Prince George's County Correctional Officers' Pension Plan

Actuarial Valuation as of July 1, 2018

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June 21, 2019

Board of Trustees
Prince George's County
1400 McCormick Drive
Largo, Maryland 20774

Subject: Actuarial Valuation Report for the Year Beginning July 1, 2018

Dear Trustees:

The results of the annual actuarial valuation of the Correctional Officers' Pension Plan (the "Plan") as of July 1, 2018, are presented in this report.

This report was prepared at the request of the Board and is intended for use by the County and the Board and those designated or approved by the Board. This report may be provided to parties other than the County only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the actuarial valuation are to measure the Plan's funding progress, to determine the contribution rates for the fiscal year ending June 30, 2020, and to analyze plan experience during the prior year. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results associated with the benefits described in this report, for purposes other than those identified above, may be significantly different.

The contribution rates in this report are determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics beginning on page A-20 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The computed County contribution rates shown on page A-1 are best viewed as the minimum contribution rates that comply with the Board's funding policy. Users of this report should be aware that contributions made at those rates do not guarantee benefit security. Until the plan is fully funded, we encourage the plan sponsor to contribute in excess of the computed contribution rates.

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

This actuarial valuation is based upon:

Data relative to the members of the Plan – Data for active members and persons receiving benefits from the Plan was provided by the Plan's staff. We have tested this data for reasonableness.

Asset Values – The asset amounts of the Plan were provided by the Plan's auditors and the Plan's staff. The results for the funding actuarial valuation use an actuarial value of assets.

Actuarial Method – The actuarial method utilized for the Plan is the Individual Entry Age Normal Actuarial Cost Method. The objective of this method is to amortize the cost of Plan benefits over the entire career of each member as a level percentage of compensation. Any Unfunded Actuarial Accrued Liability (UAAL) under this method is separately financed. All actuarial gains and losses under this method are reflected in the UAAL.

Actuarial Assumptions – The actuarial assumptions including the investment return assumption, mortality rates, retirement rates, termination rates, disability rates, and salary increase rates were updated based on the recommendations from the experience study for the period July 1, 2013 through July 1, 2017. Beginning with the actuarial valuation as of July 1, 2018, GRS made a recommendation, which the Board accepted, to separate the plans for funding purposes now that the Supplemental Plan is about 100 percent funded and a higher level of contributions is no longer needed to fully fund the Supplemental Plan. It is our opinion that the actuarial assumptions used for the actuarial valuation are reasonable. Additional information about the actuarial assumptions is included in Section C of this report.

Benefit Provisions – There have been no changes in benefit provisions since the previous valuation.

The funding objective is to provide the benefits of the Plan when due, with employee and employer contributions which, over time, will remain level as a percent of payroll.

The findings in this report are based on data and other information through July 1, 2018. The actuarial valuation was based upon information furnished by Prince George's County staff, concerning Plan benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. 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 Prince George's County staff.

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

Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries (M.A.A.A.), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. The signing actuaries are independent of the plan sponsor.

Respectfully yours,

Lance J. Weiss, E.A., M.A.A.A., F.C.A.	Amy Williams, A.S.A., M.A.A.A., F.C.A.
Senior Consultant and Team Leader	Senior Consultant

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SECTION A.

ACTUARIAL VALUATION RESULTS

Table 1

Comparative Actuarial Valuation Results [1,5]

30-Year Closed Period Level Percent of Pay Amortization[6]

	Results as of July 1, 2017 Comprehensive Plan		Supplemental Plan		Total		Results as of July 1, 2018 Comprehensive Plan		Supplemental Plan		Total	
A. Basic Data												
1 Active Participants												
a. Number	437		12		449		446		9		455	
b. Total Base Payroll	$ 26,873,400		$ 1,080,800		$ 27,954,200		$ 27,810,300		$ 817,600		$ 28,627,900	
c. Average Annual Base Payroll	61,495		90,065		62,259		62,355		90,847		62,918	
d. Average Attained Age	40.7		54.4		41.1		40.3		55.0		40.6	
e. Average Years of Credited Service	10.3		29.2		10.8		9.9		30.2		10.3	
2 Retired Participants and Beneficiaries [3]												
a. Number	231		31		262		246		35		281	
b. Total Annual Pension Being Paid	$ 10,137,800		$ 512,100		$ 10,649,900		$ 11,021,200		$ 638,400		$ 11,659,600	
3 Terminated Participants with Vested Benefits												
a. Number	14		1		15		13		1		14	
b. Total Annual Vested Pension	$ 180,000		$ 17,400		$ 197,400		$ 194,300		$ 17,400		$ 211,700	
B. Valuation Results												
1 Actuarial Accrued Liability												
a. Active Participants	$ 99,682,700		$ 4,210,900		$ 103,893,600		$ 104,234,500		$ 2,917,700		$ 107,152,200	
b. Retired Participants and Beneficiaries [2,3]	128,010,400		5,373,100		133,383,500		142,420,100		7,003,800		149,423,900	
c. Terminated Participants with Vested Benefits	1,811,800		92,200		1,904,000		1,489,700		104,700		1,594,400	
d. Total	229,504,900		9,676,200		239,181,100		248,144,300		10,026,200		258,170,500	
2 Actuarial Value of Assets	129,178,700		9,393,100		138,571,800		139,993,200		9,945,000		149,938,200	
3 Unfunded Actuarial Accrued Liability (B.1.d. - B.2.)	100,326,200		283,100		100,609,300		108,151,100		81,200		108,232,300	
4 Funded Ratio (B.2. / B.1.d.)	56.3%		97.1%		57.9%		56.4%		99.2%		58.1%	
5 Annual Normal Cost [4]												
a. Retirement, Termination, and Death Benefits					$ 7,223,100	(25.84%)	8,950,600	(32.18%)	85,200	(10.42%)	$ 9,035,800	(31.56%)
b. Expenses of Administration					265,000	(0.95%)	265,400	(0.95%)	35,600	(4.35%)	301,000	(1.05%)
c. Total					7,488,100	(26.79%)	9,216,000	(33.13%)	120,800	(14.77%)	9,336,800	(32.61%)
6 Annual Contribution Requirement [4,8]												
a. Normal Cost					7,488,100	(26.79%)	9,216,000	(33.13%)	120,800	(14.77%)	9,336,800	(32.61%)
b. Amortization of Unfunded Liability Over a Closed 30 Years [5,6]					6,150,000	(22.00%)	6,588,300	(23.69%)	4,900	(0.60%)	6,593,200	(23.03%)
c. Adjustment Due to Anticipated Contributions in Upcoming Year [7]					(108,600)	-(0.39%)	11,700	(0.05%)	(16,600)	-(2.03%)	(4,900)	-(0.01%)
d. Total					13,529,500	(48.40%)	15,816,000	(56.87%)	109,100	(13.34%)	15,925,100	(55.63%)
7 Annual Contribution Requirement [4, 8]												
a. County Portion	9,541,500	(35.51%)	460,700	(42.65%)	10,002,200	(35.78%)	12,219,600	(43.94%)	62,100	(7.59%)	12,281,700	(42.90%)
b. Employee Portion	3,465,200	(12.89%)	62,100	(5.75%)	3,527,300	(12.62%)	3,596,400	(12.93%)	47,000	(5.75%)	3,643,400	(12.73%)
c. Total	13,006,700	(48.40%)	522,800	(48.40%)	13,529,500	(48.40%)	15,816,000	(56.87%)	109,100	(13.34%)	15,925,100	(55.63%)

