CHEIRON Classic Values, Innovative Advice

Fairfax County Police Officers Retirement System

Actuarial Valuation Report as of June 30, 2016

Produced by Cheiron

October 2016

www.cheiron.us 1.877.CHEIRON (243.4766)

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October 19, 2016

Board of Trustees
Fairfax County Police Officers
Retirement System
10680 Main Street, Suite 280
Fairfax, Virginia 22030-3812

Re: Fairfax County Police Officers Retirement System
Actuarial Valuation as of June 30, 2016

Dear Members of the Board:

At your request, we have conducted our annual actuarial valuation of the Fairfax County Police Officers Retirement System as of June 30, 2016. The results of the valuation are contained in this report. The purpose of this report is to present the annual actuarial valuation of the Fairfax County Police Officers Retirement System. This report is for the use of the Fairfax County Police Officers Retirement System Board of Trustees and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. Those comments are the basis for our certification that this report is complete to the best of our knowledge and belief. The results of this report are only applicable to the County contribution for Fiscal Year 2018 and rely on future plan experience conforming to the underlying assumptions. To the extent that actual plan experience deviates from the underlying assumptions, the results would vary accordingly.

In preparing our report, we relied on information (some oral and some written) supplied by the Retirement System. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice Number 23.

This report was prepared exclusively for the Fairfax County Police Officers Retirement System for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

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 assumptions, changes in assumptions, and changes in plan provisions or applicable law.

We hereby certify that, to the best of our knowledge, this report and its contents, have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards

of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries we, meet the Qualification Standards of the American Academy of Actuaries to render the opinions contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Sincerely,
Cheiron

Fiona E. Liston, FSA, EA
Principal Consulting Actuary

Coralie A. Milligan, FSA, EA
Associate Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Fairfax County Police Officers Retirement System as of June 30, 2016. The purpose of this report is to:

1) **Measure and disclose**, as of the valuation date, the financial condition of the System;

2) **Indicate trends** in the financial progress of the System;

3) **Determine the contribution rate** to be paid by the County for Fiscal Year 2018; and

4) **Provide specific information** and documentation required for the System's financial reporting.

An actuarial valuation establishes and analyzes system assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the System's investment performance, as well as an analysis of actuarial liability gains and losses.

Section I presents a summary containing our findings and disclosing important trends experienced by the System in recent years.

Section II contains details on various asset measures, together with pertinent performance measurements.

Section III shows similar information on System liabilities, measured for actuarial, accounting, and governmental reporting purposes.

Section IV develops the County contribution rate, determined using actuarial techniques and compares that to the rate developed using the corridor method of funding.

Section V includes the required items to be included in the System's Comprehensive Annual Financial Report (CAFR).

The appendices to this report contain a summary of the System's membership at the valuation date, a summary of the major provisions of the System, and the actuarial methods and assumptions used in the valuations.

In preparing our report, we relied on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice Number 23.

The actuarial assumptions reflect our understanding of the likely future experience of the System, and the assumptions taken individually represent our best estimate for the future experience of the System. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

Finally, in preparing this report, we have conformed to generally accepted actuarial principles and practices which are consistent with the Code of Professional Conduct, and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

SECTION I - BOARD SUMMARY

General Comments

Fairfax County's annual contribution to this System is determined by using a corridor funding method. Under this funding approach, the County's contribution rate base rate consists of the normal cost rate plus expense rate plus certain amortization UAL bases. The UAL base rates are summarized in Section IV. The normal cost rate and actuarial accrued liability will be measured using the entry age funding method. If the corridor funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a rolling 15-year amortization equal to the amount necessary to re-enter the corridor. The County is taking steps to increase the 90% corridor floor to 100%. Once this threshold is reached, the 15-year periods will become closed 15-year layers.

The employer contribution rate for FY 2018, as calculated under this method, decreased from 29.63% for FY 2017 to 27.64% of payroll when using the 90% corridor floor. The County's FY 2017 contribution was actually based on a 97% corridor floor, and for FY 2018, we have also provided contribution rates for a 98% floor. On that basis, the contribution in FY 2017 was 38.98%, and for FY 2018, it will be in the range of 36.67% to 37.96%. However, the County has adopted a policy to not reduce the contribution rate until such time that the UAL has been exhausted; thus the contribution rate for FY 2017 and FY 2018 will at a minimum be 38.98%.

This valuation contains information reported in the June 30, 2016 Comprehensive Annual Financial Report (CAFR) of the System. Additional information regarding GASB Statement Number 67 can be found in a separate report.

Since the previous valuation, an experience study was performed to review the actuarial assumptions and methods. A description of the changes the Board has approved appears in Appendix B. The current results reflect these assumption changes which increased the liabilities by $9.9 million. As part of the experience study, we revisited the collection and use of data in preparing these valuations. Prior to this valuation, active data was collected as of December 31 and inactive data as of June 30 with participants appearing in both files being removed from the active population. The age and service of the active population was also adjusted to account for the lack of new entrants into the System between December 31 and June 30. Starting with this valuation, the process has been changed to collect all data as of the prior December 31 and to perform the initial valuation runs as of that date. The resulting liabilities are then adjusted for six months to the June 30 valuation date. The adjustment takes into account the actual July 1 cost-of-living increase and any other changes that are known to have occurred in that six-month period.

Trends

The System underperformed the investment assumption during the fiscal year ending in 2016, causing an actuarial loss on the asset side of the System. The actual return on a market value basis was approximately 0.85%. On an actuarial value basis, the assets returned 5.04% compared with an assumed rate of return of 7.50%. The investment loss recognized for funding purposes was $31.4 million.

SECTION I - BOARD SUMMARY

The measurement of liabilities produced a gain this year in the amount of $11.0 million. This gain was due to experience compared to our assumptions about salary increases, retirement behavior, COLA, death, etc. Specific components of the gain include:

- The average salary increase was 4.3% for active participants who were in both the June 30, 2015 and June 30, 2016 valuations. This was about as expected based on the actuarial assumption.

- The valuation assumed a 2.50% cost-of-living adjustment in 2015 for benefits in pay status. The actual CPI-based COLA was 1.00% last year, creating a liability gain of $14.5 million.

- An annual component of liability loss is the delayed recognition of new hires throughout the year. This does not contribute to an increase in the System's unfunded liability because both the member and the employer make contributions from the date of hire. However, when we look only at the liability side, they are a component of the annual liability loss, and this year they contributed $1.9 million to that number.

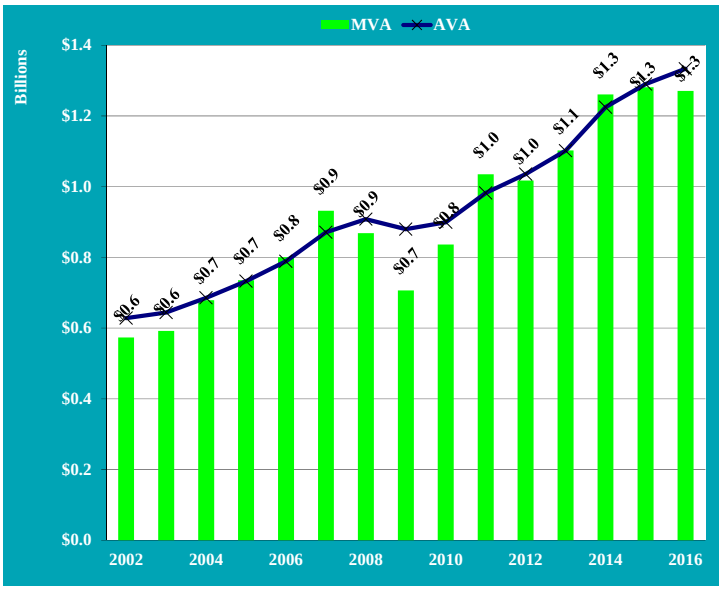
- There was a $1.6 million liability loss component that is made up of various other causes such as members terminating, retiring, dying, or becoming disabled in a way contrary to the assumption.

The combination of liability and investment experience and assumption changes, together with County plus member contributions over the last year, caused a decrease in the System's funding ratio (actuarial value of assets over actuarial accrued liability) decreasing from 86.5% at June 30, 2015 to 85.4% at June 30, 2016. For purposes of measuring whether the System remains within the funding corridor, an adjusted funding ratio is used. In this ratio, there is an additional asset recognized in the amount of the unfunded actuarial liability payments being made by the County to pay for benefit increases and assumption changes. On this basis, the System's actuarial funded ratio decreased from 89.0% at June 30, 2015 to 88.1% at June 30, 2016.

SECTION I - BOARD SUMMARY

It is important to take a step back from the latest results and view them in the context of the System's recent history. On the next three pages, we present a series of charts which display key factors in the valuations over the last 15 years. After the historical review, we present a few projection graphs, showing the possible condition of the System over the next 15 years under various market return scenarios.

Growth in Assets

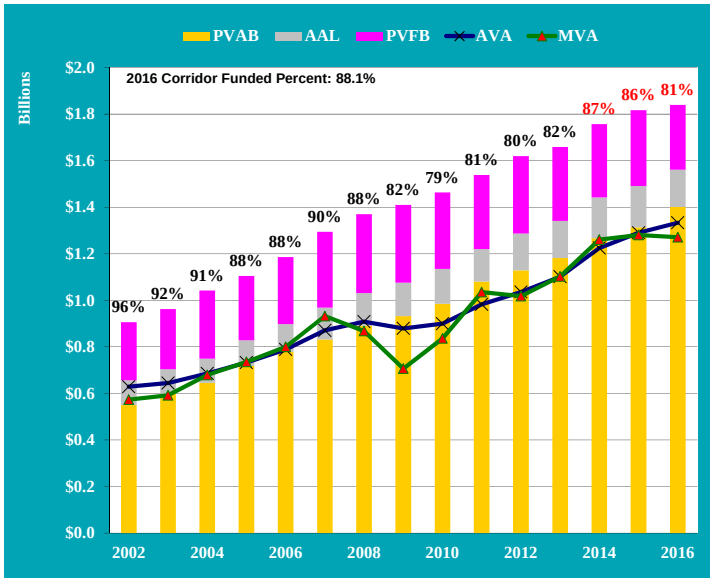


There was a slight decrease in the market value of assets (MVA) over last year due to a return of only 0.9%. The actuarial value of assets (AVA) increased due to the continued recognition of recent asset gains. The System has $62.8 million in unrecognized losses that will be phased in over the next few years due to the smaller than expected increase in the MVA.

