



Cavanaugh Macdonald
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**Virginia
Retirement
System**

**Report on the Actuarial Valuation for
Virginia Retirement System**

Prepared as of June 30, 2019





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

March 23, 2020

The Board of Trustees
Virginia Retirement System
1200 E. Main Street
Richmond, VA 23219

Dear Trustees:

We are pleased to submit the results of the annual actuarial valuation for the following divisions of the Virginia Retirement System (VRS), prepared as of June 30, 2019.

- State Employees
- Teachers
- State Police (SPORS)
- Judicial
- Virginia Law Officers (VaLORS)

In addition, this report includes information in aggregate on the actuarial valuations of the Political Subdivisions participating in VRS as of June 30, 2019. We have prepared, and provided separately, actuarial valuation reports for each of the Political Subdivisions. Please refer to the individual reports for the valuation results, summary of actuarial assumptions and methods, and plan provisions for each of the Political Subdivision plans.

The purpose of this report is to provide a summary of the funded status of VRS as of June 30, 2019 and to recommend rates of contribution. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The funded status of the Plan is the ratio of the assets to the actuarial accrued liability. While the market value of assets gives an indication of the funded status of a plan at a particular point in time and is used for financial reporting, it is not used directly in the calculation of the employer contribution rates. A less volatile actuarial value of assets, which smooths the effect of market fluctuations over a five year period, is applied to determine the funded status for rate setting purposes. For informational purposes, we exhibit the funded status based on this smoothed actuarial value of assets basis as well as the market value in this report. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation. The VRS Board of Trustees adopted a change in the interest rate from 7.00% to 6.75% for the June 30, 2019 valuation.

The valuation results indicate that the full employer contribution rates shown in the table below are sufficient to fund the normal cost for all members and finance the unfunded accrued liability of the plans. We also present the expected employer contributions to be actually funded based on the percentage of the full rate adopted by the General Assembly. For comparison, in the table below we present the employer contribution rates for fiscal years ending 2021 and 2022 based on the June 30, 2019 actuarial valuation and the employer contribution rates approved by the General Assembly for fiscal years ending 2019 and 2020. Contribution rates for VRS employers are established every two years. The actuarially calculated employer contribution rates based on the June 30, 2018 presented in this report are for informational purposes only. The total employer rates include the average employer rate for the defined contribution component of the Hybrid Plan.



System	Fiscal Years 2019/2020	Informational Only	Fiscal Years 2021/2022			
			Before Assumption Change	After Assumption Change		
	Board & General Assembly Approved	Total Employer Rate for Retirement Plans	Total Employer Rate for Retirement Plans	Actuarially Determined Rate for the Defined Benefit Plan	Employer Rate for Hybrid DC Component	Total Employer Rate for Retirement Plans
	2017 Valuation	2018 Valuation	2019 Valuation			
State	13.52%	13.36%	13.12%	13.67%	0.79%	14.46%
Teachers	15.68%	15.23%	15.00%	16.06%	0.56%	16.62%
SPORS	24.88%	23.87%	23.88%	26.26%	N/A	26.26%
ValORS	21.61%	20.81%	20.19%	21.88%	N/A	21.88%
Judicial	34.39%	31.41%	27.76%	28.49%	1.35%	29.84%
Political Subdivisions (Average rates)	7.60%	7.29%	6.96%	7.73%	0.60%	8.33%

The promised benefits of VRS are included in the calculated contribution rates which are developed using the entry age normal cost method. The valuation takes into account the differentiation between Plan 1 vested members, Plan 1 non-vested members as of January 1, 2013 resulting from HB 1130 and SB 498, Plan 2 members, and the Hybrid Plan. Five-year smoothed market value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability. In accordance with the supplemental contribution provision under the 2011 Appropriation Act, Item 469(1)(6), the portion of the unfunded accrued liability with respect to deferred contributions for the 2010-2012 biennium is amortized using a level-dollar, closed, 10 year period beginning June 30, 2011. Amendments to the 2016-2017 Virginia budget accelerated the payback of the full outstanding balance of the deferred contributions to all plans except Teachers. In accordance with the funding policy adopted by the Board of Trustees in 2013, the balance of the unfunded accrued liability as of June 30, 2013 is being amortized by regular annual contributions as a level percentage of payroll over a closed 26-year period and changes in the unfunded accrued liability since June 30, 2013 are amortized over a closed 20-year period. The amortization of the unfunded accrued liability assumes that payroll will increase by 3% annually and the amortization period will decrease by one year until reaching 0 years.

We have prepared several supporting schedules shown in the actuarial section of the Comprehensive Annual Financial Report, including the Schedule of Active Member Data and the Analysis of Financial Experience. For completeness, the table of Changes in Unfunded Actuarial Accrued Liabilities in Section VI and the Retiree and Beneficiary Data in Schedule I include the information with respect to the Political Subdivisions participating in VRS.

Our organization has only a contractual relationship with the Virginia Retirement System to provide actuarial consulting services and we do not provide other services to nor have a financial interest in the Virginia Retirement System. There are no known interests or relationships that our firm has with the Virginia Retirement System that may impair or appear to impair the objectivity of our work.



March 23, 2020
The Board of Trustees
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This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the System and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'LL'.

Larry Langer, ASA, FCA, EA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, appearing to read 'Micki R. Taylor'.

Micki R. Taylor, ASA, EA, FCA, MAAA
Consulting Actuary



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Section I – Summary of Principal Results

Introduction and Summary

This report contains the actuarial valuation results as of June 30, 2019 for the five statewide systems within the Virginia Retirement System (VRS) - State Employees, Teachers, State Police, Judicial and Virginia Law Officers - as determined by Cavanaugh Macdonald Consulting, the actuary for the VRS. Questions about this report should be directed to the VRS rather than to Cavanaugh Macdonald Consulting.

Employer Contribution Rates

The previous employer contribution rates were set by the June 30, 2017 valuation and are effective for the period July 1, 2018 through June 30, 2020, or fiscal years ending 2019 and 2020. The June 30, 2018 calculated rates shown in each table below are for informational purposes. Rates for subsequent fiscal years will be determined by future actuarial valuations.

The recommended employer contribution rate consists of five pieces which are shown in the summary tables for each statewide system:

- **Employer Normal Cost Rate** - The ongoing annual cost of active employees accruing benefits under the plan. This rate is net of the member contribution rate. The normal cost is developed using the entry age normal cost method, which develops normal costs for active members which stay level during their career if benefit provisions are unchanged and assumptions are realized.
- **Administrative Expense** - An estimate of the administrative expenses to be paid out of the trust in the upcoming fiscal year.
- **Amortization of Deferred Contributions** - The amortization, if any, of the unfunded accrued liability associated with the deferred contributions for the 2010-2012 biennium.
- **Amortization of Balance of UAAL** - The amortization of, or payment towards, the unfunded actuarial accrued liability (UAAL) for the year. The UAAL is the amount by which the actuarial value of assets falls short of, or exceeds, the actuarial accrued liability for the plan. Under the funding arrangement adopted by the Board, the UAAL is being amortized as individual layered bases. The legacy unfunded actuarial accrued liability, the unfunded actuarial accrued liability as of June 30, 2013, is amortized over a closed 30 year period beginning June 30, 2013. The amortization period of the legacy unfunded will decrease by one in each subsequent valuation until reaching 0 years. The actuarial gains and losses and other changes in the unfunded due to benefit and actuarial assumption and method changes for each valuation subsequent to the June 30, 2013 valuation will be amortized over a closed 20 year period.
- **DC Contribution for Hybrid Members** - 1% mandatory employer contribution as well as an estimate of the employer match to the voluntary contributions made to the DC plan by Hybrid Plan members.

Assets

The following summary tables show the market and actuarial values of assets for each system. Five-year smoothed market value of assets is used for actuarial valuation purposes. The actuarial value reflects only a portion of the excess (or shortfall) between recent market value returns and the corresponding expected returns based on the prior 7.00% investment return assumption. The actuarial value recognizes this excess return (or shortfall) over a five-year period at the rate of 20% per year. This approach dampens year-to-year fluctuations in the contribution rates. The actuarial value of assets cannot be less than 80% or more



Section I – Summary of Principal Results

than 120% of the market value of assets. Schedule B shows the development of the actuarial value of assets for each system and Schedule C shows the summary of changes in the market value of assets from the previous year.

Actuarial Assumptions and Methods

Schedules E and F of this report outline the full set of actuarial assumptions and methods used in the current valuation. Effective with the June 30, 2017 valuation, the actuarial assumptions were revised to reflect the results of the experience study for the period 2012 – 2016. The next experience review is expected to be implemented with the June 30, 2021 annual valuation. The VRS Board of Trustees adopted a change in the interest rate from 7.00% to 6.75% for the June 30, 2019 valuation. The valuation assumes an annual cost-of-living adjustment of 2.50% for Plan 1 members and 2.25% for Plan 2 and Hybrid members. Salary increases range between 3.50% and 5.35% depending on the member's service and classification (i.e., members with general employee benefits or with enhanced hazardous duty coverage). Liabilities were determined under the Entry Age Normal actuarial cost method.

Benefit Provisions

This actuarial valuation takes into account the provisions of VRS as of the valuation date of June 30, 2019. There have been no changes in plan provisions since the prior valuation. The main benefit provisions are summarized in Schedule G of this report.

Member Data

This actuarial valuation is based on census data supplied by the VRS. The number of active and inactive members is shown in the summary tables below with additional information provided in Section II as well as Schedules H and I. The liability for each system's share of the benefits for former employees has been reflected in the liabilities and in the contribution rates. The number of retirees shown includes those who retired from this employer, as well as those who retired from another employer with service attributed to this employer. The liabilities also take into account each system's share of the benefits for former active members who later were employed by another VRS system, and subsequently retired.



Section I – Summary of Principal Results

Experience

All the statewide systems experienced an actuarial loss for the year ended June 30, 2019, which means the unfunded actuarial accrued liability was larger than anticipated. This loss was primarily due to the decrease in the assumed interest rate as well as investment losses on an actuarial basis. Additional factors for each system are as follows with more details found in Section V:

- State Employees had additional losses due to larger salary increases than expected, partially offset by gains due to post-retirement mortality and data remediation.
- Teachers had additional losses due to larger salary increases than expected and due to new members; these losses were partially offset by gains due to post-retirement mortality and data remediation.
- State Police had additional losses due to larger salary increases than expected, partially offset by gains due to data remediation.
- Judges had additional losses due to post-retirement mortality, partially offset by gains due to retirement and data remediation.
- Virginia Law Officers had additional losses due to larger pay increases than expected.

Summary of Results

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results for State Employees, Teachers, State Police, Judicial and Virginia Law Officers are summarized below. In addition to the summary tables for each statewide system, we present a summary of the valuation results for the political subdivisions in aggregate.



Section I – Summary of Principal Results

STATE EMPLOYEES (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2019	June 30, 2018
Members:		
Active	74,799	74,582
Long Term Disability	2,112	2,205
Retirees and Beneficiaries	67,076	65,096
Inactive, Vested	13,884	13,108
Inactive, Non-Vested	29,462	27,280
Inactive, active elsewhere in VRS	<u>9,250</u>	<u>9,009</u>
Total	196,583	191,280
Annual Covered Payroll	\$ 4,375,061	\$ 4,161,922
Annual Retirement Benefits	\$ 1,362,160	\$ 1,291,501
Total Assets:		
Actuarial Value	\$ 18,932,104	\$ 18,392,939
Market Value	19,090,110	18,532,189
Actuarial Accrued Liability	\$ 25,398,188	\$ 24,115,157
Funded Ratio:		
Actuarial Value of Assets	74.54%	76.27%
Market Value of Assets	75.16%	76.85%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>6,466,084</u>	<u>5,722,218</u>
Total UAAL	\$ 6,466,084	\$ 5,722,218
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	2021 & 2022	For Informational Purposes
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	4.79 %	4.50 %
Administrative Expense	0.29 %	0.28 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>8.59 %</u>	<u>7.86 %</u>
Annual Recommended Contribution	13.67 %	12.64 %
DC Contribution for Hybrid Members	<u>0.79 %</u>	<u>0.72 %</u>
Total Employer Contribution Rate Retirement Plans	14.46 %	13.36 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	15-24	16-25



Section I – Summary of Principal Results

TEACHERS (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2019	June 30, 2018
Members:		
Active	149,396	151,585
Long Term Disability	7	6
Retirees and Beneficiaries	99,175	94,983
Inactive, Vested	26,926	24,136
Inactive, Non-Vested	37,598	33,204
Inactive, active elsewhere in VRS	<u>5,677</u>	<u>5,464</u>
Total	318,779	309,378
Annual Covered Payroll*	\$ 8,608,489	\$ 8,479,023
Annual Retirement Benefits	\$ 2,344,606	\$ 2,202,632
Total Assets:		
Actuarial Value	\$ 36,233,796	\$ 34,673,952
Market Value	36,522,769	34,919,563
Actuarial Accrued Liability	\$ 49,303,959	\$ 46,516,176
Funded Ratio:		
Actuarial Value of Assets	73.49%	74.54%
Market Value of Assets	74.08%	75.07%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 118,810	\$ 172,451
Balance of UAAL	<u>12,951,353</u>	<u>11,669,773</u>
Total UAAL	\$ 13,070,163	\$ 11,842,224
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	2021 & 2022	For Informational Purposes
Employer Contribution Rate Defined Benefit Plan:		
Employer Normal Cost Rate	6.33 %	5.85 %
Administrative Expense	0.27 %	0.25 %
Amortization of Deferred Contributions	0.73 %	0.74 %
Amortization of Balance of UAAL	<u>8.73 %</u>	<u>7.88 %</u>
Annual Recommended Contribution	16.06 %	14.72 %
DC Contribution for Hybrid Members	<u>0.56 %</u>	<u>0.51 %</u>
Total Employer Contribution Rate Retirement Plans	16.62 %	15.23 %
Amortization Period (Years):		
Deferred Contributions	2	3
Balance of UAAL	15-24	16-25

* Includes an assumed pay increase on the valuation date.