1 *Most amounts rounded to nearest $100.*

2 *Retired participant actuarial accrued liability as of July 1, 2018, includes an amount for members with no benefits payable but who have an expected future refund payout, and was increased by an additional 3.00% of the liability for members currently in pay status to account for a potential future obligation to pay benefits from the plan for participants not reported in the census data provided for the actuarial valuation as of July 1, 2018.*

3 *Includes disability retirees.*

4 *Figures in parentheses show contribution as a percentage of total base payroll.*

5 *Beginning with the actuarial valuation as of July 1, 2009, the Comprehensive and Supplemental Plans were combined for funding purposes.*
Beginning with the actuarial valuation as of July 1, 2018, the Comprehensive and Supplemental Plans were separated for funding purposes.

6 *Unfunded liability is amortized over a 30-year closed period beginning July 1, 2014. 26 years are remaining in the amortization period as of July 1, 2018.*

7 *Adjustment made to contribution rate to account for the one year lag between the actuarial valuation date at which the contribution rate is determined and the beginning of the fiscal year in which the contribution rate applies. Adjustment first effective with the actuarial valuation as of July 1, 2014, and the change to a closed period amortization policy.*

8 *The Annual Contribution Requirement from the actuarial valuation as of July 1, 2017, applies to FY2019 and the Annual Contribution Requirement from the actuarial valuation as of July 1, 2018, applies to FY2020.*

Table 2A – Comprehensive Plan
Reconciliation of Market Value of Assets

	As of June 30	
	2017	**2018**
Additions:		
Contributions:		
Employer	$ 9,263,190	$ 9,794,685
Employee	3,416,254	3,522,944
Total contributions	12,679,444	13,317,629
Transfers (to)/from other funds	(109,259)	-
Investment income :		
Net appreciation (depreciation) in fair value of assets	8,070,876	15,144,898
Interest and dividends	1,053,068	2,071,881
Total investment income	9,123,944	17,216,779
Less investment expense	498,137	478,748
Net investment income	8,625,807	16,738,031
Total additions	21,195,992	30,055,660
Deductions:		
Benefits	9,854,847	10,986,348
Refunds of contributions	685,157	924,489
General and administrative expenses	264,234	275,040
Transfers to/(from) other funds	-	-
Total deductions	10,804,238	12,185,877
Net increase (decrease)	10,391,754	17,869,783
Net assets held in trust for pension benefits, beginning of year	113,139,204	123,530,958
Net assets held in trust for pension benefits, end of year	$ 123,530,958	$ 141,400,741

Table 2B – Supplemental Plan
Reconciliation of Market Value of Assets

	As of June 30	
	2017	2018
Additions:		
Contributions:		
Employer	$ 517,388	$ 406,628
Employee	70,755	54,413
Total contributions	588,143	461,041
Transfers (to)/from other funds	-	-
Investment income:		
Net appreciation (depreciation) in fair value of assets	584,281	1,101,801
Interest and dividends	76,746	150,699
Total investment income	661,027	1,252,500
Less investment expense	9,903	18,721
Net investment income	651,124	1,233,779
Total additions	1,239,267	1,694,820
Deductions:		
Benefits	463,704	568,473
Refunds of contributions	25,673	16,691
General and administrative expenses	34,548	35,202
Transfers to/(from) other funds	-	-
Total deductions	523,925	620,366
Net increase (decrease)	715,342	1,074,454
Net assets held in trust for pension benefits, beginning of year	8,304,458	9,019,800
Net assets held in trust for pension benefits, end of year	$ 9,019,800	$ 10,094,254

Table 3A – Comprehensive Plan
Development of Actuarial Value of Assets

Year Ending June 30	2017	2018	2019	2020	2021	2022
Beginning of Year:						
(1) Market Value of Assets	$ 113,139,204	$ 123,530,958				
(2) Actuarial Value of Assets (Excluding Asset Transfer)	119,243,030	129,178,733				
(2a) Actuarial Value of Assets (Including Asset Transfer)	119,133,771	129,178,733				
End of Year:						
(3) Market Value of Assets	123,530,958	141,400,741				
(4) Net of Contributions and Disbursements	1,765,947	1,131,752				
(5) Total Investment Income						
=(3)-(1)-(4)	8,625,807	16,738,031				
(6) Projected Rate of Return	7.50%	7.50%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^.5-1)x(4)	8,550,466	9,306,495				
(8) Investment Income in Excess of Projected Income						
=(5)-(7)	75,341	7,431,536				
(9) Excess Investment Income Recognized						
This Year (5-year recognition)						
(9a) From This Year	15,068	1,486,307				
(9b) From One Year Ago	(1,847,431)	15,068	$ 1,486,307			
(9c) From Two Years Ago	(888,065)	(1,847,431)	15,068	$ 1,486,307		
(9d) From Three Years Ago	1,610,377	(888,065)	(1,847,431)	15,068	$ 1,486,307	
(9e) From Four Years Ago	729,341	1,610,376	(888,064)	(1,847,433)	15,069	$ 1,486,308
(9f) Total Recognized Investment Gain/(Loss)	(380,710)	376,255	(1,234,120)	(346,058)	1,501,376	1,486,308
(10) Change in Actuarial Value of Assets						
=(4)+(7)+(9f)	9,935,703	10,814,502				
End of Year:						
(3) Market Value of Assets	**123,530,958**	**141,400,741**				
(11) Preliminary Actuarial Value of Assets =(2)+(10)	129,178,733	139,993,235				
(11a) Upper Corridor Limit 120% x (3)	148,237,150	169,680,889				
(11b) Lower Corridor Limit 80% x (3)	98,824,766	113,120,593				
(12) Adjustment to Remain within 20% Corridor	0	0				
(13) Actuarial Value of Assets =(11)+(12)	**129,178,733**	**139,993,235**				
(14) Pending Asset Transfer	0	0				
(15) Final Actuarial Value of Assets =(13)+(14)	**129,178,733**	**139,993,235**				