Over the period July 1, 2002 to June 30, 2016, the System's assets returned approximately 7.05% per year measured at actuarial value, compared to the valuation assumption of 7.25% per year.

Assets and Liabilities

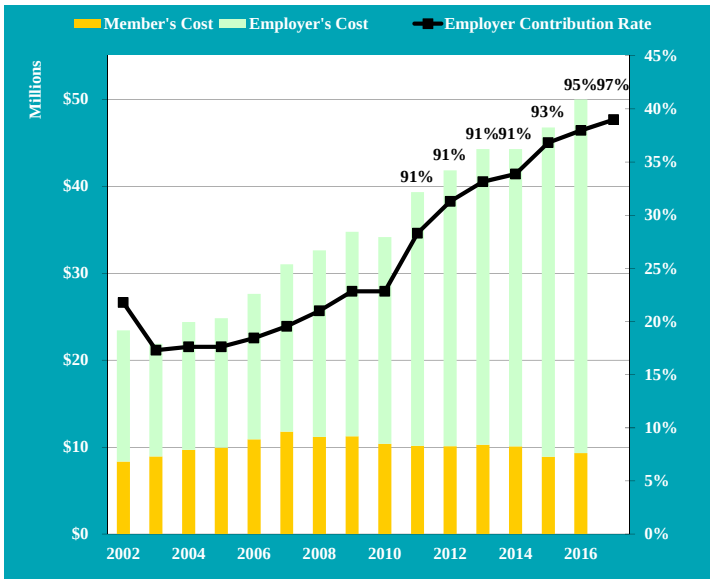
The three colored bars represent the three different measures of liability mentioned in this report. The amount represented by the top of the pink bars, the present value of future benefits (PVFB), is the amount needed to provide all benefits for the current participants and their beneficiaries. If the System had assets equal to the PVFB, no contributions would, in theory, be needed for the current members. For funding purposes, the target amount is represented by the top of the gray bar. Through the 2013 valuation, we compare the actuarial value of assets to this measure of liability in developing the funded percent (black numbers). Starting in 2014, the comparison uses the market value of assets (red numbers). These are the percentages shown in the graph labels.



SECTION I - BOARD SUMMARY

Contribution Rates

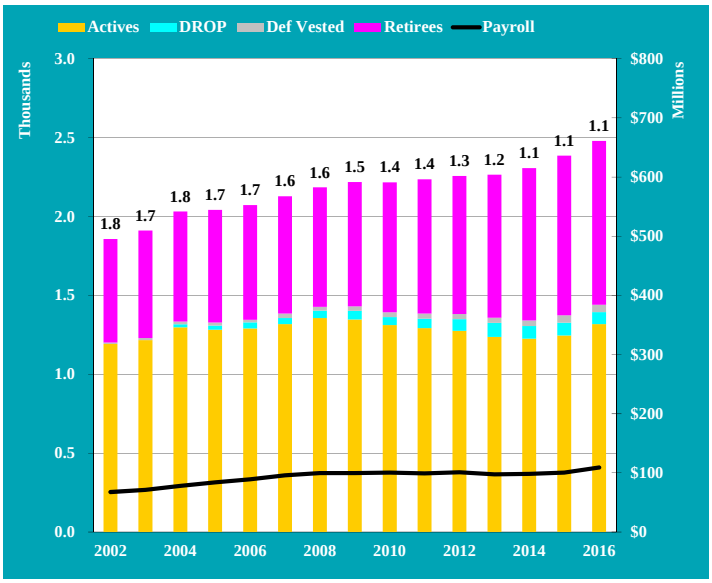
The stacked bars in this graph show the contributions made by both the County and the members (left hand scale). The black line shows the County contribution rate as a percent of payroll (right hand scale).



The member contribution rate is set by the County Ordinance. The County contribution rate is set by the actuarial process, as constrained by the corridor method. Note there is a lag in the rate shown. For example, the 2016 value is the rate prepared by the 2014 valuation and implemented for the period June 30, 2015 to June 30, 2016. Starting with FY 2011, the County contribution has been based on a corridor floor greater than 90%. The data labels show the change in this metric.

Participant Trends

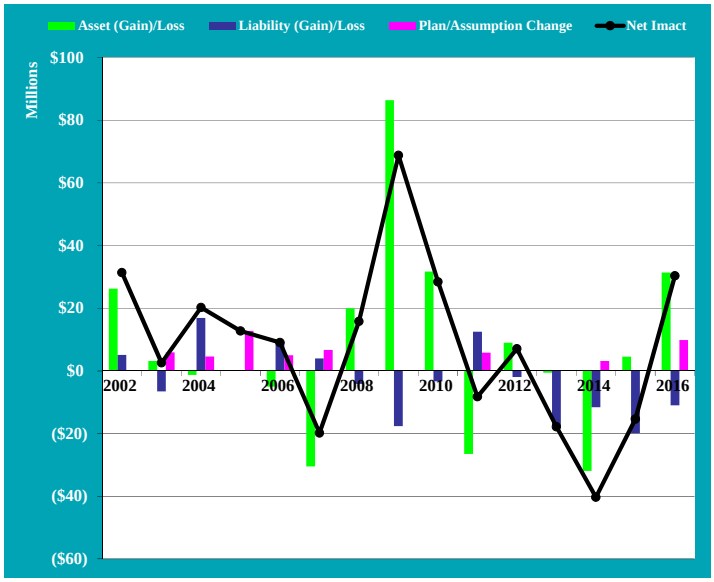
As with many systems in this country, there has been a steady growth in the number of retired members as the System has matured. The active-to-inactive ratio has decreased from 1.8 actives to each inactive in 2002 to 1.1 actives for each inactive today. While this would be an alarming trend in a pay-as-you-go system, the pool of invested assets has been established in anticipation of this development.



Starting in 2004, the chart also shows the number of DROP participants. Neither County nor member contributions are made on their behalf, which leads to a slightly lower growth in effective covered payroll for this System.

SECTION I - BOARD SUMMARY

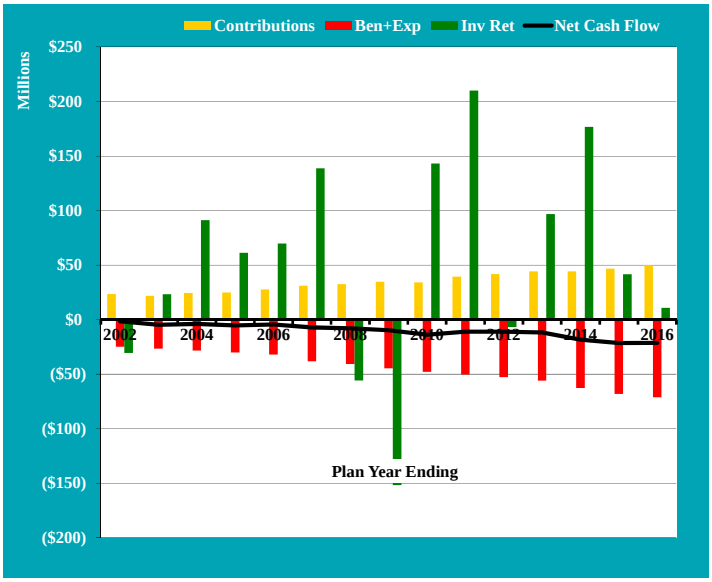
Gains and Losses



This graph shows the annual gains and losses experienced by the System, along with the change in unfunded actuarial liability (UAL) due to plan amendments and changes in assumptions. The black line shows the net impact of all such changes in a given year. Positive numbers represent increases in the UAL while negative numbers show reductions.

Cash Flow

The graph shows the annual cash flows into and out of the System. The graph shows the magnitude of the investment returns on the market value (green bars) compared to the contributions (yellow bars). The net cash flow (line) is comparing the contributions to benefits and expenses (red bar). Negative cash flow is expected for a mature system such as this one. The implications of a system with negative cash flow are that the impact of market fluctuations can be more severe. This is because, as assets are being depleted to pay benefits in down markets, there is less principal that is available to be reinvested during periods of favorable returns.



