03% to 5.47% for the ECS, increased from 30.75% to 31.43% for LEOPS, and increased from 9.53% to 9.85% for CORS. The unfunded liability rate is calculated by amortizing the pooled unfunded liability.

The increase in the contribution rate was mainly attributable to liability losses caused by payroll increases which were higher than assumed and investment losses. These decreases were partially offset by COLA increases that were lower than assumed.

Based on recent legislation, effective with the June 30, 2016 valuation, the amortization method for ECS Municipal was changed to a closed amortization period ending in FY 2043. This will be accomplished by phasing the period down from 100 years in the 2016 valuation to 18 years for the 2023 valuation. The amortization period used for ECS in the June 30, 2017 valuation is 40 years.

Maryland's laws specify a 40-year level-percent-of-pay closed period amortization schedule starting June 30, 1999 for LEOPS, and starting June 30, 2006 for CORS. The remaining amortization period as of June 30, 2017 is 22 years for LEOPS, 29 years for CORS.

In addition to the basic contribution rate, the following surcharges apply for ECS:

Surcharge Group	Surcharge		Total	Applicable Payroll
	Normal Cost	Unfunded Liability <sup>1</sup>		
Retirement System	5.00%	0.00%	5.00%	Retirement System
Non-Contributory to CPB	1.00%	1.42%	2.42%	Retirement and Pension System
CPB to ACPS <sup>2</sup>	(0.40)%	1.51%	1.11%	Pension System
Non-Contributory to ACPS	0.60%	6.84%	7.44%	Pension System

<sup>1</sup> The Contributory Pension Benefit UAL surcharge will be paid through 2020 and the other two UAL surcharges are payable through 2031.

<sup>2</sup> Contributory Pension Benefit to Alternate Contributory Pension System.

Each employer with current active participants in the Retirement System must pay 5% on the Retirement System payroll. Municipal Corporations who elected to provide CPB have a 2.42% surcharge applied to total Retirement and Pension System payroll. The surcharge consists of a 1.00% normal cost rate surcharge and a 1.42% UAL rate surcharge. Municipal Corporations who elected to provide CPB and who later elected to participate in the ACPS pay a 1.11% surcharge applied to Pension System payroll. The surcharge is the net result of a (0.40)% normal cost rate surcharge and a 1.51% UAL rate surcharge. This is paid in addition to the 2.42% CPB surcharge. Municipalities who did not elect the CPB but did elect the ACPS pay a surcharge of 7.44% applied to Pension System payroll. The surcharge consists of 0.60% normal cost rate surcharge and a 6.84% UAL rate surcharge. The 2011 General Assembly pension reforms changed the relative cost to the employers to provide benefits under the Non-Contributory Pension System (NCPS), the Contributory Pension System (ECPS) and the Alternate Contributory Pension Selection (ACPS) by increasing the ACPS

## Board Summary

employee contribution rate from 5% to 7%, while not changing the employee contribution rate for the NCPS and ECPS. In order to address the change in the relative cost between the different plans (NCPS, ECPS, ACPS), we have proposed phasing in revisions to the payroll surcharges for employers whose members are covered under the Employees Pension System. The proposal requires statutory action, so it will be submitted for consideration during the 2018 Legislative Session.

The special adjustments to the final contribution rate that apply to each Municipal Corporation can be found in Tables III-2 through III-4 for the ECS, Table III-5 for LEOPS and Table III-6 for CORS.

Municipalities with credits in the plan may use up to the amount shown to offset their basic December 2018 billing amount. Any unused credit will revert to the pooled plan on an annual basis.

# Board Summary

## Summary of Valuation Results June 30, 2017 (\$ in Millions)

	2017			2016		% Change
	ECS	LEOPS	CORS	Total	Total	
<b>A. Demographic Information</b>						
1. Active Number Counts	24,472	1,010	96	25,578	25,587	0.0%
2. Active Payroll	\$ 1,100	\$ 60	\$ 5	\$ 1,165	\$ 1,133	2.8%
3. Retired Number Counts	17,684	414	32	18,130	17,591	3.1%
4. Annual Benefits for Retired Members <sup>1</sup>	\$ 242	\$ 15	\$ 1 <sup>2</sup>	\$ 258	\$ 244	5.7%
5. Deferred / Inactive Number Counts	6,850	105	4	6,959	6,898	0.9%
6. Total Number Counts	49,006	1,529	132	50,667	50,076	1.2%
<b>B. Assets</b>						
1. Market Value (MV)	\$ 3,989	\$ 261	\$ 23	\$ 4,273	\$ 3,960	7.9%
2. Rate of Return on MV <sup>3</sup>				9.99 %	1.10 %	
3. Actuarial Value (AV)	\$ 4,091	\$ 268	\$ 23	\$ 4,382	\$ 4,174	5.0%
4. Rate of Return on AV				6.96 %	5.62 %	
5. Ratio of AV to MV				102.6%	105.4%	
<b>C. Actuarial Results</b>						
1. Normal Cost as a % of Payroll	9.30% <sup>4</sup>	21.03%	13.63%	9.92%	9.91%	
2. Actuarial Accrued Liability (AAL)						
a. Active	\$ 2,018	\$ 170	\$ 11	\$ 2,199	\$ 2,126	3.4%
b. Retired	2,615	231	12	2,858	2,714	5.3%
c. Deferred/Inactive	<u>196</u>	<u>9</u>	<u>1</u>	<u>207</u>	<u>190</u>	8.7%
d. Total	\$ 4,830	\$ 410	\$ 24	\$ 5,264	\$ 5,031	4.6%
3. Unfunded AAL (UAAL)	\$ 739	\$ 142	\$ 1	\$ 882	\$ 857	2.8%
4. Funded Ratio	84.71 %	65.31 %	95.68 %	83.25 %	82.96 %	
<b>D. Basic Contribution Rates</b>						
	FY 2019			FY 2018		
1. Pension Contributions						
a. Employer Normal Cost	3.05%	14.03%	8.63%	3.64%	3.63%	
b. Member Contribution Rate	5.74%	7.00%	5.00%	6.28%	6.28%	
c. UAAL Contribution Rate	<u>2.42%</u>	<u>17.40%</u>	<u>1.22%</u>	<u>3.18%</u>	<u>2.65%</u>	
d. Total	11.21%	38.43%	14.85%	13.10%	12.56%	
2. Total Basic Employer Contribution Rate	5.47%	31.43%	9.85%	6.82%	6.28%	

<sup>1</sup>Retiree benefit amounts include the cost-of-living adjustment granted July 1, 2017 and July 1, 2016, respectively.

<sup>2</sup>Annual benefits equal to \$830,653.

<sup>3</sup>Actuarial calculation may differ from figures reported by State Street.

<sup>4</sup>Includes surcharges.

Totals may not add due to rounding.

# Board Summary

## Other Observations

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

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

- (1) The employer normal cost as a percentage of pay will decrease to the level of the Reformed Benefit Plan's (i.e., plans for members hired after July 1, 2011) normal cost as time passes and the majority of the active population is comprised of Reformed Plan members,
- (2) The unfunded actuarial accrued liabilities will be fully amortized after:
  - 24 years (June 30, 2042) for ECS
  - 22 years (June 30, 2040) for LEOPS
  - 29 years (June 30, 2047) for CORS
- (3) The funded status of the plan will increase gradually towards a 100% funded ratio.

### Limitations of Funded Status Measurements

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

- (1) The measurement is inappropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations, for example: transferring the liability to an unrelated third party in a market value type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the System's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the System 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 already used in the measurement.

## **SECTION II**

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### **ASSETS**

## Assets

The System uses and discloses two different asset measurements which are presented in this section of the report: market value and actuarial value of assets. The market value represents, as of the valuation date, the value of the assets if they were liquidated on that date. The actuarial value of assets is a value that attempts to smooth annual investment return performance over five years to reduce annual investment volatility, and is used in determining contribution rates for the three participating employer plans.

On the following pages we present detailed information on System assets:

- Disclosure of assets at June 30, 2017.
- Statement of cash flows during the year.
- Development of the actuarial value of assets.
- Disclosure of investment performance for the year.

# Assets

**Table II-1  
Market Value and Cash Flow**

	<b>Employees (Municipal)</b>	<b>LEOPS (Municipal)</b>	<b>Corrections (Municipal)</b>	<b>Total Municipal</b>
Market Value of Assets as of 6/30/2016	\$ 3,710,593,132	\$ 229,257,940	\$ 20,595,826	\$ 3,960,446,898
Employer Contributions	90,231,727	18,398,524	477,730	109,107,981
Member Contributions	61,928,095	3,909,525	261,425	66,099,045
Investment Returns	366,247,309	23,350,487	2,052,698	391,650,494
Disbursements from the Trust	(240,156,450)	(13,432,164)	(830,653)	(254,419,267)
Net Transfers	0	0	0	0
Market Value of Assets as of 6/30/2017	\$ 3,988,843,813	\$ 261,484,312	\$ 22,557,026	\$ 4,272,885,151

# Assets

## June 30, 2017

	ECS	LEOPS	CORS	Total Municipal
Beginning of Year:				
(1) Market Value of Assets	\$3,710,593,132	\$229,257,940	\$20,595,826	\$3,960,446,898
(2) Actuarial Value of Assets	3,909,804,047	242,026,880	21,709,395	4,173,540,322
End of Year:				
(3) Market Value of Assets	3,988,843,813	261,484,312	22,557,026	4,272,885,151
(4) Net Cash Flow with Adjustment	(87,996,628)	8,875,885	(91,498)	(79,212,241)
(5) Total Investment Income				
=(3)-(1)-(4)	366,247,309	23,350,487	2,052,698	391,650,494
(6) Projected Rate of Return	7.55%	7.55%	7.55%	7.55%
(7) Projected Investment Income				
=(1)x(6)+([1+(6)] <sup>.5-1</sup> )x(4)	276,888,348	17,637,943	1,551,594	296,077,885
(8) Beginning of Year Asset Adjustment				
(9) Investment Income in Excess of Projected Income	89,358,961	5,712,544	501,104	95,572,609
(10) Excess Investment Income Recognized This Year (5-year recognition)				
(10a) From This Year	17,871,792	1,142,509	100,221	19,114,522
(10b) From One Year Ago	(47,833,605)	(2,868,639)	(262,996)	(50,965,240)
(10c) From Two Years Ago	(36,633,825)	(2,091,789)	(198,054)	(38,923,668)
(10d) From Three Years Ago	42,921,714	2,126,696	229,112	45,277,522
(10e) From Four Years Ago	16,181,548	727,586	74,353	16,983,487
(10f) Total Phase-ins	(7,492,376)	(963,637)	(57,364)	(8,513,377)
(11) Change in Actuarial Value of Assets				
=(4)+(7)+(8)+(10f)	181,399,344	25,550,191	1,402,732	208,352,267
End of Year:				
<b>(3) Market Value of Assets as of 6/30</b>	<b>3,988,843,813</b>	<b>261,484,312</b>	<b>22,557,026</b>	<b>4,272,885,151</b>
(12) Preliminary Actuarial Value of Assets = (2)+(11)	4,091,203,391	267,577,071	23,112,127	4,381,892,589
(12a) Upper Collar Limit 120% x (3)	4,786,612,576	313,781,174	27,068,431	5,127,462,181
(12b) Lower Collar Limit 80% x (3)	3,191,075,050	209,187,450	18,045,621	3,418,308,121
(13) Adjustment to Remain within 20% Collar	0	0	0	0
<b>(14) Final Actuarial Value of Assets as of 6/30</b>	<b>4,091,203,391</b>	<b>267,577,071</b>	<b>23,112,127</b>	<b>4,381,892,589</b>
(15) Difference Between Market & Actuarial Values	(102,359,578)	(6,092,759)	(555,101)	(109,007,438)
(16) Actuarial Value Rate of Return	6.97%	6.77%	6.90%	6.96%
(17) Market Value Rate of Return*	9.99%	9.99%	9.99%	9.99%
(18) Ratio of Actuarial Value to Market Value	103%	102%	102%	103%

\* Actuarial calculation may differ modestly from figures reported by State Street.



# Assets

## Employees (Municipal)

	2016	2017	2018	2019	2020	2021
Beginning of Year:						
(1) Market Value of Assets	\$3,745,205,278	\$3,710,593,132				
(2) Actuarial Value of Assets	3,775,531,516	3,909,804,047				
End of Year:						
(3) Market Value of Assets	3,710,593,132	3,988,843,813				
(4) Net of Contributions and Disbursements	(75,412,109)	(87,996,628)				
(5) Total Investment Income						
=(3)-(1)-(4)	40,799,963	366,247,309				
(6) Projected Rate of Return	7.55%	7.55%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^5-1)x(4)	279,967,987	276,888,348				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in						
Excess of Projected Income	(239,168,024)	89,358,961				
(10) Excess Investment Income Recognized						
This Year (5-year recognition)						
(10a) From This Year	(47,833,605)	17,871,792				
(10b) From One Year Ago	(36,633,825)	(47,833,605)	\$ 17,871,792			
(10c) From Two Years Ago	42,921,714	(36,633,825)	(47,833,605)	\$ 17,871,792		
(10d) From Three Years Ago	16,181,548	42,921,714	(36,633,825)	(47,833,605)	\$ 17,871,792	
(10e) From Four Years Ago	(44,919,179)	16,181,548	42,921,716	(36,633,824)	(47,833,604)	\$ 17,871,793
(10f) Total Phase-ins	(70,283,347)	(7,492,376)	(23,673,922)	(66,595,637)	(29,961,812)	17,871,793
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	134,272,531	181,399,344				
End of Year:						
<b>(3) Market Value of Assets</b>	<b>3,710,593,132</b>	<b>3,988,843,813</b>				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	3,909,804,047	4,091,203,391				
(12a) Upper Corridor Limit 120% x (3)	4,452,711,758	4,786,612,576				
(12b) Lower Corridor Limit 80% x (3)	2,968,474,506	3,191,075,050				
(13) Adjustment to Remain within 20% Collar	0	0				
<b>(14) Final Actuarial Value of Assets as of 6/30</b>	<b>3,909,804,047</b>	<b>4,091,203,391</b>				
(15) Actuarial Value Rate of Return	5.61%	6.97%				
(16) Market Value Rate of Return*	1.10%	9.99%				
(17) Ratio of Actuarial Value to Market Value	105%	103%				

\* Actuarial calculation may differ modestly from figures reported by State Street.