Section I – Summary of Principal Results

**STATE POLICE
(\$ IN THOUSANDS)**

VALUATION DATE	June 30, 2019	June 30, 2018
Members:		
Active	1,914	1,885
Long-Term Disability	19	16
Retirees and Beneficiaries	1,613	1,549
Inactive, Vested	170	160
Inactive, Non-Vested	245	209
Inactive, active elsewhere in VRS	<u>243</u>	<u>245</u>
Total	4,204	4,064
Annual Covered Payroll	\$ 132,230	\$ 126,523
Annual Retirement Benefits	\$ 60,695	\$ 57,572
Total Assets:		
Actuarial Value	\$ 858,632	\$ 830,978
Market Value	865,273	836,702
Actuarial Accrued Liability	\$ 1,181,120	\$ 1,112,893
Funded Ratio:		
Actuarial Value of Assets	72.70%	74.67%
Market Value of Assets	73.26%	75.18%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>322,488</u>	<u>281,915</u>
Total UAAL	\$ 322,488	\$ 281,915
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	2021 & 2022	For Informational Purposes
Employer Contribution Rate:		
Employer Normal Cost Rate	12.12 %	11.15 %
Administrative Expense	0.38 %	0.41 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>13.76 %</u>	<u>12.31 %</u>
Annual Recommended Contribution	26.26 %	23.87 %
DC Contribution for Hybrid Members		
Deferred Contributions	0	0
Balance of UAAL	15-24	16-25



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**JUDICIAL
(\$ IN THOUSANDS)**

VALUATION DATE	June 30, 2019	June 30, 2018
Members:		
Active	462	416
Retirees and Beneficiaries	560	544
Inactive, Vested	5	4
Inactive, Non-Vested	0	0
Inactive, active elsewhere in VRS	<u>3</u>	<u>4</u>
Total	1,030	968
 Annual Covered Payroll	 \$ 76,848	 \$ 67,424
 Annual Retirement Benefits	 \$ 43,406	 \$ 41,562
 Total Assets:		
Actuarial Value	\$ 553,136	\$ 536,022
Market Value	557,541	540,009
 Actuarial Accrued Liability	 \$ 669,741	 \$ 645,662
 Funded Ratio:		
Actuarial Value of Assets	82.59%	83.02%
Market Value of Assets	83.25%	83.64%
 Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>116,605</u>	<u>109,640</u>
Total UAAL	\$ 116,605	\$ 109,640
 RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	 2021 & 2022	 For Informational Purposes
 Employer Contribution Rate:		
Employer Normal Cost Rate	21.14 %	22.14 %
Administrative Expense	0.42 %	0.49 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>6.93 %</u>	<u>7.47 %</u>
Annual Recommended Contribution	28.49 %	30.10 %
 DC Contribution for Hybrid Members	<u>1.35 %</u>	<u>1.31 %</u>
 Total Employer Contribution Rate Retirement	29.84 %	31.41 %
 Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	15-24	16-25



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**VIRGINIA LAW OFFICERS
(\$ IN THOUSANDS)**

VALUATION DATE	June 30, 2019	June 30, 2018
Members:		
Active	8,692	8,718
Long Term Disability	524	557
Retirees and Beneficiaries	5,559	5,225
Inactive, Vested	1,218	1,103
Inactive, Non-Vested	5,274	5,125
Inactive, active elsewhere in VRS	<u>3,271</u>	<u>2,948</u>
Total	24,538	23,676
Annual Covered Payroll	\$ 369,776	\$ 346,106
Annual Retirement Benefits	\$ 110,886	\$ 103,588
Total Assets:		
Actuarial Value	\$ 1,484,995	\$ 1,413,876
Market Value	1,495,990	1,423,980
Actuarial Accrued Liability	\$ 2,211,238	\$ 2,057,504
Funded Ratio:		
Actuarial Value of Assets	67.16%	68.72%
Market Value of Assets	67.65%	69.21%
Unfunded Actuarial Accrued Liability (UAAL):		
10-Year Payback of Deferred Contributions	\$ 0	\$ 0
Balance of UAAL	<u>726,243</u>	<u>643,628</u>
Total UAAL	\$ 726,243	\$ 643,628
RECOMMENDED CONTRIBUTIONS FOR FISCAL YEAR ENDING	2021 & 2022	For Informational Purposes
Employer Contribution Rate:		
Employer Normal Cost Rate	9.92 %	9.63 %
Administrative Expense	0.23 %	0.25 %
Amortization of Deferred Contributions	0.00 %	0.00 %
Amortization of Balance of UAAL	<u>11.73 %</u>	<u>10.93 %</u>
Annual Recommended Contribution	21.88 %	20.81 %
Amortization Period (Years):		
Deferred Contributions	0	0
Balance of UAAL	15-24	16-25



Section I – Summary of Principal Results

POLITICAL SUBDIVISIONS (\$ IN THOUSANDS)

VALUATION DATE	June 30, 2019	June 30, 2018
Number of Political Subdivisions in VRS	593	588
Members:		
Active	110,415	108,691
Long Term Disability	30	25
Retirees and Beneficiaries*	73,740	70,195
Inactive, Vested*	18,368	17,190
Inactive, Non-Vested*	38,752	35,035
Inactive, active elsewhere in VRS	<u>34,170</u>	<u>32,040</u>
Total	275,475	263,176
Annual Covered Payroll	\$ 5,258,467	\$ 4,973,503
Annual Retirement Benefits	\$ 1,080,487	\$ 1,003,716
Total Assets:**		
Actuarial Value	\$ 21,078,248	\$ 20,137,904
Market Value	21,259,032	20,302,821
Actuarial Accrued Liability**	\$ 24,431,824	\$ 22,543,485
Funded Ratio:		
Actuarial Value of Assets	86.27%	89.33%
Market Value of Assets	87.01%	90.06%
Unfunded Actuarial Accrued Liability (UAAL)**	3,353,576	2,405,581
	For Informational Purposes	For Informational Purposes
Average Employer Contribution Rate Defined Benefit Plan <i>(net of employee contributions)</i>	7.73 %	6.76 %
Average Employer Contribution Rate Defined Contribution Plan	<u>0.60 %</u>	<u>0.53 %</u>
Average Employer Contribution Rate Retirement Plans	8.33 %	7.29 %
Amortization Period (Years)	15-24	16-25

* Includes count for each plan from which members are receiving pension benefits or entitled to deferred vested benefits. Therefore, members with benefits from more than one political subdivision are counted more than once. This does not include counts for Political Subdivisions with no active members.

** Includes Political Subdivisions with no active members.



Section I – Summary of Principal Results

In accordance with the supplemental contribution provision of the 2011 Appropriation Act, Item 469(1)(6), the portion of the unfunded accrued liability with respect to deferred contributions for the 2010-2012 biennium will be paid back to the plans over a 10-year period. Amendments to the 2016-2017 Virginia budget accelerated the payback of the full outstanding balance of the deferred contributions to all plans except Teachers. Below we provide an estimate of the deferred contributions as provided by VRS.

DIVISION	Deferred Contributions (\$ in thousands)	
	Outstanding Balance as of 6/30/2019	Outstanding Balance as of 6/30/2018
State Employees	\$ 0	\$ 0
Teachers	118,810	172,451
State Police	0	0
Virginia Law Officers	0	0
Judicial	0	0
Total	\$ 118,810	\$ 172,451



Section II – Membership Data

1. Data regarding the membership of VRS for use as a basis of the valuation was furnished by VRS. The following table shows the number of active members and their annual compensation as of June 30, 2019 on the basis of which the valuation was prepared.

TABLE 1
THE NUMBER AND ANNUAL COMPENSATION OF
ACTIVE MEMBERS AS OF JUNE 30, 2019
(\$ IN THOUSANDS)

DIVISION	NUMBER	COMPENSATION*
State Employees	74,799	\$4,375,061
Teachers	149,396	8,210,129
State Police	1,914	132,230
Judicial	462	76,848
Virginia Law Officers	8,692	369,776
Political Subdivisions	<u>110,415</u>	<u>5,258,467</u>
Total	345,678	\$18,422,511

* Actual annual compensation provided by VRS.

2. The following table shows a five-year history of active member valuation data, including the political subdivisions.

TABLE 2
SCHEDULE OF TOTAL ACTIVE MEMBER VALUATION DATA

VALUATION DATE	NUMBER	ANNUAL PAYROLL (\$ IN THOUSANDS)	ANNUAL AVERAGE PAY	% CHANGE IN AVERAGE PAY
6/30/2019	345,678	\$ 18,422,511	\$ 53,294	3.78 %
6/30/2018	345,877	17,762,411	51,355	2.10 %
6/30/2017	343,559	17,280,580	50,299	1.95 %
6/30/2016	341,719	16,859,077	49,336	2.27 %
6/30/2015	340,048	16,404,201	48,241	1.37 %



Section II – Membership Data

3. The following table shows the number and annual retirement benefits payable to retired members and survivors on the roll of VRS as of the valuation date.

TABLE 3
THE NUMBER AND ANNUAL RETIREMENT BENEFITS
OF RETIRED MEMBERS AND SURVIVORS OF DECEASED MEMBERS
ON THE ROLL AS OF JUNE 30, 2019
(\$ IN THOUSANDS)

TYPE OF RETIREMENT	DIVISION						TOTAL
	STATE EMPLOYEES	TEACHERS	STATE POLICE	JUDICIAL	VIRGINIA LAW OFFICERS	POLITICAL SUBDIVISIONS*	
Service:							
Number	58,396	91,481	1,187	416	4,971	60,717	217,168
Annual Benefits	\$1,231,195	\$2,197,303	\$49,469	\$36,358	\$104,159	\$902,424	\$4,520,908
Disability:							
Number	3,479	4,393	189	0	261	8,224	16,546
Annual Benefits	\$58,558	\$98,166	\$6,707	\$0	\$4,005	\$130,977	\$298,413
Survivors:							
Number	5,201	3,301	237	144	327	4,799	14,009
Annual Benefits	\$72,407	\$49,137	\$4,519	\$7,048	\$2,722	\$47,086	\$182,919
Total:							
Number	67,076	99,175	1,613	560	5,559	73,740	247,723
Annual Benefits	\$1,362,160	\$2,344,606	\$60,695	\$43,406	\$110,886	\$1,080,487	\$5,002,240

- * Includes count for each plan from which members are receiving pension benefits or entitled to deferred vested benefits. Therefore, members with benefits from more than one political subdivision are counted more than once. This does not include counts for Political Subdivisions with no active members.

4. The five tables of Schedule H, which can be found at the end of this document, show the distribution by age and service of the number and average annual compensation of active members for each division included in the valuation.



Section III – Assets

- Schedule C shows the additions and deductions to the assets of VRS for the year preceding the valuation date and a reconciliation of the fund balances at market value. As of June 30, 2019, the market value of assets used to determine the actuarial value of assets for each division is shown below:

TABLE 4
COMPARISON OF MARKET VALUE OF ASSETS
(\$ IN THOUSANDS)

DIVISION	JUNE 30, 2019 MARKET VALUE	JUNE 30, 2018 MARKET VALUE
State Employees	\$19,090,110	\$18,532,189
Teachers	36,522,769	34,919,563
State Police	865,273	836,702
Judicial	557,541	540,009
Virginia Law Officers	1,495,990	1,423,980
Political Subdivisions*	<u>21,259,032</u>	<u>20,302,821</u>
Total Market Value of Assets	\$79,790,715	\$76,555,264

* Includes Political Subdivisions with no active members.

- Schedule B shows the development of the actuarial value of assets as of June 30, 2019. The following table shows the actuarial value of assets allocated among all divisions.

TABLE 5
COMPARISON OF ACTUARIAL VALUE OF ASSETS
(\$ IN THOUSANDS)

DIVISION	JUNE 30, 2019 ACTUARIAL VALUE	JUNE 30, 2018 ACTUARIAL VALUE
State Employees	\$18,932,104	\$18,392,939
Teachers	36,233,796	34,673,952
State Police	858,632	830,978
Judicial	553,136	536,022
Virginia Law Officers	1,484,995	1,413,876
Political Subdivisions*	<u>21,078,248</u>	<u>20,137,904</u>
Total Actuarial Value of Assets	\$79,140,911	\$75,985,671

* Includes Political Subdivisions with no active members.



Section IV – Contribution Rates

1. The actuarially determined employer contribution rates as a percent of payroll for each division based on the June 30, 2019 actuarial valuation are shown in the following table:

TABLE 6

Division	Employer Contribution Rate Defined Benefit Plan	Employer Contribution Rate Defined Contribution Plan	Employer Contribution Rate Retirement Plans
State Employees	13.67%	0.79%	14.46%
Teachers	16.06	0.56	16.62
State Police	26.26	N/A	26.26
Judicial	28.49	1.35	29.84
Virginia Law Officers	21.88	N/A	21.88

The rates shown are net of member contributions.



Section IV – Contribution Rates

2. The table below shows the development of the normal contribution rate, the unfunded accrued liability (UAL) rate, the actuarially recommended defined benefit plan contribution rate, the employer defined contribution plan rate and the total employer retirement plans contribution rate for each division as of June 30, 2019.

TABLE 7
EMPLOYER CONTRIBUTION RATE
EXPRESSED AS PERCENT OF ACTIVE MEMBER PAYROLL

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers
<u>Employer Contribution Rate for Defined Benefit Plan</u>					
Normal Cost					
Service Retirement Benefits	6.41%	8.61%	13.29%	24.65%	8.46%
Disability Benefits	0.97%	0.59%	1.37%	0.00%	2.74%
Survivor Benefits	0.34%	0.19%	0.65%	0.94%	0.28%
Separation Benefits	<u>1.67%</u>	<u>1.62%</u>	<u>1.81%</u>	<u>0.00%</u>	<u>3.44%</u>
Total	9.39%	11.01%	17.12%	25.59%	14.92%
Member Current Contributions	<u>4.60%</u>	<u>4.68%</u>	<u>5.00%</u>	<u>4.45%</u>	<u>5.00%</u>
Employer Normal Cost	4.79%	6.33%	12.12%	21.14%	9.92%
Administrative Expense	0.29%	0.27%	0.38%	0.42%	0.23%
Amortization of UAAL (<i>net of deferred contributions</i>) *	8.59%	8.73%	13.76%	6.93%	11.73%
Amortization of Deferred Contributions *	0.00%	0.73%	0.00%	0.00%	0.00%
Actuarially Recommended Employer Defined Benefit Plan Contribution Rate to pay Normal Cost and amortize UAAL	13.67%	16.06%	26.26%	28.49%	21.88%
<u>Defined Contribution Hybrid Plan</u>	0.79%	0.56%	N/A	1.35%	N/A
Employer Contribution Rate for Retirement Plans	14.46%	16.62%	26.26%	29.84%	21.88%

- * The amortization period of the unfunded less the deferred contribution begins at 30 years on June 30, 2013 and will decrease by one each year until reaching 0 years. Each subsequent year a new base will be added to the unfunded accrued liability and will be amortized over a closed 20 year period. The deferred contribution, as defined under the 2011 Appropriation Act, Item 469(1)(6), has been paid off except for Teachers which is to be amortized using a level-dollar, closed, 10 year period. See Schedule D for the Amortization Schedules showing each base comprising the unfunded accrued liability.