SECTION I - BOARD SUMMARY

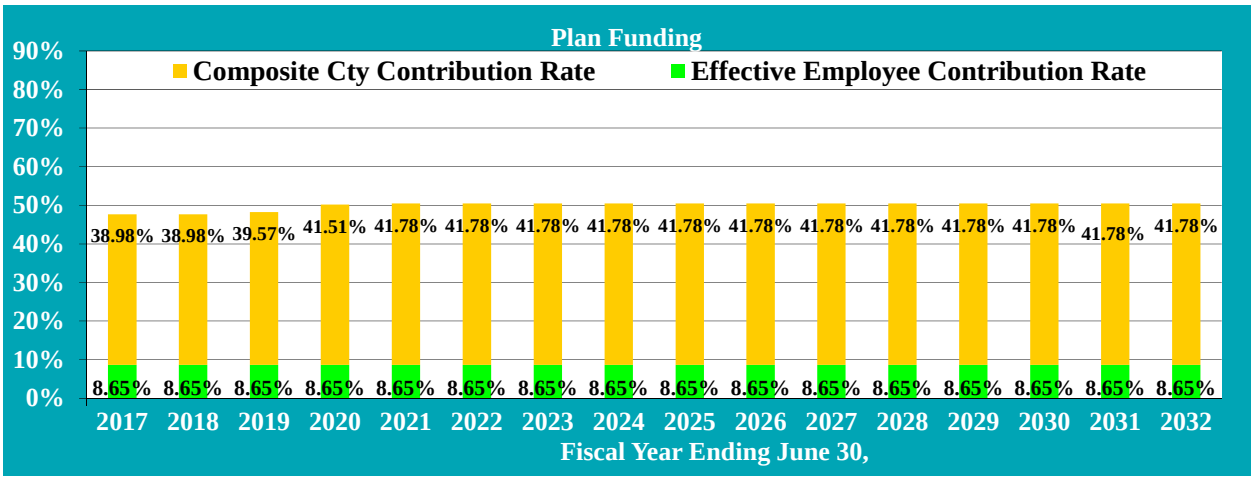
Future Outlook

Base-line Projections

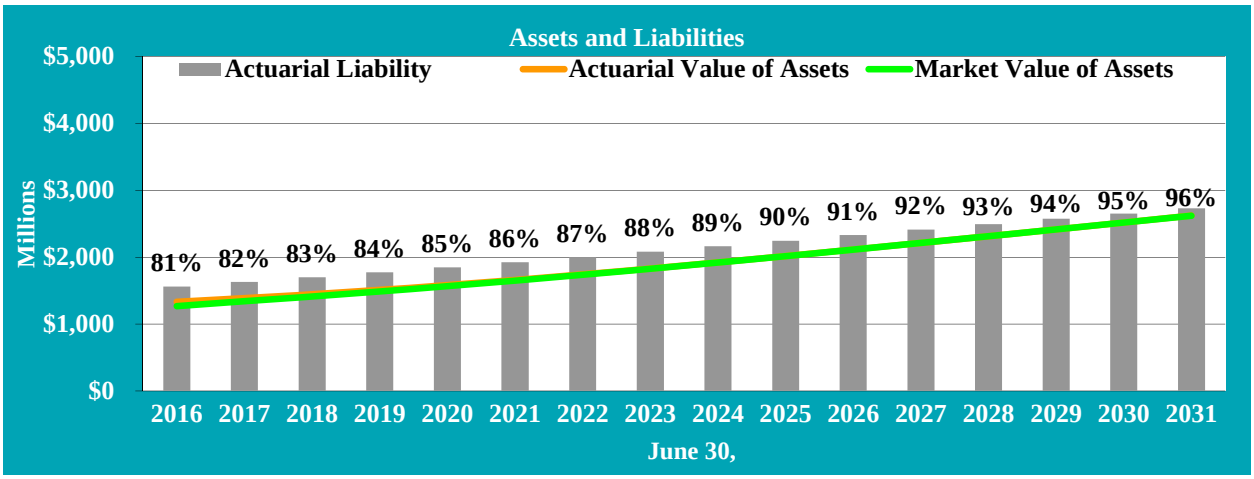
The two graphs below show the expected progress of the System over the next 15 years assuming the System's assets earn 7.25% on their *market value.*

The floor of the County's corridor contribution calculation was increased to 97% for FY 2017. In FY 2018, the amortization target could range from 97% to 98% and continue increasing until the amortization target is 100%. In addition to the increasing corridor floor, the County does not intend to reduce the contribution rate until the System is 100% funded.

The graph entitled "Plan Funding" illustrates the FY 2018 floor at 98% with 1% annual increases thereafter.



The "Assets and Liabilities" graph shows the projected funding status over the next 15 years. The funded ratio gradually increases for the entire projection period ultimately reaching 96% funded as of 2031.



SECTION I - BOARD SUMMARY

The future funding status of this System will be influenced by the investment earnings. The prior projection assumed the System would earn 7.25% each and every year, which is extremely unlikely.

In the projections that follow, we show the risk to the System under volatile markets. Since 1980, the System has averaged a 9.66% return per year. In the following charts, we show results assuming returns over the next 15 years average 4.75%, 7.25%, and 9.75%. Different patterns of returns will produce different results from those shown here.

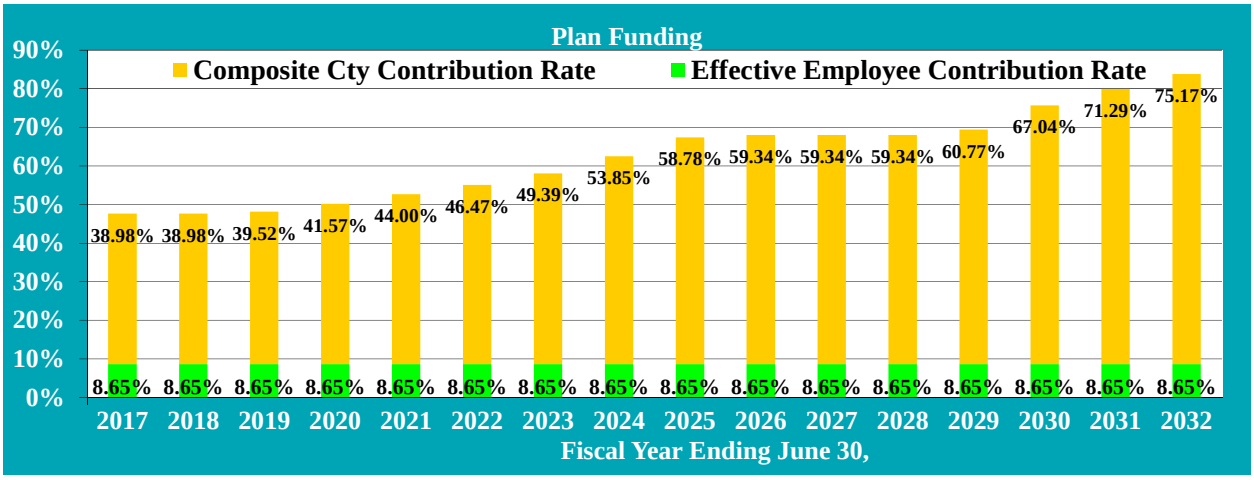
Table I-1

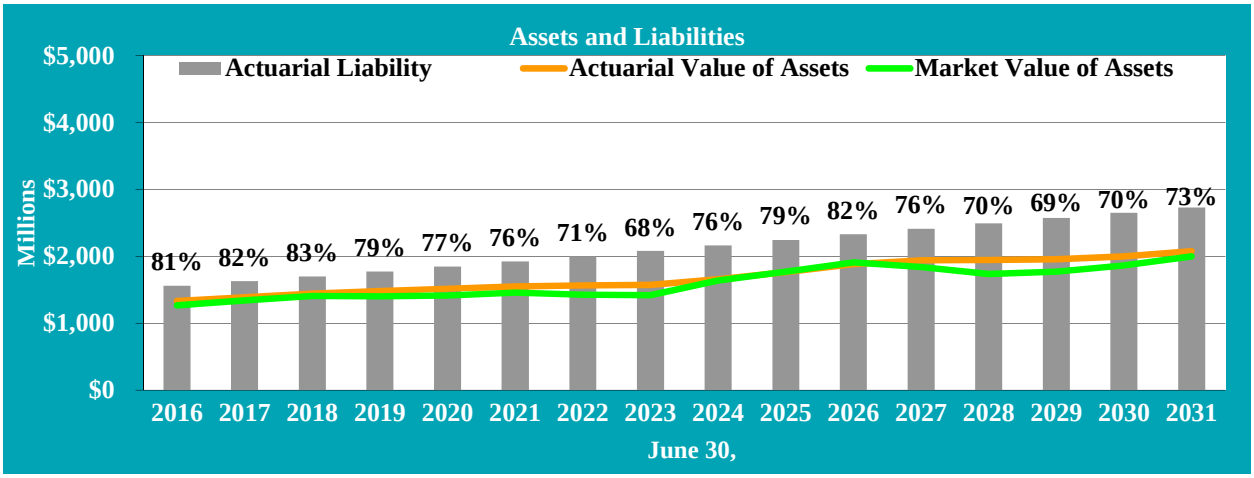
Fiscal Year Ending June 30,	Average 4.75%	Average 7.25%	Average 9.75%
2016	7.42%	2.09%	-6.10%
2017	6.80	6.92	4.29
2018	1.42	17.47	17.90
2019	2.73	29.76	32.31
2020	4.91	19.17	-9.23
2021	-0.44	5.36	12.22
2022	1.23	10.78	17.56
2023	17.34	4.05	-14.20
2024	9.25	15.35	14.94
2025	9.00	-0.69	14.58
2026	-2.36	1.80	28.20
2027	-4.00	-8.62	24.67
2028	3.95	4.40	3.70
2029	7.02	-0.84	7.12
2029	8.92	7.58	9.97
Average	**4.75%**	**7.25%**	**9.75%**

SECTION I - BOARD SUMMARY

Alternative Projection - with average return of 4.75% in the period

Under this scenario, the corridor contribution rate increases from 39% to about 75% of pay. The System's funding drops to as low as 68%; even with the ramping up of contributions.