# Assets

	LEOPS (Municipal)					
	2016	2017	2018	2019	2020	2021
Beginning of Year:						
(1) Market Value of Assets	\$217,714,201	\$229,257,940				
(2) Actuarial Value of Assets	220,137,251	242,026,880				
End of Year:						
(3) Market Value of Assets	229,257,940	261,484,312				
(4) Net of Contributions and Disbursements	9,111,798	8,875,885				
(5) Total Investment Income						
=(3)-(1)-(4)	2,431,941	23,350,487				
(6) Projected Rate of Return	7.55%	7.55%				
(7) Projected Investment Income						
=(1)x(6)+[(1+(6))^5-1]x(4)	16,775,134	17,637,943				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	(14,343,193)	5,712,544				
(10) Excess Investment Income Recognized This Year (5-year recognition)						
(10a) From This Year	(2,868,639)	1,142,509				
(10b) From One Year Ago	(2,091,789)	(2,868,639)	\$ 1,142,509			
(10c) From Two Years Ago	2,126,696	(2,091,789)	(2,868,639)	\$ 1,142,509		
(10d) From Three Years Ago	727,588	2,126,696	(2,091,789)	(2,868,639)	\$ 1,142,509	
(10e) From Four Years Ago	(1,891,159)	727,586	2,126,697	(2,091,787)	(2,868,637)	\$ 1,142,508
(10f) Total Phase-ins	(3,997,303)	(963,637)	(1,691,222)	(3,817,917)	(1,726,128)	1,142,508
(11) Change in Actuarial Value of Assets = (4)+(7)+(8)+(10f)	21,889,629	25,550,191				
End of Year:						
<b>(3) Market Value of Assets</b>	<b>229,257,940</b>	<b>261,484,312</b>				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	242,026,880	267,577,071				
(12a) Upper Corridor Limit 120% x (3)	275,109,528	313,781,174				
(12b) Lower Corridor Limit 80% x (3)	183,406,352	209,187,450				
(13) Adjustment to Remain within 20% Collar	0	0				
<b>(14) Final Actuarial Value of Assets as of 6/30</b>	<b>242,026,880</b>	<b>267,577,071</b>				
(15) Actuarial Value Rate of Return	5.69%	6.77%				
(16) Market Value Rate of Return*	1.09%	9.99%				
(17) Ratio of Actuarial Value to Market Value	106%	102%				

\* Actuarial calculation may differ modestly from figures reported by State Street.

# Assets

	CORS (Municipal)					
	2016	2017	2018	2019	2020	2021
Beginning of Year:						
(1) Market Value of Assets	\$20,405,374	\$20,595,826				
(2) Actuarial Value of Assets	20,523,472	21,709,395				
End of Year:						
(3) Market Value of Assets	20,595,826	22,557,026				
(4) Net of Contributions and Disbursements	(33,917)	(91,498)				
(5) Total Investment Income						
=(3)-(1)-(4)	224,369	2,052,698				
(6) Projected Rate of Return	7.55%	7.55%				
(7) Projected Investment Income						
=(1)x(6)+[(1+(6))^5-1]x(4)	1,539,349	1,551,594				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	(1,314,980)	501,104				
(10) Excess Investment Income Recognized This Year (5-year recognition)						
(10a) From This Year	(262,996)	100,221				
(10b) From One Year Ago	(198,054)	(262,996)	\$ 100,221			
(10c) From Two Years Ago	229,112	(198,054)	(262,996)	\$ 100,221		
(10d) From Three Years Ago	74,353	229,112	(198,054)	(262,996)	\$ 100,221	
(10e) From Four Years Ago	(161,924)	74,353	229,111	(198,053)	(262,996)	\$ 100,220
(10f) Total Phase-ins	(319,509)	(57,364)	(131,718)	(360,828)	(162,775)	100,220
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	1,185,923	1,402,732				
End of Year:						
<b>(3) Market Value of Assets</b>	<b>20,595,826</b>	<b>22,557,026</b>				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	21,709,395	23,112,127				
(12a) Upper Corridor Limit 120% x (3)	24,714,991	27,068,431				
(12b) Lower Corridor Limit 80% x (3)	16,476,661	18,045,621				
(13) Adjustment to Remain within 20% Collar	0	0				
<b>(14) Final Actuarial Value of Assets as of 6/30</b>	<b>21,709,395</b>	<b>23,112,127</b>				
(15) Actuarial Value Rate of Return	5.95%	6.90%				
(16) Market Value Rate of Return*	1.10%	9.99%				
(17) Ratio of Actuarial Value to Market Value	105%	102%				

\* Actuarial calculation may differ modestly from figures reported by State Street.

## **SECTION III**

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### **LIABILITIES**

## Liabilities

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. There are several methods currently used in making such a determination.

The method used for this valuation is referred to as the "individual entry age normal actuarial cost method." Under this method, a level-percent-of-pay employer cost is determined which, along with member contributions, will pay for projected retirement benefits for a new entrant to the plan. The level percent developed is called the "normal cost" rate.

The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and funds accumulated as of the same date is referred to as the unfunded actuarial liability. If the employer's contributions exceed the employer's normal cost for the year, after allowing for interest earned on the previous balance of the unfunded actuarial liability, this liability will be reduced. Benefit improvements, actuarial gains and losses, and changes in actuarial procedures will also have an effect on the total liability and on the portion of it that is unfunded.

After the amount of the unfunded actuarial liability has been determined, a schedule of contributions is established to amortize that amount over a given period. Maryland's laws specify a single period closed amortization period ending in FY 2043 for ECS Municipal. The LEOPS 40 years started June 30, 1999. Thus, for the June 30, 2017 valuation, the remaining period of amortization is 22 years for the LEOPS. The CORS 40 years started June 30, 2006. Thus for the June 30, 2017 valuation, the remaining period of amortization is 29 years for CORS.

The following table (Table III-1) displays by System the Individual Entry Age Normal actuarial liabilities and unfunded actuarial liability. Table III-2 shows the portion of ECS Municipal unfunded liability (i.e., Deficit Amount) assigned to each of 16 individual participating municipalities. The table also shows the additional charge which will be billed to exhaust this liability starting with the December 2018 billing.

Table III-3 shows 14 municipalities who have credits in ECS Municipal. These municipalities may use up to the amount shown to offset their basic December 2018 billing amount. Any unused credit will revert to the pooled plan on an annual basis. The June 30, 2017 valuation includes PGU withdrawals as of June 30, 2017 and does not include PGUs entries as of July 1, 2017.

Table III-4 shows the new entrant and withdrawal liability balances and payments (credits) for ECS Municipal.

Table III-5 shows the new entrant and withdrawal liability balances and payments (credits) for LEOPS Municipal.

There are no new entrant liability or withdrawal liability balances for CORS Municipal (Table III-6).

# Liabilities

June 30, 2017

Table III-1  
Liabilities

	Employees Combined System	LEOPS	Correctional Officers'	Total Municipal
Present Value of Benefits for:				
a. Active Members	\$ 2,788,417,800	\$ 265,499,016	\$ 16,214,639	\$ 3,070,131,455
b. Retired Member and Beneficiaries	2,615,086,444	230,808,079	12,140,972	2,858,035,495
c. Terminated Vested Members and Inactives*	<u>196,417,536</u>	<u>9,306,338</u>	<u>1,087,640</u>	<u>206,811,514</u>
d. Total	\$ 5,599,921,780	\$ 505,613,433	\$ 29,443,251	\$ 6,134,978,464
Individual Entry Age Actuarial Accrued Liability for:				
a. Active Members	\$ 2,018,259,714	\$ 169,595,717	\$ 10,927,951	\$ 2,198,783,382
b. Retired Member and Beneficiaries	2,615,086,444	230,808,079	12,140,972	2,858,035,495
c. Terminated Vested Members and Inactives*	<u>196,417,536</u>	<u>9,306,338</u>	<u>1,087,640</u>	<u>206,811,514</u>
d. Total	\$ 4,829,763,694	\$ 409,710,134	\$ 24,156,563	\$ 5,263,630,391
Actuarial Value of Assets	\$ 4,091,203,391	\$ 267,577,071	\$ 23,112,127	\$ 4,381,892,589
Unfunded Actuarial Liability	\$ 738,560,303	\$ 142,133,063	\$ 1,044,436	\$ 881,737,802
Funded Percent	84.7%	65.3%	95.7%	83.2%

\* Includes liability for accumulated member contributions with interest for non-vested inactive members.

# Liabilities

**Table III-2  
Schedule of Deficit Amounts as of June 30, 2017  
and Deficit Payments for December 2018 Billing**

Initial PLD Number	PLD Name	Deficit Amount at 6/30/2017*	December 2018 Payment	Year of Last Payment
7402	Dorchester Co. Bd. of Education	\$ 168,947	\$ 47,617	2020
7412	Dorchester Co. Roads Board	763,332	53,607 ***	2035
7425	Cambridge, City of	291,004	82,018	2020
7602/8	Garrett Co. Bd. of Ed. & Bd. of Ed. Cafe	158,853	44,772	2020
7711	Harford Co. Government	3,328,297	938,067	2020
8102	Prince Georges Co. Bd. of Education	6,254,737	1,762,873	2020
8111	Prince Georges Co. Government	15,693,375	4,423,116	2020
8134	Cheverly, City of	184,839	52,096	2020
8135	Prince Georges Co. Crossing Guards	9,742	2,746	2020
8502	Talbot Co. Bd. of Education	587,705	41,273 ***	2035
8604	Hagerstown Junior College	85,442	24,081	2020
8625	Hagerstown, City of	6,151,213	431,988 ***	2035
8725	Salisbury, City of	271,771	76,598	2020
8811	Worcester Co. Commission	39,030	11,000	2020
8816	Worcester Co. Liquor Bd.	5,059	1,426	2020
8827	Berlin, Town of	112,083	31,590	2020
	<b>TOTAL</b>	<b>\$ 34,105,429</b>	<b>\$ 8,024,869</b>	

\* The outstanding balance is based on the 7.50% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the pooled liability and the assigned new entrant and deficit liability. The assigned new entrant and deficit liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

\*\*\* Denotes 40-year amortization, payments increase 15% per year for the first 5 years and 5% per year thereafter (all affected municipalities are beyond the initial 5-year period and are therefore subject to 5% annual increases). All others are amortized over a 25-year period with increasing 5% per year.

# Liabilities

**Table III-3  
Schedule of Surplus Amounts as of June 30, 2017  
& Maximum Credits to December 2018 Billing**

Initial PLD Number	PLD Name	Surplus Amount at 6/30/2017*	December 2018 Credit	Year of Last Credit
6534	Tri-County Council of Western Maryland	\$ (140,144)	\$ (39,499)	2020
6533	Allegany Co. Housing Authority	(377)	(106)	2020
6731	Md. Health & Higher Educ. Fac. Auth	(71,134)	(20,049)	2020
7525	Brunswick, Town of	(276,356)	(77,890)	2020
7702	Harford Co. Bd. of Education	(129,263)	(36,432)	2020
7804	Howard Community College	(123,545)	(34,821)	2020
8004	Montgomery College	(127,815)	(36,024)	2020
8129	New Carrollton, City of	(189,650)	(53,452)	2020
8131	Upper Marlboro, Town of	(2,757)	(777)	2020
8202	Queen Anne Co. Bd. of Education	(32,352)	(9,118)	2020
8402	Somerset Co. Bd. of Education	(103,921)	(29,290)	2020
8426	Crisfield, City of	(14,744)	(4,156)	2020
8610	Washington Co. Library	(212,492)	(59,890)	2020
8825	Pocomoke City #	(83,428)	(23,514)	2020
	<b>TOTAL</b>	<b>\$ (1,507,978)</b>	<b>\$ (425,018)</b>	

\* The outstanding balance is based on the 7.50% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the pooled liability and the assigned new entrant and deficit liability. The assigned new entrant and deficit liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

# Reflects revised payment schedule after transferring Police Officers to LEOPS.

Amortized over a 25-year period with credits increasing 5% per year.



# Liabilities

Table III-4

## Employees Combined System (Municipal)

Schedule of New Entrant and Withdrawal Payments and Credits as of June 30, 2017 for December 2018 Billing  
(Unless noted, amounts are amortized over 25 years with payments increasing 5% per year)

LOC Number	Municipal Corporation	Outstanding Balance as of 6/30/2017*	December 2018 Payment	Last Payment Year
<b>NEW ENTRANT</b>				
6533	Allegany Co Housing Authority	\$ 5,691	\$ 2,114	2019
7025	Town of Preston	21,386	7,944	2019
7026	Town of Denton	301,960	112,166	2019
7028	Town of Federalsburg	320,674	36,433 **	2030
7127	Carroll Soil Conservation District	1,139	423	2019
7206	Cecil County Library	5,179	1,924	2019
7380	So MD Tri-County Comm Action	344,800	128,079	2019
7480	Dorchester Co. Sanitary Commission	(16,747)	(1,494)	2039
7528	Catoctin & Frederick Soil Conservation	487	181	2019
7529	Town of Thurmont#	1,043,235	223,449 **	2022
7706	Harford Co Library	3,416	1,269	2019
7880	Howard Co Comm Action Comm	74,458	27,658	2019
7902	Kent Co Brd of Education	346,606	128,750	2019
7926	Town of Rock Hall	8,694	1,084 **	2028
7927	Kent County Soil and Water Conserv. Dist.	(37,984)	(3,518) **	2037
8142	Town of Edmonston	(119,889)	(11,104) **	2037
8144	Town of Morningside	23,855	2,167	2038
8426	City of Crisfield	48,048	17,820 **	2019
8428	Town of Princess Anne	464	172	2019
8429	Somerset County Economic Dev. Comm.	(13,777)	(1,276) **	2037
8528	Town of Oxford	43,381	16,114	2019
8780	Shore Up	252,377	93,748	2019
8834	Tri-County Council for the Lower Eastern Shore	(17,181)	(6,382)	2019
	<b>TOTAL NEW ENTRANT</b>	<b>\$ 2,640,272</b>	<b>\$ 777,721</b>	
<b>WITHDRAWAL</b>				
6628	AAC Econ Opp Com	\$ 387,529	\$ 36,664 **	2036
	<b>TOTAL WITHDRAWAL</b>	<b>\$ 387,529</b>	<b>\$ 36,664</b>	
	<b>GRAND TOTAL</b>	<b>\$ 3,027,801</b>	<b>\$ 814,385</b>	

\* The outstanding balance is based on the 7.50% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the pooled liability and the assigned new entrant and deficit liability. The assigned new entrant and deficit liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

\*\* Level dollar payments or credits.