Section V – Derivation of Experience Gains and Losses

CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITIES (UAAL) DURING FISCAL YEAR 2019 (\$ IN THOUSANDS)

	State Employees	Teachers	State Police	Judicial	Virginia Law Officers	Political Subdivisions	Total
A. Calculation of Expected Unfunded Actuarial Accrued Liability							
1. UAAL as of June 30, 2018	\$ 5,722,218	\$ 11,842,224	\$ 281,915	\$ 109,640	\$ 643,628	\$ 2,405,581	\$21,005,206
2. Normal Cost for previous year	354,541	830,844	18,765	17,539	41,613	519,766	1,783,069
3. Actual contributions during the year	(733,929)	(1,659,931)	(37,267)	(25,744)	(92,264)	(733,492)	(3,282,627)
4. Interest at previous year's rate of 0.07							
a. on UAAL	400,555	828,956	19,734	7,675	45,054	168,391	1,470,365
b. on normal cost	24,818	58,159	1,314	1,228	2,913	36,384	124,816
c. on contributions	(25,688)	(58,098)	(1,304)	(901)	(3,229)	(25,672)	(114,892)
d. total: (a)+(b)+(c)	\$ 399,685	\$ 829,017	\$ 19,744	\$ 8,002	\$ 44,738	\$ 179,103	\$ 1,480,289
5. Expected UAAL as of June 30, 2019 A1+A2+A3+A4	5,742,515	11,842,154	283,157	109,437	637,715	2,370,958	20,985,937
6. Actual UAAL as of June 30, 2019	6,466,084	13,070,163	322,488	116,605	726,243	3,353,576	24,055,159
7. Total Gain/(Loss): A5-A6	\$ (723,569)	\$ (1,228,009)	\$ (39,331)	\$ (7,168)	\$ (88,528)	\$ (982,618)	\$ (3,069,222)
B. Calculation of Asset Gain/(Loss)							
1. Actuarial Value of Assets (AVA) as of June 30, 2018	\$18,392,939	\$ 34,673,952	\$ 830,978	\$ 536,022	\$ 1,413,876	\$20,137,904	\$75,985,671
2. Contributions during the year	\$ 733,929	\$ 1,659,931	\$ 37,267	\$ 25,744	\$ 92,264	\$ 733,492	\$ 3,282,627
3. Benefit payments during the year	(1,387,730)	(2,367,753)	(63,488)	(43,584)	(114,126)	(1,123,040)	(5,099,721)
4. Interest at previous year's rate of 0.07							
a. on AVA at beginning of year	\$ 1,287,506	\$ 2,427,177	\$ 58,168	\$ 37,522	\$ 98,971	\$ 1,409,653	\$ 5,318,997
b. on contributions	25,688	58,098	1,304	901	3,229	25,672	114,892
c. on benefit payments	(48,571)	(82,871)	(2,222)	(1,525)	(3,994)	(39,306)	(178,489)
d. total: (a)+(b)+(c)	\$ 1,264,623	\$ 2,402,404	\$ 57,250	\$ 36,898	\$ 98,206	\$ 1,396,019	\$ 5,255,400
5. Expected AVA as of June 30, 2019 B1+B2+B3+B4	19,003,761	36,368,534	862,007	555,080	1,490,220	21,144,375	79,423,977
6. Actual AVA as of June 30, 2019	18,932,104	36,233,796	858,632	553,136	1,484,995	21,078,248	79,140,911
7. Gain/(Loss) on assets: B6-B5	\$ (71,657)	\$ (134,738)	\$ (3,375)	\$ (1,944)	\$ (5,225)	\$ (66,127)	\$ (283,066)
C. Calculation of Liability Gain/(Loss)							
1. Gain/(Loss) due to change in investment rate of return	(671,336)	(1,469,768)	(32,016)	(13,983)	(62,982)	(703,281)	(2,953,366)
2. Gain/(Loss) due to plan amendments	0	0	0	0	0	(17,729)	(17,729)
3. Gain/(Loss) due to change in methods	0	0	0	0	0	0	0
4. Liability Experience Gain/(Loss): A7-B7-C1-C2-C3	\$ 19,424	\$ 376,497	\$ (3,940)	\$ 8,759	\$ (20,321)	\$ (195,481)	\$ 184,939



Section V – Derivation of Experience Gains and Losses

GAINS & LOSSES DURING FISCAL YEAR 2019 (\$ IN MILLIONS)

Type of Activity	State Employees	Teachers	State Police	Judges	Virginia Law Officers	Political Subdivisions
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	(\$12.3)	\$25.3	\$0.0	\$6.8	(\$13.8)	(\$32.8)
Disability Before Retirement. If disability claims are less than assumed, there is a gain. If more claims, a loss.	\$6.2	\$11.9	(\$0.4)	\$0.0	\$2.0	\$16.8
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(\$0.4)	(\$0.4)	\$0.2	\$0.1	(\$0.3)	\$0.4
Withdrawal from Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(\$11.7)	\$45.7	(\$0.1)	\$0.0	\$10.4	\$2.4
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(\$171.7)	(\$39.2)	(\$8.6)	\$2.3	(\$25.7)	(\$173.3)
New Members. Additional unfunded accrued liability will produce a loss.	(\$20.9)	(\$129.4)	(\$0.3)	(\$0.2)	(\$2.3)	(\$31.6)
Death after Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	\$86.6	\$105.0	(\$1.8)	(\$5.8)	\$4.6	\$14.9
Data and Other Adjustments.	\$111.6	\$221.5	\$8.6	\$5.7	(\$0.2)	\$25.0
Benefit Payments. If benefit payments are greater than expected, there is a loss. If the benefits payments are less, a gain.	\$24.0	\$121.1	(\$1.9)	(\$0.3)	\$4.3	(\$23.8)
Cost of Living Allowance (COLA). If COLA is greater than expected, there is a loss. If COLA is less, a gain.	\$8.0	\$15.0	\$0.4	\$0.1	\$0.7	\$6.5
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(\$71.7)	(\$134.7)	(\$3.4)	(\$1.9)	(\$5.2)	(\$66.1)
Gain (Loss) During Year	(52.3)	241.8	(7.3)	6.8	(25.5)	(261.6)
Non-Recurring Items. Adjustments for plan amendments, assumption changes, etc.	(671.3)	(1,469.8)	(\$32.0)	(\$14.0)	(\$63.0)	(\$721.0)
Total Gain (Loss) During Year	(\$723.6)	(\$1,228.0)	(\$39.3)	(\$7.2)	(\$88.5)	(\$982.6)
Expected Contributions vs. Actual Contributions. If the difference in the actual contribution to the plan is more or less than what was expected based on the previous valuation then there will be a gain or loss associated with this difference.	\$37.1	\$62.2	\$2.1	\$2.6	\$11.2	\$87.1
Experience Gain (Loss) During Year (Gain (Loss) During Year Plus Contribution Gain (Loss))	(\$15.2)	\$304.0	(\$5.2)	\$9.4	(\$14.3)	(\$174.5)



Section VI – Risk Considerations

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, is first applicable for the June 30, 2019 actuarial valuation for the Virginia Retirement System (the System).

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal risk or the plan could become “pay as you go.” The term “risk” is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including the impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay; and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. There is a risk if the funded status declines significantly that the level of contributions required to return the System to being well-funded would be higher than employers could afford.

The other significant risk factor for the System is investment return because of the volatility of returns and the size of plan assets compared to payroll. While over the long term the fund has investment returns in excess of the assumed rate of return, market volatility results in one-year returns that are rarely exactly as assumed and rather fluctuate above or below the long-term assumed rate of return. While this is to be expected, managing the investment risk is imperative to the long term health of the fund.

A key demographic risk for all retirement systems is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions anticipate some improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a



Section VI – Risk Considerations

significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The following summarizes some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.

Historical Asset Volatility Ratios

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions. Dollar amounts in the following charts are given in thousands.

State Employees

ACTUARIAL VALUATION DATE	MARKET VALUE OF ASSETS	COVERED PAYROLL	ASSET VOLATILITY RATIO
June 30, 2015	\$16,398,575	\$3,872,724	4.23
June 30, 2016	\$16,367,842	\$4,002,477	4.09
June 30, 2017	\$17,789,888	\$4,037,072	4.41
June 30, 2018	\$18,532,189	\$4,161,922	4.45
June 30, 2019	\$19,090,110	\$4,375,061	4.36

Teachers

ACTUARIAL VALUATION DATE	MARKET VALUE OF ASSETS	COVERED PAYROLL	ASSET VOLATILITY RATIO
June 30, 2015	\$30,344,072	\$7,488,507	4.05
June 30, 2016	\$30,168,211	\$7,666,824	3.93
June 30, 2017	\$33,119,545	\$7,919,450	4.18
June 30, 2018	\$34,919,563	\$8,086,933	4.32
June 30, 2019	\$36,522,769	\$8,210,129	4.45



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State Police

ACTUARIAL VALUATION DATE	MARKET VALUE OF ASSETS	COVERED PAYROLL	ASSET VOLATILITY RATIO
June 30, 2015	\$733,352	\$110,543	6.63
June 30, 2016	\$730,688	\$114,877	6.36
June 30, 2017	\$796,073	\$110,265	7.22
June 30, 2018	\$836,702	\$126,523	6.61
June 30, 2019	\$865,273	\$132,230	6.54

Judicial

ACTUARIAL VALUATION DATE	MARKET VALUE OF ASSETS	COVERED PAYROLL	ASSET VOLATILITY RATIO
June 30, 2015	\$456,258	\$61,881	7.37
June 30, 2016	\$467,389	\$65,524	7.13
June 30, 2017	\$512,749	\$66,288	7.74
June 30, 2018	\$540,009	\$67,424	8.01
June 30, 2019	\$557,541	\$76,848	7.26

Virginia Law Officers

ACTUARIAL VALUATION DATE	MARKET VALUE OF ASSETS	COVERED PAYROLL	ASSET VOLATILITY RATIO
June 30, 2015	\$1,191,353	\$330,397	3.61
June 30, 2016	\$1,211,446	\$352,677	3.44
June 30, 2017	\$1,345,887	\$339,150	3.97
June 30, 2018	\$1,423,980	\$346,106	4.11
June 30, 2019	\$1,495,990	\$369,776	4.05



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Historical Cash Flows

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. Note that negative cash flows are expected in mature retirement systems. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. Each VRS system has had negative cash flows from 0% to 4% in recent years, so there is no concern for the foreseeable future.

State Employees

FISCAL YEAR ENDING	MARKET VALUE OF ASSETS	CONTRIBUTIONS AND REVENUE	BENEFIT PAYMENTS AND EXPENSES	NET CASH FLOW	NET CASH FLOW AS A PERCENT OF MVA
June 30, 2015	\$16,398,575	\$676,680	(\$1,174,723)	(\$498,043)	-3.04%
June 30, 2016	\$16,367,842	\$923,257	(\$1,231,156)	(\$307,899)	-1.88%
June 30, 2017	\$17,789,888	\$737,270	(\$1,279,035)	(\$541,765)	-3.05%
June 30, 2018	\$18,532,189	\$750,350	(\$1,339,942)	(\$589,592)	-3.18%
June 30, 2019	\$19,090,110	\$747,636	(\$1,401,437)	(\$653,801)	-3.42%

Teachers

FISCAL YEAR ENDING	MARKET VALUE OF ASSETS	CONTRIBUTIONS AND REVENUE	BENEFIT PAYMENTS AND EXPENSES	NET CASH FLOW	NET CASH FLOW AS A PERCENT OF MVA
June 30, 2015	\$30,344,072	\$1,641,592	(\$2,035,750)	(\$394,158)	-1.30%
June 30, 2016	\$30,168,211	\$1,443,498	(\$2,136,063)	(\$692,565)	-2.30%
June 30, 2017	\$33,119,545	\$1,531,558	(\$2,212,515)	(\$680,957)	-2.06%
June 30, 2018	\$34,919,563	\$1,684,990	(\$2,306,129)	(\$621,139)	-1.78%
June 30, 2019	\$36,522,769	\$1,685,314	(\$2,393,136)	(\$707,822)	-1.94%



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State Police

FISCAL YEAR ENDING	MARKET VALUE OF ASSETS	CONTRIBUTIONS AND REVENUE	BENEFIT PAYMENTS AND EXPENSES	NET CASH FLOW	NET CASH FLOW AS A PERCENT OF MVA
June 30, 2015	\$733,352	\$34,107	(\$54,211)	(\$20,104)	-2.74%
June 30, 2016	\$730,688	\$39,414	(\$54,712)	(\$15,298)	-2.09%
June 30, 2017	\$796,073	\$37,589	(\$59,469)	(\$21,880)	-2.75%
June 30, 2018	\$836,702	\$42,117	(\$59,636)	(\$17,519)	-2.09%
June 30, 2019	\$865,273	\$37,816	(\$64,037)	(\$26,221)	-3.03%

Judicial

FISCAL YEAR ENDING	MARKET VALUE OF ASSETS	CONTRIBUTIONS AND REVENUE	BENEFIT PAYMENTS AND EXPENSES	NET CASH FLOW	NET CASH FLOW AS A PERCENT OF MVA
June 30, 2015	\$456,258	\$34,518	(\$40,505)	(\$5,987)	-1.31%
June 30, 2016	\$467,389	\$44,738	(\$41,719)	\$3,019	0.65%
June 30, 2017	\$512,749	\$30,884	(\$41,553)	(\$10,669)	-2.08%
June 30, 2018	\$540,009	\$31,327	(\$41,533)	(\$10,206)	-1.89%
June 30, 2019	\$557,541	\$26,098	(\$43,938)	(\$17,840)	-3.20%

Virginia Law Officers

FISCAL YEAR ENDING	MARKET VALUE OF ASSETS	CONTRIBUTIONS AND REVENUE	BENEFIT PAYMENTS AND EXPENSES	NET CASH FLOW	NET CASH FLOW AS A PERCENT OF MVA
June 30, 2015	\$1,191,353	\$79,165	(\$90,574)	(\$11,409)	-0.96%
June 30, 2016	\$1,211,446	\$96,966	(\$97,772)	(\$806)	-0.07%
June 30, 2017	\$1,345,887	\$91,414	(\$103,012)	(\$11,598)	-0.86%
June 30, 2018	\$1,423,980	\$91,289	(\$111,488)	(\$20,199)	-1.42%
June 30, 2019	\$1,495,990	\$93,198	(\$115,060)	(\$21,862)	-1.46%



Section VI – Risk Considerations

Comparison of Valuation Results Under Alternate Investment Return Assumptions

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates. For example, if the expected return is decreased, it will result in an increase in the liability of the Plan as well as the actuarial contributions. Conversely, if we increase expected return, it will result in a decrease in the liability of the Plan as well as the actuarial contributions. The impacts of positive or negative changes in the assumed rate of return are shown in the tables below (dollar amounts in thousands):

State Employees

Discount Rate	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	6.45%	7.70%	9.39%	11.68%	14.83%
Member Contribution Rate	4.60%	4.60%	4.60%	4.60%	4.60%
Employer Normal Cost Rate	1.85%	3.10%	4.79%	7.08%	10.23%
Administrative Expense Load	0.29%	0.29%	0.29%	0.29%	0.29%
Total Employer Normal Cost Rate	2.14%	3.39%	5.08%	7.37%	10.52%
Total Amortization Rate	1.76%	5.14%	8.59%	12.13%	15.74%
Defined Contribution Hybrid Plan	0.79%	0.79%	0.79%	0.79%	0.79%
Total Employer Rate	4.69%	9.32%	14.46%	20.29%	27.05%
Change in Employer Rate	(9.77)%	(5.14)%	0.00%	5.83 %	12.59 %
Estimated Change in Annual Funding	(427,443)	(224,878)		255,066	550,820
Unfunded Liability	1,816,410	3,945,510	6,466,084	9,465,033	13,044,464
Funded Status	91.2%	82.8%	74.5%	66.7%	59.2%