Table 3B – Supplemental Plan
Development of Actuarial Value of Results

Year Ending June 30	2017	2018	2019	2020	2021	2022
Beginning of Year:						
(1) Market Value of Assets	$ 8,304,458	$ 9,019,800				
(2) Actuarial Value of Assets (Excluding Asset Transfer)	8,726,721	9,393,071				
(2a) Actuarial Value of Assets (Including Asset Transfer)	8,726,721	9,393,071				
End of Year:						
(3) Market Value of Assets	9,019,800	10,094,254				
(4) Net of Contributions and Disbursements	64,218	(159,325)				
(5) Total Investment Income						
=(3)-(1)-(4)	651,124	1,233,779				
(6) Projected Rate of Return	7.50%	7.50%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^.5-1)x(4)	625,199	670,618				
(8) Investment Income in Excess of Projected Income						
=(5)-(7)	25,925	563,161				
(9) Excess Investment Income Recognized						
This Year (5-year recognition)						
(9a) From This Year	5,185	112,632				
(9b) From One Year Ago	(129,579)	5,185	$ 112,632			
(9c) From Two Years Ago	(57,702)	(129,579)	5,185	$ 112,632		
(9d) From Three Years Ago	110,132	(57,702)	(129,579)	5,185	$ 112,632	
(9e) From Four Years Ago	48,897	110,131	(57,704)	(129,578)	5,185	$ 112,633
(9f) Total Recognized Investment Gain/(Loss)	(23,067)	40,667	(69,466)	(11,761)	117,817	112,633
(10) Change in Actuarial Value of Assets						
=(4)+(7)+(9f)	666,350	551,960				
End of Year:						
(3) Market Value of Assets	**9,019,800**	**10,094,254**				
(11) Preliminary Actuarial Value of Assets =(2)+(10)	9,393,071	9,945,031				
(11a) Upper Corridor Limit 120% x (3)	10,823,760	12,113,105				
(11b) Lower Corridor Limit 80% x (3)	7,215,840	8,075,403				
(12) Adjustment to Remain within 20% Corridor	0	0				
(13) Actuarial Value of Assets =(11)+(12)	**9,393,071**	**9,945,031**				
(14) Pending Asset Transfer	0	0				
(15) Final Actuarial Value of Assets =(13)+(14)	**9,393,071**	**9,945,031**				

Table 4A – Comprehensive Plan
Historical Comparison of Results

Year Ending June 30	2014	2015	2016	2017	2018
(1) Market Value of Assets	$ 104,368,840	$ 111,214,843	$ 113,029,945	$ 123,530,958	$ 141,400,741
(2) Actuarial Value of Assets	$ 95,954,380	$ 109,611,061	$ 119,133,771	$ 129,178,733	$ 139,993,235
(3) Difference Between Market & Actuarial Values	$ 8,414,460	$ 1,603,782	$ (6,103,826)	$ (5,647,775)	$ 1,407,506
(4) Estimated Market Value Rate of Return	16.54 %	3.31 %	(0.71)%	7.57 %	13.49 %
(5) Estimated Actuarial Value Rate of Return	12.06 %	10.57 %	6.23 %	6.80 %	7.46 %
(6) Ratio of Actuarial Value to Market Value	92 %	99 %	105 %	105 %	99 %
(7) Funded Ratio (Market Value of Assets)	53.0 %	52.1 %	50.9 %	53.8 %	57.0 %
(8) Funded Ratio (Actuarial Value of Assets)	48.8 %	51.4 %	53.7 %	56.3 %	56.4 %

Beginning with the actuarial valuation as of July 1, 2009, the Comprehensive and Supplemental Plans were combined for funding purposes.
Beginning with the actuarial valuation as of July 1, 2018, the Comprehensive and Supplemental Plans were separated for funding purposes.
Market value of assets and actuarial value of assets as of June 30, 2016, include an adjustment for the pending asset transfer.

Table 4B – Supplemental Plan
Historical Comparison of Results

Year Ending June 30	2014	2015	2016	2017	2018
(1) Market Value of Assets	$ 7,404,428	$ 8,072,146	$ 8,304,458	$ 9,019,800	$ 10,094,254
(2) Actuarial Value of Assets	$ 6,831,760	$ 7,942,058	$ 8,726,721	$ 9,393,071	$ 9,945,031
(3) Difference Between Market & Actuarial Values	$ 572,668	$ 130,088	$ (422,263)	$ (373,271)	$ 149,223
(4) Estimated Market Value Rate of Return	16.33 %	3.70 %	(0.40)%	7.81 %	13.80 %
(5) Estimated Actuarial Value Rate of Return	11.73 %	10.30 %	6.44 %	6.87 %	7.64 %
(6) Ratio of Actuarial Value to Market Value	92 %	98 %	105 %	104 %	99 %
(7) Funded Ratio (Market Value of Assets)	83.9 %	82.7 %	83.8 %	93.2 %	100.7 %
(8) Funded Ratio (Actuarial Value of Assets)	77.4 %	81.3 %	88.1 %	97.1 %	99.2 %

Beginning with the actuarial valuation as of July 1, 2009, the Comprehensive and Supplemental Plans were combined for funding purposes.
Beginning with the actuarial valuation as of July 1, 2018, the Comprehensive and Supplemental Plans were separated for funding purposes.

Table 5A – Comprehensive Plan
Reconciliation of Total Annual Contribution Requirement and Employee/County Contribution Rates

Valuation as of July 1	2014	2015	2016	2017	2018
Total contribution rate at previous valuation	48.86%	48.53%	47.78%	48.72%	48.40%
Expected total contribution rate at current valuation	48.99%	49.45%	48.76%	48.51%	48.89%
Change due to:					
Recognition of asset (gains)/losses	-0.94%	-0.77%	0.33%	0.20%	0.01%
Salary increases	-0.12%	-0.28%	0.04%	0.03%	0.04%
Other plan experience	-0.79%	-0.62%	-0.35%	-0.34%	-0.71%
Net transfers	0.00%	0.00%	-0.06%	0.00%	0.00%
Change in actuarial assumptions	1.39%	0.00%	0.00%	0.00%	7.52%
Plan improvements	0.00%	0.00%	0.00%	0.00%	0.00%
Measurement improvements	0.00%	0.00%	0.00%	0.00%	1.12%
Total change	-0.46%	-1.67%	-0.04%	-0.11%	7.98%
Actual total contribution rate at current valuation	48.53%	47.78%	48.72%	48.40%	56.87%

EMPLOYEE/COUNTY CONTRIBUTION RATES

Valuation as of July 1	2014	2015	2016	2017	2018
Employee Contribution Rates					
Hired before 7/1/1995	12.00%	12.00%	12.00%	12.00%	12.00%
Hired on or after 7/1/1995	13.00%	13.00%	13.00%	13.00%	13.00%
Composite	12.84%	12.87%	12.87%	12.89%	12.93%
County Contribution Rates					
Hired before 7/1/1995	36.53%	35.78%	36.72%	36.40%	44.87%
Hired on or after 7/1/1995	35.53%	34.78%	35.72%	35.40%	43.87%
Composite	35.69%	34.91%	35.85%	35.51%	43.94%

The reconciliation for valuation years beginning July 1 for 2014-2017 are shown for the Comprehensive and Supplemental plans on a combined basis. The change in contribution rate due to separating the plans for funding purposes is included in measurement improvements.