# The Town made additional payments of \$326,360 in 2012 and \$230,189 in 2014 which accelerated the last payment year from 2028 to 2022 and reduced the final payment from \$223,449 to \$157,627.

# Liabilities

**Table III-5**  
**LEOPS (Municipal)**  
**Schedule of New Entrant Payments and Credits as of June 30, 2017 for December 2018 Billing**  
**(Amounts are amortized over 25 years with level annual payments)**

LOC Number	Municipal Corporation	Outstanding Balance as of 6/30/2017*	December 2018 Payment	Last Payment Year
7128	City of Taneytown	\$ (266,500)	\$ (33,229)	2028
7130	Town of Hampstead	(460,994)	(50,370)	2031
7425	City of Cambridge	(240,952)	(39,676)	2024
7925A	Town of Chestertown	(453,122)	(51,481)	2030
8126	City of Hyattsville	(419,978)	(59,012)	2026
8211	Queen Anne Public Safety EEs	(1,487,136)	(185,426)	2028
8428	Town of Princess Anne	(520,230)	(61,748)	2029
8628	Town of Hancock	(53,389)	(7,039)	2027
8725A	Salisbury Police	(704,855)	(92,930)	2027
8725B	Salisbury Fire	(1,176,253)	(146,663)	2028
8811	Worcester County	(2,407,953)	(254,054)	2032
7427	Town of Hurlock	(459,518)	(48,482)	2032
7030	Caroline County Sheriffs	(26,015)	(2,660)	2033
8727	City of Fruitland	(1,294,271)	(128,611)	2034
6511	Alleghany County Sheriff's Deputies	(586,074)	(51,467)	2035
8825	Pocomoke City	(1,177,439)	(103,398)	2036
	<b>TOTAL NEW ENTRANT</b>	<b>\$(11,734,679)</b>	<b>\$(1,316,246)</b>	
<b>WITHDRAWAL</b>				
	<b>TOTAL WITHDRAWAL</b>	<b>\$ 0</b>	<b>\$ 0</b>	
	<b>GRAND TOTAL</b>	<b>\$(11,734,679)</b>	<b>\$(1,316,246)</b>	

\* The outstanding balance is based on the 7.50% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the pooled liability and the assigned new entrant and deficit liability. The assigned new entrant and deficit liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

\*\* Denotes 10-year amortization.

# Liabilities

**Table III-6**  
**Correctional Officers' Retirement System (Municipal)**  
**Schedule of New Entrant Payments and Credits as of June 30, 2017 for December 2018 Billing**  
**(Amounts are amortized over 25 years with level annual payments)**

<b>LOC Number</b>	<b>Municipal Corporation<sup>#</sup></b>	<b>Outstanding Balance as of 6/30/2017*</b>	<b>December 2018 Payment</b>	<b>Last Payment Year</b>
	TOTAL	\$ 0	\$ 0	

# There are currently no PGUs with new entrant payments or credits.

\* The outstanding balance is based on the 7.50% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the pooled liability and the assigned new entrant and deficit liability. The assigned new entrant and deficit liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

## **SECTION IV**

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### **CONTRIBUTIONS**

# Contributions

## A. Contribution Results for December 2018 Billings (FY 2019)

Each Municipal Corporation's basic appropriation to the Systems in Fiscal Year 2019 may be determined by applying the contribution rates set forth in this report to the expected FY 2019 active member payrolls for each Municipal Corporation.

The Individual Entry Age Normal method was used to develop the contribution rates. Under this funding method, as with most other actuarial funding methods, a total contribution rate is determined which consists of two elements: the normal cost rate and the unfunded actuarial liability rate. In addition, each employer with current active participants in the Retirement System must pay 5% on the Retirement System payroll. Municipal Corporations who elected to provide CPB have a 2.42% surcharge applied to total Retirement and Pension System payroll. The surcharge consists of a 1.00% normal cost rate surcharge and a 1.42% UAL rate surcharge. Municipal Corporations who elected to provide CPB and who later elected to participate in the ACPS pay a 1.11% surcharge applied to Pension System payroll. The surcharge is the net result of a (0.40)% normal cost rate surcharge and a 1.51% UAL rate surcharge. This is paid in addition to the 2.42% CPB surcharge. Municipalities who did not elect the CPB but did elect the ACPS pay a surcharge of 7.44% applied to Pension System payroll. The surcharge consists of 0.60% normal cost rate surcharge and a 6.84% UAL rate surcharge.

The 1.42% UAL surcharge for CPB participation will be paid through 2020, while the other two ACPS UAL surcharges will be paid through 2031.

Certain participating employers will have to pay special liability amounts calculated at their entry to the System or deficit payments based on the 1996 legislation, and other participating employers will be able to apply credits also based on the 1996 legislation.

# Contributions

TABLE IV-1  
Detailed Actuarial Information  
Employees' Combined System

	Actuarial Valuation Performed		% Change
	June 30, 2017 (for FY 2019)	June 30, 2016 (for FY 2018)	
<b>A. Demographic Information</b>			
Number of:			
Active Members	24,472	24,542	(0.29)%
Retired Members and Beneficiaries	17,684	17,185	2.90%
Vested Deferred Members	6,850	6,797	0.78%
Annual Salaries of Active Members	\$ 1,100,455,307	\$ 1,073,974,587	2.47%
Annual Retirement Allowance for Retired Members and Beneficiaries <sup>#</sup>	\$ 241,750,153	\$ 229,322,203	5.42%
<b>B. Actuarial Results</b>			
1. Entry Age Actuarial Accrued Liability	\$ 4,829,763,694	\$ 4,638,658,487	4.12%
2. Actuarial Value of Assets	<u>4,091,203,391</u>	<u>3,909,804,047</u>	4.64%
3. Unfunded Actuarial Accrued Liability (1-2)	\$ 738,560,303	\$ 728,854,440	1.33%
4. Funded Ratio	84.7%	84.3%	
5. Assigned Liability			
a. Deficit Balances (Table III-2)	\$ 34,105,429	\$ 38,678,783	
b. Surplus Balances (Table III-3)	(1,507,978)	(1,789,864)	
c. New Entrant Liability Balances (Table III-4)	3,027,801	3,550,768	
d. UAL Portion of CPB Surcharge (Table IV-2)	34,937,433	44,533,948	
e. UAL Portion of CPB to ACPS Surcharge (Table IV-2)	139,283,668	142,904,381	
f. UAL Portion of Noncontributory to ACPS Surcharge (Table IV-2)	<u>6,355,380</u>	<u>6,630,963</u>	
g. Total Assigned Liability Balances	\$ 216,201,732	\$ 234,508,979	(7.81)%
6. Pooled Unfunded Actuarial Accrued Liability (3-5g)	522,358,571	494,345,461	
7. Outstanding Balance of Previously Amortized Bases	<u>0</u>	<u>0</u>	
8. Current Year Amortization Base (6-7)	\$ 522,358,571	\$ 494,345,461	5.67%
9. Sum of Pooled Unfunded Amortization Payments	27,110,392	21,074,890	28.64%
10. Total Projected Payroll	\$ 1,117,653,096	\$ 1,091,022,868	2.44%
11. UAL Amortization Rate	2.42%	1.95%	
12. Employer Normal Cost			
a. Pension System Employer Normal Cost	\$ 39,176,209	\$ 38,555,688	
b. Retirement System Normal Cost (Table IV-2)	201,506	220,948	
c. CPB Normal Cost Surcharge (Table IV-2)	8,856,821	8,641,349	
d. CPB to ACPS Normal Cost Surcharge (Table IV-2)	(3,525,011)	(3,439,300)	
e. Noncontributory to ACPS normal cost surcharge (Table IV-2)	<u>53,262</u>	<u>52,846</u>	
f. Employer Normal Cost After Adjustment (a-b-c-d-e)	\$ 33,589,631	\$ 33,079,845	1.54%
13. Employer Normal Cost Adjusted for Timing	\$ 34,114,566	\$ 33,604,954	
14. Employer Normal Cost Rate	3.05%	3.08%	
15. Basic Employer Cost Rate (11+ 14)	5.47%	5.03%	

<sup>#</sup> Retiree benefit amounts include the cost-of-living adjustment granted July 1, 2017 and July 1, 2016, respectively.

# Contributions

**Table IV-2  
Surcharges  
Employees' Combined System**

	Actuarial Valuation Performed	
	June 30, 2017 (for FY 2019)	June 30, 2016 (for FY 2018)
<b>Normal Cost Surcharges</b>		
1. Retirement System Payroll	\$ 4,030,122	\$ 4,418,951
2. Retirement System Normal Cost Surcharge Rate	5.00%	5.00%
3. Retirement System Normal Cost Surcharge Amount	\$ 201,506	\$ 220,948
4. Payroll for Municipals Under CPB	\$ 885,682,139	\$ 864,134,946
5. CPB Normal Cost Surcharge Rate	1.00%	1.00%
6. CPB Normal Cost Surcharge Amount	\$ 8,856,821	\$ 8,641,349
7. Payroll for Municipals Going from CPB to ACPS	\$ 881,252,841	\$ 859,825,052
8. CPB to ACPS Normal Cost Surcharge Rate	(0.40%)	(0.40%)
9. CPB to ACPS Normal Cost Surcharge Amount	\$ (3,525,011)	\$ (3,439,300)
10. Payroll for Noncontributory ACPS	\$ 8,876,928	\$ 8,807,690
11. CPB to ACPS Normal Cost Surcharge Rate	0.60%	0.60%
12. CPB to ACPS Normal Cost Surcharge Amount	\$ 53,262	\$ 52,846
<b>Unfunded Liability Surcharges</b>		
1. Payroll for Municipals Under CPB	\$ 885,682,139	\$ 864,134,946
2. CPB UAL Surcharge Rate	1.42%	1.42%
3. Amortization Factor*	2.777952	3.629287
4. CPB UAL Surcharge Amount	\$ 34,937,433	\$ 44,533,948
5. Payroll for Municipals Going from CPB to ACPS	\$ 881,252,841	\$ 859,825,052
6. CPB to ACPS UAL Surcharge Rate	1.51%	1.51%
7. Amortization Factor**	10.467012	11.006735
8. CPB to ACPS UAL Surcharge Amount	\$ 139,283,668	\$ 142,904,381
9. Payroll for Noncontributory ACPS	\$ 8,876,928	\$ 8,807,690
10. CPB to ACPS UAL Surcharge Rate	6.84%	6.84%
11. Amortization Factor**	10.467012	11.006735
12. CPB to ACPS UAL Surcharge Amount	\$ 6,355,380	\$ 6,630,963

\* The remaining amortization period is 3 years in 2017 and 4 years in 2016.

\*\* The remaining amortization period is 14 years in 2017 and 15 years in 2016.

# Contributions

**TABLE IV-3**  
**Detailed Actuarial Information**  
**LEOPS**

	<b>Actuarial Valuation Performed</b>		<b>% Change</b>
	<b>June 30, 2017</b> <b>(for FY 2019)</b>	<b>June 30, 2016</b> <b>(for FY 2018)</b>	
<b>A. Demographic Information</b>			
Number of:			
Active Members	1,010	952	6.09%
Retired Members and Beneficiaries	414	377	9.81%
Vested Deferred Members	105	100	5.00%
Annual Salaries of Active Members	\$ 59,734,705	\$ 54,299,302	10.01%
Annual Retirement Allowance for Retired Members and Beneficiaries <sup>#</sup>	\$ 14,932,854	\$ 13,431,908	11.17%
<b>B. Actuarial Results</b>			
1. Entry Age Actuarial Accrued Liability	\$ 409,710,134	\$ 369,959,119	10.74%
2. Actuarial Value of Assets	\$ 267,577,071	\$ 242,026,880	10.56%
3. Funded Ratio	65.31%	65.42%	
4. Unfunded Actuarial Accrued Liability (1-2)	\$ 142,133,063	\$ 127,932,239	11.10%
5. New Entrant Liability Balances (Table III-5)	<u>(11,734,679)</u>	<u>(10,432,220)</u>	(12.48)%
6. Pooled Unfunded Actuarial Accrued Liability (4-5)	\$ 153,867,742	\$ 138,364,459	11.20%
7. Amortization Factors*	14.228785	14.616742	
8. Unfunded Amortization Payment	\$ 10,813,836	\$ 9,466,163	14.24%
9. Total Projected Payroll	\$ 60,668,232	\$ 55,161,250	9.98%
10. UAL Amortization Rate	17.40%	16.71%	
11. Employer Normal Cost	\$ 8,380,779	\$ 7,623,622	
12. Employer Normal Cost Adjusted for Timing	\$ 8,511,753	\$ 7,744,639	9.91%
13. Employer Normal Cost Rate	14.03%	14.04%	
14. Basic Employer Cost Rate (10 + 13)	31.43%	30.75%	

\* The remaining amortization period is 22 years in 2017 and 23 years in 2016.

<sup>#</sup> Retiree benefit amounts include the cost-of-living adjustment granted July 1, 2017 and July 1, 2016, respectively.



# Contributions

**TABLE IV-4**  
**Detailed Actuarial Information**  
**Correctional Officers' Retirement System**

	Actuarial Valuation Performed		
	June 30, 2017 (for FY 2019)	June 30, 2016 (for FY 2018)	% Change
<b>A. Demographic Information</b>			
Number of:			
Active Members	96	93	3.23%
Retired Members and Beneficiaries	32	29	10.34%
Vested Deferred Members	4	1	300.00%
Annual Salaries of Active Members	\$ 5,261,521	\$ 4,954,236	6.20%
Annual Retirement Allowance for Retired Members and Beneficiaries <sup>#</sup>	\$ 830,653	\$ 786,075	5.67%
<b>B. Actuarial Results</b>			
1. Entry Age Actuarial Accrued Liability	\$ 24,156,563	\$ 22,401,138	7.84%
2. Actuarial Value of Assets	\$ 23,112,127	\$ 21,709,395	6.46%
3. Funded Ratio	95.68%	96.91%	
4. Unfunded Actuarial Accrued Liability (1-2)	\$ 1,044,436	\$ 691,743	50.99%
5. New Entrant Liability Balances (Table III-6)	-	-	
6. Pooled Unfunded Actuarial Accrued Liability (4-5)	\$ 1,044,436	\$ 691,743	50.99%
7. Amortization Factors*	16.640877	16.931863	
8. Unfunded Amortization Payment	\$ 62,763	\$ 40,855	53.62%
9. Total Projected Payroll	\$ 5,343,747	\$ 5,032,880	6.18%
10. UAL Amortization Rate	1.22%	0.78%	
11. Employer Normal Cost	\$ 454,069	\$ 433,496	
12. Employer Normal Cost Adjusted for Timing	\$ 461,165	\$ 440,377	4.72%
13. Employer Normal Cost Rate	8.63%	8.75%	
14. Basic Employer Cost Rate (10 + 13)	9.85%	9.53%	

\* The remaining amortization period is 29 years in 2017 and 30 years in 2016.