Teachers

Discount Rate	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	7.03%	8.73%	11.01%	14.08%	18.25%
Member Contribution Rate	4.68%	4.68%	4.68%	4.68%	4.68%
Employer Normal Cost Rate	2.35%	4.05%	6.33%	9.40%	13.57%
Administrative Expense Load	0.27%	0.27%	0.27%	0.27%	0.27%
Total Employer Normal Cost Rate	2.62%	4.32%	6.60%	9.67%	13.84%
Total Amortization Rate	1.80%	5.56%	9.46%	13.52%	17.79%
Defined Contribution Hybrid Plan	0.56%	0.56%	0.56%	0.56%	0.56%
Total Employer Rate	4.98%	10.44%	16.62%	23.75%	32.19%
Change in Employer Rate	(11.64)%	(6.18)%	0.00%	7.13 %	15.57 %
Estimated Change in Annual Funding	(955,659)	(507,386)		585,382	1,278,317
Unfunded Liability	3,011,919	7,582,426	13,070,163	19,711,183	27,812,775
Funded Status	92.3%	82.7%	73.5%	64.8%	56.6%



Section VI – Risk Considerations

State Police

Discount Rate	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	10.57%	13.40%	17.12%	22.03%	28.55%
Member Contribution Rate	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Normal Cost Rate	5.57%	8.40%	12.12%	17.03%	23.55%
Administrative Expense Load	0.38%	0.38%	0.38%	0.38%	0.38%
Total Employer Normal Cost Rate	5.95%	8.78%	12.50%	17.41%	23.93%
Total Amortization Rate	3.12%	8.39%	13.76%	19.27%	24.94%
Defined Contribution Hybrid Plan	N/A	N/A	N/A	N/A	N/A
Total Employer Rate	9.07%	17.17%	26.26%	36.68%	48.87%
Change in Employer Rate	(17.19)%	(9.09)%	0.00 %	10.42 %	22.61 %
Estimated Change in Annual Funding	(22,730)	(12,020)		13,778	29,897
Unfunded Liability	100,500	202,238	322,488	465,565	636,967
Funded Status	89.5%	80.9%	72.7%	64.8%	57.4%

Judicial

Discount Rate	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	18.62%	21.77%	25.59%	30.23%	35.90%
Member Contribution Rate	4.45%	4.45%	4.45%	4.45%	4.45%
Employer Normal Cost Rate	14.17%	17.32%	21.14%	25.78%	31.45%
Administrative Expense Load	0.42%	0.42%	0.42%	0.42%	0.42%
Total Employer Normal Cost Rate	14.59%	17.74%	21.56%	26.20%	31.87%
Total Amortization Rate	(1.67)%	2.67%	6.93%	11.11%	15.23%
Defined Contribution Hybrid Plan	1.35%	1.35%	1.35%	1.35%	1.35%
Total Employer Rate	14.27%	21.76%	29.84%	38.66%	48.45%
Change in Employer Rate	(15.57)%	(8.08)%	0.00 %	8.82 %	18.61 %
Estimated Change in Annual Funding	(11,965)	(6,209)		6,778	14,301
Unfunded Liability	17,003	63,452	116,605	177,759	248,519
Funded Status	97.0%	89.7%	82.6%	75.7%	69.0%



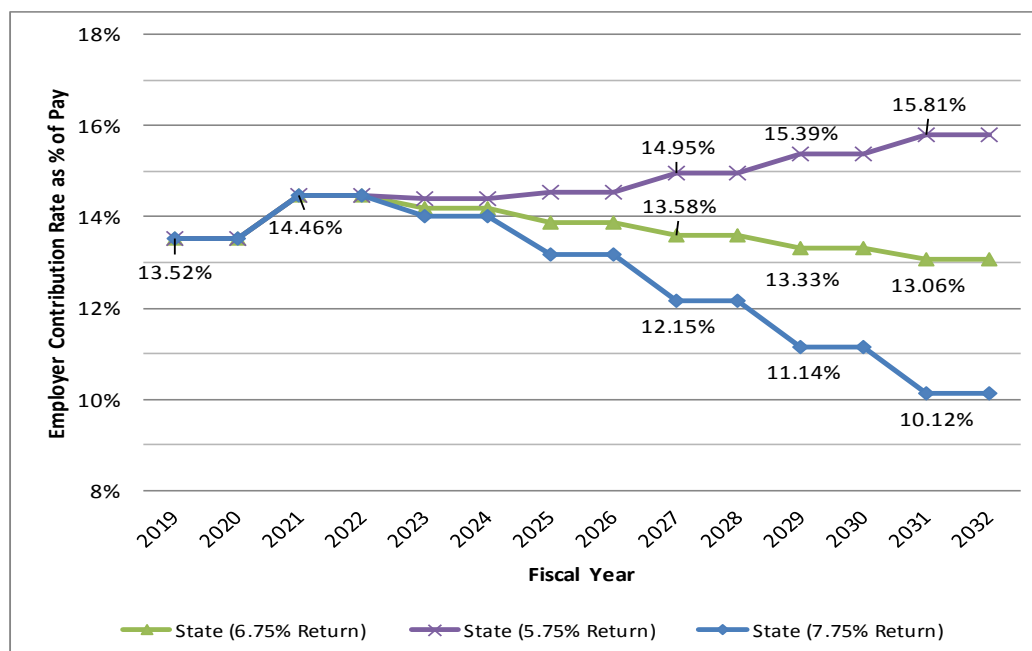
Section VI – Risk Considerations

Virginia Law Officers

Discount Rate	8.75%	7.75%	Current 6.75%	5.75%	4.75%
Total Normal Cost Rate	10.04%	12.14%	14.92%	18.64%	23.66%
Member Contribution Rate	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Normal Cost Rate	5.04%	7.14%	9.92%	13.64%	18.66%
Administrative Expense Load	0.23%	0.23%	0.23%	0.23%	0.23%
Total Employer Normal Cost Rate	5.27%	7.37%	10.15%	13.87%	18.89%
Total Amortization Rate	4.65%	8.12%	11.73%	15.53%	19.56%
Defined Contribution Hybrid Plan	N/A	N/A	N/A	N/A	N/A
Total Employer Rate	9.92%	15.49%	21.88%	29.40%	38.45%
Change in Employer Rate	(11.96)%	(6.39)%	0.00 %	7.52 %	16.57 %
Estimated Change in Annual Funding	(44,225)	(23,629)		27,807	61,272
Unfunded Liability	295,051	491,088	726,243	1,011,035	1,359,432
Funded Status	83.4%	75.1%	67.2%	59.5%	52.2%

In addition to the current year's valuation results given above for all of the statewide plans, the following charts show a projection of future contribution rates at 1 percent above and below the current assumed rate for both the State and Teachers plans.

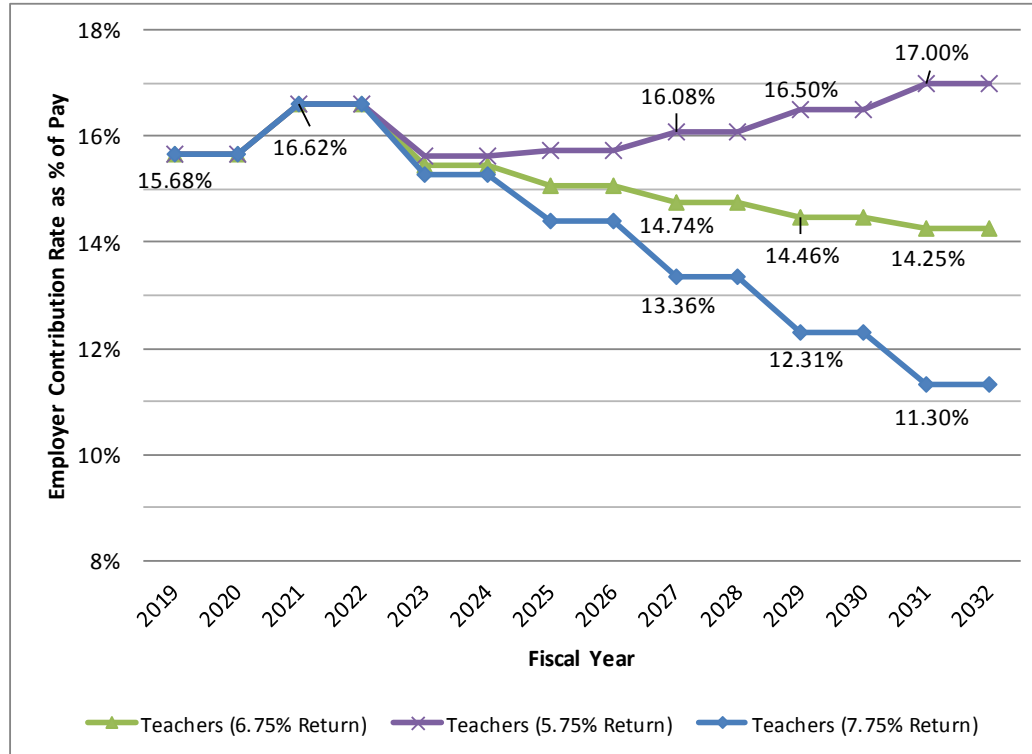
State Employees





Section VI – Risk Considerations

Teachers





Schedule A – Valuation Balance Sheet

STATE EMPLOYEES

As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets	\$	18,932,104,000
Present value of future members' contributions		1,465,465,807
Present value of future employer contributions		
Normal contributions	\$	1,464,221,980
Unfunded accrued liability contributions		<u>6,466,083,710</u>
Total prospective employer contributions		<u>7,930,305,690</u>
Total Present and Prospective Assets	\$	<u><u>28,327,875,497</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits	\$	14,549,881,962
Present value of prospective benefits payable on account of inactive members		1,281,812,427
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$11,110,152,058	
Disability retirement benefits	612,882,912	
Survivor benefits	322,293,856	
Separation benefits	<u>450,852,282</u>	
Total		<u>12,496,181,108</u>
Total Actuarial Liabilities	\$	<u><u>28,327,875,497</u></u>



Schedule A – Valuation Balance Sheet

TEACHERS
As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 36,233,796,000
Present value of future members' contributions		3,557,452,195
Present value of future employer contributions		
Normal contributions	\$ 4,567,051,108	
Unfunded accrued liability contributions	<u>13,070,163,064</u>	
Total prospective employer contributions		<u>17,637,214,172</u>
Total Present and Prospective Assets		<u><u>\$ 57,428,462,367</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 27,322,414,260
Present value of prospective benefits payable on account of inactive members		1,488,023,960
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$ 26,216,009,058	
Disability retirement benefits	838,490,603	
Survivor benefits	394,706,250	
Separation benefits	<u>1,168,818,236</u>	
Total		<u>28,618,024,147</u>
Total Actuarial Liabilities		<u><u>\$ 57,428,462,367</u></u>



Schedule A – Valuation Balance Sheet

STATE POLICE
As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets	\$	858,632,000
Present value of future members' contributions		61,619,560
Present value of future employer contributions		
Normal contributions	\$	145,938,350
Unfunded accrued liability contributions		<u>322,487,851</u>
Total prospective employer contributions		<u>468,426,201</u>
Total Present and Prospective Assets	\$	<u><u>1,388,677,761</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits	\$	655,590,203
Present value of prospective benefits payable on account of inactive members		27,218,551
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$	623,970,737
Disability retirement benefits		31,790,828
Survivor benefits		17,695,973
Separation benefits		<u>32,411,469</u>
Total		<u>705,869,007</u>
Total Actuarial Liabilities	\$	<u><u>1,388,677,761</u></u>



Schedule A – Valuation Balance Sheet

JUDICIAL
As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets	\$	553,136,000
Present value of future members' contributions		26,096,898
Present value of future employer contributions		
Normal contributions	\$ 103,647,085	
Unfunded accrued liability contributions	<u>116,604,869</u>	
Total prospective employer contributions		<u>220,251,954</u>
Total Present and Prospective Assets	\$	<u><u>799,484,852</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits	\$	425,668,522
Present value of prospective benefits payable on account of inactive members		2,177,136
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$ 361,625,702	
Disability retirement benefits	-	
Survivor benefits	10,013,492	
Separation benefits	<u>-</u>	
Total		<u>371,639,194</u>
Total Actuarial Liabilities	\$	<u><u>799,484,852</u></u>



Schedule A – Valuation Balance Sheet

VIRGINIA LAW OFFICERS

As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 1,484,995,000
Present value of future members' contributions		100,094,704
Present value of future employer contributions		
Normal contributions	\$ 187,158,280	
Unfunded accrued liability contributions	<u>726,242,682</u>	
Total prospective employer contributions		<u>913,400,962</u>
Total Present and Prospective Assets		<u><u>\$ 2,498,490,666</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 1,235,246,536
Present value of prospective benefits payable on account of inactive members		196,959,394
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$ 845,250,613	
Disability retirement benefits	94,014,879	
Survivor benefits	14,637,627	
Separation benefits	<u>112,381,617</u>	
Total		<u>1,066,284,736</u>
Total Actuarial Liabilities		<u><u>\$ 2,498,490,666</u></u>



Schedule A – Valuation Balance Sheet

POLITICAL SUBDIVISIONS

As of June 30, 2019

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Assets		\$ 21,078,248,000
Present value of future members' contributions		1,711,611,694
Present value of future employer contributions		
Normal contributions	\$ 2,675,046,574	
Unfunded accrued liability contributions	<u>3,353,576,098</u>	
Total prospective employer contributions		<u>6,028,622,672</u>
Total Present and Prospective Assets		<u><u>\$ 28,818,482,366</u></u>
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		\$ 12,129,214,162
Present value of prospective benefits payable on account of inactive members		1,566,573,869
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	\$12,906,917,959	
Disability retirement benefits	932,022,532	
Survivor benefits	312,769,350	
Separation benefits	<u>970,984,494</u>	
Total		<u>15,122,694,335</u>
Total Actuarial Liabilities		<u><u>\$ 28,818,482,366</u></u>



Schedule A – Solvency Test

SOLVENCY TEST

Virginia Retirement System (State Employees, Teachers, and Political Subdivisions)
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$13,613,905	\$58,337,920	\$27,182,146	\$99,133,971	\$76,244,148	100.00%	100.00%	15.79%
6/30/2018	13,221,525	54,132,392	25,820,901	93,174,818	73,204,795	100.00	100.00	22.66
6/30/2017	12,887,047	51,247,606	25,716,631	89,851,284	69,214,246	100.00	100.00	19.75
6/30/2016	12,518,183	48,717,940	25,882,869	87,118,992	65,203,736	100.00	100.00	15.33
6/30/2015	12,176,530	46,783,519	25,751,093	84,711,142	62,083,601	100.00	100.00	12.13