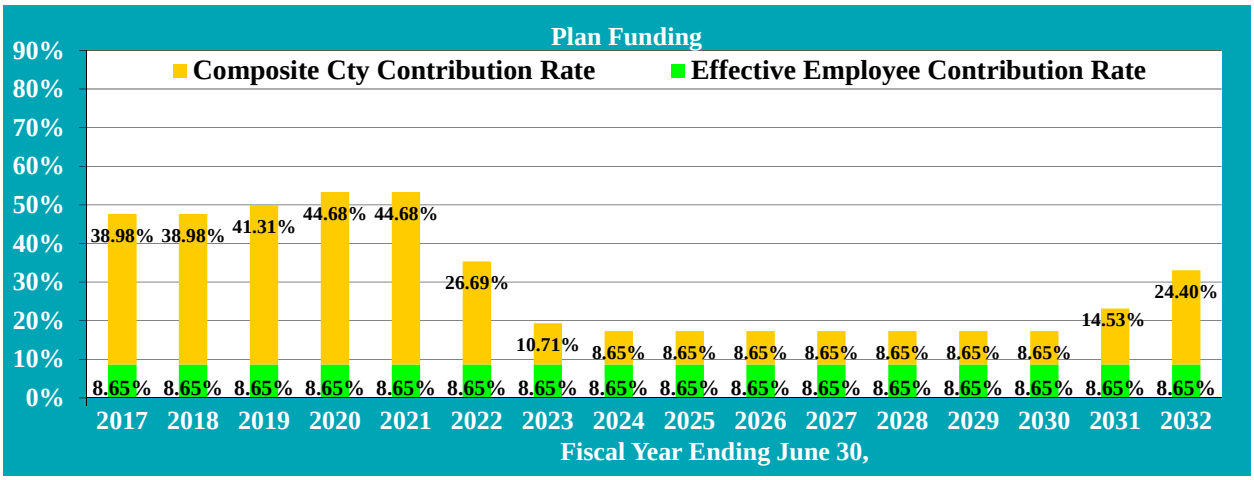


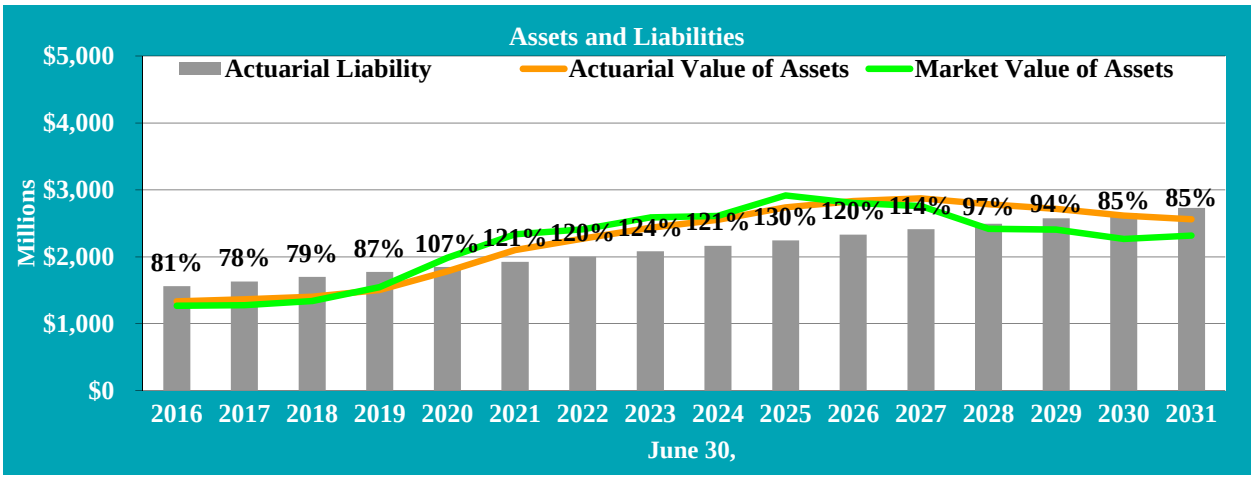


SECTION I - BOARD SUMMARY

Alternative Projection - with average return of 7.25% in the period

Under this scenario, in which the System is assumed to enjoy higher than average returns in the third through fifth years, the corridor contribution rate increases over the next few years as the corridor floor is increased to 100%. After that time, the contribution drops dramatically as returns continue to push the funded percent over the 120% top of the corridor. County contributions in this System can never drop below the member's contribution rate.

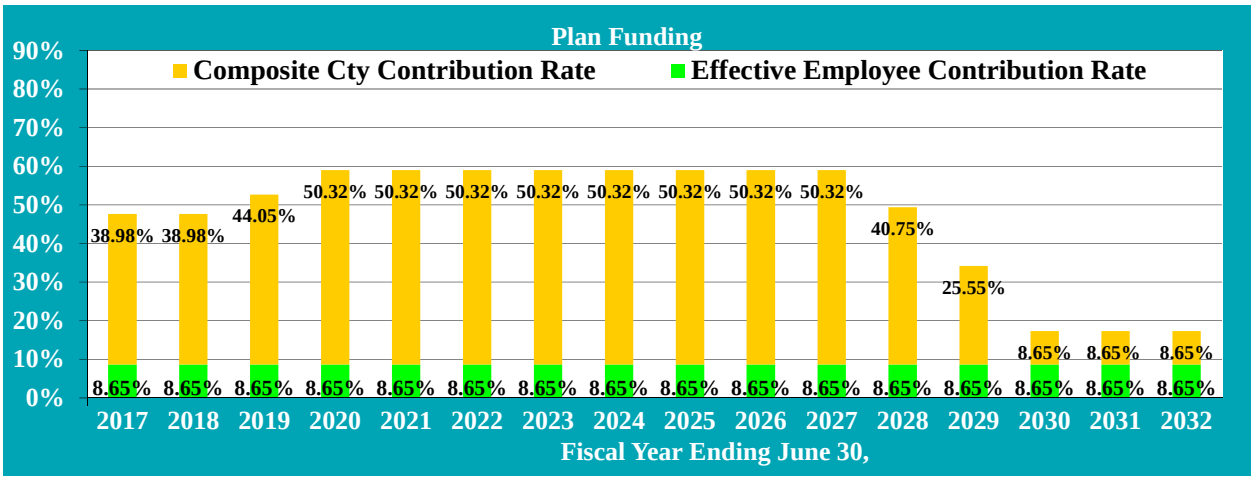


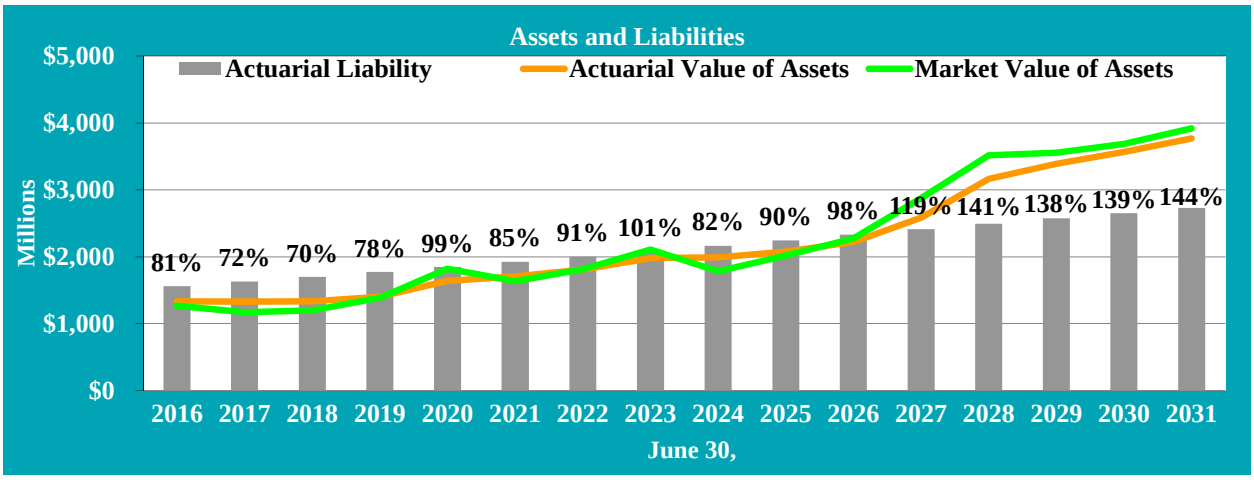


SECTION I - BOARD SUMMARY

Alternative Projection – with average return of 9.75% in the period

Under this scenario, in which returns for the first two years are less than 7.25% but subsequent returns are much higher, the corridor contribution rate increases to 50.32% where it remains until the System reaches 100% funding. This determination is made using the corridor assets. By the end of the projection period, the County rate is down to the System's minimum of 8.65%, equal to the member contribution rate.





SECTION I - BOARD SUMMARY

Table I-2
Summary of Prinicpal Plan Results

Valuation as of:	7/1/2015	6/30/2016	% Chg.
Participant Counts			
Actives (excluding DROP)	1,246	1,319	5.9%
DROPs	81	75	-7.4%
Terminated Vesteds	47	47	0.0%
In Pay Status	1,012	1,039	2.7%
Total	2,386	2,480	3.9%
Annual Salaries of Active Members	$ 100,619,957	$ 109,062,310	8.4%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 62,578,862	$ 64,765,252	3.5%
Assets and Liabilities			
Actuarial Accrued Liability (AL)	$ 1,491,060,034	$ 1,560,517,712	4.7%
Assets for Valuation Purposes (AVA)	1,289,972,504	1,333,218,360	3.4%
Unfunded Actuarial Liability	$ 201,087,530	$ 227,299,352	13.0%
Actuarial Value Funding Ratio (AVA/AL)	86.5%	85.4%	
Market Value Funding Ratio (MVA/AL)	85.9%	81.4%	
Present Value of Accrued Benefits	$ 1,313,668,963	$ 1,400,949,413	6.6%
Market Value of Assets	1,280,915,090	1,270,389,713	-0.8%
Unfunded Accrued Liability (not less than $0)	$ 32,753,873	$ 130,559,700	298.6%
Accrued Benefit Funding Ratio	97.5%	90.7%	
Contributions as a Percentage of Payroll	**Fiscal Year 2017**	**Fiscal Year 2018**	
Corridor Method:			
Normal Cost Contribution	22.38%	18.46%	
Increase Due to Amortized Changes	5.56%	6.38%	
Administrative Expense	0.30%	0.40%	
Base Rate	28.24%	25.24%	
Amortize to 97%	38.98%	36.67%	
Amortize to 98%	40.32%	37.96% [1]	

[1] The actual contribution rate to be paid by the County in FY 2018 will be held at 38.98%, which is based on the amortize to 97% amount shown above for FY 2017.