<sup>#</sup> Retiree benefit amounts include the cost-of-living adjustment granted July 1, 2017 and July 1, 2016, respectively.

## **APPENDIX A**

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### **MEMBERSHIP INFORMATION**

# Membership Information

## June 30, 2017

The State Retirement Agency provided the actuary with all necessary membership data. This information was gathered as of June 30, 2017.

In this section we present a review of the current membership statistics. First, we summarize the membership count, payroll and benefits by status and system. Following this summary, active membership distributions are examined by age and service.

## Membership Information June 30, 2017

		Active Members		Retirees and Beneficiaries					Vested Former Members (Includes Inactives)	Total
		Number	Salary	Number	Benefits#	Avg. Monthly Benefit	Avg. Age	Avg. Age at Ret.*	Number	Number
Employees' Retirement	Total	66	\$ 4,030,122							
	Vested	66	\$ 4,030,122							
	Non-vested	0	\$ -	3,004	\$ 61,635,718	\$ 1,710	78.7	59.8	25	3,095
Employees' Pension	Total	24,406	\$ 1,096,425,185							
	Vested	14,877	\$ 751,400,199							
	Non-vested	9,529	\$ 345,024,986	14,680	\$ 180,114,435	\$ 1,022	70.0	63.2	6,825	45,911
LEOPS	Total	1,010	\$ 59,734,705							
	Vested	676	\$ 43,663,691							
	Non-vested	334	\$ 16,071,014	414	\$ 14,932,854	\$ 3,006	56.0	52.4	105	1,529
CORS	Total	96	\$ 5,261,521							
	Vested	61	\$ 3,612,099							
	Non-vested	35	\$ 1,649,422	32	\$ 830,653	\$ 2,163	59.4	56.7	4	132
Total Systems	Total	25,578	\$ 1,165,451,533							
	Vested	15,680	\$ 802,706,111							
	Non-vested	9,898	\$ 362,745,422	18,130	\$ 257,513,660	\$ 1,184	71.1	62.4	6,959	50,667

\* Includes normal and early service retirees only.

# Retiree benefit amounts include the cost-of-living adjustment granted July 1, 2017.

## Membership Information June 30, 2017

Maryland State Retirement and Pension System Active Membership Statistics June 30, 2017				
System	Number	Average Age	Average Service	Average Salary
Employees' Retirement	66	63.1	40.6	\$61,062
Employees' Pension	24,406	49.2	10.8	44,924
Employees' Combined System	24,472	49.3	10.9	44,968
LEOPS – Municipal	1,010	39.1	10.7	59,143
CORS	96	40.9	9.5	54,808
<b>TOTAL SYSTEMS</b>	<b>25,578</b>	<b>48.8</b>	<b>10.9</b>	<b>\$45,565</b>

### Active Membership by PGU Type

	PGU Count	Member Count	Payroll	Avg. Age	Avg. Srv.
<b>Board of Education (w. ECS employees)</b>	<b>19</b>	12,716	\$ 495,975,966	50.3	11.3
<b>City/Town Govt.</b>	<b>58</b>	3,319	161,869,296	46.0	11.2
<b>Community College</b>	<b>9</b>	846	36,704,499	48.1	9.6
<b>County Agency/Authority</b>	<b>14</b>	577	21,777,336	46.9	8.4
<b>County Govt.</b>	<b>16</b>	7,631	431,310,541	47.8	12.7
<b>Library</b>	<b>6</b>	145	6,281,227	47.6	8.2
<b>Other</b>	<b>10</b>	344	11,532,668	50.6	12.4
<b>Total</b>	<b>132</b>	25,578	\$ 1,165,451,533	48.8	11.6

# Membership Information

## June 30, 2017

Location Code	PGU Type	Name	Plans
6504	Comm College	ALLEGANY COMMUNITY COLLEGE	ACPB, RCPB
6502	Board of Ed.	ALLEGANY COUNTY BOARD OF EDUCATION	ACPB, RCPB
6511	County	ALLEGANY COUNTY COMMISSIONERS	ERS, ACPB, RCPB, LEOPS
6530	County	ALLEGANY COUNTY COMMISSIONERS	ACPB, RCPB
6506	Library	ALLEGANY COUNTY LIBRARY	ACPB
6604	Comm College	ANNE ARUNDEL COMMUNITY COLLEGE	ACPB, RCPB
6602	Board of Ed.	ANNE ARUNDEL COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
6628	Other	ANNE ARUNDEL COUNTY ECONOMIC OPPORTUNITY COMMITTEE, INC.	NCPB
6732	City/Town	BALTIMORE METROPOLITAN COUNCIL	ACPB
7527	City/Town	BURGESS & COMM OF MIDDLETOWN	ECPB
7526	City/Town	BURGESS & COMM OF WALKERSVILLE	ACPB, RCPB
6902	Board of Ed.	CALVERT COUNTY BOARD OF EDUCATION	ACPB, RCPB
7002	Board of Ed.	CAROLINE COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
7030	Other	CAROLINE COUNTY SHERIFFS	NCPB, LEOPS
7102	Board of Ed.	CARROLL COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
7106	Library	CARROLL COUNTY PUBLIC LIBRARY	ACPB, RCPB
7127	Co Agency	CARROLL SOIL CONSERVATION DISTRICT	ACPB, RCPB
7202	Board of Ed.	CECIL COUNTY BOARD OF EDUCATION	ACPB, RCPB
7211	County	CECIL COUNTY COMMISSION	ERS, ACPB, RCPB
7206	Library	CECIL COUNTY LIBRARY	ACPB, RCPB
7304	Comm College	CHARLES COUNTY COMMUNITY COLLEGE	ERS, ACPB, RCPB
6626	City/Town	CHESAPEAKE BAY COMMISSION	ACPB, RCPB
6625	City/Town	CITY OF ANNAPOLIS	ACPB, RCPB
7425	City/Town	CITY OF CAMBRIDGE	ACPB, RCPB, LEOPS
8143	City/Town	CITY OF COLLEGE PARK	ACPB, RCPB
8426	City/Town	CITY OF CRISFIELD	NCPB
6526	City/Town	CITY OF CUMBERLAND (NCPS)	ERS, ACPB, RCPB
6531	City/Town	CITY OF CUMBERLAND-POLICE DEPT.	LEOPS
6536	City/Town	CITY OF FROSTBURG	ECPB
8727	City/Town	CITY OF FRUITLAND	ACPB, RCPB, LEOPS
8125	City/Town	CITY OF GREENBELT	ERS, ACPB, RCPB, LEOPS
8625	City/Town	CITY OF HAGERSTOWN	ERS, ACPB, RCPB
8126	City/Town	CITY OF HYATTSVILLE	ACPB, RCPB, LEOPS
8129	City/Town	CITY OF NEW CARROLLTON	ERS, ACPB, RCPB
8825	City/Town	CITY OF POCOMOKE	ACPB, RCPB, LEOPS
8725	City/Town	CITY OF SALISBURY	ERS, ACPB, RCPB, LEOPS
8030	City/Town	CITY OF TAKOMA PARK	ERS, ACPB, RCPB
7125	City/Town	CITY OF WESTMINSTER	ERS, ACPB, RCPB, LEOPS
8525	City/Town	COMMISSIONERS OF ST MICHAELS	ACPB, RCPB
7529	City/Town	COMMISSIONERS OF THURMONT	ACPB, RCPB
7880	Co Agency	COMMUNITY ACTION AGENCY OF HOWARD COUNTY	ACPB, RCPB
8132	City/Town	DISTRICT HEIGHTS	ACPB, RCPB
7402	Board of Ed.	DORCHESTER COUNTY BOARD OF EDUCATION	ACPB, RCPB
7411	County	DORCHESTER COUNTY COMMISSION	ERS, ACPB, RCPB, LEOPS
7412	County	DORCHESTER COUNTY ROADS	ACPB, RCPB
7480	Co Agency	DORCHESTER COUNTY SANITARY COMMISSION (Effective 7/1/2015)	ACPB, RCPB
8728	Library	EASTERN SHORE REGIONAL LIBRARY INC	ACPB, RCPB
7502	Board of Ed.	FREDERICK COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
7528	Co Agency	FREDERICK COUNTY SOIL CONSERVATION (NCPS)	ACPB, RCPB
7602	Board of Ed.	GARRETT COUNTY BOARD OF EDUCATION	ACPB, RCPB
7611	County	GARRETT COUNTY COMMISSION	NCPB
7680	Co Agency	GARRETT COUNTY COMMUNITY ACTION COMMITTEE INC	ACPB, RCPB
7612	Other	GARRETT COUNTY ROADS	ERS, NCPB
8604	Comm College	HAGERSTOWN COMMUNITY COLLEGE	ACPB, RCPB
7702	Board of Ed.	HARFORD COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
7704	Comm College	HARFORD COUNTY COMMUNITY COLLEGE	ERS, ACPB, RCPB
7711	County	HARFORD COUNTY GOVERNMENT	ERS, ACPB, RCPB, LEOPS
7706	Library	HARFORD COUNTY PUBLIC LIBRARY	ACPB, RCPB
6533	County	HOUSING AUTHORITY OF ALLEGANY COUNTY	ACPB, RCPB
7426	City/Town	HOUSING AUTHORITY OF CAMBRIDGE	ACPB
8427	Other	HOUSING AUTHORITY OF CRISFIELD	NCPB
7804	Comm College	HOWARD COMMUNITY COLLEGE	ACPB, RCPB
7802	Board of Ed.	HOWARD COUNTY BOARD OF EDUCATION	ACPB, RCPB
7902	Board of Ed.	KENT COUNTY BOARD OF EDUCATION	ACPB, RCPB
7911	County	KENT COUNTY GOVT	ACPB, RCPB, LEOPS
7927	Co Agency	KENT SOIL AND WATER CONSERVATION DISTRICT	ACPB, RCPB

# Membership Information

## June 30, 2017

Location Code	PGU Type	Name	Plans
8127	City/Town	MAYOR & COUNCIL CITY OF MT RAINIER	ACPB, RCPB
7525	County	MAYOR AND CITY COUNCIL OF BRUNSWICK	ACPB, RCPB
7427	City/Town	MAYOR AND COUNCIL OF HURLOCK	ACPB, RCPB, LEOPS
6731	Other	MD HEALTH AND HIGHER EDUCATIONAL FACILITIES AUTHORITY	ACPB, RCPB
8004	Comm College	MONTGOMERY COLLEGE	ACPB, RCPB
8925	Other	NORTHEAST MD WASTE DISPOSAL AUTHORITY (NCPS)	ACPB, RCPB
8104	Comm College	PRINCE GEORGES COMMUNITY COLLEGE	ACPB, RCPB
8102	Board of Ed.	PRINCE GEORGES COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
8135	Other	PRINCE GEORGES COUNTY CROSSING GUARDS	NCPB
8111	County	PRINCE GEORGES COUNTY GOVERNMENT	ERS, NCPB
8106	Library	PRINCE GEORGES COUNTY MEMORIAL LIBRARY	ERS, ACPB, RCPB
8202	Board of Ed.	QUEEN ANNES COUNTY BOARD OF EDUCATION	ACPB, RCPB
8211	County	QUEEN ANNES COUNTY COMMISSIONERS	ACPB, RCPB, LEOPS
8780	Other	SHORE UP! INC	ACPB, RCPB
8425	Co Agency	SOMERSET CO SANITARY DISTRICT INC	ACPB, RCPB
8402	Board of Ed.	SOMERSET COUNTY BOARD OF EDUCATION	ACPB, RCPB
8411	County	SOMERSET COUNTY COMMISSIONERS	ACPB, RCPB
8429	Co Agency	SOMERSET COUNTY ECONOMIC DEVELOPMENT COMMISSION	ACPB
7380	Co Agency	SOUTHERN MARYLAND TRI-COUNTY COMMUNITY ACTION COMMITTEE INC	ACPB, RCPB
8302	Board of Ed.	ST MARYS COUNTY BOARD OF EDUCATION	ERS, ACPB, RCPB
8311	County	ST MARYS COUNTY COMMISSIONERS	ERS, ACPB, RCPB
8333	Co Agency	ST MARY'S COUNTY HOUSING AUTHORITY	ACPB, RCPB
8327	Co Agency	ST MARY'S METROPOLITON COMMISSION	ACPB, RCPB
8502	Board of Ed.	TALBOT COUNTY BD OF EDUCATION	ACPB, RCPB
8511	County	TALBOT COUNTY COUNCIL	ERS, ACPB, RCPB
8827	City/Town	TOWN OF BERLIN	ACPB, RCPB
8140	City/Town	TOWN OF BERWYN HEIGHTS	ACPB, RCPB
8139	City/Town	TOWN OF BLADENSBURG	ACPB, RCPB
8137	City/Town	TOWN OF BOWIE	LEOPS
8226	City/Town	TOWN OF CENTREVILLE	RCPB
7925	City/Town	TOWN OF CHESTERTOWN	ACPB, RCPB, LEOPS
8134	City/Town	TOWN OF CHEVERLY	ACPB, RCPB
7026	City/Town	TOWN OF DENTON	ACPB, RCPB
8142	City/Town	TOWN OF EDMONSTON	ACPB, RCPB
7225	City/Town	TOWN OF ELKTON	NCPB
7531	City/Town	TOWN OF EMMITSBURG	ECPB
7028	City/Town	TOWN OF FEDERALSBURG	ACPB, RCPB
7029	City/Town	TOWN OF GREENSBORO	ACPB, RCPB
7130	City/Town	TOWN OF HAMPSTEAD	LEOPS
8138	City/Town	TOWN OF LANDOVER HILLS	ACPB, RCPB
7326	City/Town	TOWN OF LAPLATA	ACPB, RCPB
7126	City/Town	TOWN OF MANCHESTER	ERS, ACPB, RCPB
8144	City/Town	TOWN OF MORNINGSIDE	RCPB
7129	City/Town	TOWN OF MT. AIRY	ACPB, RCPB
6925	City/Town	TOWN OF NORTH BEACH	NCPB
7625	City/Town	TOWN OF OAKLAND	ACPB, RCPB
8528	City/Town	TOWN OF OXFORD	ACPB, RCPB
7025	City/Town	TOWN OF PRESTON	ACPB, RCPB
8428	City/Town	TOWN OF PRINCESS ANNE	ACPB, RCPB, LEOPS
8225	City/Town	TOWN OF QUEENSTOWN	ACPB, RCPB
7027	City/Town	TOWN OF RIDGELY	ACPB, RCPB
7926	City/Town	TOWN OF ROCKHALL	ACPB, RCPB
8826	City/Town	TOWN OF SNOW HILL	ACPB, RCPB
7131	City/Town	TOWN OF SYKESVILLE	RCPB
7128	City/Town	TOWN OF TANEYTOWN	ECPB, LEOPS
8141	City/Town	TOWN OF UNIVERSITY PARK	ACPB, RCPB
8131	City/Town	TOWN OF UPPER MARLBORO	ACPB, RCPB
8834	Co Agency	TRI-COUNTY COUNCIL FOR LOWER EASTERN SHORE	ACPB, RCPB
6534	Co Agency	TRI-COUNTY COUNCIL FOR WESTERN MARYLAND INC.	ACPB, RCPB
8618	Other	WASH CO BD OF LICENSE COMM	ACPB, RCPB
8602	Board of Ed.	WASHINGTON COUNTY BOARD OF EDUCATION	ACPB, RCPB
8610	Other	WASHINGTON COUNTY LIBRARY JANITORS	ACPB, RCPB
8802	Board of Ed.	WORCESTER COUNTY BOARD OF EDUCATION	ACPB, RCPB
8811	County	WORCESTER COUNTY GOVERNMENT	ACPB, RCPB, CORS, LEOPS
8816	Co Agency	WORCESTER COUNTY LIQUOR CONTROL BOARD	ACPB, RCPB
8704	Comm College	WOR-WIC COMMUNITY COLLEGE	ACPB, RCPB