State Employees Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$3,459,343	\$15,831,694	\$6,107,151	\$25,398,188	\$18,932,104	100.00%	97.73%	0.00%
6/30/2018	3,416,685	14,911,769	5,786,703	24,115,157	18,392,939	100.00	100.00	1.11
6/30/2017	3,374,835	14,148,870	5,787,829	23,311,534	17,547,764	100.00	100.00	0.42
6/30/2016	3,324,003	13,408,506	6,145,734	22,878,243	16,672,776	100.00	99.55	0.00
6/30/2015	3,267,188	12,960,842	6,063,528	22,291,558	15,881,597	100.00	97.33	0.00



Schedule A – Solvency Test

Teachers Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$6,520,986	\$28,810,438	\$13,972,535	\$49,303,959	\$36,233,796	100.00%	100.00%	6.46%
6/30/2018	6,282,723	26,726,567	13,506,886	46,516,176	34,673,952	100.00	100.00	12.32
6/30/2017	6,082,982	25,474,535	13,448,500	45,006,017	32,684,868	100.00	100.00	8.38
6/30/2016	5,871,258	24,559,074	13,151,297	43,581,629	30,768,277	100.00	100.00	2.57
6/30/2015	5,679,555	23,776,912	13,107,711	42,564,178	29,441,485	100.00	99.94	0.00

Political Subdivisions Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$3,633,576	\$13,695,788	\$7,102,460	\$24,431,824	\$21,078,248	100.00%	100.00%	52.78%
6/30/2018	3,522,117	12,494,055	6,527,313	22,543,485	20,137,904	100.00	100.00	63.15
6/30/2017	3,429,230	11,624,201	6,480,302	21,533,733	18,981,614	100.00	100.00	60.62
6/30/2016	3,322,922	10,750,359	6,585,839	20,659,120	17,762,683	100.00	100.00	56.02
6/30/2015	3,229,787	10,045,765	6,579,854	19,855,406	16,760,519	100.00	100.00	52.96



Schedule A – Solvency Test

State Police Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$105,943	\$682,809	\$392,368	\$1,181,120	\$858,632	100.00%	100.00%	17.81%
6/30/2018	103,710	646,580	362,603	1,112,893	830,978	100.00	100.00	22.25
6/30/2017	99,643	622,206	318,779	1,040,628	785,677	100.00	100.00	20.02
6/30/2016	100,291	585,837	395,852	1,081,980	744,656	100.00	100.00	14.79
6/30/2015	95,394	586,984	368,323	1,050,701	710,864	100.00	100.00	7.73

Judicial Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$42,660	\$427,846	\$199,235	\$669,741	\$553,136	100.00%	100.00%	41.47%
6/30/2018	41,009	413,609	191,044	645,662	536,022	100.00	100.00	42.61
6/30/2017	39,104	407,862	184,556	631,522	505,834	100.00	100.00	31.90
6/30/2016	37,648	395,698	174,452	607,798	476,321	100.00	100.00	24.63
6/30/2015	36,784	390,690	172,914	600,388	442,250	100.00	100.00	8.55



Schedule A – Solvency Test

Virginia Law Officers Retirement System
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$244,233	\$1,432,206	\$534,799	\$2,211,238	\$1,484,995	100.00%	86.63%	0.00%
6/30/2018	240,390	1,317,732	499,382	2,057,504	1,413,876	100.00	89.05	0.00
6/30/2017	240,517	1,219,673	517,591	1,977,781	1,328,178	100.00	89.18	0.00
6/30/2016	237,416	1,160,507	586,334	1,984,257	1,235,490	100.00	86.00	0.00
6/30/2015	232,824	1,088,742	585,155	1,906,721	1,155,767	100.00	84.77	0.00

All Retirement Systems Combined
(\$ in thousands)

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Total		(1)	(2)	(3)
6/30/2019	\$14,006,741	\$60,880,781	\$28,308,548	\$103,196,070	\$79,140,911	100.00%	100.00%	15.03%
6/30/2018	13,606,634	56,510,313	26,873,930	96,990,877	75,985,671	100.00	100.00	21.84
6/30/2017	13,266,311	53,497,347	26,737,557	93,501,215	71,833,935	100.00	100.00	18.96
6/30/2016	12,893,538	50,859,982	27,039,507	90,793,027	67,660,203	100.00	100.00	14.45
6/30/2015	12,541,532	48,849,935	26,877,485	88,268,952	64,392,482	100.00	100.00	11.17



Schedule B – Development of Actuarial Value of Assets

**STATE EMPLOYEES
For the Year Ending June 30, 2019
(\$ in thousands)**

(1)	Actuarial Value Beginning of Year	\$	18,392,939
(2)	Market Value End of Year	\$	19,090,110
(3)	Market Value Beginning of Year (Adjusted)	\$	18,532,189
(4)	Cash Flow		
a.	Contributions	\$	747,065
b.	Benefit Payments		(1,387,730)
c.	Administrative Expenses		(12,374)
d.	Miscellaneous revenue and expenses		(762)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(653,801)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	1,211,722
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	1,274,370
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(62,648)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(12,530)
b.	First Prior Year		15,102
c.	Second Prior Year		167,405
d.	Third Prior Year		(171,992)
e.	Fourth Prior Year		(79,389)
f.	Total Recognized Investment Gain	\$	(81,404)
(7)	Adjustment to Beginning of Year Market Value		-
(8)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f + (7)]	\$	18,932,104



Schedule B – Development of Actuarial Value of Assets

TEACHERS
For the Year Ending June 30, 2019
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	34,673,952
(2)	Market Value End of Year	\$	36,522,769
(3)	Market Value Beginning of Year	\$	34,919,563
(4)	Cash Flow		
a.	Contributions	\$	1,684,222
b.	Benefit Payments		(2,367,753)
c.	Administrative Expenses		(22,843)
d.	Miscellaneous revenue and expenses		(1,448)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(707,822)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	2,311,028
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	2,419,596
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(108,568)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(21,714)
b.	First Prior Year		24,906
c.	Second Prior Year		308,870
d.	Third Prior Year		(316,628)
e.	Fourth Prior Year		(147,364)
f.	Total Recognized Investment Gain	\$	(151,930)
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	36,233,796



Schedule B – Development of Actuarial Value of Assets

**STATE POLICE
For the Year Ending June 30, 2019
(\$ in thousands)**

(1)	Actuarial Value Beginning of Year	\$	830,978
(2)	Market Value End of Year	\$	865,273
(3)	Market Value Beginning of Year	\$	836,702
(4)	Cash Flow		
a.	Contributions	\$	37,816
b.	Benefit Payments		(63,488)
c.	Administrative Expenses		(488)
d.	Miscellaneous revenue and expenses		(61)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(26,221)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	54,792
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	57,651
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(2,859)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(572)
b.	First Prior Year		607
c.	Second Prior Year		7,377
d.	Third Prior Year		(7,633)
e.	Fourth Prior Year		(3,555)
f.	Total Recognized Investment Gain	\$	(3,776)
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	858,632



Schedule B – Development of Actuarial Value of Assets

JUDICIAL
For the Year Ending June 30, 2019
(\$ in thousands)

(1)	Actuarial Value Beginning of Year	\$	536,022
(2)	Market Value End of Year	\$	557,541
(3)	Market Value Beginning of Year	\$	540,009
(4)	Cash Flow		
a.	Contributions	\$	26,098
b.	Benefit Payments		(43,584)
c.	Administrative Expenses		(315)
d.	Miscellaneous revenue and expenses		(39)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(17,840)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	35,372
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	37,176
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(1,804)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(361)
b.	First Prior Year		386
c.	Second Prior Year		4,737
d.	Third Prior Year		(4,786)
e.	Fourth Prior Year		(2,198)
f.	Total Recognized Investment Gain	\$	(2,222)
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	553,136



Schedule B – Development of Actuarial Value of Assets

**VIRGINIA LAW OFFICERS
For the Year Ending June 30, 2019
(\$ in thousands)**

(1)	Actuarial Value Beginning of Year	\$	1,413,876
(2)	Market Value End of Year	\$	1,495,990
(3)	Market Value Beginning of Year	\$	1,423,980
(4)	Cash Flow		
a.	Contributions	\$	93,198
b.	Benefit Payments		(114,126)
c.	Administrative Expenses		(831)
d.	Miscellaneous revenue and expenses		(103)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(21,862)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	93,872
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	98,913
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(5,041)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(1,008)
b.	First Prior Year		957
c.	Second Prior Year		12,329
d.	Third Prior Year		(12,494)
e.	Fourth Prior Year		(5,716)
f.	Total Recognized Investment Gain	\$	(5,932)
(7)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f]	\$	1,484,995



Schedule B – Development of Actuarial Value of Assets

**POLITICAL SUBDIVISIONS
For the Year Ending June 30, 2019
(\$ in thousands)**

(1)	Actuarial Value Beginning of Year	\$	20,137,904
(2)	Market Value End of Year	\$	21,259,032
(3)	Market Value Beginning of Year	\$	20,302,821
(4)	Cash Flow		
a.	Contributions	\$	747,714
b.	Benefit Payments		(1,123,040)
c.	Administrative Expenses		(13,369)
d.	Miscellaneous revenue and expenses		(853)
e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	\$	(389,548)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)e	\$	1,345,759
b.	Assumed Rate		7.00%
c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	\$	1,407,563
d.	Amount for Phased-in Recognition: (5)a – (5)c	\$	(61,804)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(12,361)
b.	First Prior Year		16,335
c.	Second Prior Year		180,914
d.	Third Prior Year		(180,602)
e.	Fourth Prior Year		(81,957)
f.	Total Recognized Investment Gain	\$	(77,671)
(7)	Adjustment to Beginning of Year Market Value		0
(8)	Actuarial Value End of Year: [(1) + (4)e + (5)c + (6)f + (7)]	\$	21,078,248



Schedule C – Summary of Changes in Net Assets

STATE EMPLOYEES
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	201,481
Members (paid by employer)		-
Employers		<u>545,584</u>
Total	\$	747,065
Miscellaneous Revenue		(762)
Net Investment Income		<u>1,211,722</u>
TOTAL	\$	<u>1,958,025</u>

Deductions for the Year

Benefit Payments	\$	1,360,833
Refunds		26,897
Transfers		-
Administrative Expenses		<u>12,374</u>
TOTAL	\$	<u>1,400,104</u>

Excess of Additions Over Deductions \$ 557,921

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	18,532,189
Adjustment to Beginning of Year Market Value		-
Excess of Additions over Deductions		<u>557,921</u>
Market Value of Assets as of 6/30/2019*	\$	<u>19,090,110</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

TEACHERS
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	403,258
Members (paid by employer)		-
Employers		<u>1,280,964</u>
Total	\$	1,684,222
Miscellaneous Revenue		(1,448)
Net Investment Income		<u>2,311,028</u>
TOTAL	\$	3,993,802

Deductions for the Year

Benefit Payments	\$	2,331,038
Refunds		36,715
Transfers		-
Administrative Expenses		<u>22,843</u>
TOTAL	\$	<u>2,390,596</u>

<u>Excess of Additions Over Deductions</u>	\$	<u>1,603,206</u>
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Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	34,919,563
Excess of Additions over Deductions		<u>1,603,206</u>
Market Value of Assets as of 6/30/2019*	\$	<u>36,522,769</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

STATE POLICE
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	6,379
Members (paid by employer)		-
Employers		<u>31,437</u>
Total	\$	37,816
Miscellaneous Revenue		(61)
Net Investment Income		<u>54,792</u>
TOTAL	\$	92,547

Deductions for the Year

Benefit Payments	\$	62,683
Refunds		805
Transfers		-
Administrative Expenses		<u>488</u>
TOTAL	\$	<u>63,976</u>

<u>Excess of Additions Over Deductions</u>	\$	<u>28,571</u>
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Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	836,702
Excess of Additions over Deductions		<u>28,571</u>
Market Value of Assets as of 6/30/2019*	\$	<u>865,273</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

JUDICIAL
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:

Members	\$	3,208
Members (paid by employer)		-
Employers		<u>22,890</u>

Total \$ 26,098

Miscellaneous Revenue (39)

Net Investment Income 35,372

TOTAL \$ 61,431

Deductions for the Year

Benefit Payments	\$	43,584
Refunds		-
Transfers		-
Administrative Expenses		<u>315</u>

TOTAL \$ 43,899

Excess of Additions Over Deductions \$ 17,532

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	540,009
Excess of Additions over Deductions		<u>17,532</u>
Market Value of Assets as of 6/30/2019*	\$	<u>557,541</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

VIRGINIA LAW OFFICERS
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	17,871
Members (paid by employer)		-
Employers		<u>75,327</u>
Total	\$	93,198
Miscellaneous Revenue		(103)
Net Investment Income		<u>93,872</u>
TOTAL	\$	186,967

Deductions for the Year

Benefit Payments	\$	109,193
Refunds		4,933
Transfers		-
Administrative Expenses		<u>831</u>
TOTAL	\$	<u>114,957</u>

Excess of Additions Over Deductions \$ 72,010

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	1,423,980
Excess of Additions over Deductions		<u>72,010</u>
Market Value of Assets as of 6/30/2019*	\$	<u>1,495,990</u>

*The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule C – Summary of Changes in Net Assets

POLITICAL SUBDIVISIONS
For the Year Ending June 30, 2019
(\$ in thousands)

Additions for the Year

Contributions:		
Members	\$	248,421
Members (paid by employer)		-
Employers		<u>499,293</u>
Total	\$	747,714
Miscellaneous Revenue		(853)
Net Investment Income		<u>1,345,759</u>
TOTAL	\$	2,092,620

Deductions for the Year

Benefit Payments	\$	1,082,791
Refunds		40,249
Transfers		-
Administrative Expenses		<u>13,369</u>
TOTAL	\$	<u>1,136,409</u>

Excess of Additions Over Deductions \$ 956,211

Reconciliation of Asset Balances

Market Value of Assets as of 6/30/2018	\$	20,302,821
Adjustment to Beginning of Year Market Value		-
Excess of Additions over Deductions		<u>956,211</u>
Market Value of Assets as of 6/30/2019*	\$	<u>21,259,032</u>

*The Market Value of Assets shown above includes Political Subdivisions with no active members and is used in the determination of the Actuarial Value of Assets (Schedule B).