Table 5B – Supplemental Plan
Reconciliation of Total Annual Contribution Requirement and Employee/County Contribution Rates

Valuation as of July 1	2014	2015	2016	2017	2018
Total contribution rate at previous valuation					48.40%
Expected total contribution rate at current valuation					48.89%
Change due to:					
Recognition of asset (gains)/losses					-0.10%
Salary increases					0.31%
Other plan experience					3.11%
Net transfers					0.00%
Change in actuarial assumptions					-0.29%
Plan improvements					0.00%
Measurement improvements					-38.58%
Total change					-35.55%
Actual total contribution rate at current valuation					13.34%

EMPLOYEE/COUNTY CONTRIBUTION RATES

Valuation as of July 1	2014	2015	2016	2017	2018
Employee Contribution Rates					
Hired before 7/1/1995	5.75%	5.75%	5.75%	5.75%	5.75%
Hired on or after 7/1/1995	6.75%	6.75%	6.75%	6.75%	6.75%
Composite	5.75%	5.75%	5.75%	5.75%	5.75%
County Contribution Rates					
Hired before 7/1/1995	42.78%	42.03%	42.97%	42.65%	7.59%
Hired on or after 7/1/1995	41.78%	41.03%	41.97%	41.65%	6.59%
Composite	42.78%	42.03%	42.97%	42.65%	7.59%

The reconciliation for valuation years beginning July 1 for 2014-2017 were on a combined basis for the Comprehensive and Supplemental plans and are shown on Table 5A. The change in contribution rate due to separating the plans for funding purposes is included in measurement improvements.

Table 6A – Comprehensive Plan
Reconciliation of Unfunded Actuarial Accrued Liability and Funded Ratio

Valuation as of July 1	2014	2015	2016	2017	2018
Unfunded liability at previous valuation	$ 89,814,800	$100,785,600	$103,680,700	$102,795,600	$100,326,200
Expected unfunded liability at current valuation					
Normal cost for plan year	7,093,400	7,063,400	7,435,200	7,263,600	7,361,200
Interest on unfunded liability and normal cost	6,997,300	7,819,000	8,049,800	7,977,000	7,795,400
Contributions with interest to current valuation date	10,800,800	12,940,900	13,418,700	13,146,300	13,808,000
Total expected change in unfunded liability at current valuation	3,289,900	1,941,500	2,066,300	2,094,300	1,348,600
Total expected unfunded liability at current valuation	93,104,700	102,727,100	105,747,000	104,889,900	101,674,800
Change due to:					
Recognition of asset (gains)/losses	(3,957,600)	(3,411,400)	1,409,200	834,400	47,300
Salary increases	3,224,400	6,262,400	(2,966,600)	(4,395,800)	899,200
Other plan experience	(2,254,900)	(1,897,400)	(1,129,400)	(1,002,300)	(2,982,800)
Net transfers	0	0	(264,600)	0	0
Change in actuarial assumptions	10,669,000	0	0	0	8,512,600
Plan improvements	0	0	0	0	0
Measurement improvements	0	0	0	0	0
Total change	7,680,900	953,600	(2,951,400)	(4,563,700)	6,476,300
Unfunded liability at current valuation	100,785,600	103,680,700	102,795,600	100,326,200	108,151,100

RECONCILIATION OF FUNDED RATIO (BASED ON ACTUARIAL VALUE OF ASSETS)

Valuation as of July 1	2014	2015	2016	2017	2018
Funded ratio at previous valuation	48.5%	48.8%	51.4%	53.7%	56.3%
Expected funded ratio at current valuation	49.7%	50.8%	53.3%	55.3%	57.9%
Change due to:					
Recognition of asset gains/(losses)	2.0%	1.6%	-0.6%	-0.3%	0.0%
Salary increases	-0.9%	-1.5%	0.7%	1.0%	-0.3%
Other plan experience	0.6%	0.5%	0.3%	0.3%	0.8%
Net transfers	0.0%	0.0%	0.0%	0.0%	0.0%
Change in actuarial assumptions	-2.6%	0.0%	0.0%	0.0%	-2.0%
Plan improvements	0.0%	0.0%	0.0%	0.0%	0.0%
Measurement improvements	0.0%	0.0%	0.0%	0.0%	0.0%
Total change	-0.9%	0.6%	0.4%	1.0%	-1.5%
Funded ratio at current valuation	48.8%	51.4%	53.7%	56.3%	56.4%
Market value of assets funded ratio at current valuation	53.0%	52.1%	50.9%	53.8%	57.0%

Table 6B –Supplemental Plan
Reconciliation of Unfunded Actuarial Accrued Liability and Funded Ratio

Valuation as of July 1	2014	2015	2016	2017	2018
Unfunded liability at previous valuation	$ 2,017,300	$ 1,995,400	$ 1,824,100	$ 1,178,400	$ 283,100
Expected unfunded liability at current valuation					
Normal cost for plan year	170,100	156,700	168,100	146,200	126,900
Interest on unfunded liability and normal cost	157,600	155,400	143,000	93,800	25,900
Contributions with interest to current valuation date	667,800	794,200	730,200	609,800	478,000
Total expected change in unfunded liability at current valuation	(340,100)	(482,100)	(419,100)	(369,800)	(325,200)
Total expected unfunded liability at current valuation	1,677,200	1,513,300	1,405,000	808,600	(42,100)
Change due to:					
Recognition of asset (gains)/losses	(252,800)	(226,000)	85,800	54,700	(12,700)
Salary increases	280,000	285,500	(69,900)	(76,300)	53,500
Other plan experience	(297,400)	251,300	(242,500)	(503,900)	345,200
Net transfers	0	0	0	0	0
Change in actuarial assumptions	588,400	0	0	0	(262,700)
Plan improvements	0	0	0	0	0
Measurement improvements	0	0	0	0	0
Total change	318,200	310,800	(226,600)	(525,500)	123,300
Unfunded liability at current valuation	1,995,400	1,824,100	1,178,400	283,100	81,200