## **APPENDIX B**

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### **ACTUARIAL ASSUMPTIONS AND METHODS**



# Actuarial Assumptions and Methods

## A. Actuarial Assumptions

Actuarial assumptions were developed in connection with a study of 2010-2014 experience in the Experience Study report dated May 21, 2015, which includes the rationale for the assumptions. The assumptions were adopted by the Board on May 21, 2015. New economic assumptions were adopted by the Board for the 2017 valuation on July 18, 2017. Actuarial assumptions are based on a combination of future expectations and historical data. Specific assumptions are shown below.

	1. Valuation Interest Rate	2. Annual Rate of Increase in Cost of			3. Aggregate Payroll Growth
		Service Before 7/1/11	Service After 7/1/11		
Employees' Retirement	7.50%	2.65%	2.65%	*	3.15%
Employees' Pension	7.50%	2.26%	1.47%	**,***	3.15%
LEOPS	7.50%	2.26%	1.47%	**,***,#	3.15%
Correctional Officers' Retirement System	7.50%	2.65%	1.47%	***	3.15%

\* A rate of 2.26% is applicable for members with a COLA cap of 3%, a rate of 2.63% is applicable for members with a COLA cap of 5%, and a 2.65% COLA is applicable for members with no COLA cap.

\*\* A 2.26% simple rate is applicable for municipal members of these Systems, who do not elect to be covered under the Contributory plan.

\*\*\* For benefits attributable to service on or after July 1, 2011, a 1.47% COLA was assumed. The increase is capped at the lesser of 2.5% and increase in CPI if the most recent calendar year market value rate of return was greater than or equal to the assumed rate (currently 7.50% as approved by the Board of Trustees). The increase is capped at the lesser of 1% and increase in CPI if the market value return was less than the assumed rate of 7.50%.

# For groups whose COLA is capped at 5%, a 2.63% COLA was assumed. A 2.65% COLA was assumed for groups with an unlimited COLA.

The valuation interest rate is net of investment expenses. Administrative expenses are assumed to be paid directly by employers external to the plan assets. Price inflation is assumed to be 2.65% and wage inflation (i.e., aggregate payroll growth) is assumed to be 3.15%.

## Actuarial Assumptions and Methods

### A. Actuarial Assumptions, cont.

Years of Service	3. Annual Rates of Salary Increases for First 10 Years of Service			
	Employees' Retirement	Employees' Pension	LEOPS	Correctional Officers
0	6.15%	6.15%	7.15%	8.90%
1	6.40%	6.40%	6.90%	7.15%
2	5.90%	5.90%	6.15%	3.40%
3	4.90%	4.90%	4.65%	3.40%
4	4.40%	4.40%	4.65%	3.40%
5	4.40%	4.40%	4.40%	3.90%
6	4.40%	4.40%	4.40%	3.90%
7	4.40%	4.40%	4.15%	3.65%
8	4.15%	4.15%	4.15%	3.40%
9	4.15%	4.15%	4.15%	3.40%

3. Annual Rates of Salary Increases for Sample Ages with 10 or More Years of Service				
Age	Employees' Retirement	Employees' Pension	LEOPS	Correctional Officers
25	4.40%	4.40%	4.15%	4.15%
30	4.15%	4.15%	4.15%	3.90%
35	3.90%	3.90%	4.15%	3.65%
40	3.90%	3.90%	3.90%	3.65%
45	3.65%	3.65%	3.90%	3.65%
50	3.40%	3.40%	3.65%	3.15%
55	3.40%	3.40%	3.15%	3.15%
60	3.15%	3.15%	3.15%	3.15%
65	3.15%	3.15%	3.15%	3.15%

## Actuarial Assumptions and Methods

### A. Actuarial Assumptions, cont.

Sample Ages	Years of Service	4. Annual Rates of Withdrawal							
		Employees' Retirement		Employees' Pension		LEOPS		Correctional Officers	
		Male	Female	Male	Female	Male	Female	Male	Female
All	0	21.00%	20.00%	21.00%	20.00%	17.00%	17.00%	16.00%	18.00%
	1	15.00%	15.00%	15.00%	15.00%	10.00%	10.00%	12.00%	16.00%
	2	13.00%	13.00%	13.00%	13.00%	8.50%	8.50%	9.00%	12.00%
	3	10.50%	11.00%	10.50%	11.00%	7.00%	7.00%	8.00%	10.00%
	4	8.50%	9.00%	8.50%	9.00%	6.00%	6.00%	6.00%	10.00%
	5	7.25%	6.50%	7.25%	6.50%	5.50%	5.50%	5.50%	8.50%
	6	6.50%	6.00%	6.50%	6.00%	5.00%	5.00%	5.00%	8.00%
	7	5.50%	5.25%	5.50%	5.25%	4.50%	4.50%	4.00%	7.00%
	8	5.00%	4.75%	5.00%	4.75%	3.50%	3.50%	3.50%	6.00%
	9	4.50%	4.00%	4.50%	4.00%	3.50%	3.50%	3.50%	5.00%
25	10 & Over	4.00%	4.00%	4.00%	4.00%	3.50%	3.50%	3.00%	3.75%
30		3.50%	4.00%	3.50%	4.00%	2.50%	2.50%	3.00%	3.75%
35		2.75%	3.25%	2.75%	3.25%	2.00%	2.00%	3.00%	3.75%
40		2.25%	2.50%	2.25%	2.50%	1.75%	1.75%	3.00%	3.75%
45		2.00%	2.25%	2.00%	2.25%	1.75%	1.75%	3.00%	3.75%
50		2.00%	2.00%	2.00%	2.00%	1.75%	1.75%	3.00%	3.75%
55		2.00%	2.00%	2.00%	2.00%	1.75%	1.75%	3.00%	3.75%
60	2.00%	2.00%	2.00%	2.00%	1.75%	1.75%	3.00%	3.75%	
65	2.00%	2.00%	2.00%	2.00%	1.75%	1.75%	3.00%	3.75%	

*For active members of Employees' Retirement (Regular) and Pension Systems, the probability of electing a refund upon withdrawal (if eligible for a vested benefit) is 15% upon first becoming vested, grading down to 0% upon reaching first eligibility for retirement. Active members that terminate from the other Systems that are eligible for a deferred vested benefit are assumed to leave their contributions in the plan and 100 percent are assumed to elect a deferred benefit.*

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

### Rates of Mortality

	Healthy Retiree (Non-Disabled) Mortality Assumption			Pre-Retirement Mortality Assumption	
	RP-2014 Healthy Annuitant Mortality Tables with Generational Projection Using MP-2014		Future Life Expectancy Age 65 (Birth Year 1952)	RP-2014 Employee Mortality Tables with Generational Projection Using MP-2014	
	<u>Collar</u>	<u>Year Projected to in 2014</u>	<u>Life Expectancy</u>	<u>Collar</u>	<u>Year Projected to in 2014</u>
<b>Employees' Combined System</b>					
<b>Male</b>	Male Blue Collar Annuitant Table	2010	20.18	Male Blue Collar Employee Table	2014
<b>Female</b>	Female Blue Collar Annuitant Table	2012	23.12	Female Blue Collar Employee Table	2014
<b>LEOPS</b>					
<b>Male</b>	Male Combined Annuitant Table	2014	21.85	Male Combined Employee Table	2014
<b>Female</b>	Female Combined Annuitant Table	2014	24.04	Female Combined Employee Table	2014
<b>CORS</b>					
<b>Male</b>	Male White Collar Annuitant Table	2012	20.18	Male White Collar Employee Table	2014
<b>Female</b>	Female White Collar Annuitant Table	2016	23.12	Female White Collar Employee Table	2014

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

### Rates of Mortality

Disabled Mortality Assumption			
	RP-2014 Disabled Annuitant Mortality Tables with no projection (static tables)		Future Life Expectancy Age 65 (Birth Year 1952)
	<u>Collar</u>	<u>Set Forward</u>	<u>Life Expectancy</u>
<b>Employees' Combined System</b>			
Male	Male Disabled Annuitant Table	2	13.85
Female	Female Disabled Annuitant Table	3	15.55
<b>CORS</b>			
Male	Male Disabled Annuitant Table	2	13.85
Female	Female Disabled Annuitant Table	3	15.55
	RP-2014 Healthy Annuitant Mortality Tables with Generational Projection Using MP-2014		Future Life Expectancy Age 65 (Birth Year 1952)
	<u>Collar</u>	<u>Year Projected to in 2014</u>	<u>Life Expectancy</u>
<b>LEOPS</b>			
Male	Male Blue Collar Annuitant Table	2014	20.80
Female	Female Blue Collar Annuitant Table	2014	23.48

## Actuarial Assumptions and Methods

### A. Actuarial Assumptions, cont.

5. Actuarial Present Value of \$1 Monthly for Life (without COLA) - Healthy Members								
Sample Ages in 2017	Employees' Retirement		Employees' Pension		LEOPS		Correctional Officers	
	Male	Female	Male	Female	Male	Female	Male	Female
50	143.23	148.08	143.23	148.08	145.40	149.30	143.23	148.08
55	136.36	142.32	136.36	142.32	139.28	143.93	136.36	142.32
60	127.82	134.87	127.82	134.87	131.65	136.85	127.82	134.87
65	117.16	125.35	117.16	125.35	122.03	127.75	117.16	125.35
70	104.47	113.56	104.47	113.56	110.16	116.40	104.47	113.56
75	89.88	99.64	89.88	99.64	95.93	102.78	89.88	99.64
80	74.01	84.04	74.01	84.04	79.79	87.15	74.01	84.04

5. Future Life Expectancy (Years) - Healthy Members								
Sample Ages in 2017	Employees' Retirement		Employees' Pension		LEOPS		Correctional Officers	
	Male	Female	Male	Female	Male	Female	Male	Female
50	33.81	37.40	33.81	37.40	35.59	38.44	33.81	37.40
55	29.05	32.48	29.05	32.48	30.82	33.50	29.05	32.48
60	24.51	27.71	24.51	27.71	26.25	28.69	24.51	27.71
65	20.18	23.12	20.18	23.12	21.85	24.04	20.18	23.12
70	16.17	18.78	16.17	18.78	17.69	19.62	16.17	18.78
75	12.52	14.78	12.52	14.78	13.82	15.52	12.52	14.78
80	9.32	11.22	9.32	11.22	10.34	11.82	9.32	11.22

## Actuarial Assumptions and Methods

### A. Actuarial Assumptions, cont.

5. Actuarial Present Value of \$1 Monthly for Life (without COLA) - Disabled Members								
Sample Ages	Employees' Retirement		Employees' Pension		LEOPS		Correctional Officers	
	Male	Female	Male	Female	Male	Female	Male	Female
50	116.82	126.71	116.82	126.71	144.11	148.44	116.82	126.71
55	110.86	120.13	110.86	120.13	137.38	142.80	110.86	120.13
60	103.44	111.85	103.44	111.85	129.08	135.54	103.44	111.85
65	94.29	101.53	94.29	101.53	118.80	126.21	94.29	101.53
70	83.56	89.57	83.56	89.57	106.54	114.58	83.56	89.57
75	71.64	76.80	71.64	76.80	92.24	100.79	71.64	76.80
80	59.01	64.02	59.01	64.02	76.46	85.30	59.01	64.02

5. Future Life Expectancy (Years) - Disabled Members								
Sample Ages	Employees' Retirement		Employees' Pension		LEOPS		Correctional Officers	
	Male	Female	Male	Female	Male	Female	Male	Female
50	21.82	25.28	21.82	25.28	34.50	37.77	21.82	25.28
55	19.17	22.00	19.17	22.00	29.71	32.85	19.17	22.00
60	16.51	18.74	16.51	18.74	25.14	28.08	16.51	18.74
65	13.85	15.55	13.85	15.55	20.80	23.48	13.85	15.55
70	11.29	12.55	11.29	12.55	16.75	19.11	11.29	12.55
75	8.92	9.89	8.92	9.89	13.05	15.08	8.92	9.89
80	6.80	7.62	6.80	7.62	9.77	11.48	6.80	7.62

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

Accidental Death Mortality Rates		
LEOPS		
Sample Ages	Male	Female
20	0.0122%	0.0049%
25	0.0145%	0.0052%
30	0.0136%	0.0065%
35	0.0157%	0.0086%
40	0.0188%	0.0119%
45	0.0292%	0.0197%
50	0.0506%	0.0331%
55	0.0836%	0.0502%
60	0.1406%	0.0733%
65	0.2483%	0.1109%
70	0.4156%	0.1893%
75	0.6956%	0.3230%
80	1.1643%	0.5514%

An additional margin for future mortality improvements is included in the projection scale.