Schedule D – Amortization of Unfunded Accrued Liability

STATE EMPLOYEES
As of June 30, 2019

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2019</u>	<u>BOY 2019/2020 Amortization Payment</u>	<u>Years Remaining June 30, 2019</u>
2013 Original Unfunded	\$7,117,727,223	\$7,440,786,247	\$452,865,117	\$7,477,075,609	\$455,929,660	24 years
2014 Experience (Gain) / Loss	(\$414,716,278)	(\$399,512,362)	(\$32,721,399)	(\$392,466,330)	(\$33,208,907)	15 years
2015 Experience (Gain) / Loss	(\$637,505,432)	(\$622,791,440)	(\$48,834,579)	(\$614,133,841)	(\$49,515,148)	16 years
2016 Experience (Gain) / Loss	(\$87,589,562)	(\$86,484,206)	(\$6,514,164)	(\$85,567,945)	(\$6,598,775)	17 years
2017 Assumption Change	\$62,300,692	\$61,988,603	\$4,498,440	\$61,514,474	\$4,552,674	18 years
2017 Experience (Gain) / Loss	(\$570,456,389)	(\$567,598,747)	(\$41,189,978)	(\$563,257,383)	(\$41,686,567)	18 years
2018 Experience (Gain) / Loss	(\$104,169,714)	(\$104,169,714)	(\$7,302,530)	(\$103,647,887)	(\$7,383,867)	19 years
2019 Experience (Gain) / Loss	\$15,231,288			\$15,231,288	\$1,047,258	20 years
2019 Assumption Change	\$671,335,725			\$671,335,725	\$46,159,050	20 years
Total		\$5,722,218,381	\$320,800,907	\$6,466,083,710	\$369,295,378	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2019	\$6,466,083,710
June 30, 2020	\$6,508,321,544
June 30, 2021	\$6,541,583,747
June 30, 2022	\$6,564,909,664
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

TEACHERS
As of June 30, 2019

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2019</u>	<u>BOY 2019/2020 Amortization Payment</u>	<u>Years Remaining June 30, 2019</u>
2013 Original Unfunded	\$14,493,629,234	\$15,151,465,308	\$922,156,595	\$15,225,360,323	\$928,396,839	24 years
2014 Experience (Gain) / Loss	(\$958,176,017)	(\$923,048,319)	(\$75,600,745)	(\$906,768,904)	(\$76,727,101)	15 years
2015 Experience (Gain) / Loss	(\$1,043,509,874)	(\$1,019,425,065)	(\$79,935,578)	(\$1,005,253,751)	(\$81,049,578)	16 years
2016 Experience (Gain) / Loss	(\$411,540,187)	(\$406,346,661)	(\$30,606,846)	(\$402,041,602)	(\$31,004,389)	17 years
2017 Assumption Change	\$104,287,885	\$103,765,466	\$7,530,139	\$102,971,800	\$7,620,922	18 years
2017 Experience (Gain) / Loss	(\$685,386,348)	(\$681,952,977)	(\$49,488,530)	(\$676,736,958)	(\$50,085,168)	18 years
2018 Experience (Gain) / Loss	(\$554,684,143)	(\$554,684,143)	(\$38,884,600)	(\$551,905,511)	(\$39,317,706)	19 years
2019 Experience (Gain) / Loss	(\$304,039,579)			(\$304,039,579)	(\$20,904,858)	20 years
2019 Assumption Change	\$1,469,767,609			\$1,469,767,609	\$101,056,854	20 years
2011 10 Yr Payback of Contribution Deficit	\$741,432,106	\$172,450,722	\$61,413,678	\$118,809,637	\$61,344,274	2 years
Total		\$11,842,224,331	\$716,584,113	\$13,070,163,064	\$799,330,089	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2019	\$13,070,163,064
June 30, 2020	\$13,099,114,201
June 30, 2021	\$13,106,385,542
June 30, 2022	\$13,155,289,696
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

STATE POLICE
As of June 30, 2019

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2019</u>	<u>BOY 2019/2020 Amortization Payment</u>	<u>Years Remaining June 30, 2019</u>
2013 Original Unfunded	\$385,000,723	\$402,475,116	\$24,495,656	\$404,438,022	\$24,661,418	24 years
2014 Experience (Gain) / Loss	(\$25,215,304)	(\$24,290,886)	(\$1,989,505)	(\$23,862,478)	(\$2,019,146)	15 years
2015 Experience (Gain) / Loss	(\$30,844,770)	(\$30,132,855)	(\$2,362,790)	(\$29,713,970)	(\$2,395,718)	16 years
2016 Experience (Gain) / Loss	(\$3,942,276)	(\$3,892,526)	(\$293,193)	(\$3,851,286)	(\$297,001)	17 years
2017 Assumption Change	(\$63,376,957)	(\$63,059,476)	(\$4,576,152)	(\$62,577,157)	(\$4,631,323)	18 years
2017 Experience (Gain) / Loss	(\$22,588,135)	(\$22,474,982)	(\$1,630,983)	(\$22,303,079)	(\$1,650,646)	18 years
2018 Experience (Gain) / Loss	\$23,290,790	\$23,290,790	\$1,632,737	\$23,174,117	\$1,650,922	19 years
2019 Experience (Gain) / Loss	\$5,168,037			\$5,168,037	\$355,339	20 years
2019 Assumption Change	\$32,015,645			\$32,015,645	\$2,201,301	20 years
Total		\$281,915,181	\$15,275,770	\$322,487,851	\$17,875,146	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2019	\$322,487,851
June 30, 2020	\$325,174,063
June 30, 2021	\$327,469,142
June 30, 2022	\$329,329,515
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

JUDICIAL
As of June 30, 2019

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2019</u>	<u>BOY 2019/2020 Amortization Payment</u>	<u>Years Remaining June 30, 2019</u>
2013 Original Unfunded	\$209,625,821	\$219,140,308	\$13,337,435	\$220,209,074	\$13,427,689	24 years
2014 Experience (Gain) / Loss	(\$21,000,605)	(\$20,230,703)	(\$1,656,962)	(\$19,873,903)	(\$1,681,649)	15 years
2015 Experience (Gain) / Loss	(\$44,957,373)	(\$43,919,730)	(\$3,443,852)	(\$43,309,189)	(\$3,491,846)	16 years
2016 Experience (Gain) / Loss	(\$19,134,811)	(\$18,893,335)	(\$1,423,084)	(\$18,693,169)	(\$1,441,568)	17 years
2017 Assumption Change	\$19,588,792	\$19,490,664	\$1,414,415	\$19,341,586	\$1,431,467	18 years
2017 Experience (Gain) / Loss	(\$27,709,090)	(\$27,570,284)	(\$2,000,743)	(\$27,359,409)	(\$2,024,864)	18 years
2018 Experience (Gain) / Loss	(\$18,377,310)	(\$18,377,310)	(\$1,288,291)	(\$18,285,250)	(\$1,302,640)	19 years
2019 Experience (Gain) / Loss	(\$9,407,887)			(\$9,407,887)	(\$646,858)	20 years
2019 Assumption Change	\$13,983,016			\$13,983,016	\$961,431	20 years
Total		\$109,639,610	\$4,938,918	\$116,604,869	\$5,231,162	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2019	\$116,604,869
June 30, 2020	\$118,891,432
June 30, 2021	\$121,164,811
June 30, 2022	\$123,419,090
June 30, 2043	\$0



Schedule D – Amortization of Unfunded Accrued Liability

VIRGINIA LAW OFFICERS
As of June 30, 2019

<u>Description</u>	<u>Original Amount</u>	<u>Outstanding Balance as of June 30, 2018</u>	<u>BOY 2018/2019 Amortization Payment</u>	<u>Outstanding Balance as of June 30, 2019</u>	<u>BOY 2019/2020 Amortization Payment</u>	<u>Years Remaining June 30, 2019</u>
2013 Original Unfunded	\$759,539,883	\$794,013,837	\$48,325,695	\$797,886,312	\$48,652,716	24 years
2014 Experience (Gain) / Loss	(\$27,744,710)	(\$26,727,562)	(\$2,189,077)	(\$26,256,179)	(\$2,221,691)	15 years
2015 Experience (Gain) / Loss	(\$16,540,081)	(\$16,158,326)	(\$1,267,013)	(\$15,933,705)	(\$1,284,671)	16 years
2016 Experience (Gain) / Loss	\$9,695,693	\$9,573,336	\$721,083	\$9,471,911	\$730,449	17 years
2017 Assumption Change	(\$59,590,715)	(\$59,292,202)	(\$4,302,766)	(\$58,838,697)	(\$4,354,640)	18 years
2017 Experience (Gain) / Loss	(\$46,004,687)	(\$45,774,231)	(\$3,321,782)	(\$45,424,120)	(\$3,361,830)	18 years
2018 Experience (Gain) / Loss	(\$12,006,355)	(\$12,006,355)	(\$841,672)	(\$11,946,211)	(\$851,047)	19 years
2019 Experience (Gain) / Loss	\$14,301,783			\$14,301,783	\$983,348	20 years
2019 Assumption Change	\$62,981,588			\$62,981,588	\$4,330,427	20 years
Total		\$643,628,497	\$37,124,468	\$726,242,682	\$42,623,061	

<u>Date</u>	<u>Projected Unfunded Liability</u>
June 30, 2019	\$726,242,682
June 30, 2020	\$729,763,945
June 30, 2021	\$732,157,891
June 30, 2022	\$733,307,475
June 30, 2043	\$0



Schedule E – Outline of Actuarial Assumptions and Methods

Assumptions and Methods which apply to all VRS Plans

The basis for the assumptions is the Virginia Retirement System Experience Study for the Four-Year Period July 1, 2012 to June 30, 2016 issued February 21, 2018 and presented and adopted by the Board at its April 2017 meeting as well as the investment rate of return of 6.75% adopted by the Board of Trustees at its October 10, 2019 meeting. These assumptions comply with Actuarial Standard of Practice (ASOP) No. 27, Selection of Economic Assumptions for Measuring Pension Obligations and ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations.

Investment Return Rate: 6.75% per annum, compounded annually, net of investment expenses.

Inflation Assumption: 2.50% per year.

Actuarial Cost Method: Entry age normal cost method. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability. See Schedule F for a detailed explanation.

Funding Period: The legacy unfunded actuarial accrued liability less the deferred contribution as of June 30, 2013 is amortized over a closed 30 year period from June 30, 2013. The amortization period of the unfunded less the deferred contribution, will decrease by one each year until reaching 0 years. The deferred contribution, as defined under the 2011 Appropriations Act, Item 469(1)(6), has been paid off except for Teachers which is to be amortized using a level-dollar, closed 10 year period beginning June 30, 2011. The actuarial gains and losses and other changes in the unfunded due to benefit and actuarial assumption and method changes for each valuation subsequent to the June 30, 2013 valuation will be amortized over a closed 20 year period. See the Amortization Schedules for more detail.

The amortization payment includes an adjustment of 1.018041 to account for the passage of time from the valuation date to the date the contribution is made.

Payroll Growth Rate: 3.00% per annum.

Asset Valuation Method: The method of valuing assets is intended to recognize a “smoothed” market value of assets. Under this method, the difference between actual return on market value from investment experience and the expected return on market value is recognized over a five-year period. The resulting actuarial value of assets cannot be less than 80% or more than 120% of the market value of assets.



Schedule E – Outline of Actuarial Assumptions and Methods

Cost-of-living Increase:	2.50% per year compounded annually for Plan 1 members receiving benefits or vested as of January 1, 2013 and 2.25% compounded annually for all other members. The temporary supplement for SPORS and VaLORS members is assumed to be adjusted biennially based on increases of 2.50% per annum compounded annually.
Percent Electing a Deferred Termination Benefit:	Terminating members are assumed to elect a return of contributions or a deferred annuity, whichever is most valuable benefit at the time of termination. Termination benefits are assumed to commence at normal retirement age.
Assumed Payment Form:	Modified cash refund annuity; in which the total benefit received by a member and his or her estate cannot be less than the total contributions made by the member while he or she was an active participant. . For members in pay status, the modified cash refund was estimated to be in effect for two years after retirement for Judicial members and three years for all others.
Marriage Assumption:	100% of active employees are assumed to be married, with males two years older than females.
Service Related Disability:	The service related disability benefits do not include an adjustment for Social Security or Worker's Compensation benefits.
Hazardous Duty Service:	The valuations of SPORS and VaLORS assume that all VRS service is hazardous duty service for purposes of determining eligibility for the temporary supplement.
Administrative Expenses:	The employer contribution rates include a rate for anticipated non-investment expenses based on actual prior year experience.



Schedule E – State Employees’ Actuarial Assumptions and Methods

STATE EMPLOYEES

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males setback 1 year, 85% of rates; females setback 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year; females setback 1 year with 1.5% increase compounded from ages 70 to 85

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males 115% of rates; females 130% of rates

State Employees Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00031	0.00044	0.00803	0.00016	0.00016	0.00285
25	0.00043	0.00045	0.00957	0.00017	0.00017	0.00304
30	0.00037	0.00046	0.00894	0.00020	0.00020	0.00383
35	0.00042	0.00053	0.01035	0.00027	0.00027	0.00503
40	0.00050	0.00066	0.01242	0.00036	0.00036	0.00696
45	0.00073	0.00107	0.01925	0.00058	0.00058	0.01155
50	0.00127	0.00431	0.02304	0.00098	0.00098	0.01520
55	0.00211	0.00599	0.02639	0.00151	0.00333	0.01827
60	0.00345	0.00789	0.02933	0.00214	0.00454	0.02081
65	0.00587	0.01102	0.03389	0.00315	0.00684	0.02522
70	0.00970	0.01677	0.04238	0.00527	0.01104	0.03410
75		0.02704	0.05702		0.01930	0.04963
80		0.04548	0.08047		0.03437	0.07380
85		0.07920	0.11900		0.06378	0.10933
90		0.14247	0.18618		0.11280	0.16137

25% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – State Employees’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 1.

State Employees Retirement Rates, Plan 1 Male							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	≥31
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.033	0.033	0.125	0.125
51	0.000	0.000	0.000	0.033	0.030	0.080	0.090
52	0.000	0.000	0.000	0.033	0.030	0.080	0.090
53	0.000	0.000	0.000	0.033	0.030	0.050	0.090
54	0.000	0.000	0.000	0.033	0.030	0.050	0.090
55	0.000	0.045	0.045	0.045	0.035	0.050	0.090
56	0.000	0.045	0.040	0.040	0.040	0.050	0.090
57	0.000	0.045	0.040	0.040	0.040	0.075	0.090
58	0.000	0.045	0.040	0.040	0.040	0.100	0.090
59	0.000	0.045	0.040	0.040	0.040	0.100	0.090
60	0.000	0.045	0.050	0.050	0.050	0.115	0.090
61	0.000	0.150	0.075	0.075	0.075	0.165	0.150
62	0.000	0.150	0.100	0.100	0.100	0.200	0.200
63	0.000	0.150	0.100	0.100	0.100	0.200	0.175
64	0.000	0.150	0.135	0.135	0.135	0.200	0.175
65	0.000	0.250	0.250	0.250	0.250	0.250	0.250
66	0.000	0.275	0.250	0.250	0.250	0.250	0.250
67	0.000	0.275	0.220	0.220	0.220	0.220	0.220
68	0.000	0.200	0.220	0.220	0.220	0.220	0.220
69	0.000	0.200	0.220	0.220	0.220	0.220	0.220
70	0.000	0.200	0.220	0.220	0.220	0.220	0.220
71	0.000	0.200	0.220	0.220	0.220	0.220	0.220
72	0.000	0.200	0.220	0.220	0.220	0.220	0.220
73	0.000	0.200	0.220	0.220	0.220	0.220	0.220
74	0.000	0.200	0.220	0.220	0.220	0.220	0.220
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

State Employees Retirement Rates, Plan 1 Female							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	≥31
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.030	0.030	0.075	0.075
51	0.000	0.000	0.000	0.035	0.030	0.075	0.060
52	0.000	0.000	0.000	0.035	0.030	0.075	0.060
53	0.000	0.000	0.000	0.035	0.035	0.100	0.090
54	0.000	0.000	0.000	0.050	0.035	0.100	0.090
55	0.000	0.050	0.050	0.050	0.040	0.100	0.090
56	0.000	0.050	0.050	0.050	0.050	0.100	0.090
57	0.000	0.050	0.050	0.050	0.050	0.100	0.090
58	0.000	0.050	0.050	0.050	0.050	0.100	0.090
59	0.000	0.050	0.050	0.050	0.050	0.100	0.090
60	0.000	0.050	0.050	0.050	0.050	0.120	0.125
61	0.000	0.075	0.080	0.080	0.080	0.165	0.175
62	0.000	0.100	0.120	0.120	0.120	0.225	0.250
63	0.000	0.175	0.120	0.120	0.120	0.225	0.175
64	0.000	0.175	0.150	0.150	0.150	0.225	0.175
65	0.000	0.275	0.275	0.275	0.275	0.275	0.300
66	0.000	0.300	0.300	0.300	0.300	0.300	0.300
67	0.000	0.300	0.250	0.250	0.250	0.250	0.250
68	0.000	0.250	0.250	0.250	0.250	0.250	0.250
69	0.000	0.250	0.250	0.250	0.250	0.250	0.250
70	0.000	0.250	0.250	0.250	0.250	0.250	0.250
71	0.000	0.250	0.250	0.250	0.250	0.250	0.250
72	0.000	0.250	0.250	0.250	0.250	0.250	0.250
73	0.000	0.250	0.250	0.250	0.250	0.250	0.250
74	0.000	0.250	0.250	0.250	0.250	0.250	0.250
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 2 and the Hybrid Plan.