RECONCILIATION OF FUNDED RATIO (BASED ON ACTUARIAL VALUE OF ASSETS)

Valuation as of July 1	2014	2015	2016	2017	2018
Funded ratio at previous valuation	74.3%	77.4%	81.3%	88.1%	97.1%
Expected funded ratio at current valuation	79.7%	83.6%	86.2%	92.1%	100.4%
Change due to:					
Recognition of asset gains/(losses)	2.9%	2.3%	-0.9%	-0.5%	0.1%
Salary increases	-2.8%	-2.4%	0.7%	0.7%	-0.5%
Other plan experience	3.0%	-2.2%	2.1%	4.8%	-3.4%
Net transfers	0.0%	0.0%	0.0%	0.0%	0.0%
Change in actuarial assumptions	-5.4%	0.0%	0.0%	0.0%	2.6%
Plan improvements	0.0%	0.0%	0.0%	0.0%	0.0%
Measurement improvements	0.0%	0.0%	0.0%	0.0%	0.0%
Total change	-2.3%	-2.3%	1.9%	5.0%	-1.2%
Funded ratio at current valuation	77.4%	81.3%	88.1%	97.1%	99.2%
Market value of assets funded ratio at current valuation	83.9%	82.7%	83.8%	93.2%	100.7%

Table 7A – Comprehensive Plan
Actuarial Participant Data – Active Members

Attained Age	Completed Years of Service at Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30&Up	Total	Valuation Payroll
Under 20	4							4	$ 167,468
20-24	21							21	895,280
25-29	40	25	1					66	3,222,704
30-34	32	37	20					89	4,770,767
35-39	18	9	21	10				58	3,486,008
40-44	9	5	12	18	2			46	3,168,070
45-49	7	6	13	21	7	2		56	4,001,251
50-54	6	10	11	16	5	2	1	51	3,744,343
55-59	3	2	12	13		1	4	35	2,684,778
60+		2	3	8		4	3	20	1,669,641
Total	**140**	**96**	**93**	**86**	**14**	**9**	**8**	**446**	**$ 27,810,310**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	40.3 years
Service:	9.9 years
Annual Pay:	$62,355

Table 7B – Supplemental Plan
Actuarial Participant Data – Active Members

Attained Age	0-4	5-9	10-14	15-19	20-24	25-29	30&Up	Total	Valuation Payroll
	Completed Years of Service at Valuation Date								
30-34									$ -
35-39									-
40-44									-
45-49						2		2	186,398
50-54						1	1	2	183,561
55-59						1	2	3	270,919
60+						1	1	2	176,748
Total						**5**	**4**	**9**	**$ 817,627**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	55.0 years
Service:	30.2 years
Annual Pay:	$90,847

Table 8A – Comprehensive Plan
Actuarial Participant Data – Terminated Vested Members and Members in Pay Status

Retired Participants, Disability Retirees and Beneficiaries*

Age Group	Number		Annual Pension Being Paid
Under 55	72	$	3,066,232
55-59	65		3,198,541
60-64	49		2,375,142
65-69	32		1,272,030
70 & Over	28		1,109,210
Total	**246**	**$**	**11,021,155**

Terminated Vested Participants

Age Group	Number		Annual Deferred Pension
Under 25	-	$	-
25-34	7		102,020
35-44	2		40,319
45-54	4		51,965
55 & Over	-		-
Total	**13**	**$**	**194,304**

**Number and benefits paid to alternate payees are classified based on the retiree's age.*
Does not include estimated benefit amounts for members with unknown status.

Table 8B – Supplemental Plan
Actuarial Participant Data – Terminated Vested Members and Members in Pay Status

Retired Participants and Beneficiaries

Age Group	Number		Annual Pension Being Paid
Under 55	7	$	110,235
55-59	6		156,427
60-64	6		117,509
65-69	5		87,991
70 & Over	11		166,209
Total	**35**	**$**	**638,371**

Terminated Vested Participants

Age Group	Number		Annual Deferred Pension
Under 25	-	$	-
25-34	-		-
35-44	-		-
45-54	1		17,371
55 & Over	-		-
Total	**1**	**$**	**17,371**

Comments and Analysis

A. PURPOSES OF THE ACTUARIAL VALUATION

This report presents the results of an actuarial valuation of the Plan as of July 1, 2018. The purposes of the actuarial valuation are to determine the funding status of the Plan as of the valuation date, to develop contribution rates for fiscal year 2020, and to analyze the experience of the Plan during the past year. The required accounting information for pension plans, under GASB Statement No. 67, is provided in a separate report beginning for fiscal year ending June 30, 2014. The required accounting information for pension plan sponsors, under GASB Statement No. 68, is provided in a separate report beginning for fiscal year ending June 30, 2015. Historical accounting information can be found in the funding actuarial valuation report as of July 1, 2014.

B. EXPERIENCE DURING FY 2018

Combined Plan

Prior to the actuarial valuation as of July 1, 2009, there were two stand-alone pension plans for Correctional Officers' that were separately funded – the Comprehensive Plan and the Supplemental Plan. The Supplemental Plan is a closed plan meaning there are no new active members entering. GRS made a recommendation, which the Board accepted, to combine the plans for funding purposes. The recommendation does not have an impact on the eligibility conditions, benefits or employee contributions of the plans. The recommendation only has an impact on the pattern of future County contributions. As a result of the recommendation, beginning with the actuarial valuation as of July 1, 2009, one total contribution rate has been calculated for the combined plan. The member contributions are fixed based on the bargaining agreements and pension plan documents and the County contributes the remainder of the total contribution.

Beginning with the actuarial valuation as of July 1, 2018, GRS made a recommendation, which the Board accepted, to separate the plans for funding purposes now that the Supplemental Plan is about 100 percent funded and a higher level of contributions is no longer needed to fully fund the Supplemental Plan.

Comprehensive Plan

In summary, the results of the actuarial valuation indicate a total contribution rate for the fiscal year beginning July 1, 2019, of 56.87 percent of covered payroll, representing payment of the normal cost and amortization of the unfunded actuarial accrued liability over a 30-year closed level-percent-of-pay amortization period (26 years remaining as of July 1, 2018). Based on the current actuarial valuation, the average employee contribution is 12.93 percent of pay, with the County contributing the remaining 43.94 percent of pay on average. The total contribution rate increased from 48.40 percent of pay at the last actuarial valuation to 56.87 percent of pay.

As of July 1, 2018, the actuarial accrued liability of $248,144,300 is 56.4 percent funded by the actuarial value of assets of $139,993,200, leaving an unfunded actuarial accrued liability of $108,151,100. The funded ratio increased from 56.3 percent at the last actuarial valuation to 56.4 percent for the current actuarial valuation.