The RP-2014 tables used in the valuation were extended in order that no zero rates exist in the tables. For Annuitant tables, ages 1-17 were populated using RP-2014 Juvenile rates, ages 18-19 were populated with Employee rates, and ages 20-49 were derived using a cubic spline. For Employee tables, ages 1-17 were populated using RP-2014 Juvenile rates, ages 81-94 were derived using a cubic spline, and ages 95-120 were populated with Annuitant rates.



# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

6. Annual Rates of Disability																
Sample Ages	Employees' Retirement				Employees' Pension				LEOPS				Correctional Officers			
	Ordinary		Accidental		Ordinary		Accidental		Ordinary		Accidental		Ordinary		Accidental	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
25	0.02665%	0.02451%	0.00960%	0.00880%	0.12570%	0.07810%	0.04032%	0.02121%	0.17136%	0.51612%	0.32368%	0.62560%	0.12570%	0.11560%	0.10413%	0.16065%
30	0.02633%	0.02425%	0.01000%	0.00920%	0.16110%	0.07720%	0.04228%	0.02226%	0.21966%	0.55297%	0.34578%	0.55860%	0.16110%	0.12010%	0.12495%	0.16065%
35	0.04550%	0.04225%	0.01400%	0.01300%	0.20130%	0.13350%	0.05908%	0.03119%	0.27456%	0.55803%	0.42143%	0.54940%	0.20130%	0.20760%	0.15768%	0.16065%
40	0.08619%	0.07794%	0.01840%	0.01670%	0.26670%	0.24660%	0.07756%	0.03990%	0.36372%	0.65428%	0.48671%	0.56160%	0.26670%	0.38360%	0.19933%	0.17850%
45	0.10933%	0.11557%	0.01630%	0.01730%	0.35770%	0.36500%	0.06888%	0.04137%	0.48780%	0.79332%	0.53992%	0.56360%	0.35770%	0.56780%	0.24990%	0.20528%
50	0.13195%	0.16562%	0.01450%	0.01820%	0.51670%	0.62800%	0.06132%	0.04358%	0.65784%	0.98241%	0.75463%	0.72340%	0.51150%	0.81410%	0.35403%	0.26775%
55	0.17635%	0.22926%	0.01370%	0.01780%	0.73010%	0.80460%	0.05782%	0.04263%	0.65784%	0.98241%	0.98464%	1.12040%	0.65770%	1.12760%	0.43733%	0.37485%
60	0.23043%	0.31701%	0.01400%	0.01930%	0.74020%	0.90260%	0.05908%	0.04620%	0.65784%	0.98241%	1.21737%	1.98120%	0.80690%	1.55820%	0.43733%	0.37485%

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

Ages	7. Annual Rates of Normal Retirement													
	Employees' Retirement		Employees' Pension				LEOPS				Correctional Officers			
	All Years of Service		At Least 30 Years		Less Than 30 Years		At Least 25 Years		Less Than 25 Years		At Least 20 Years		Less Than 20 Years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
40							40.0%	40.0%			23.0%	23.0%		
41							40.0%	40.0%			18.0%	18.0%		
42							40.0%	40.0%			18.0%	18.0%		
43							40.0%	40.0%			16.0%	16.0%		
44							40.0%	40.0%			16.0%	16.0%		
45	17.0%	16.0%	12.0%	11.0%			36.0%	36.0%			15.0%	15.0%		
46	17.0%	16.0%	12.0%	11.0%			36.0%	36.0%			14.0%	14.0%		
47	17.0%	16.0%	12.0%	11.0%			36.0%	36.0%			14.0%	14.0%		
48	17.0%	16.0%	12.0%	11.0%			36.0%	36.0%			13.0%	13.0%		
49	17.0%	16.0%	12.0%	11.0%			36.0%	36.0%			13.0%	13.0%		
50	10.0%	11.0%	9.0%	11.0%			32.0%	32.0%	5.0%	5.0%	13.0%	13.0%		
51	10.0%	11.0%	9.0%	11.0%			32.0%	32.0%	5.0%	5.0%	12.0%	12.0%		
52	10.0%	11.0%	9.0%	11.0%			32.0%	32.0%	5.0%	5.0%	12.0%	12.0%		
53	10.0%	11.0%	9.0%	11.0%			20.0%	20.0%	5.0%	5.0%	12.0%	12.0%		
54	10.0%	11.0%	9.0%	11.0%			25.0%	25.0%	5.0%	5.0%	12.0%	12.0%		
55	11.0%	13.0%	9.0%	10.0%			23.0%	23.0%	5.0%	5.0%	12.0%	12.0%	4.5%	4.5%
56	11.0%	13.0%	9.0%	10.0%			23.0%	23.0%	5.0%	5.0%	11.0%	11.0%	4.5%	4.5%
57	11.0%	13.0%	9.0%	10.0%			23.0%	23.0%	5.0%	5.0%	11.0%	11.0%	4.5%	4.5%
58	11.0%	13.0%	9.0%	10.0%			23.0%	23.0%	5.0%	5.0%	11.0%	11.0%	4.5%	4.5%
59	11.0%	13.0%	9.0%	10.0%			18.0%	18.0%	5.0%	5.0%	11.0%	11.0%	4.5%	4.5%
60	13.0%	13.0%	10.0%	14.0%			23.0%	23.0%	8.0%	8.0%	11.0%	11.0%	4.5%	4.5%
61	15.0%	18.0%	13.0%	14.0%			23.0%	23.0%	8.0%	8.0%	13.0%	13.0%	4.5%	4.5%
62	27.0%	22.0%	25.0%	28.0%	16.0%	18.0%	30.0%	30.0%	15.0%	15.0%	30.0%	30.0%	12.0%	12.0%
63	23.0%	22.0%	23.0%	24.0%	13.0%	16.0%	30.0%	30.0%	15.0%	15.0%	30.0%	30.0%	12.0%	12.0%
64	19.0%	22.0%	18.0%	20.0%	13.0%	14.0%	30.0%	30.0%	15.0%	15.0%	20.0%	20.0%	12.0%	12.0%
65	20.0%	22.0%	17.0%	20.0%	13.0%	16.0%	50.0%	50.0%	50.0%	50.0%	30.0%	30.0%	12.0%	12.0%
66	25.0%	25.0%	25.0%	25.0%	18.0%	18.0%	50.0%	50.0%	50.0%	50.0%	30.0%	30.0%	25.0%	25.0%
67	25.0%	22.0%	25.0%	22.0%	16.0%	17.0%	50.0%	50.0%	50.0%	50.0%	30.0%	30.0%	20.0%	20.0%
68	18.0%	22.0%	18.0%	22.0%	14.0%	15.0%	50.0%	50.0%	50.0%	50.0%	30.0%	30.0%	20.0%	20.0%
69	18.0%	22.0%	18.0%	18.0%	14.0%	15.0%	50.0%	50.0%	50.0%	50.0%	30.0%	30.0%	20.0%	20.0%
70	20.0%	20.0%	22.0%	22.0%	16.0%	18.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
71	20.0%	20.0%	22.0%	20.0%	13.0%	15.0%								
72	20.0%	20.0%	22.0%	20.0%	13.0%	15.0%								
73	20.0%	20.0%	22.0%	20.0%	13.0%	15.0%								
74	20.0%	20.0%	22.0%	20.0%	13.0%	15.0%								
75 & Over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%								

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

Ages	7. Annual Rates of Early Retirement					
	Employees' Retirement		Employees' Pension			
	Male	Female	Non-Reformed		Reformed	
			Male	Female	Male	Female
40	5.0%	5.0%				
41	5.0%	5.0%				
42	5.0%	5.0%				
43	5.0%	5.0%				
44	5.0%	5.0%				
45	5.0%	5.0%				
46	5.0%	5.0%				
47	5.0%	5.0%				
48	5.0%	5.0%				
49	5.0%	5.0%				
50	5.0%	5.0%				
51	5.0%	5.0%				
52	5.0%	5.0%				
53	5.0%	5.0%				
54	5.0%	5.0%				
55	5.0%	5.0%	2.0%	2.0%		
56	5.0%	5.0%	1.5%	2.5%		
57	5.0%	5.0%	2.0%	2.5%		
58	5.0%	5.0%	2.0%	3.0%		
59	5.0%	5.0%	2.5%	3.0%		
60			4.0%	4.5%	9.5%	11.5%
61			6.0%	5.5%	6.0%	5.5%
62					6.5%	6.0%
63					7.0%	6.5%
64					7.5%	7.0%

Ages	8. Additional Rates to Add to Annual Rates of Normal Retirement at Age of First Eligibility			
	Employees' Pension Reformed			
	At Least 30 Years		Less Than 30 Years	
	Male	Female	Male	Female
55 and Under	35.0%	35.0%		
56	28.0%	28.0%		
57	21.0%	21.0%		
58	14.0%	14.0%		
59	7.0%	7.0%		
60	0.0%	0.0%		
61	0.0%	0.0%		
62	0.0%	0.0%		
63	0.0%	0.0%		
64	0.0%	0.0%		
65+	0.0%	0.0%	25.0%	25.0%

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, cont.

### 9. Social Security Covered Compensation

<b>Employees' Retirement</b>	Not applicable
<b>Employees' Pension</b>	Future covered compensation levels, used to estimate member contributions and retirement allowances, were calculated using a 3.15% per annum compounded increase in the 2017 Social Security Maximum Taxable Wage Base.
<b>LEOPS</b>	Future covered compensation levels, used to estimate member contributions and retirement allowances, were calculated using a 3.15% per annum compounded increase in the 2017 Social Security Maximum Taxable Wage Base.
<b>Correctional Officers' Retirement</b>	Not applicable

# Actuarial Assumptions and Methods

## A. Actuarial Assumptions, concluded

### 10. Retirement Age for Inactive Vested Participants

**Employees' Retirement**                      Age 60

**Employees' Pension**                      Age 55 if at least 15 years of eligibility service.  
Age 62 if less than 15 years of eligibility service.  
Age 60 if at least 15 years of eligibility service (hired after 6/30/11).  
Age 65 if less than 15 years of eligibility service (hired after 6/30/11).

**LEOPS**    Age 50

**Correctional Officers'  
Retirement**                                      Age 55

## Actuarial Assumptions and Methods

<b>Marriage Assumption:</b>	75% of males and females are assumed to be married for purposes of death-in-service benefits.
<b>Pay Increase Timing:</b>	Middle of (Fiscal) year. This is equivalent to assuming that reported pays represent the annualized rate of pay at the beginning of the (Fiscal) year.
<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 rounded integer service on the date the decrement is assumed to occur.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Decrement Operation:</b>	Mortality and disability operate during retirement eligibility.
<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. New entrant normal cost contributions are applied to the funding of new entrant benefits.
<b>Unused Sick Leave:</b>	Each member is assumed to have an additional 5 months of service at retirement attributable to sick leave.
<b>Unknown Data for Participants:</b>	Average characteristics of the group as a whole are used to fill in the unknown data.
<b>Age of Spouse:</b>	In the absence of complete data, females are assumed to be 4 years younger than males.
<b>Option Elections:</b>	It was assumed optional forms of payment were actuarially equivalent to the normal form of payment.
<b>Actuarial Equivalence:</b>	
ECS & CORS	5.85% interest, RP 2014 Combined Annuitant Mortality, 50% Unisex, 2.29% COLA pre-reform, 1.49% COLA post-reform.
LEOPS	5.85% interest, RP 2014 Combined Annuitant Mortality, 85% Unisex, 2.46% COLA pre-reform, 1.49% COLA post-reform.

## Actuarial Assumptions and Methods

### Liability Adjustments:

An additional liability was added to the aggregate results for Employees' Pension Systems to reflect that the past service benefits would be calculated based on the full time salary equivalent for part-time members. The additional liability amount is \$17,970,000 for EPS.

For LEOPS, the value of the DROP interest credits of 4% to 6% vs. the valuation interest rate of 7.50% was accounted for through the use of certain load factors as shown in the table below. The assumed length of time members would stay in the DROP was 4.73 years for LEOPS, based on the average projected DROP period of current DROP members in the data provided by the SRA.

<u>Load Applied to</u>	<u>Load Factor</u> <u>LEOPS</u>
Active Normal Retirement Decrement	0.9890
Liabilities for Members in the DROP	0.9924
DROP Account Balances	0.9276

# Actuarial Assumptions and Methods

## 1. Asset Valuation Method

All Systems use a method based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year-to-year. Under this method, the actuarial value of the assets reflects annually one-fifth of the market value gains for the five prior years. The resulting value is restricted to be not less than 80% of market value nor greater than 120% of market value. As of June 30, 2007, the calculation of market gains included the difference between market and actuarial assets as of June 30, 2006.

For the Employees' Retirement & Pension System and for LEOPS, assets must be allocated between State and Municipal Corporation members. Beginning July 1, 1984, this allocation is based upon actual cash flows and shared investment results.

## 2. Funding Method

All Systems use the individual entry age normal method to determine costs. Under this funding method, a total contribution rate is determined which consists of two elements, the normal cost rate and the Unfunded Actuarial Liability (UAL) rate.

The Individual Entry Age Normal cost rate is determined as the value, as of age at entry into the plan, of the member's projected future benefits, and divided by the value, also as of the member's entry age, of his expected future salary. For purposes of calculating the normal cost rate, the same benefit accrual rates used to calculate the present value of future benefits are used to calculate the normal cost. The benefit provisions applicable to each member are used in developing his/her individual normal cost rate.

In addition to contributions required to meet the System's normal cost, contributions will be required to fund the System's unfunded actuarial liability. Actuarial liability is defined as the present value of future benefits less the present value of future normal costs. The unfunded actuarial liability is the total of the actuarial liability for all members less the actuarial value of the System's assets.

There is an additional component in the unfunded actuarial accrued liability amortization contribution rate that accounts for the effects of the lag between the valuation date and when the contribution is made. This calculation assumes the contributions that would be received in fiscal year 2018 are equal to the budgeted contributions developed in the valuation as of June 30, 2016.

The UAL for the Employees' Combined System's is amortized over a single period closed amortization period ending in FY 2043. This will be accomplished by phasing the period down from 100 years in 2016 valuation down to 20 years for the 2022 valuation.

The UAL for LEOPS is being amortized over a closed 22-year period ending June 30, 2040.

The UAL for CORS is being amortized over a closed 29-year period ending June 30, 2047.



## **APPENDIX C**

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### **SUMMARY OF PLAN PROVISIONS**

# Maryland State Retirement and Pension System

## Employees' Retirement System

### Summary of Plan Provisions

#### 1. Membership

System closed to new members hired on or after January 1, 1980. Members on December 31, 1979 continue to be members unless they elected to transfer into the Employees' Pension System (established January 1, 1980) prior to January 1, 2005.