State Employees Retirement Rates, Plan 2 and Hybrid Male																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	≥40
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.125
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.080
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.080	0.090
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090	0.090
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.090	0.090	0.090	0.090	0.090
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075	0.090	0.090	0.090	0.090	0.090	0.090
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
60	0.000	0.045	0.045	0.045	0.045	0.045	0.045	0.115	0.115	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
61	0.000	0.150	0.075	0.075	0.075	0.075	0.165	0.165	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
62	0.000	0.150	0.100	0.100	0.100	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
63	0.000	0.150	0.100	0.100	0.200	0.200	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
64	0.000	0.150	0.135	0.200	0.200	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
65	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
66	0.000	0.275	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
67	0.000	0.275	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
68	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
69	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
70	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
71	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
72	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
73	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
74	0.000	0.200	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

State Employees Retirement Rates, Plan 2 and Hybrid Female																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	≥40
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.075	0.060
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
60	0.000	0.050	0.050	0.050	0.050	0.050	0.050	0.120	0.120	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
61	0.000	0.075	0.080	0.080	0.080	0.080	0.165	0.165	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
62	0.000	0.100	0.120	0.120	0.120	0.225	0.225	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
63	0.000	0.175	0.120	0.120	0.225	0.225	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
64	0.000	0.175	0.150	0.225	0.225	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
65	0.000	0.275	0.275	0.275	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
66	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
67	0.000	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
68	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
69	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
70	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
71	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
72	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
73	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
74	0.000	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – State Employees’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 25% of disability cases are assumed to be service related.

State Employees Disability Rates		
Age	Male	Female
20	0.00039	0.00033
25	0.00072	0.00100
30	0.00091	0.00211
35	0.00129	0.00281
40	0.00212	0.00354
45	0.00343	0.00474
50	0.00497	0.00629
55	0.00629	0.00742
60	0.00690	0.00735
65	0.00657	0.00653
70	0.00572	0.00841



Schedule E – State Employees’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

State Employees Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.25852	0.25852	0.25694	0.23691	0.19663	0.15321	0.11602	0.09132	0.08331	0.08331	0.08331
25	0.22297	0.22297	0.22056	0.20171	0.16921	0.13670	0.10954	0.09132	0.08251	0.07732	0.07214
30	0.17601	0.17601	0.17095	0.15425	0.13244	0.11401	0.10011	0.08993	0.08095	0.06790	0.05485
35	0.15120	0.14553	0.13631	0.12195	0.10694	0.09577	0.08902	0.08387	0.07574	0.05878	0.04183
40	0.14480	0.12618	0.11198	0.09890	0.08767	0.08029	0.07681	0.07442	0.06799	0.04938	0.03077
45	0.14223	0.11470	0.09617	0.08321	0.07345	0.06888	0.06600	0.06412	0.05934	0.04282	0.02630
50	0.13789	0.10668	0.08617	0.07370	0.06544	0.06362	0.05994	0.05630	0.05128	0.03879	0.02630
55	0.13242	0.10032	0.08050	0.07094	0.06491	0.06348	0.05950	0.05391	0.04470	0.03550	0.02630
60	0.13038	0.09617	0.07857	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.13038	0.09477	0.07859	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.13038	0.09477	0.07859	0.07094	0.06491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

State Employees Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.31434	0.31434	0.30334	0.27392	0.23350	0.18606	0.14708	0.12545	0.12362	0.12362	0.12362
25	0.26747	0.26747	0.25594	0.23170	0.20061	0.16601	0.13663	0.11705	0.11136	0.11136	0.11136
30	0.21874	0.20726	0.19398	0.17630	0.15700	0.13853	0.12163	0.10538	0.09500	0.09045	0.09045
35	0.19257	0.17078	0.15532	0.14101	0.12758	0.11658	0.10633	0.09380	0.08241	0.07177	0.06019
40	0.17770	0.14790	0.12987	0.11685	0.10577	0.09775	0.09030	0.08135	0.07188	0.05904	0.03747
45	0.17029	0.13335	0.11247	0.09984	0.08920	0.08275	0.07531	0.06872	0.06277	0.05214	0.03025
50	0.16721	0.12286	0.09934	0.08763	0.07822	0.07316	0.06479	0.05936	0.05545	0.05088	0.03025
55	0.16695	0.11694	0.09149	0.08236	0.07660	0.07039	0.06175	0.05711	0.05138	0.05088	0.03025
60	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.16695	0.11656	0.09060	0.08236	0.07660	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – State Employees’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following total salary increase rates are used. The total salary increase rate consists of an inflation rate of 2.50%, a productivity component of 1.00%, and a variable merit component that is dependent on years of service.

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	5.35%
2	5.35
3	4.75
4	4.45
5	4.45
6	4.45
7	4.35
8	4.25
9	4.00
10	4.00
11-19	3.65
20 or more	3.50

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member’s actual election contained in the valuation data.

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – Teachers’ Actuarial Assumptions and Methods

TEACHERS

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 White Collar Employee Rates to age 80, White Collar Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020

Post-Retirement:

RP-2014 White Collar Employee Rates to age 49, White Collar Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males 1% increase compounded from ages 70 to 90; females setback 3 years with 1.5% increase compounded from ages 65 to 75 and 2.0% increase compounded from ages 75 to 90

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; 115% of rates for males and females

Teachers Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00028	0.00028	0.00803	0.00014	0.00015	0.00252
25	0.00033	0.00033	0.00957	0.00014	0.00014	0.00269
30	0.00031	0.00031	0.00894	0.00018	0.00016	0.00339
35	0.00036	0.00036	0.01035	0.00024	0.00020	0.00445
40	0.00043	0.00043	0.01242	0.00033	0.00026	0.00616
45	0.00067	0.00067	0.01925	0.00054	0.00040	0.01022
50	0.00116	0.00272	0.02304	0.00091	0.00068	0.01345
55	0.00192	0.00384	0.02639	0.00137	0.00225	0.01616
60	0.00315	0.00501	0.02933	0.00194	0.00297	0.01841
65	0.00540	0.00705	0.03389	0.00290	0.00460	0.02231
70	0.00939	0.01144	0.04238	0.00505	0.00804	0.03017
75		0.02063	0.05702		0.01419	0.04390
80		0.03801	0.08047		0.02649	0.06529
85		0.07325	0.11900		0.05139	0.09672
90		0.14553	0.18618		0.10307	0.14275

5% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Teachers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 1.

Teachers Retirement Rates, Plan 1 Male							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	≥31
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.020	0.020	0.175	0.175
51	0.000	0.000	0.000	0.020	0.020	0.175	0.150
52	0.000	0.000	0.000	0.020	0.020	0.175	0.150
53	0.000	0.000	0.000	0.020	0.020	0.175	0.150
54	0.000	0.000	0.000	0.040	0.035	0.175	0.150
55	0.000	0.070	0.070	0.070	0.045	0.225	0.150
56	0.000	0.070	0.045	0.045	0.045	0.225	0.150
57	0.000	0.070	0.045	0.045	0.045	0.225	0.150
58	0.000	0.070	0.060	0.060	0.060	0.225	0.150
59	0.000	0.100	0.060	0.060	0.060	0.225	0.150
60	0.000	0.100	0.070	0.070	0.070	0.225	0.150
61	0.000	0.110	0.085	0.085	0.085	0.300	0.250
62	0.000	0.170	0.150	0.150	0.150	0.350	0.350
63	0.000	0.140	0.150	0.150	0.150	0.350	0.250
64	0.000	0.180	0.150	0.150	0.150	0.350	0.250
65	0.000	0.300	0.300	0.300	0.300	0.300	0.350
66	0.000	0.275	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.350	0.350	0.350	0.350	0.350
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

Teachers Retirement Rates, Plan 1 Female							
Age	Years of service						
	0-4	5	6-9	10	11-29	30	≥31
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.024	0.024	0.150	0.150
51	0.000	0.000	0.000	0.035	0.020	0.150	0.100
52	0.000	0.000	0.000	0.035	0.025	0.150	0.100
53	0.000	0.000	0.000	0.035	0.025	0.150	0.100
54	0.000	0.000	0.000	0.040	0.030	0.150	0.100
55	0.000	0.060	0.060	0.060	0.050	0.225	0.160
56	0.000	0.060	0.050	0.050	0.050	0.225	0.160
57	0.000	0.060	0.050	0.050	0.050	0.225	0.160
58	0.000	0.070	0.050	0.050	0.050	0.225	0.160
59	0.000	0.080	0.060	0.060	0.060	0.225	0.200
60	0.000	0.090	0.080	0.080	0.080	0.225	0.200
61	0.000	0.150	0.100	0.100	0.100	0.300	0.250
62	0.000	0.150	0.150	0.150	0.150	0.350	0.300
63	0.000	0.150	0.150	0.150	0.150	0.350	0.300
64	0.000	0.250	0.150	0.150	0.150	0.350	0.300
65	0.000	0.300	0.300	0.300	0.300	0.300	0.350
66	0.000	0.300	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.300	0.300	0.300	0.300	0.300
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire from Plan 2 and the Hybrid Plan.

Teachers Retirement Rates, Plan 2 and Hybrid Male																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	≥40
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150	0.150
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.175	0.150	0.150	0.150
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
60	0.000	0.100	0.100	0.100	0.100	0.100	0.100	0.225	0.225	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
61	0.000	0.110	0.085	0.085	0.085	0.085	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
62	0.000	0.170	0.150	0.150	0.150	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
63	0.000	0.140	0.150	0.150	0.350	0.350	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
64	0.000	0.180	0.150	0.350	0.350	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
65	0.000	0.300	0.300	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
66	0.000	0.275	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

Teachers Retirement Rates, Plan 2 and Hybrid Female																		
Age	Years of service																	
	0-4	5	6-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	≥40
≤49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100	0.100
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.150	0.100	0.100	0.100
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160
57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160	0.160
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.160	0.160	0.160	0.160	0.160	0.160	0.160
59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.225	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
60	0.000	0.090	0.090	0.090	0.090	0.090	0.090	0.225	0.225	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
61	0.000	0.150	0.100	0.100	0.100	0.100	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
62	0.000	0.150	0.150	0.150	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
63	0.000	0.150	0.150	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
64	0.000	0.250	0.150	0.350	0.350	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
65	0.000	0.300	0.300	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
66	0.000	0.300	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
67	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
68	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
69	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
70	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
71	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
72	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
73	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
74	0.000	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
≥75	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



Schedule E – Teachers’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 5% of disability cases are assumed to be service related.

Teachers Disability Rates		
Age	Male	Female
20	0.000005	0.000003
25	0.000005	0.000023
30	0.000064	0.000081
35	0.000135	0.000196
40	0.000325	0.000481
45	0.000725	0.000792
50	0.001444	0.001609
55	0.002443	0.002521
60	0.003395	0.003321
65	0.003773	0.003509
70	0.003773	0.003509



Schedule E – Teachers’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

Teachers Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.21079	0.14843	0.11901	0.11020	0.09349	0.08050	0.08046	0.07228	0.05097	0.04292	0.04292
25	0.18729	0.14293	0.12175	0.11084	0.09453	0.08071	0.07568	0.06716	0.05060	0.04286	0.04286
30	0.16964	0.13940	0.12584	0.11218	0.09637	0.08159	0.07055	0.06162	0.05134	0.04355	0.04355
35	0.16964	0.13888	0.12459	0.10907	0.09347	0.07931	0.06709	0.05881	0.05210	0.04361	0.03314
40	0.16964	0.13888	0.12078	0.10272	0.08688	0.07483	0.06444	0.05760	0.05255	0.04302	0.02407
45	0.16964	0.13888	0.11573	0.10116	0.07864	0.06940	0.06230	0.05733	0.05243	0.04239	0.02407
50	0.16964	0.13888	0.11233	0.10116	0.07206	0.06391	0.06033	0.05733	0.05234	0.04238	0.02407
55	0.16964	0.13888	0.11217	0.10116	0.07038	0.05844	0.05813	0.05733	0.05234	0.04238	0.02407
60	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.16964	0.13888	0.11217	0.10116	0.07038	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Teachers Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.18697	0.11393	0.09392	0.09392	0.08483	0.06269	0.04984	0.04984	0.04938	0.04663	0.04663
25	0.18037	0.12332	0.10860	0.10637	0.09381	0.07728	0.06567	0.06507	0.05448	0.04933	0.04933
30	0.17320	0.13889	0.12685	0.11780	0.10503	0.09536	0.08496	0.07332	0.06172	0.05303	0.04656
35	0.16500	0.14138	0.12602	0.11307	0.10178	0.09519	0.08653	0.07385	0.06386	0.05292	0.03931
40	0.15660	0.13208	0.11313	0.09891	0.08919	0.08395	0.07759	0.06810	0.06086	0.04911	0.02568
45	0.15055	0.12047	0.09933	0.08544	0.07686	0.07181	0.06623	0.05912	0.05390	0.04417	0.02287
50	0.14909	0.11617	0.09449	0.08038	0.07126	0.06481	0.05822	0.05346	0.04858	0.04357	0.02287
55	0.14909	0.11617	0.09449	0.08038	0.07093	0.06249	0.05450	0.05326	0.04771	0.04357	0.02287
60	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.14909	0.11617	0.09449	0.08038	0.07093	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – Teachers’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: Teachers are assumed to receive their first salary increase on the valuation date. The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase
1	5.95%
2	5.85
3	5.85
4	5.45
5	5.45
6	5.45
7	5.35
8	5.35
9	5.35
10	4.85
11	4.85
12	4.85
13	4.75
14	4.75
15	4.65
16	4.65
17	4.55
18	4.45
19	4.45
20 or more	3.50

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – State Police Actuarial Assumptions and Methods

STATE POLICE

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males 90% of rates; females set forward 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males set forward 2 years; unisex using 100% male

SPORS Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00036	0.00044	0.00839	0.00016	0.00016	0.00839
25	0.00043	0.00045	0.00772	0.00018	0.00019	0.00772
30	0.00040	0.00046	0.00820	0.00023	0.00025	0.00820
35	0.00046	0.00053	0.00948	0.00030	0.00033	0.00948
40	0.00056	0.00066	0.01247	0.00043	0.00052	0.01247
45	0.00086	0.00107	0.01810	0.00072	0.00089	0.01810
50	0.00149	0.00431	0.02124	0.00118	0.00317	0.02124
55	0.00246	0.00599	0.02397	0.00174	0.00423	0.02397
60	0.00405	0.00789	0.02682	0.00247	0.00625	0.02682
65	0.00693	0.01102	0.03182	0.00383	0.00989	0.03182
70	0.01139	0.01694	0.04125	0.00653	0.01601	0.04125
75		0.02871	0.05658		0.02631	0.05658
80		0.05074	0.08141		0.04493	0.08141
85		0.09286	0.12299		0.07928	0.12299
90		0.17558	0.19143		0.14077	0.19143

85% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – State Police Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire.