The estimated asset return during the year ended June 30, 2018, was 13.49 percent on a market value of assets basis of assets and 7.46 percent on an actuarial value of assets basis. The estimated asset return on a market value basis was higher and on an actuarial value of assets basis was slightly lower than the assumed asset return of 7.50 percent during fiscal year 2018. The asset gains in fiscal years 2014, 2017 and 2018, partially offset by the asset losses in fiscal years 2015 and 2016 resulted in a net increase in the contribution rate and no change in the funded ratio attributable to investment performance. Table 4A has information on historical investment returns and asset values.

The actuarial accrued liability for retired participants as of July 1, 2018, was increased by 3.00 percent to account for a potential future obligation to pay benefits from the plan for participants included in the actuarial valuation as of July 1, 2017, who were not reported in the census data in the actuarial valuation as of July 1, 2018.

There was unfavorable salary increase experience and favorable demographic plan experience (retirements, disabilities, terminations and deaths) compared to what was expected under the actuarial assumptions.

The change in actuarial assumptions decreased the funded ratio and increased the contribution rate.

Tables 5A and 6A have reconciliations of the contribution rates, unfunded actuarial accrued liability and funded ratio, including changes due to asset returns, plan experience, changes in actuarial assumptions and changes in plan provisions.

Supplemental Plan

In summary, the results of the actuarial valuation indicate a total contribution rate for the fiscal year beginning July 1, 2019, of 13.34 percent of covered payroll, representing payment of the normal cost and amortization of the unfunded actuarial accrued liability over a 30-year closed level-percent-of-pay amortization period (26 years remaining as of July 1, 2018). Based on the current actuarial valuation, the employee contribution is 5.75 percent of pay, with the County contributing the remaining 7.59 percent of pay. The total contribution rate decreased from 48.40 percent of pay at the last actuarial valuation to 13.34 percent of pay. The total contribution rate as of July 1, 2017 was calculated on a combined basis for the Comprehensive and Supplemental Plans and the total contribution rate as of July 1, 2018 was calculated for the Supplemental Plan only, which caused the decrease in the total contribution rate.

As of July 1, 2018, the actuarial accrued liability of $10,026,200 is 99.2 percent funded by the actuarial value of assets of $9,945,000, leaving an unfunded actuarial accrued liability of $81,200. The funded ratio increased from 97.1 percent at the last actuarial valuation to 99.2 percent for the current actuarial valuation.

The estimated asset return during the year ended June 30, 2018, was 13.80 percent on a market value of assets basis and 7.64 percent on an actuarial value of assets basis. The estimated asset return on a market value basis was higher and on an actuarial value of assets basis was higher than the assumed asset return of 7.50 percent during fiscal year 2018. The asset gains in fiscal years 2014, 2017 and 2018, partially offset by the asset losses in fiscal years 2015 and 2016 resulted in a net decrease in the contribution rate and a net increase in the funded ratio attributable to investment performance. Table 4B has information on historical investment returns and asset values.

There was unfavorable salary increase experience and unfavorable demographic plan experience (retirements, terminations and deaths) compared to what was expected under the actuarial assumptions.

The change in actuarial assumptions increased the funded ratio and decreased the contribution rate.

Tables 5B and 6B have reconciliations of the contribution rates, unfunded actuarial accrued liability and funded ratio, including changes due to asset returns, plan experience, changes in actuarial assumptions and changes in plan provisions.

C. PLAN PROVISIONS

There have been no changes in benefit provisions since the previous actuarial valuation. The plan provisions are summarized in Section B.

D. ACTUARIAL ASSUMPTIONS AND METHODS

Section C contains a summary of the actuarial assumptions and methods used in the actuarial valuation. The Board adopted changes in the actuarial assumptions first effective with this actuarial valuation as of July 1, 2018, based on an experience study performed for the period July 1, 2013 to July 1, 2017.

The funding method is based on the Individual Entry Age Normal Actuarial Cost Method and 30-year closed-period level-percent-of-pay amortization of the unfunded liability beginning with the valuation as of July 1, 2014. (30-year open-period level-percent-of-pay amortization was used prior to the valuation as of July 1, 2014.) Funding under the 30-year closed-period policy is expected to gradually improve the funded status over time and increase the funded ratio to 100 percent at the end of the 30-year period.

The method for calculating the total contribution rate was changed for the actuarial valuation as of July 1, 2018 from calculating the total contribution rate on a combined basis for the Comprehensive and Supplemental Plans to calculating a separate total contribution rate for each of the plans.

E. ACCOUNTING INFORMATION UNDER GASB

A separate actuarial valuation report with calculations completed in accordance with the provisions of GASB Statement Nos. 67 and 68 has been issued.

F. OTHER OBSERVATIONS

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

Given the Plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the Plan earning 7.25 percent on the actuarial value of assets), it is expected that:

1) For the Comprehensive Plan, the County normal cost as a percentage of pay will decrease to the level of the normal cost for members hired after July 1, 2008 (with later retirement eligibility conditions and higher employee contribution rates) as time passes and the majority of the active population is comprised of these members. The unfunded liability contribution will remain level as a percentage of pay through the end of the closed amortization period. For the Supplemental Plan, the County normal cost will remain level as a percentage of pay, but will decrease as a dollar amount as the number of active members decreases. The unfunded liability is currently close to zero. If the Supplemental Plan remains fully funded, an unfunded liability contribution will not be required;
2) The unfunded actuarial accrued liabilities will be fully amortized after 30 years from the fiscal year ending June 30, 2016 (June 30, 2045), which corresponds to the beginning of the closed amortization period established in the actuarial valuation as of July 1, 2014; and
3) The funded status of the plans will increase gradually towards a 100 percent 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 Plan assets to cover the estimated cost of settling the Plan's benefit obligations; for example, transferring the liability to an unrelated third party in a free market type transaction.
2) The measurement is dependent upon the actuarial cost method which, in combination with the Plan's amortization policy, affects the timing and amounts of future contributions. The 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 percent is not synonymous with no required future contributions. If the funded status were 100 percent, the Plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

G. RISK MEASURES

Risks Associated With Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of actuarial assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the actuarial assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

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 due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of this actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1) Investment risk – actual investment returns may differ from the expected returns;
2) Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3) Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll or other relevant contribution base;
4) Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5) Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6) Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The County contribution rates shown in Tables 5A and 5B may be considered as a minimum contribution rate that complies with the County's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

Comprehensive Plan

	2017	2018
Ratio of the market value of assets to total payroll	4.60	5.08
Ratio of actuarial accrued liability to payroll	8.54	8.92
Ratio of actives to retirees and beneficiaries	1.89	1.81
Ratio of net cash flow to market value of assets	1%	1%

Supplemental Plan

	2017	2018
Ratio of the market value of assets to total payroll	8.35	12.35
Ratio of actuarial accrued liability to payroll	8.95	12.26
Ratio of actives to retirees and beneficiaries	0.39	0.26
Ratio of net cash flow to market value of assets	1%	-2%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5 percent different than assumed would equal 10 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100 percent is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2 percent other than assumed would equal 5 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries
A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets
A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment
Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

SECTION B.