SECTION II - ASSETS

Pension system assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact upon benefit levels, County contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on System assets including:

- **Disclosure** of System assets at June 30, 2015 and June 30, 2016,
- Statement of the **changes** in market values during the year,
- Development of the **actuarial value of assets**,
- An assessment of **investment performance**, and
- A projection of the System's expected **cash flows** for the next 10 years.

Disclosure

The market value of assets represents "snap-shot or cash-out" values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not suitable for long-range planning.

The actuarial values are market values which have been smoothed; they are used for evaluating the System's ongoing liability to meet its obligations.

Current methods employed by this system set the actuarial value equal to the expected value plus 33⅓% of the difference between the expected value of assets and the actual market value, where the expected value is equal to the prior year's actuarial value, rolled forward with actual contributions, benefit payments, and administrative expenses plus interest imputed at the prior year investment return assumption of 7.50%.

SECTION II - ASSETS

Table II-1
Statement of Assets at Market Value

	6/30/2015	6/30/2016
Assets		
Equity in County's Pooled Cash, Contributions Receivable and Other Assets	$ 3,822,073	$ 4,223,869
Accrued Interest and Dividends Receivable	2,110,672	2,162,693
Receivable from Sale of Investments	1,904,055	3,536,699
US Government Obligations	53,758,847	53,072,184
Asset-Backed Securities	78,818,452	75,710,401
Other Bonds and Notes	50,064,788	70,178,147
Common and Preferred Stock	141,882,708	151,533,585
Pooled and Mutual Funds	909,208,150	860,476,806
Short-Term Investments	44,075,294	55,523,234
Cash Collateral Received Under Securities Lending Agreements	15,634,903	12,294,528
Total Assets	$ 1,301,279,942	$ 1,288,712,146
Liabilities		
Payable for Collateral Received Under Securities Lending Agreements	$ 15,634,903	$ 12,294,528
Payable for Purchase of Investments	2,789,710	3,857,400
Accounts Payable and Accrued Expenses	1,940,239	2,170,505
Total Liabilities	$ 20,364,852	$ 18,322,433
Net Assets Available for Benefits	**$ 1,280,915,090**	**$ 1,270,389,713**

SECTION II - ASSETS

Table II-2
Changes in Market Values

Value of Assets – July 1, 2015			$	1,280,915,090
Additions				
Contributions:				
County Contributions	$	40,646,884		
Employee Contributions		9,324,066		
Total Contributions			$	49,970,950
Investment Income:				
Net Appreciation (Depreciation) in Fair Value of Investments	$	(2,135,185)		
Interest		11,420,882		
Dividends		4,720,946		
Total Investment Income	$	14,006,643		
Investment Activity Expenses:				
Management Fees	$	(2,933,668)		
Custodian Fees		(76,557)		
Consulting Expense		(40,996)		
Allocated Administrative Expenses		(236,767)		
Total Investment Activity Expenses	$	(3,287,988)		
From Securities Lending Activities:				
Securities Lending Income	$	67,164		
Securities Lending Expenses				
Borrowers Rebates		0		
Management Fees		(21,791)		
Net Income from Securities Lending Activities	$	45,373		
Net Investment Income			$	10,764,028
Total Additions			$	60,734,978
Deductions				
Annuity Benefits	$	(65,061,094)		
Disability Benefits		(1,397,337)		
Survivor Benefits		(3,894,192)		
Refunds and Other Expenses		(397,188)		
Administrative Expenses		(510,544)		
Total Deductions			$	(71,260,355)
Total				
Net Increase (Decrease)			$	(10,525,377)
Value of Assets – June 30, 2016			**$**	**1,270,389,713**

SECTION II - ASSETS

Actuarial Value of Assets

The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce, or eliminate, erratic results which could develop from short-term fluctuations in the market value of assets. For this system, the actuarial value has been calculated by adding 33⅓% of the difference between market value and expected value to the expected value. The following table illustrates the calculation of the actuarial value of assets for the June 30, 2016 valuation.

Table II-3
Development of Actuarial Value of Assets
as of June 30, 2016

1.	Actuarial Value of Assets at July 1, 2015	**$ 1,289,972,504**
2.	Amount in (1) with Interest to June 30, 2016	1,386,720,442
3.	County and Member Contributions for the Plan Year Ended June 30, 2016	49,970,950
4.	Interest on Contributions Assuming Received Uniformly Throughout the Year to June 30, 2016	1,873,911
5.	Disbursements from Trust Except Investment Expenses, July 1, 2015 Through June 30, 2016	(71,260,355)
6.	Interest on Disbursements Assuming Payments Made Uniformly Throughout the Year to June 30, 2016	(2,672,264)
7.	Expected Value of Assets at June 30, 2016 = (2) + (3) + (4) + (5) + (6)	1,364,632,684
8.	Market Value of Assets at June 30, 2016	1,270,389,713
9.	Excess of (8) Over (7)	$ (94,242,971)
10.	Actuarial Value of Assets at June 30, 2016 = (7) + 33-1/3% of (9)	**$ 1,333,218,360**

** All interest adjustments are made using the 7 ½% per annum actuarial assumed interest rate that was in effect in the prior year.*

SECTION II - ASSETS

Investment Performance

The market value of assets (MVA) returned 0.85% during 2016, which is less than the assumed 7.50% return. A return of 5.04% on the actuarial value of assets (AVA) is primarily the result of the asset smoothing method being utilized for the calculation of the actuarial value of assets. Since only 33⅓% of the gain or loss from the performance of the System is recognized in a given year, in periods of very good performance, the AVA can lag significantly behind the MVA. In a period of negative returns, the AVA does not decline as rapidly as the MVA.

Table II-4
Annual Rates of Return

Year Ending June 30,	Market Value	Actuarial Value	Total Return Standard & Poor's 500 Index	Barclays Global Aggregate Index[1]
1992	12.2%	10.0%	13.5%	14.2%
1993	15.0%	11.4%	13.6%	13.2%
1994	3.4%	7.6%	1.3%	-1.5%
1995	14.6%	10.5%	26.1%	12.8%
1996	16.1%	19.2% [2]	26.0%	4.7% [3]
1997	21.4%	15.1%	34.7%	8.2%
1998	17.3%	8.1%	30.2%	10.5%
1999	8.1%	15.9%	22.8%	3.1%
2000	7.7%	12.7%	7.2%	4.6%
2001	-3.1%	7.0%	-14.8%	11.2%
2002	-5.1%	3.0%	-18.0%	8.6%
2003	4.1%	3.3%	0.3%	10.4%
2004	15.5%	7.0%	19.1%	0.3%
2005	9.1%	7.7%	6.3%	6.8%
2006	9.5%	8.3%	8.6%	-0.8%
2007	17.4%	11.4%	20.6%	6.1%
2008	-6.0%	5.2%	-13.1%	7.1%
2009	-17.6%	-2.1%	-26.2%	5.5%
2010	20.5%	3.9%	14.4%	9.5%
2011	25.3%	10.5%	30.8%	3.9%
2012	-0.7%	6.6%	5.4%	7.5%
2013	9.6%	7.6%	20.6%	-0.1%
2014	16.2%	10.3%	24.6%	4.4%
2015	3.3%	7.1%	7.4%	1.8%
2016	0.9%	5.0%	4.0%	6.0%

[1] Formerly the Lehman Global Aggregate Bond Index.
[2] The actuarial return in 1996 reflects the adjustment to a revised actuarial valuation method.
[3] Figures shown prior to 1997 are Shearson Lehman Government/Corporate Bond Index.

SECTION II - ASSETS

Expected benefit payments are projected for the closed group valued at June 30, 2016. Projecting any further than 10 years using a closed-group would not yield reliable predictions due to the omission of new hires.

Expected employer contributions are projected based on the current County contribution rate of 38.98% for FY 2017, and then using amortize to 98% rate for FY 2018, amortize to 99% for FY 2019 and so on increasing to 100%. This projection assumes no further gains or losses and a 2.75% annual increase in the total covered payroll, and models the anticipated impact of new hires coming in with altered plan provisions.

Table II-5
Projection of System's Benefit Payments and Employer Contributions

Year Beginning July 1,	Expected Benefit Payments	Expected County Contributions
2016	$ 71,100,000	$ 42,512,000
2017	77,460,000	43,682,000
2018	77,225,000	45,189,000
2019	84,556,000	47,958,000
2020	88,389,000	49,277,000
2021	93,640,000	50,632,000
2022	99,384,000	52,024,000
2023	104,145,000	53,455,000
2024	108,617,000	54,925,000
2025	113,669,000	56,435,000

SECTION III - LIABILITIES

In this section, we present detailed information on system liabilities including:

- **Disclosure** of system liabilities at June 30, 2015 and June 30, 2016,
- Statement of **changes** in these liabilities during the year, and
- A **projection** of future liabilities.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the System, this represents the amount of money needed today to fund all future benefits and expenses of the System, assuming participants continue to accrue benefits and all assumptions are met.

- **Actuarial Accrued Liability:** Used for funding calculations and GASB disclosures, this liability is calculated taking the present value of benefits above and subtracting the present value of future member contributions and future employer normal costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal** funding method.

- **Present Value of Accrued Liabilities:** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fully pay off the current accrued obligations of the System, assuming no future accruals of benefits and that all assumptions are met, including the 7.25% investment return. These liabilities are also used to assess whether the System can meet its current benefit commitments.

None of the liability figures disclosed in this report is meant to be a measure of the System's settlement liability.