Membership includes employees of the State and approximately 121 participating employers.

#### 2. Member Contributions

- Plan A: Generally 7% of earnable compensation to maintain all benefits, including unlimited compounded cost-of-living adjustments.
- Plan B: Generally 5% of earnable compensation to maintain all benefits, except the compounded cost-of-living adjustments which are capped at 5%.
- Plan C: (Plan C provides a two-part benefit based on benefits of the Employees' Retirement System and the Employees' Non-Contributory Pension System). Employee contributions, if any are based on participation of the employer in one of the three plans under the Employees' Pension System (refer to summary of Employees' Pension System).

Interest earned on all employee contributions is 4% per year.

#### 3. Service Retirement Allowance

Eligibility: 30 years of eligibility service or attainment of age 60.

Allowance:  $1/55^{\text{th}}$  of average final compensation for the three highest years as a member for each year of creditable service.

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Employees' Retirement System; for creditable service after election date, the amount determined by the service retirement formula for the Employees' Non-Contributory Pension System under which the employer participates.

#### 4. Early Retirement Allowance

Eligibility: 25 years of eligibility service.

Allowance: Service retirement allowance reduced by .005 for each month that date of retirement precedes the earlier of age 60 or the date the member would have completed 30 years of eligibility service. The maximum reduction is 30%.

# Maryland State Retirement and Pension System

## Employees' Retirement System

### Summary of Plan Provisions

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Employees' Retirement System with a maximum reduction of 30%; for creditable service after election date, the amount determined by the service retirement formula for the Employees' Non-Contributory Pension System under which the employer participates with a .005 reduction for each month retirement occurs prior to age 62 (maximum reduction of 42%).

## 5. Disability Retirement Allowance

### Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is permanent.

Allowance: The benefit is  $1/55^{\text{th}}$  of average final compensation for the three highest years as a member for each year of creditable service. The minimum benefit is 25% of average final compensation; the maximum benefit can be no greater than  $1/55^{\text{th}}$  of average final compensation for each year of creditable service the member would have accrued if employment continued to age 60.

Plan C: The benefit is the greater of the Employees' Retirement System allowance noted above, or the ordinary disability benefit of the Employees' Pension System.

### Accidental

Eligibility: Certification of the Medical Board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty.

Allowance: The benefit is 66 2/3% of average final compensation for the three highest years as a member, plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation.

# Maryland State Retirement and Pension System

## Employees' Retirement System

### Summary of Plan Provisions

#### 6. Death Benefits

Eligibility: One year of eligibility service.

Benefit: One time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions. If member dies prior to accruing one year of service, payment is only the return of accumulated member contributions.

##### Spouse Law

Eligibility: Surviving spouse designated as the sole primary beneficiary and the deceased member was eligible to retire or was at least age 55 with at least 15 years of eligibility service.

Benefit: Surviving spouse may elect a one-time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions, or a monthly allowance under Option 2 (100% survivor benefit).

##### Special Death Benefit

Eligibility: Killed in line of duty.

Benefit: 66 2/3% of average final compensation for the three highest years as a member payable to a surviving spouse, dependent children or dependent parents. Accumulated member contributions are paid to the designated beneficiary(ies). Beginning July 1, 2017, the duration of payments that may be made to dependent children of deceased ERS and CORS members receiving a special death benefit is extended to surviving nondisabled children until each child turns 26 years old. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled.

Note: Death benefits outlined above are payable upon death of an active member. If member is not active, only accumulated member contributions are payable at time of death.

#### 7. Vested Retirement Allowance

Eligibility: Five years of eligibility service.

Allowance: Accrued retirement allowance payable at age 60, provided member does not withdraw accumulated member contributions.

# Maryland State Retirement and Pension System

## Employees' Retirement System

### Summary of Plan Provisions

#### 8. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted based on the Consumer Price Index (CPI). Any adjustments are effective July 1 for all benefits which have been in payment for one year.

- Plan A: Unlimited and compounded.
- Plan B: Capped at 5% and compounded.
- Plan C: Combination of COLA for either Plan A or Plan B - (depending on member selection prior to electing Plan C) - for benefit calculated under the Employees' Retirement System, plus capped at 3% compounded COLA on benefit calculated under the Employees' Non-Contributory Pension System.

In years in which COLAs would be less than zero due to a decline in the Consumer Price Index, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

#### 9. Optional Forms of Payment

Normal service allowance is a single life annuity.

Option 1: Cash refund equal to excess of present value of retirement allowance at date of retirement minus total amount of payments made to date of death.

Option 2: 100% joint and survivor annuity. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 3: 50% joint and survivor annuity.

Option 4: This option guarantees a return of accumulated member contributions remaining at date of death.

Option 5: 100% "pop-up" joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 6: 50% "pop-up" joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree.

Retirees who are to receive a service retirement, early service retirement, disability benefit, or vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

For Option 5 and 6 – If the designated beneficiary predeceases the retiree, a new beneficiary may be named. However, the retirement allowance will be re-calculated.

# Maryland State Retirement and Pension System

## Employees' Retirement System

### Summary of Plan Provisions

#### 10. Miscellaneous Provisions

##### For Detention Center Officers

Effective July 1, 2006, Maryland counties may elect to participate on behalf of their detention center officers.

An immediate service retirement allowance is payable to a detention center officer if, on or before the retirement, the officer has completed 20 years of eligibility service and served at least five years as a detention center officer immediately preceding retirement. The vested retirement allowance of a detention center officer who was in that position for at least five years preceding retirement commences at age 55.

#### 11. Change in Benefits for Employees' Retirement System

Beginning July 1, 2017, the duration of payments that may be made to dependent children of deceased ERS and CORS members receiving a special death benefit is extended to surviving nondisabled children until each child turns 26 years old. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled.

# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

#### 1. Membership

Membership is a condition of employment for all regular employees of the State of Maryland hired on or after January 1, 1980, excluding those eligible for the Teachers' Retirement System, Teachers' Pension System, State Police Retirement System, certain judges, correctional officers, and members of the General Assembly. Certain governmental units also have elected to participate in the System.

There are four plans under the Employees' Pension System.

- Non-Contributory Pension System (**NCPS**) - The original pension system established on January 1, 1980 that only applies to certain participating governmental units that did not elect to participate in the Contributory Pension System or the Alternate Contributory Pension Selection.
- Employees' Contributory Pension System (**ECPS**) – The ECPS established July 1, 1998 that only applies to certain participating governmental units that elected the ECPS but did not elect to participate in the Alternate Contributory Pension Selection.
- Alternate Contributory Pension Selection (**ACPS**) - Applies to all State employees and employees of participating governmental units that are members of the ACPS on or before June 30, 2011.
- Reformed Contributory Pension Benefit (**RCPB**) – Applies to all State employees and, employees of participating governmental units enrolling in the Employees' Pension System on or after July 1, 2011. It does not apply to employees of participating governmental units covered by the NCPS or ECPS.

#### 2. Member Contributions

**NCPS:** Members are only required to make contributions of 5% on earnable compensation that exceeds the Social Security Taxable Wage Base.

**ECPS:** Members are required to make contributions of 2% of earnable compensation.

**ACPS:** Members are required to make contributions of 7% of earnable compensation.

**RCPB:** Members are required to make contributions of 7% of earnable compensation.

Contributions earn interest at 5% per year.

# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

### 3. Service Retirement Allowance

NCPS, ECPS, and ACPS Eligibility: 30 years of eligibility service or attainment of one of the following:

- Age 62 with 5 years of eligibility service
- Age 63 with 4 years of eligibility service
- Age 64 with 3 years of eligibility service
- Age 65 or older with 2 years of eligibility service

NCPS Allowance:

0.8% of average final compensation up to the SSIL for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service.

ECPS Allowance: The greater of (i) or (ii), plus (iii), as described below:

- (i) 1.2% of average final compensation for the three highest consecutive years as an employee for each year of creditable service on or before June 30, 1998;
- (ii) 0.8% of average final compensation up to the SSIL for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service on or before June 30, 1998; or
- (iii) 1.4% of average final compensation for the three highest consecutive years as an employee for each year of creditable service after June 30, 1998.

ACPS Allowance: The greater of (i) or (ii), plus (iii), as described below:

- (i) 1.2% of average final compensation for the three highest consecutive years as an employee for each year of creditable service on or before June 30, 1998;
- (ii) 0.8% of average final compensation up to the SSIL for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service on or before June 30, 1998; or
- (iii) 1.8% of average final compensation for the three highest consecutive years as an employee for each year of creditable service after June 30, 1998.

The Social Security Integration Level (SSIL) is the average of all Social Security Wage Bases over the thirty-five (35) calendar years prior to your retirement.



# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

Note: Members who transferred into the Employees' Pension System, on or after April 1, 1998, receive benefits based on the provisions of the NCPS as in effect on January 1, 1980 except for COLA benefits. The COLAs are capped at a maximum of 3% compounded annually.

RCPB Eligibility: Combined age and eligibility service of at least 90 years or age 65 after 10 years of eligibility service.

RCPB Allowance: 1.5% of average final compensation for the five highest consecutive years as an employee for each year of creditable service on or after July 1, 2011.

#### 4. Early Retirement Allowance

NCPS, ECPS, and ACPS Eligibility: Attainment of age 55 and at least 15 years of eligibility service.

NCPS, ECPS, and ACPS Allowance: Service retirement allowance computed as of early retirement date, reduced by .005 for each month that early retirement date precedes age 62 (maximum reduction is 42%).

RCPB Eligibility: Attainment of age 60 with at least 15 years of eligibility service.

RCPB Allowance: Service retirement allowance computed as of early retirement date, reduced by .005 for each month that early retirement date precedes age 65 (maximum reduction is 30%).

#### 5. Disability Retirement Allowance

##### Ordinary

Eligibility: Five years of eligibility service and certification of the Medical Board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is permanent.

Allowance: The benefit is the service retirement allowance computed on the basis that service continues until age 62 (age 65 for RCPB) without any change in the rate of earnable compensation. If disability occurs on or after age 62 (age 65 for RCPB), the benefit is based on creditable service at time of retirement.

##### Accidental

Eligibility: Certification of the Medical Board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty.

# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

Allowance: The benefit is 66 2/3% of average final compensation for the three highest consecutive years (five years for RCPB) as a member, plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation.

#### 6. Death Benefits

Eligibility: One year of eligibility service.

Benefit: One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions. If member dies prior to accruing one year of service, payment is only the return of accumulated member contributions.

##### Spouse Law

Eligibility: Surviving spouse designated as the sole primary beneficiary and the deceased member was eligible to retire or had at least 25 years of eligibility service, or was at least 55 years old with at least 15 years of eligibility service.

Benefit: Surviving spouse may elect one time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions or a monthly allowance under Option 2 (100% survivor benefit).

##### Special Death Benefit

Eligibility: Killed in the line of duty.

Benefit: 66 2/3% of average final compensation for the three highest consecutive years as a member payable to a surviving spouse, dependent children or dependent parents. Accumulated member contributions are paid to the designated beneficiary(ies). Beginning July 1, 2017, the duration of payments that may be made to dependent children receiving a special death benefit is extended to surviving nondisabled children until each child turns 26 years old. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled.

Note: Death benefits outlined above are payable upon death of an active member. If member is not active, only accumulated member contributions are payable at time of death.

#### 7. Vested Retirement Allowance

NCPS, ECPS, and ACPS Eligibility: Five years of eligibility service.

# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

NCPS, ECPS, and ACPS Allowance: Accrued retirement allowance payable at age 62. A member who has completed 15 years of eligibility service may begin to receive benefit payments at any time on or after attainment of age 55, reduced by .005 for each month that benefit commencement date precedes age 62. If member does not commence to receive benefit payments, and dies before attaining age 62, only accumulated member contributions are returned.

#### 8. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Effective July 1, 1998, the adjustment is capped at a maximum of 3% compounded COLA, and is applied to all benefits which have been in payment for one year. All adjustments are effective July 1.

Retirement allowances of NCPS retirees (retirees of participating employers who did not elect the ECPS or ACPS) have a COLA that is capped at a maximum of 3% of the initial benefit. The COLA is applied to all benefits which have been in payment for one year. All adjustments are effective July 1.

For benefits attributable to service on or after July 1, 2011, the COLA is capped at the lesser of 2.5% or the increase in CPI if the most recent calendar year market value rate of return was greater than or equal to the assumed rate. The adjustment is capped at the lesser of 1% or the increase in CPI if the market value return was less than the assumed rate.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

#### 9. Optional Forms of Payment

Normal service allowance is in a single life annuity.

Option 1: Cash refund equal to excess of present value of retirement allowance at date of retirement minus total amount of payments made to date of death.

Option 2: 100% joint and survivor annuity. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 3: 50% joint and survivor annuity.

Option 4: This option guarantees a return of accumulated member contributions remaining at date of death.

# Maryland State Retirement and Pension System

## Employees' Pension System

### Summary of Plan Provisions

- Option 5: 100% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.
- Option 6: 50% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree.

For Options 5 and 6 – If the designated beneficiary predeceases the retiree, a new beneficiary may be named. However, the retirement allowance will be re-calculated.

Retirees who are to receive a service retirement, early service retirement, disability benefit, or vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

## 10. Change in Benefits

Beginning July 1, 2017, the duration of payments that may be made to dependent children receiving a special death benefit is extended to surviving nondisabled children until each child turns 26 years old. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled.

# Maryland State Retirement and Pension System Law Enforcement Officers' Pension System (Retirement Plan) Summary of Plan Provisions

## A. Retirement System Provisions

### 1. Membership

The retirement tier was closed to new participants effective January 1, 2005.

### 2. Member Contributions

Members who transferred from the Employees' Retirement System (Plan A) are required to contribute 7% of earnable compensation. Members who transferred from the Employees' Retirement System (Plan B) contribute 5% of earnable compensation.

Contributions earn interest at 4% per year.

### 3. Service Retirement Allowance

Eligibility: 25 years of eligibility service or attainment of age 50.

Allowance: 2.3% of average final compensation for the three highest years as a member for each of the first 30 years of creditable service, plus 1.0% of average final compensation for each additional year.

### 4. Early Retirement Allowance

Not applicable to this System.

### 5. Disability Retirement Allowance

#### Ordinary

Eligibility: Five years of eligibility service and certification of the Medical Board designated by the Board of Trustees that member is incapacitated for the performance of duty, and that incapacity is permanent.