SUMMARY OF PLAN PROVISIONS

Brief Summary of Plan Provisions

	Comprehensive Plan	Supplemental Plan
1. Effective Date:	July 1, 1996, as amended through July 1, 2018.	June 30, 1985, as amended through July 1, 2018.
2. Eligibility:	All full-time Correctional Officers through the rank of major hired on or after July 1, 1996, and those hired prior to July 1, 1996, who elected to participate in the Comprehensive Plan.	All full-time Correctional Officers through the rank of major hired before July 1, 1996, except those who elected to participate in the Comprehensive Plan.
3. Credited Service:	All continuous service (up to a maximum of 30 years) and interruptions of continuous service due to disability, or to military service.	All continuous service (up to a maximum of 30 years) and interruptions of continuous service due to disability, or to military service.
4. Retirement Dates:		
a. Normal –	The earlier of completion of 20 years of County service, or age 55. For non-vested members as of July 1, 2013 (hired after July 1, 2008), the earlier of completion of 25 years of County service, or age 55.	The earlier of completion of 25 years of County service, or age 60.
b. Early –	No provision.	No provision.
c. Late –	An employee may work beyond Normal Retirement Date.	An employee may work beyond Normal Retirement Date.
d. Disability –	<u>Service-Connected</u> – No minimum service requirement. <u>Non-Service-Connected</u> – 5 years of credited service.	No provision.
5. Annual Retirement Benefits:		
a. Normal or Late –	3.0% of Average Annual Compensation (high 24 months' base) times years of service (not to exceed 20) plus 2.5% times years of service in excess of 20 (not to exceed 10).	1.3% of Average Annual Compensation (high 36 months' base) times years of service (not to exceed 25) plus 1.25% times years of service in excess of 25 (not to exceed 5).

Brief Summary of Plan Provisions

	Comprehensive Plan	Supplemental Plan
5. Annual Retirement Benefits: (Cont'd)		
b. Disability –	Service-Connected – 60% of Average Annual Compensation. Non-Service-Connected – The greater of the accrued normal retirement benefit or 30% of Average Annual Compensation.	No provision.
6. Termination Benefits:		
a. Under 5 years of credited service –	Return of employee contributions with interest.	Return of employee contributions with interest.
b. 5 or more years of credited service –	If contributions are left in the fund, an employee is entitled to a vested benefit payable at Normal Retirement Date equal to the benefit accrued to date of termination.	If contributions are left in the fund, an employee is entitled to a vested benefit payable at Normal Retirement Date equal to the benefit accrued to date of termination.
7. Death Benefits:	Return of employee contributions with interest, less any benefits paid prior to death. Effective July 1, 2008, the spouse of a participant, whose death is a death in the line of duty, is eligible for a pre-retirement survivor annuity. The benefit is payable immediately and equals 100% of the employee pension assuming the employee had exactly 20 years of service, reduced for election of a joint and contingent annuity payment.	Return of employee contributions with interest, less any benefits paid prior to death.
8. Payment of Retirement Benefits:	The normal form of payment is for the life of the participant only. An actuarially reduced joint and 50% surviving spouse form of payment may be elected.	The normal form of payment is for the life of the participant only. An actuarially reduced joint and 50% surviving spouse form of payment may be elected.
9. Employee Contributions:	12.0% of base pay (13.0% of base pay for officers hired on or after July 1, 1995).	25% of the total contribution to the plan before the benefit enhancement (effective July 1, 2003) plus 1.5% of base pay (2.5% for employees becoming participants on or after July 1, 1995) plus 75% of the cost of the benefit enhancement.

	Comprehensive Plan	Supplemental Plan
10. Post-Retirement Increases:	Effective February 1, 1998, and every year thereafter, retirees will receive an increase in their benefit based on two-thirds (2/3) of total investment returns during the prior plan year in excess of the actuarial assumption annually. All eligible retirees and eligible spouses will receive an identical dollar increase, not to exceed $100 per month. No increase will be provided if the available amount is not sufficient to provide at least a $10 per month increase. Also, any shortfall of investment return versus the actuarial assumption will be carried over to future determinations. Effective January 31, 2014, the minimum post retirement increase is $35 per month. This provision has resulted in the following increases:	No provision.
11. 13th Check:	Retirees received a one-time distribution of a thirteenth (13th) check for five hundred dollars ($500.00) in Fiscal Years 2008 and 2009.	No provision.

Increases under the Post-Retirement Increases provision (item 10):

Effective Date	Monthly Amount
2/1/1998	$100.00
2/1/1999	100.00
2/1/2000	100.00
2/1/2001	0.00
2/1/2002	0.00
2/1/2003	0.00
2/1/2004	0.00
2/1/2005	0.00
2/1/2006	0.00
2/1/2007	0.00
2/1/2008	0.00
2/1/2009	0.00
2/1/2010	0.00
2/1/2011	0.00
2/1/2012	0.00
2/1/2013	0.00
2/1/2014	35.00
2/1/2015	35.00
2/1/2016	35.00
2/1/2017	35.00
2/1/2018	35.00

SECTION C.

ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions and Methods

The actuarial assumptions and methods are first effective with the actuarial valuation as of July 1, 2018, and are based on the experience study for the period July 1, 2013 to July 1, 2017.

1. Interest: 7.25 percent compounded annually, net of investment expenses (based on assumed price inflation assumption of 2.50 percent).

2. Mortality: The mortality assumptions are based on the following Public Sector 2010 Mortality tables. The rates are projected from 2010 using projection scale MP-2018 (generational mortality) and therefore include a provision for future mortality improvement.

Type	Assumption
Post-retirement non-disabled	Pub-2010 Healthy Retiree Mortality Table (for Safety Employees), sex distinct
Post-retirement disabled	Pub-2010 Disabled Retiree Mortality Table (for Safety Employees), sex distinct
Pre-retirement non-service connected	Pub-2010 Employee Mortality Table (for Safety Employees), sex distinct
Pre-retirement service connected	10% of the rates from the Pub-2010 Employee Mortality Table (for Safety Employees), sex distinct

3. Expenses: Non-investment expenses equivalent to 105 percent of the average administrative expenses incurred in the last three fiscal years as supplied by the County and incorporated in the Normal Cost.