The following table discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of System assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

SECTION III - LIABILITIES

Table III-1
Liabilities/Net (Surplus)/Unfunded

	July 1, 2015	June 30, 2016
Present Value of Future Benefits		
Active Participant Benefits (excluding DROP)	$ 854,975,305	$ 844,248,040
DROP Participant Benefits	106,579,962	99,592,292
Retiree Benefits	848,265,136	888,212,589
Terminated Vested and Inactive Members	6,847,419	7,299,722
Present Value of Benefits (PVB)	**$ 1,816,667,822**	**$ 1,839,352,643**
Market Value of Assets (MVA)	$ 1,280,915,090	$ 1,270,389,713
Future Employee Contributions	89,482,542	87,968,548
Future County Contributions	446,270,190	480,994,382
Total Resources	**$ 1,816,667,822**	**$ 1,839,352,643**
Actuarial Accrued Liability		
Present Value of Benefits (PVB)	$ 1,816,667,822	$ 1,839,352,643
Present Value of Future Normal Costs (PVFNC)		
County Portion	236,125,246	190,866,383
Employee Portion	89,482,542	87,968,548
Actuarial Accrued Liability (AAL = PVB - PVFNC)	**$ 1,491,060,034**	**$ 1,560,517,712**
Actuarial Value of Assets (AVA)	1,289,972,504	1,333,218,360
Net (Surplus)/Unfunded (AAL – AVA)	**$ 201,087,530**	**$ 227,299,352**
Present Value of Accrued Benefits		
Present Value of Benefits (PVB)	$ 1,816,667,822	$ 1,839,352,643
Present Value of Future Benefit Accruals (PVFBA)	502,998,859	438,403,230
Present Value of Accrued Benefits (PVAB = PVB – PVFBA)	**$ 1,313,668,963**	**$ 1,400,949,413**
Market Value of Assets (MVA)	$ 1,280,915,090	$ 1,270,389,713
Net Unfunded, not less than $0 (PVAB – MVA)	**$ 32,753,873**	**$ 130,559,700**

SECTION III - LIABILITIES

Changes in Liabilities

Each of the liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above and also due to changes in System assets resulting from the following:

- County contributions less than the full actuarial contribution
- Investment earnings different than expected
- A change in the method used to measure System assets

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the System. Below we present key changes in liabilities since the last valuation.

Table III-2

	Present Value of Benefits	Actuarial Accrued Liability	Present Value of Accrued Benefits
Liabilities 7/1/2015	$ 1,816,667,822	$ 1,491,060,034	$ 1,313,668,963
Liabilities 6/30/2016	1,839,352,643	1,560,517,712	1,400,949,413
Liability Increase (Decrease)	$ 22,684,821	$ 69,457,678	$ 87,280,450
Change Due to:			
Plan Amendment	$ 0	$ 0	$ 0
Actuarial (Gain)/Loss	*Not Calculated*	(10,963,818)	*Not Calculated*
Method and Assumption Changes	(36,091,443)	9,895,400	27,556,531
Benefits Accumulated and Other Sources	58,776,264	70,526,096	59,723,919

SECTION IV - CONTRIBUTIONS

In the process of evaluating the financial condition of any pension system, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the system. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that is both stable and predictable.

For this system, the funding method employed is the **Entry Age Actuarial Cost Method**. Under this method, there are three components to the total contribution: the **normal cost rate**, the **unfunded actuarial liability rate** (UAL rate), and the **administrative expense rate**. The normal cost rate is determined in the following steps. First, an individual normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits. This value is then divided by the value, also at entry age, of the member's expected future salary. Second, the normal cost rate is multiplied by current salary and added together to obtain the total rate. Finally, the total normal cost rate is reduced by the average member contribution rate to produce the County's normal cost rate.

Budgeted Rate (Based on Corridor Method)

The County's total contribution rate is equal to the normal cost rate plus rate changes due to amendments passed or assumption changes adopted since July 1, 2001 plus the expense rate as long as the System's actuarial funded status remains within a corridor of 90% to 120%. The normal cost rate and actuarial accrued liability will continue to be measured using the entry age funding method. If the funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a 15-year amortization equal to the amount necessary to re-enter the corridor.

Table IV-1

Changes Since 2001	Impact on UAL Rate
2002 ad-hoc COLA	+ 0.32%
2004 ad-hoc COLA	+ 0.48%
2005 Implementation of DROP	+ 0.16%
2005 ad-hoc COLA	+ 0.46%
2005 Assumption Changes	+ 0.83%
2006 ad-hoc COLA	+ 0.45%
2007 ad-hoc COLA	+ 0.45%
2007 Remove 30 year service cap on benefits	+ 0.07%
2008 ad-hoc COLA	+ 0.50%
2010 Assumption Changes	+ 0.52%
2014 Assumption Changes	+ 1.32%
2016 Assumption Changes	+ 0.82%
Total Increase	+ 6.38%

SECTION IV - CONTRIBUTIONS

The table below presents and compares the budgeted rate for the System for this valuation and the prior one. In both cases, the amortization follows the corridor method amortization to Total County Rate using 90%.

Table IV-2
Actuarially Determined Rate (for Corridor Contribution)

Valuation Date	July 1, 2015	June 30, 2016
Fiscal Year	2017	2018
Normal Cost Rate	22.38%	18.46%
UAL Rate	5.56%	6.38%
Amortization of Amount Outside Corridor (to 90%)	1.39%	2.40%
Expense Rate	0.30%	0.40%
Total County Rate	29.63%	27.64%
Total Rate with Alternative Amortization Targets of		
97%	38.98% [1]	36.67%
98%	40.32%	37.96% [2]

[1] The actual contribution rate being paid by the County in FY 2017 is 38.98%, which is based on the amortize 97% amount shown above.

[2] The County has a policy of not paying any less than the existing rate until such a time as the UAL has been exhausted. FY 2018 will be held at the 38.98% rate in effect for FY 2017.

SECTION IV - CONTRIBUTIONS

Table IV-3
Development of Corridor Contribution Rate

		July 1, 2015 (for FY 2017)	June 30, 2016 (for FY 2018)
1.	**Present Value of Future Benefits**		
	a. Active Employees	$ 854,975,305	$ 844,248,040
	b. DROP	106,579,962	99,592,292
	c. Retired Members	848,265,136	888,212,589
	d. Vested Terminated and Inactive Members	6,847,419	7,299,722
	e. Total Present Value	$ 1,816,667,822	$ 1,839,352,643
2.	**Present Value of Future Normal Costs**		
	a. County Portion	$ 236,125,246	$ 190,866,383
	b. Employee Portion	89,482,542	87,968,548
	c. Total Present Value	$ 325,607,788	$ 278,834,931
3.	**Actuarial Accrued Liability (1) – (2)**	$ 1,491,060,034	$ 1,560,517,712
4.	**Actuarial Value of Assets for Corridor Purposes**		
	a. Actuarial Assets	$ 1,289,972,504	$ 1,333,218,360
	b. Outstanding Balance of Plan and Assumption Changes	36,445,169	42,208,334
	c. Adjusted Assets (a) + (b)	$ 1,326,417,673	$ 1,375,426,694
5.	**Funding Ratio for Corridor Test**	89.0%	88.1%
6.	**Liability to be Amortized if outside Corridor**		
	a. [97% or 98%] x (3) - (4)(c)	$ 119,910,560	$ 153,880,664
	b. (4)(c) - 120%x(3)	0	0
7.	**Active Member Payroll**	$ 100,619,957	$ 109,062,310
8.	**Unfunded Liability Amortization Factor**	11.0918	11.0842
9.	**Amortization as a % of Payroll (6)/(7)/(8)**	10.74%	12.72%
10.	**County Contribution Results (Corridor)**		
	a. Normal Cost Rate	22.38%	18.46%
	b. Administrative Expense Rate	0.30%	0.40%
	c. Plan Change Amortizations	5.56%	6.38%
	d. Amortization Outside Corridor (9)	10.74%	12.72%
	e. Total County Contribution Rate June 30[1]	38.98%	37.96%

[1] The actual contribution rate to be paid by the County in FY 2018 will be held at 38.98%, which is based on the amortize to 97% amount shown above for FY 2017.

SECTION V - ACCOUNTING STATEMENT INFORMATION

ASC Topic 960 of the Financial Accounting Standards Board (FASB) describes certain disclosures regarding a plan's funded status.

The FASB ASC Topic 960 disclosures provide a quasi "snap shot" view of how the System's assets compare to its liabilities if contributions stopped and accrued benefit claims had to be satisfied. However, due to potential legal requirements and the possibility that alternative interest rates would have to be used to determine the liabilities, these values may not be a good indication of the amount of money it would take to buy the benefits for all members if the System were to terminate.

FASB ASC Topic 960 specifies that a comparison of the present value of accrued (accumulated) benefits with the market value of the assets as of the valuation date must be provided. The relevant amounts as of June 30, 2015 and June 30, 2016 are exhibited in Table V-1, which also includes a reconciliation of liabilities determined as of the prior valuation, July 1, 2015 to the liabilities as of June 30, 2016.

Table V-2 is a history of gains and losses in Accrued Liability, and Table V-3 is the Solvency Test which shows the portion of Accrued Liability covered by Assets. See our report dated October 3, 2016 for the required disclosures under GASB Statement Number 67.