Allowance: Service retirement allowance with a minimum of 25% of average final compensation.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System (Retirement Plan)

### Summary of Plan Provisions

#### Accidental

Eligibility: Total and permanent disability as certified by the Medical Board arising out of or in the course of the actual performance of duty.

Allowance: The benefit is 66 2/3% of average final compensation plus an annuity provided by accumulated member contributions with a maximum of average final compensation.

## 6. Death Benefits

#### Ordinary

Eligibility: 1 through 2 years of eligibility service and not eligible for special death benefit.

Benefit: Member's annual earnable compensation at time of death plus accumulated contributions.

Regardless of length of service, members' accumulated contributions are paid.

#### Special Benefit

Eligibility: Two or more years of eligibility service.

Benefit: Accumulated contributions paid to designated beneficiary plus an allowance of 50% of the ordinary disability benefit. Payment is made to the surviving spouse; however if there is no surviving spouse or spouse dies before youngest child reaches age 26, one-half of average final compensation continues until the youngest child reaches age 26. If the child is disabled, the benefit will continue past age 26 as long as the child remains disabled. If none of the above conditions is met, the ordinary death benefit is paid to the designated beneficiary.

Eligibility: Death arises out of or in the course of the actual performance of duty.

Benefit: Accumulated member contributions paid to designated beneficiary plus an allowance of 66 2/3% of the member's average final compensation. Payment is made to the surviving spouse; however if there is no surviving spouse or spouse dies before youngest child reaches age 26, one-half of average final compensation continues until the youngest child reaches age 26. If the child is disabled, the benefit will continue past age 26 as long as the child remains disabled. If none of the above conditions is met, the ordinary death benefit is paid to the designated beneficiary.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System (Retirement Plan)

### Summary of Plan Provisions

Note: Death benefits outlined above are payable upon death of an active member. If member is not active, only member accumulated contributions and interest are payable at time of death, unless benefit payment has commenced.

#### 7. Vested Retirement Allowance

Eligibility: Five years of eligibility service.

Allowance: Accrued retirement allowance payable at age 50 if the member does not withdraw the member's accumulated contributions.

#### 8. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). COLAs are effective July 1 and are applied to all benefits which have been in payment for one year. For members contributing 7% of earnable compensation, unlimited COLA is compounded annually. For members contributing 5% of earnable compensation, the COLA is capped at a maximum 5% compounded annually.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

#### 9. Optional Forms of Payment

**The normal service allowance is a 50% joint and survivor annuity with spouse**, if any; or if there is no surviving spouse or upon the death of the surviving spouse, to any children of the deceased under the age of 26 years, until every child dies or becomes 26 years of age. If the child is disabled, the benefit will continue past age 26 as long as the child remains disabled.

Other forms of payment may be elected if there is no spouse at time of retirement.

Option 1: Cash refund equal to excess of present value of retirement allowance at date of retirement minus total amount of payments made to date of death.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System (Retirement Plan)

### Summary of Plan Provisions

- Option 2: 100% joint and survivor annuity. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.
- Option 3: 50% joint and survivor annuity.
- Option 4: This option guarantees a return of accumulated member contributions remaining at date of death.
- Option 5: 100% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.
- Option 6: 50% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree.

For Options 5 and 6 – If the designated beneficiary predeceases the retiree, a new beneficiary may be named. However, the retirement allowance will be re-calculated.

#### 10. Deferred Retirement Option Program (DROP)

Members with 25 years of eligibility service, but less than 30 years of eligibility service, may elect to enter the DROP program for no more than five years. Members who enter DROP are retired and cease making member contributions, and cease accruing service credit and additional benefits. For members who enter DROP on or before June 30, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 6% per year, compounded monthly. For members who enter DROP on or after July 1, 2011, the service retirement allowance, with COLAs, is credited to an account earning interest at the rate of 4% per year, compounded annually. When the DROP period ends, members terminate employment and begin receiving their monthly allowance plus the lump sum payment from their DROP account. During the DROP period, members remain eligible for Accidental Disability benefits if incapacitated while in DROP.

#### 11. Change in Benefits

Beginning July 1, 2017, the duration of payments that may be made to dependent children receiving a special death benefit or a retiree survivor benefit is extended to surviving nondisabled children until each child turns 26 years old. Disabled children receiving a special death benefit or a retiree survivor benefit may receive a special death benefit as long as they remain disabled.



# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System

### Summary of Plan Provisions

#### B. Pension System Provisions

##### 1. Membership

Membership is a condition of employment for all law enforcement officers who are employees of the State as provided in the Annotated Code of Maryland, State Personnel and Pensions Article, Title 26, Section 26-201. This includes participating governmental units who elect to have their law enforcement officers or firefighters/paramedics participate in the System.

##### 2. Member Contributions

Members are required to contribute 7% of earnable compensation.

Contributions earn interest at 5% per year.

##### 3. Service Retirement Allowance

Eligibility: 25 years of eligibility service or attainment of age 50.

Allowance: For individuals who are members on or before June 30, 2011, 2.0% of average final compensation for the three highest consecutive years as an employee for each of the first 30 years of creditable service. For individuals who are members on or after July 1, 2011, 2.0% of average compensation for the five highest consecutive years as an employee for each of the first 30 years of creditable service. Maximum benefit is 60% of average final compensation.

##### 4. Early Retirement Allowance

Not applicable to this System.

##### 5. Disability Retirement Allowance

###### Ordinary

Eligibility: Five years of eligibility service and certification of the Medical Board designated by the Board of Trustees that member is incapacitated for the performance of duty, and that incapacity is permanent.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System

### Summary of Plan Provisions

Allowance: Service retirement allowance computed on the basis that service continues until age 50 without any change in rate of earnable compensation. If disability occurs after age 50, the benefit is based on creditable service at time of retirement.

#### **Accidental**

Eligibility: Total and permanent disability as certified by the Medical Board arising out of or in the course of the actual performance of duty.

Allowance: The benefit is 66 2/3% of average final compensation plus an annuity provided by accumulated member contributions with a maximum of average final compensation.

## **6. Death Benefits**

#### **Normal**

Eligibility: 1 through 2 years of eligibility service and not eligible for special death benefit as noted below.

Benefit: One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions. If member dies prior to accruing one year of service, payment is only the return of accumulated member contributions.

#### **Special Death Benefit**

Eligibility: More than two years of eligibility service or death in the performance of duty.

Benefit: Accumulated member contributions paid to designated beneficiary plus an allowance of 50% of the ordinary disability benefit. Payment is made to the surviving spouse; however if there is no surviving spouse or spouse dies before youngest child reaches age 26, one half of average final compensation continues until the youngest child reaches age 26. If none of the above conditions is met, the ordinary death benefit is paid to the designated beneficiary.

Eligibility: Death arises out of or in the course of the actual performance of duty.

Benefit: Accumulated member contributions paid to designated beneficiary plus an allowance of 66 2/3% of the member's average final compensation. Payment is made to the surviving spouse; however if there is no surviving spouse or spouse dies before youngest child reaches age 26, one-half of average final compensation continues until the youngest child reaches age 26. If none of the above conditions is met, the ordinary death benefit is paid to the designated beneficiary.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System

### Summary of Plan Provisions

Note: Death benefits outlined above are payable upon death of an active member. If member is not active, only accumulated member contributions are payable at time of death, unless benefit payment has commenced.

#### 7. Vested Retirement Allowance

Eligibility: For individuals who are members on or before June 30, 2011, 5 years of eligibility service. For individuals who become members on or after July 1, 2011, 10 years of eligibility service.

Allowance: Accrued retirement allowance payable at age 50 if the member does not withdraw their accumulated member contributions.

#### 8. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Effective July 1, 2000, the adjustment is capped at a maximum 3% compounded and is applied to all benefits which have been in payment for one year. All adjustments are effective July 1.

For benefits attributable to service on or after July 1, 2011, the COLA is capped at the lesser of 2.5% or the increase in CPI if the most recent calendar year market value rate of return was greater than or equal to the assumed rate. The adjustment is capped at the lesser of 1% or the increase in CPI if the market value return was less than the assumed rate.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

#### 9. Optional Forms of Payment

**The normal service allowance is a 50% joint and survivor annuity with spouse**, if any; or if there is no surviving spouse or upon the death of the surviving spouse, to any children of the deceased under the age of 26 years, until every child dies or becomes 26 years of age. If the child is disabled, the benefit will continue past age 26 as long as the child remains disabled.

Other forms of payment may be elected if there is no spouse at time of retirement.

Option 1: Cash refund equal to excess of present value of retirement allowance at date of retirement minus total amount of payments made to date of death.

# Maryland State Retirement and Pension System

## Law Enforcement Officers Pension System

### Summary of Plan Provisions

Option 2: 100% joint and survivor annuity. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 3: 50% joint and survivor annuity.

Option 4: This option guarantees a return of accumulated member contributions remaining at date of death.

Option 5: 100% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 6: 50% “pop-up” joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree.

For Options 5 and 6 – If the designated beneficiary predeceases the retiree, a new beneficiary may be named. However, the retirement allowance will be re-calculated.

#### 10. Deferred Retirement Option Plan (DROP)

DROP participation is the lesser of 5 years or the difference between 30 years and the member’s creditable service. Members who enter DROP are retired and cease making member contributions, and cease accruing service credit and additional benefits. For members who enter DROP on or before June 30, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 6% per year, compounded monthly. For members who enter DROP on or after July 1, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 4% per year, compounded annually. When the DROP period ends, members terminate employment and begin receiving their monthly allowance plus the lump sum payment from their DROP account. During the DROP period, members remain eligible for Accidental Disability benefits if incapacitated while in DROP.

#### 11. Changes in Benefits

None.

# Maryland State Retirement and Pension System

## Correctional Officers Retirement System

### Summary of Plan Provisions

#### 1. Membership

Membership is limited to detention center officers of Maryland Counties that elect to participate.

#### 2. Member Contributions

Members are required to contribute 5% of earnable compensation. Contributions earn interest at 4% per year.

#### 3. Service Retirement Allowance

Eligibility: 20 years of eligibility service, with at least the last five years served as a detention center officer.

Allowance: 1/55th of average final compensation for the three highest years as a member for each year of creditable service. The retirement allowance for an individual who is a correctional officer on or after July 1, 2011, is 1/55th of average final compensation for the five highest years as a member for each year of creditable service.

Note: Members are eligible to receive a vested benefit at age 55. Therefore, members may receive an immediate retirement allowance at age 55 if they have accrued at least five years (ten years for an individual who became a correctional officer on or after July 1, 2011) of eligibility service as a detention center officer.

#### 4. Early Retirement Allowance

Not applicable to this System.

#### 5. Disability Retirement Allowance

##### Ordinary

Eligibility: Five years of eligibility service and certification of the Medical Board designated by the Board of Trustees that the member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that the incapacity is permanent.

Allowance: The benefit is 1/55th of average final compensation for the three highest years as a member for each year of creditable service. The minimum benefit is 25% of average final compensation; the maximum benefit can be no greater than 1/55th of average final compensation for each year of creditable service the member would have accrued if employment continued to age 60.

# Maryland State Retirement and Pension System

## Correctional Officers' Retirement System

### Summary of Plan Provisions

#### **Accidental**

Eligibility: Certification of the Medical Board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty.

Allowance: The benefit is 66 2/3% of average final compensation for the three highest years as a member plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation.

## **6. Death Benefits**

Eligibility: One year of eligibility service.

Benefit: One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions. If member dies prior to accruing one year of service, payment is only the return of accumulated member contributions.

#### **Spouse Law**

Eligibility: Surviving spouse designated as the sole primary beneficiary and the deceased member was eligible to retire or was at least age 55 with at least 15 years of eligibility service.

Benefit: Surviving spouse may elect one time lump sum payment of member's annual earnable compensation at time of death plus accumulated member contributions or a monthly allowance under Option 2 (100% survivor benefit).

#### **Special Death Benefit**

Eligibility: Death in line of duty.

Benefit: 66 2/3% of average final compensation for the three highest years as a member payable to a surviving spouse or if no surviving spouse to dependent children until age 18. Accumulated member contributions are paid to the designated beneficiary.

Note: Death benefits outlined above are payable upon death of an active member. If member is not active, only accumulated member contributions are payable at time of death.

# Maryland State Retirement and Pension System

## Correctional Officers' Retirement System

### Summary of Plan Provisions

#### 7. Vested Retirement Allowance

Eligibility: Five years of eligibility service. Ten years of eligibility service for individuals who become correctional officers on or after July 1, 2011.

Allowance: Deferred vested benefit payable at age 55 (age 60 for maximum security attendants) provided member does not withdraw contributions.

#### 8. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index. The unlimited compounded COLAs are effective July 1 for all benefits which have been in payment for one year.

For benefits attributable to service on or after July 1, 2011, the COLA is capped at the lesser of 2.5% or the increase in CPI if the most recent calendar year market value rate of return was greater than or equal to the assumed rate. The adjustment is capped at the lesser of 1% or the increase in CPI if the market value return was less than the assumed rate.

#### 9. Optional Forms of Payment

Basic form of payment is a single life annuity.

Option 1: Cash refund equal to excess of present value of retirement allowance at date of retirement minus total amount of payments made to date of death.

Option 2: 100% joint and survivor annuity. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

Option 3: 50% joint and survivor annuity.

Option 4: This option guarantees a return of accumulated member contributions remaining at the date of death.

Option 5: 100% "pop-up" joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree. Your named beneficiary cannot be more than 10 years younger than you unless the beneficiary is your spouse or disabled child.

# Maryland State Retirement and Pension System Correctional Officers' Retirement System Summary of Plan Provisions

Option 6: 50% "pop-up" joint and survivor annuity with adjustment to maximum benefit if beneficiary predeceases retiree.

For Options 5 and 6 – If the designated beneficiary predeceases the retiree, a new beneficiary may be named. However, the retirement allowance will be re-calculated.

## 10. Change in Benefits

None.





December 5, 2017

Maryland State Retirement and Pension System  
120 East Baltimore Street, 16<sup>th</sup> Floor  
Baltimore, Maryland 21202

Attention: Ms. Melody Countess

**Re: Maryland State Retirement and Pension System Annual Valuation Report for  
Maryland Municipal Corporations**

Dear Melody:

Enclosed are 40 copies of our report of the actuarial valuation of the Maryland State Retirement and Pension System Annual Valuation Report for Maryland Municipal Corporations.

Respectfully submitted,

A handwritten signature in black ink that reads "Brian B. Murphy". The signature is written in a cursive style with a large initial "B" and "M".

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

BBM:rmn  
Enclosures