Comprehensive Plan:

Valuation	Actual Administrative Expenses				Assumed Expenses
Year	3 Years Prior	2 Years Prior	1 Year Prior	3-Year Average	Added to Normal Cost
2017	$ 175,666	$ 219,077	$ 264,234	$ 219,659	$ 230,600
2018	219,077	264,234	275,040	252,784	265,400

Supplemental Plan:

Valuation	Actual Administrative Expenses				Assumed Expenses
Year	3 Years Prior	2 Years Prior	1 Year Prior	3-Year Average	Added to Normal Cost
2017	$ 31,774	$ 31,822	$ 34,548	$ 32,715	$ 34,400
2018	31,822	34,548	35,202	33,857	35,600

4. Salary Scale:

The following illustrative annual rates of salary increase were used:

Service	Salary Increase
1	7.75%
2-4	10.75%
5	7.75%
6-10	6.50%
11-21	6.00%
22	5.50%
23	5.00%
24	4.50%
25-30	4.00%
31+	3.00%

5. Turnover:

The following illustrative annual rates of withdrawal were used (includes disability for Supplemental Plan):

Service Beginning of Year	Percentage of Employees Terminating Employment Annually
0	7.50%
1	7.25%
2	7.00%
3	6.50%
4	6.00%
5	4.00%
6	3.75%
7	3.50%
8	3.25%
9	3.00%
10	2.75%
11	2.50%
12	2.25%
13	2.00%
14	1.75%
15+	0.75%

6. Disability:

The following illustrative annual rates of disability were used for the Comprehensive Plan:

Rate of Disability Per 1,000 Participants

Age	Total	Service Connected	Non-Service Connected
Under 25	1.00	0.50	0.50
25-29	1.00	0.50	0.50
30-34	2.00	1.00	1.00
35-39	3.00	1.50	1.50
40-44	10.00	5.00	5.00
45-49	10.00	5.00	5.00
50-54	10.00	5.00	5.00
55-59	10.00	5.00	5.00
60+	10.00	5.00	5.00

7. Retirement Age:

The following illustrative annual rates of retirement were used and are based on member retirement eligibility conditions (Supplemental Plan members use the age 55 and 20 years of service rates):

	Earlier of Age 55 and 20 yrs	Earlier of Age 55 and 25 yrs	
Service	Retirement Rate	First Elg.	Ultimate Rate
5 - 14	5.0%	5.0%	5.0%
15	25.0%	25.0%	25.0%
16 - 19	10.0%	10.0%	10.0%
20	25.0%	25.0%	25.0%
21	15.0%	35.0%	15.0%
22	15.0%	45.0%	15.0%
23	15.0%	50.0%	15.0%
24	15.0%	60.0%	15.0%
25	20.0%	65.0%	20.0%
26 - 29	20.0%		20.0%
30 - 34	30.0%		30.0%
35+	100.0%		100.0%

50 percent retirement is assumed beginning at age 65 and 100 percent retirement is assumed at 35 years of service.

8. Asset Valuation Method:

The calculated value is determined by adjusting the market value of assets to reflect the investment gains and losses (the difference between the actual investment return and the expected investment return) during each of the last five years at the rate of 20 percent per year. A corridor is then applied to the calculated value such that it is not greater than 120 percent or less than 80 percent of the market value of assets.

9.	**Cost Method:**	Entry age normal cost method, under which the normal cost as a percentage of pay for each employee remains level from entry age to retirement, and the accrued liability represents the fund which would now be on hand if all past normal costs had actually been paid, and all current assumptions had been realized.
10.	**Amortization Method:**	30-Year Closed, Level Percentage of Payroll as of July 1, 2014.
11.	**Payroll Growth:**	Total payroll is assumed to increase by 3.0 percent per year.
12.	**Benefit Service:**	Exact fractional years of service are used to determine the amount of benefit payable.
13.	**Decrement Timing:**	All decrements are assumed to occur mid-year.
14.	**Decrement Relativity:**	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
15.	**Decrement Operation:**	Turnover decrement does not operate after member reaches retirement eligibility.
16.	**Eligibility Testing:**	Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.
17.	**Marriage Assumption:**	85 percent of members are assumed to be married for purposes of valuing death-in-service benefits. The male spouse is assumed to be three years older than the female spouse. (This applies to the Comprehensive Plan only.)
18.	**Pay Increase Timing:**	End of (fiscal) year.
19.	**Unused Leave:**	Employees retiring with 20 or more years of County service are assumed to have unused leave equivalent to additional years of credited service based on the number of years of service at retirement.

Years at Retirement	20-24 Years	25+ Years
Comprehensive Plan	2.0 Years	2.0 Years
Supplemental Plan	None	None

Sick leave hours in excess of the service cap are refunded at the rate of pay at retirement times hours of excess sick leave. Excess sick leave hours are determined using the assumption that 55 hours of sick leave time is equal to 1 month of additional service credit.

20. Cost of Benefit Enhancements: It is assumed that a contribution rate of 5.75 percent for Supplemental members hired before July 1, 1995, and 6.75 for Supplemental members hired on or after July 1, 1995, represents the bargained employee contribution rate and reflects the employees' share of the cost of the benefit enhancements.

21. Data Adjustments/Missing Data: There were Comprehensive Plan active participants included in the previous actuarial valuation as of July 1, 2017, who were not reported in the census data for the current actuarial valuation as of July 1, 2018. Therefore, the actuarial accrued liability for retired participants was increased by 3.00 percent to account for a potential future obligation to pay benefits from the plan for these participants with unknown status.

A minimum salary of $40,647 was used for active participants for valuation purposes.

The actuarial accrued liability for Comprehensive Plan retired participants includes an amount of $698,106 for inactive/deferred members reported with a benefit of $0 as of July 1, 2018, who are expected to receive a future refund payout.

The actuarial accrued liability for Supplemental Plan retired participants includes an amount of $176,779 for inactive/deferred members reported with a benefit of $0 as of July 1, 2018, who are expected to receive a future refund payout.

SECTION D.

GLOSSARY OF TERMS

Glossary of Terms

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

Actuarial Assumptions. Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan. Demographic, or "people" assumptions, include rates of mortality, retirement and separation. Economic, or "money" assumptions, include expected investment return, inflation and salary increases.

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

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

Actuarial Value of Assets (AVA). Smoothed value of assets that recognizes the difference between the expected investment return using the valuation assumption and the actual investment return over a five-year period. Dampens volatility of asset value over time.

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

Annual Required Contribution. The sum of the normal cost and amortization of the unfunded actuarial accrued liability.

Asset Return. The net investment return for the asset divided by the mean asset value. Example: if $1.00 is invested and yields $1.07 after a year, the asset return is 7.00 percent.

Funded Ratio. The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.

Market Value of Assets (MVA). The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market.

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

Unfunded Actuarial Accrued Liability (UAAL). The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."