SECTION V - ACCOUNTING STATEMENT INFORMATION

Table V-1
Accounting Statement Information

		July 1, 2015	June 30, 2016
A.	**FASB ASC Topic 960 Basis**		
1.	Present Value of Benefits Accrued and Vested to Date		
a.	Members Currently Receiving Payments	$ 848,265,136	$ 888,212,589
b.	Vested Terminated and Inactive Members	6,847,419	7,299,722
c.	DROP	106,579,962	99,592,292
d.	Active Members	345,578,264	397,324,236
e.	Total PVVB	$ 1,307,270,781	$ 1,392,428,839
2.	Present Value of Non-Vested Accrued Benefits for Active Members	6,398,182	8,520,574
3.	Total Present Value of Accrued Benefits	$ 1,313,668,963	$ 1,400,949,413
4.	Assets at Market Value	1,280,915,090	1,270,389,713
5.	Unfunded Present Value of Accrued Benefits, But Not Less Than Zero	$ 32,753,873	$ 130,559,700
6.	Ratio of Assets to Value of Benefits (4) / (3)	97.5%	90.7%

B.	**Statement of Changes in Present Value of Accrued Benefits**	
	Actuarial Present Value of Accrued Benefits as of July 1, 2015	$ 1,313,668,963
	Increase (Decrease) During Year Attributable to:	
	Passage of Time	$ 97,938,794
	Benefit Paid – FY 2016	(70,749,811)
	Assumption Changes	27,556,531
	Plan Amendment	0
	Benefits Accrued, Other Gains/Losses	32,534,936
	Net Increase (Decrease)	$ 87,280,450
	Actuarial Present Value of Accrued Benefits as of June 30, 2016	$ 1,400,949,413

SECTION V - ACCOUNTING STATEMENT INFORMATION

Table V-2
Analysis of Financial Experience
Gains and Losses in Accrued Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience and Actual Experience

Type of Activity	Gain (or Loss) for Year ending June 30, 2011	2012	2013	2014	2015	2016
Investment Income	$ 26,496,140	$ (8,996,470)	$ 523,678	$ 31,937,393	$ (4,528,707)	$ (31,414,324)
Combined Liability Experience	(12,495,024)	1,919,058	17,282,544	11,575,441	19,857,201	10,963,818
Gain (or Loss) During Year from Financial Experience	$ 14,001,116	$ (7,077,412)	$ 17,806,222	$ 43,512,834	$ 15,328,494	$ (20,450,506)
Non-Recurring Items	(5,795,987)	0	0	(3,202,649)	0	(9,895,400)
Composite Gain (or Loss) During Year	**$ 8,205,129**	**$ (7,077,412)**	**$ 17,806,222**	**$ 40,310,185**	**$ 15,328,494**	**$ (30,345,906)**

Table V-3
Solvency Test

Valuation Date June 30,	Aggregate Accrued Liabilities For (1) Active Member Contributions	(2) Retirees Vested Terms, Beneficiaries & DROP	(3) Active Members (Employer Financed Portion)	Reported Assets*	Portion of Accrued Liabilities by Reported Assets (1)	(2)	(3)
2011	$ 104,188,027	$ 732,172,476	$ 383,248,604	$ 982,153,681	100%	100%	38%
2012	107,411,328	798,639,061	380,790,276	1,035,444,171	100%	100%	34%
2013	107,211,514	859,305,980	374,612,001	1,101,474,728	100%	100%	36%
2014	106,872,811	913,113,803	421,557,979	1,224,882,430	100%	100%	49%
2015	105,765,035	961,692,517	423,602,482	1,289,972,504	100%	100%	53%
2016	110,961,165	995,104,603	454,451,944	1,333,218,360	100%	100%	50%

* Reported assets are the actuarial value of assets in this demonstration.

APPENDIX A - MEMBERSHIP INFORMATION

The data for this valuation was provided electronically by the Fairfax County Retirement System staff. Cheiron did not perform a formal audit on the data. However, we did perform checks of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice Number 23 – Data Quality. The data was collected as of December 31, 2015.

Data reported in this Appendix is as of the December 31, 2015 data collection date. Covered payroll and benefits in pay status reported elsewhere in this report have been adjusted to approximate the June 30, 2016 values.

For inactive participants given with a Joint and Survivor form of benefit and no continuation percentage provided, a survivor percentage of 100% is assumed.

APPENDIX A - MEMBERSHIP INFORMATION

Summary of Membership Data as of June 30, 2016

Active Members *	Count	Annual Salary Rates	Average Annual Salary
Employed Prior to July 1, 1981	2	$ 365,349	$ 182,674
Employed on or After July 1, 1981	1,061	89,693,113	84,536
Employed on or After January 1, 2013	256	15,044,642	58,768
Total	1,319	$ 105,103,104	$ 79,684
Average Age	38.3		
Average Service	12.1		

*Excludes DROP Participants

Inactive Members and DROP Participants	Count	Total Annual Benefit	Average Monthly Benefit
Service Retirement	880	$ 59,126,595	$ 5,599
Service–Connected Disability	30	1,280,136	3,556
Ordinary Disability	6	135,167	1,877
Beneficiaries	123	3,577,547	2,424
Total/Average in Payment Status	1,039	$ 64,119,445	$ 5,143
DROP	75	$ 5,422,669	$ 6,025
Vested Former Members	47	$ 908,661	$ 1,611

APPENDIX A - MEMBERSHIP INFORMATION

Data Reconciliation from July 1, 2015 to June 30, 2016

	Active	DROP	Terminated Vested	Retired	Service-Connected Disability	Ordinary Disability	Widow	Beneficiary	Child	Total
Participant count as of July 1, 2015	**1,246**	**81**	**47**	**862**	**28**	**6**	**89**	**21**	**6**	**2,386**
New Hires / Re-hires	113									**113**
Terminated Vested	(5)		5							**0**
DROP	(11)	11								**0**
Retired	(3)	(16)	(1)	20						**0**
Deceased with beneficiary	(4)	(1)		(2)			6	5	3	**7**
Deceased without beneficiary	(3)		(5)					(5)		**(13)**
Benefits Expired									(1)	**(1)**
Ordinary Disability										**0**
Service-Connected Disability	(1)				1					**0**
Terminated Not Vested	(13)									**(13)**
Corrections			1		1		(1)			**1**
Change	73	(6)	0	18	2	0	5	0	2	**94**
Participant count as of June 30, 2016	**1,319**	**75**	**47**	**880**	**30**	**6**	**94**	**21**	**8**	**2,480**

APPENDIX A - MEMBERSHIP INFORMATION

Distribution of Active Participants - - Total

COUNTS BY AGE/SERVICE

Age	Service								Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	
Under 25	56	31	4	0	0	0	0	0	91
25 to 29	38	95	45	2	0	0	0	0	180
30 to 34	6	42	106	56	0	0	0	0	210
35 to 39	7	15	39	116	65	0	0	0	242
40 to 44	2	8	16	61	131	53	0	0	271
45 to 49	1	2	6	37	57	84	14	0	201
50 to 54	0	1	5	17	17	30	29	2	101
55 to 59	0	2	3	3	2	6	1	5	22
60 to 64	0	0	0	0	1	0	0	0	1
65 & up	0	0	0	0	0	0	0	0	0
Total	110	196	224	292	273	173	44	7	1,319

TOTAL SALARY BY AGE/SERVICE

Age	Service								Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	
Under 25	$ 3,232,205	$ 1,707,198	$ 243,844	$ 0	$ 0	$ 0	$ 0	$ 0	$ 5,183,247
25 to 29	2,278,450	5,699,364	3,018,252	131,178	0	0	0	0	11,127,244
30 to 34	360,694	2,571,901	7,712,668	4,498,591	0	0	0	0	15,143,854
35 to 39	429,831	963,049	2,923,355	9,508,739	5,775,225	0	0	0	19,600,199
40 to 44	119,486	550,714	1,265,301	4,969,263	11,483,896	5,291,045	0	0	23,679,705
45 to 49	68,656	135,865	454,892	3,068,100	4,934,076	8,349,450	1,610,775	0	18,621,814
50 to 54	0	70,206	360,920	1,359,334	1,416,111	2,821,881	3,165,782	197,907	9,392,141
55 to 59	0	143,846	232,011	245,235	172,368	607,625	100,817	771,499	2,273,401
60 to 64	0	0	0	0	81,499	0	0	0	81,499
65 & up	0	0	0	0	0	0	0	0	0
Total	$ 6,489,322	$ 11,842,143	$ 16,211,243	$ 23,780,440	$ 23,863,175	$ 17,070,001	$ 4,877,374	$ 969,406	$ 105,103,104

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

A. Long-Term Assumptions Used to Determine System Costs and Liabilities

1. Demographic Assumptions

a. Healthy Mortality

Annual Deaths Per 10,000 Members Mortality Projected to 2016		
Age	Male	Female
20	6	2
25	6	2
30	5	2
35	6	3
40	8	5
45	13	8
50	52	29
55	67	38
60	90	59
65	139	98
70	223	156
75	364	251
80	605	414
85	1,032	726
90	1,768	1,281
95	2,720	2,072
100	3,788	3,022

110% and 100% of the RP-2014 Healthy Annuitant Mortality Table for males and females, respectively, projected using the RPEC-2015 model, with an ultimate rate of 0.75% for ages 20-85 grading down to an ultimate rate of 0% for ages 115-120 and convergence to the ultimate rate in the year 2015. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

20% of pre-retirement deaths are assumed to be service-connected.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

b. Disabled Mortality

Annual Deaths Per 1,000 Members Mortality Projected to 2016		
Age	Male	Female
45	19	11
50	22	14
55	23	15
60	25	19
65	31	25
70	42	34
75	58	50
80	82	74

100% and 115% of the RP-2014 Disabled Annuitant Mortality Table for males and females, respectively, projected using the RPEC-2015 model, with an ultimate rate of 0.75% for ages 20-85 grading down to an ultimate rate of 0% for ages 115-120 and convergence to the ultimate rate in the year 2015. The valuation uses fully generational projection of mortality improvements. Sample rates shown are projected through the valuation date.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

c. Termination of Employment (Prior to Normal Retirement Eligibility)

Annual Terminations Per 1,000 Members	
Years of Service	Terminations
0	70
1	50
2	40
3	33
4	28
5	23
6	20
7	15
8	14
9	11
10	8
11	7
12	6
13	6
14	5
15	5
16	4
17	4
18	3
19	3
20	2
21	2
22	1
23	1
24	1
25 or more	0

It is assumed that members who terminated before normal or early retirement age elect to receive a refund of contributions instead of vested benefits.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

d. Disability

Annual Disabilities Per 1,000 Members*	
Age	Male and Female
20	1
25	1
30	1
35	1
40	2
45	3
50	5
55	8
60	8

* 70% of disabilities are assumed to be service-connected. Of these, 100% are assumed to receive Workers' Compensation benefits.

e. Retirement/DROP

Years of Service	Retirement/DROP*
25	40%
26	40
27	40
28	40
29	40
30	40
31	40
32	40
33	40
34	40
35+	100

* 70% of those who leave under this decrement are assumed to DROP, with the other 30% taking immediate retirement.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

f. Merit/Seniority Salary Increase (in addition to across-the-board increase)

Years of Service*	Merit/Seniority Increase
0	7.00%
1	6.00
2	5.00
3	4.00
4	3.00
5	2.00
6+	1.00

g. Family Composition

For purposes of valuing the pre-retirement death benefit, an assumption concerning how many employees are married is needed. The assumption used in this valuation is that 80% of active employees are married at death and that the female spouse is five years-younger than the male spouse. In addition, each married employee is assumed to have two children, 22 and 24 years younger than the employee.

h. Sick Leave Credit

Unused sick leave balances as reported for each active member are used as of the valuation date. Future sick leave accruals are assumed to accrue at 100% of each participant's annual average but are capped at 124 hours per year.

2. Economic Assumptions

a.	Rate of Investment Return:	7.25%
b.	Rate of General Wage Increase:	2.75%
c.	Rate of Increase in Cost of Living:	2.50% *
d.	Rate of Increase in Total Payroll (for Amortization):	2.75%
e.	Administrative Expenses as a Percentage of Payroll:	0.40%

* Benefit increases are limited to 4% per year.

3. Rationale for Assumptions

The actuarial assumptions were adopted by the Board of Trustees upon the recommendation of the actuary, based on an experience study performed in 2016. The results of this study were presented in a report dated June 2016 and are incorporated into this report by reference.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

4. Changes Since Last Valuation

All of the assumptions were reviewed as part of the experience study performed in early 2016. The assumptions that were changed since the last valuation include healthy and disabled mortality rates, termination, disability and DROP rates, salary increases, sick leave credit, investment return, general wage increase, cost-of-living adjustments, total payroll increase, and administrative expenses as a percentage of payroll.

The data collection and valuation processes were also changed to use a data collection and measurement date of December 31, 2015 and roll-forward the resulting liabilities to the June 30, 2016 valuation date.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Funding Method

The Entry Age Normal Cost method is used to determine costs. Under this method, the employer contribution has three components: the normal cost, the payment toward the unfunded actuarial liability, and the expense rate.

The normal cost is a level percent of pay cost which, along with the member contributions, will pay for projected benefits at retirement for each plan participant.

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.

The expense rate is added to cover the System's administrative expenses.

Under the Corridor Funding Method, the employer's total contribution rate is equal to the normal cost rate plus the UAL amortization rates for changes due to assumption changes or amendments passed since July 1, 2001, plus the expense rate as long as the System's actuarial funded status remains within a corridor of 90% to 120%. If the funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a 15-year amortization equal to the amount necessary to re-enter the corridor.

The 90% corridor floor is being increased to 100% by 2020. As of the 2015 valuation, the floor had reached 97%. Amortization is currently performed using an open 15-year period (with the exception of prior changes identified in Section IV). Once the corridor floor reaches 100% the 15-year period will be closed. Continued use of an open amortization period would result in the System's UAL never being fully exhausted.

2. Actuarial Value of Assets

For purposes of determining the County contribution to the System, we use an actuarial value of assets. The asset adjustment method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

In determining the actuarial value of assets, we calculate an expected actuarial value based on cash flow for the year and imputed returns at the actuarial assumption. This expected value is compared to the market value and one-third of the difference is added to the preliminary actuarial value to arrive at the final actuarial value.

3. Valuation Timing

All participant data is collected as of the December 31 prior to the valuation date. Initial valuation runs are performed as of December 31, and the resulting liabilities are then adjusted for six months to the June 30 valuation date. The adjustment takes into account

the actual July 1 cost-of-living increase and any other changes that are known to have occurred in that six-month period.

4. Changes Since Last Valuation

As a result of an experience study, changes were made to the data collection timing, and a revised process is used to run valuation liabilities as of the December 31 prior to the valuation date and then adjust those liabilities to June 30. This change was made to better align the data sources and to allow for use of the same valuation liability for funding and GASB 67 disclosures.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

1. Membership

The plan covers Police Officers who are not covered by the Fairfax County Employees' Retirement System, the Uniformed Retirement System or the VRS. In addition, former Park Police Officers who elected, effective January 22, 1983, to transfer to this System from the Uniformed Retirement System are eligible for membership.

2. Member Contributions

8.65% of compensation. Starting on January 1, 1984, the contributions are made through an "employer pick-up" arrangement which results in deferral of taxes on the contributions.

Interest is credited at the rate of 5% per year.

3. Credited Service

All service as a member, including the period a member is on service-connected disability retirement plus certain purchased prior service for re-employed officers, is credited. In addition, credit is allowed at the rate of one month for 172 hours of accrued unused sick leave. For those hired on or after January 1, 2013, the amount of unused sick leave that may be used is capped at 2,080 hours.

4. Average Final Compensation

Compensation includes salary including pick-up contributions, roll call, and holiday pay. Average final compensation is the average over the high 36 consecutive months (or shorter period of total service) including the period covered by unused sick leave.

5. Normal Retirement

Eligibility

For members employed before July 1, 1981, age 55 or completion of 20 years of service. For members employed after July 1, 1981, age 55 or completion of 25 years of service.

Benefit

2.8% of average final compensation for each year of service with a maximum benefit of 84%. The benefit is then increased by 3%.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

6. Early Retirement

Eligibility

20 years of service (does not apply if hired before July 1, 1981)

Benefit

Normal retirement benefit calculated using average final compensation and service at early retirement, actuarially reduced. The resulting benefit is then increased by 3%.

7. DROP (Deferred Retirement Option Program)

Eligibility

All members are eligible for DROP participation upon attaining eligibility for normal service retirement. Members can only participate in DROP once, and their election is irrevocable.

Benefit

The benefit scheduled to begin at normal retirement will be credited to a separate DROP account within the Retirement System, accumulating with interest while the member continues to work for a period of 36 months. Upon completion of the three-year period, DROP participation ends, and participants must terminate employment. At that time, the participant will receive payment of the accumulated DROP benefits and begin receiving his or her monthly retirement benefit (in the same amount as determined at commencement of DROP participation, plus annual cost-of-living increases).

The DROP account will be credited with interest at an annual rate of 5%, compounded monthly.

Death or Disability during DROP

Non Service-Connected: The effective date of the death or disability will be treated as the end of the DROP participation.

Service-Connected Disability: The member may elect either (1) to receive the service-connected disability benefits to which he or she would otherwise be entitled (forfeiture of DROP balance) or (2) the normal retirement benefit plus the DROP account balance.

Service-Connected Death: The beneficiary will receive payment of the accumulated DROP benefits and the regular service-connected benefit.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

8. Service-Connected Disability

Eligibility

No age or service requirement

Benefit

For total disability, 66-2/3% of compensation as of the date of disability less 100% of Virginia Workers' Compensation benefit, payable to 25 years of service at which time the benefit converts to 60% of the current compensation for the position from which the member retired.

9. Ordinary Disability

Eligibility

No age or service requirement

Benefit

If not eligible for normal or early retirement benefit, greater of (i) 10% of average final compensation or (ii) amount determined under normal retirement benefit formula, based on average final compensation and credited service as of disability date. The resulting benefit is then increased by 3%.

10. Service-Connected Death

Eligibility

No age or service requirement

Benefit

Spouse may elect a benefit of 66-2/3% of member's current salary in lieu of ordinary death benefit. The resulting benefit is then increased by 3%.

11. Ordinary Death

Eligibility

No age or service requirement (covers death while active or after normal, early or service-connected disability benefits)

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Benefit

Surviving spouse receives $1,000 per month payable for the life of the spouse but ceasing upon remarriage. Surviving children under 18, or under age 23 if full-time students, receive $400 per month. The maximum combination of benefits is $2,000 per month. This benefit will be increased by cost-of-living adjustments in the future. The monthly benefits for the year beginning July 1, 2015 are $2,257.10, $902.83, and $4,514.18, respectively.

12. Vesting

Eligibility

Five years of service

Benefit

Normal retirement benefit based on average final compensation and service at date of termination. Benefit is payable in full at age 55 or actuarially reduced and payable at early retirement age.

A member may withdraw his contributions at termination, in which case no deferred vested benefit is payable.

13. Withdrawal

Eligibility

Not eligible for other benefits

Benefit

Member contribution account balance

14. Form of Payment

The normal form of payment is a life annuity with a guarantee that at least the amount of member contributions will be paid to the retiree or beneficiaries.

A member who is entitled to a normal or early retirement benefit may elect an actuarially equivalent Joint and Survivor pop-up benefit.

15. Cost-of-Living Adjustment

Each July 1, benefits are increased by the lesser of 4% or the increase in the cost-of-living index. The increase is prorated for those who have not been retired for a full year.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Cost-of-living adjustments do not apply to deferred vested benefits prior to benefit commencement. Service connected disability benefits, commencing prior to July 1, 1981, are increased by the salary index used in the actuarial valuation instead of by the cost-of-living index.

In addition to automatic adjustments, benefits may be further increased on an ad hoc basis, if actuarial experience has been favorable.

16. Changes Since Last Valuation

None

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