SPORS Retirement Rates			
Age	Years of service		
	0-4	5-24	>=25
<=49	0.000	0.000	0.000
50	0.000	0.100	0.100
51	0.000	0.030	0.100
52	0.000	0.030	0.100
53	0.000	0.030	0.100
54	0.000	0.030	0.100
55	0.000	0.060	0.100
56	0.000	0.060	0.100
57	0.000	0.060	0.100
58	0.000	0.100	0.100
59	0.000	0.100	0.100
60	0.000	0.100	0.100
61	0.000	0.100	0.100
62	0.000	0.200	0.200
63	0.000	0.200	0.200
64	0.000	0.200	0.200
>=65	0.000	1.000	1.000



Schedule E – State Police Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 85% of disability cases are assumed to be service related.

SPORS Disability Rates	
Age	Unisex
<=44	0.00194
45	0.00233
50	0.00481
55	0.00770
60	0.00897
65	0.01108
70	0.01368

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

SPORS Termination Rates	
Service	Unisex
0	0.09750
1	0.04750
2	0.04750
3	0.04750
4	0.04750
5	0.04750
6	0.04750
7	0.03000
8	0.03000
9	0.03000
>=10	0.01750



Schedule E – State Police Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	4.75%
2	4.75
3	4.75
4	4.75
5	4.65
6	4.40
7	4.40
8	4.40
9	4.40
10 - 19	4.00
20 or more	3.50

It is assumed members covered under VSDP receive a 3.50% annual increase in pay while disabled and this adjusted pay is used to determine deferred benefits payable from the System.

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member's actual election contained in the valuation data.



Schedule E – Judicial Actuarial Assumptions and Methods

JUDICIAL

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males setback 1 year, 85% of rates; females setback 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year; females setback 1 year with 1.5% compounding increase from ages 70 to 85

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males 115% of rates; females 130% of rates

Judicial Employees Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00031	0.00044	0.00803	0.00016	0.00016	0.00285
25	0.00043	0.00045	0.00957	0.00017	0.00017	0.00304
30	0.00037	0.00046	0.00894	0.00020	0.00020	0.00383
35	0.00042	0.00053	0.01035	0.00027	0.00027	0.00503
40	0.00050	0.00066	0.01242	0.00036	0.00036	0.00696
45	0.00073	0.00107	0.01925	0.00058	0.00058	0.01155
50	0.00127	0.00431	0.02304	0.00098	0.00098	0.01520
55	0.00211	0.00599	0.02639	0.00151	0.00333	0.01827
60	0.00345	0.00789	0.02933	0.00214	0.00454	0.02081
65	0.00587	0.01102	0.03389	0.00315	0.00684	0.02522
70	0.00970	0.01677	0.04238	0.00527	0.01104	0.03410
75		0.02704	0.05702		0.01930	0.04963
80		0.04548	0.08047		0.03437	0.07380
85		0.07920	0.11900		0.06378	0.10933
90		0.14247	0.18618		0.11280	0.16137

5% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Judicial Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire with an unreduced retirement benefit.

Judicial Retirement Rates	
Age	Unisex
<=59	0.000
60	0.150
61	0.150
62	0.150
63	0.150
64	0.150
65	0.150
66	0.150
67	0.150
68	0.150
69	0.150
70	0.500
71	0.500
72	0.500
>=73	1.000

DISABILITY RATES: There are no assumed rates of disability prior to service retirement (for causes other than death or retirement).

TERMINATION RATES: There are no assumed rates of withdrawal prior to service retirement (for causes other than death or retirement).

SALARY INCREASE RATES: Salary increase rates are 4.5%.

EMPLOYER CONTRIBUTION TO DEFINED CONTRIBUTION HYBRID PLAN: The valuation assumes an average employer defined contribution rate for members in the Hybrid Plan. This is reported by VRS for each valuation.



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

VIRGINIA LAW OFFICERS

Plan Specific Assumptions and Methods

MORTALITY RATES:

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with Scale BB to 2020; males 90% of rates; females set forward 1 year

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with Scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years

Post-Disablement:

RP-2014 Disabled Mortality Rates projected with Scale BB to 2020; males set forward 2 years; unisex using 100% male

VaLORS Mortality Rates						
Age	Male			Female		
	Pre Retirement	Post Retirement	Post Disablement	Pre Retirement	Post Retirement	Post Disablement
20	0.00036	0.00044	0.00839	0.00016	0.00016	0.00839
25	0.00043	0.00045	0.00772	0.00018	0.00019	0.00772
30	0.00040	0.00046	0.00820	0.00023	0.00025	0.00820
35	0.00046	0.00053	0.00948	0.00030	0.00033	0.00948
40	0.00056	0.00066	0.01247	0.00043	0.00052	0.01247
45	0.00086	0.00107	0.01810	0.00072	0.00089	0.01810
50	0.00149	0.00431	0.02124	0.00118	0.00317	0.02124
55	0.00246	0.00599	0.02397	0.00174	0.00423	0.02397
60	0.00405	0.00789	0.02682	0.00247	0.00625	0.02682
65	0.00693	0.01102	0.03182	0.00383	0.00989	0.03182
70	0.01139	0.01694	0.04125	0.00653	0.01601	0.04125
75		0.02871	0.05658		0.02631	0.05658
80		0.05074	0.08141		0.04493	0.08141
85		0.09286	0.12299		0.07928	0.12299
90		0.17558	0.19143		0.14077	0.19143

35% of pre-retirement deaths are assumed to be service related. Mortality improvement is anticipated under the post-retirement mortality assumption as projected with Scale BB.



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

RETIREMENT RATES: The following rates of retirement are assumed for members eligible to retire.

VaLORS Retirement Rates, Male					
Age	Years of service				
	0-4	5	6-24	25	>=26
<=49	0.000	0.000	0.000	0.000	0.000
50	0.000	0.110	0.110	0.350	0.350
51	0.000	0.100	0.080	0.300	0.250
52	0.000	0.100	0.080	0.300	0.250
53	0.000	0.100	0.080	0.300	0.250
54	0.000	0.100	0.080	0.240	0.250
55	0.000	0.100	0.080	0.180	0.250
56	0.000	0.100	0.090	0.180	0.200
57	0.000	0.100	0.100	0.180	0.200
58	0.000	0.100	0.100	0.180	0.200
59	0.000	0.100	0.120	0.180	0.200
60	0.000	0.180	0.180	0.180	0.200
61	0.000	0.180	0.200	0.200	0.200
62	0.000	0.180	0.400	0.400	0.400
63	0.000	0.400	0.250	0.250	0.250
64	0.000	0.150	0.250	0.250	0.250
>=65	0.000	1.000	1.000	1.000	1.000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

VaLORS Retirement Rates, Female					
Age	Years of service				
	0-4	5	6-24	25	>=26
<=49	0.000	0.000	0.000	0.000	0.000
50	0.000	0.100	0.100	0.375	0.375
51	0.000	0.100	0.080	0.250	0.200
52	0.000	0.100	0.080	0.250	0.200
53	0.000	0.100	0.080	0.250	0.225
54	0.000	0.100	0.080	0.250	0.250
55	0.000	0.100	0.080	0.250	0.275
56	0.000	0.100	0.080	0.250	0.300
57	0.000	0.100	0.080	0.250	0.225
58	0.000	0.100	0.080	0.400	0.225
59	0.000	0.100	0.130	0.300	0.225
60	0.000	0.200	0.200	0.200	0.225
61	0.000	0.200	0.225	0.225	0.225
62	0.000	0.200	0.300	0.300	0.300
63	0.000	0.200	0.250	0.250	0.250
64	0.000	0.200	0.250	0.250	0.250
>=65	0.000	1.000	1.000	1.000	1.000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

DISABILITY RATES: As shown below for selected ages. 35% of disability cases are assumed to be service related.

VaLORS Disability Rates		
Age	Male	Female
20	0.00143	0.00543
25	0.00322	0.00581
30	0.00584	0.00659
35	0.00720	0.00769
40	0.00793	0.01001
45	0.00913	0.01381
50	0.01165	0.01821
55	0.01501	0.02277
60	0.01782	0.02901
65	0.01916	0.03865
70	0.01920	0.05499



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

TERMINATION RATES: The following are sample withdrawal rates based on age and years of service (for causes other than death, disability, or retirement).

VaLORS Termination Rates, Male											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.31876	0.28460	0.25466	0.22550	0.19680	0.16134	0.13524	0.12367	0.12367	0.12367	0.12367
25	0.30264	0.26915	0.23838	0.20793	0.17797	0.14758	0.12544	0.11510	0.11510	0.11510	0.11510
30	0.28066	0.24612	0.21425	0.18325	0.15307	0.12980	0.11286	0.10375	0.10098	0.10098	0.10098
35	0.25749	0.21974	0.18823	0.16020	0.13400	0.11603	0.10242	0.09350	0.08615	0.07590	0.06050
40	0.23639	0.19311	0.16185	0.13861	0.11962	0.10471	0.09313	0.08358	0.07325	0.05907	0.04275
45	0.22182	0.17034	0.13792	0.12032	0.11173	0.09580	0.08484	0.07391	0.06240	0.05163	0.04275
50	0.21689	0.15441	0.11855	0.10683	0.10683	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
55	0.21689	0.14708	0.10525	0.09930	0.09930	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
60	0.21689	0.14673	0.09871	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.21689	0.14673	0.09796	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.21689	0.14673	0.09796	0.09787	0.09787	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

VaLORS Termination Rates, Female											
Age	Years of service										
	0	1	2	3	4	5	6	7	8	9	≥10
20	0.34816	0.33235	0.29905	0.25161	0.20346	0.15381	0.13567	0.10072	0.09919	0.09919	0.09919
25	0.33633	0.30645	0.27155	0.23161	0.19212	0.15381	0.13567	0.10072	0.09919	0.09919	0.09919
30	0.32698	0.27494	0.23556	0.20432	0.17667	0.15381	0.13567	0.10072	0.09919	0.09066	0.09066
35	0.32025	0.25204	0.20727	0.17948	0.15980	0.14868	0.13534	0.10072	0.09909	0.08073	0.06058
40	0.31390	0.23286	0.18182	0.15417	0.14036	0.13413	0.12530	0.10072	0.09311	0.07057	0.03901
45	0.30589	0.21487	0.15693	0.12720	0.11803	0.10976	0.10134	0.09113	0.07804	0.06036	0.03687
50	0.29483	0.19601	0.13051	0.09760	0.09281	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
55	0.28000	0.17544	0.10155	0.06516	0.06490	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
60	0.26118	0.15309	0.06978	0.02989	0.03440	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
65	0.23879	0.12934	0.03574	0.00004	0.00182	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
70	0.20897	0.10078	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



Schedule E – Virginia Law Officers’ Actuarial Assumptions and Methods

SALARY INCREASE RATES: The following salary increase rates are used. Inflation rate of 2.50% plus productivity component of 1.00% plus step-rate/promotional component as shown:

Pay Increase Assumption	
Years of Service	Total Increase (Next Year)
1	4.75%
2	4.75
3	4.75
4	4.75
5	4.65
6	4.40
7	4.40
8	4.40
9	4.40
10 - 19	4.00
20 or more	3.50

It is assumed members covered under VSDP receive a 3.50% annual increase in pay while disabled and this adjusted pay is used to determine deferred benefits payable from the System.

DISABILITY ELECTION: All active members hired on or after January 1, 1999 will enter the Virginia Sickness and Disability Program (VSDP) and will not be eligible to receive non-VSDP disability benefits. For members hired before January 1, 1999 we measure the liabilities based upon the member’s actual election contained in the valuation data.



Schedule E – Summary of Actuarial Assumption and Method Changes

2009 Valuation

1. Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2008 are stated below.

SYSTEM	ASSUMPTION CHANGE
State	Increase rates of withdrawals Increase rates of disability retirement up to age 52, females Decrease rates of disability retirement after age 52, all members Decrease rates of service retirement
Teachers	Increase rates of withdrawals Increase rates of disability retirement Decrease rates of service retirement
SPORS	Decrease rates of withdrawals, males Decrease rates of service retirement
VaLORS	Increase rates of withdrawals Decrease rates of disability retirement Change rates of service retirement
Judicial	Increase rates of salary increases

2. For the June 30, 2009 valuation the Board suspended application of the 80%/120% market value of assets corridor on the actuarial value of assets.

2010 Valuation

The investment return rate was decreased from 7.50% per annum to 7.00% per annum.

2011 Valuation

The amortization period of the unfunded less the deferred contribution begins at 30 years on June 30, 2011 and will decrease by one each year until reaching the minimum period of 20 years. The deferred contribution, as defined under 2011 Appropriations Act, Item 469(1)(6), is amortized using a level-dollar, closed, 10 year period beginning June 30, 2011.

2013 Valuation

1. The amortization period of the unfunded as of June 30, 2013 less the deferred contribution under 2011 Appropriations Act, Item 469(1)(6) is amortized using a level-dollar, closed, 30 year period beginning June 30, 2013 decreasing by one each year until reaching 0 years.



Schedule E – Summary of Actuarial Assumption and Method Changes

2. Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2012 are summarized below.

STATE SYSTEM	ASSUMPTION CHANGE
State	Update mortality table Decrease rates of service retirement Decrease rates of withdrawals for less than 10 years of service Decrease rates of male disability retirement Reduce rates of salary increase by 0.25% per year
Teachers	Update mortality table Adjustments to rates of service retirement Decrease rates of withdrawals for three through nine years of service Decrease rates of disability Reduce rates of salary increase by 0.25% per year
SPORS	Update mortality table Increase rate of service retirement at age 54
VaLORS	Update mortality table Adjustments to rates of service retirement Decrease rates of withdrawals for females under 10 years of service Increase rates of disability Decrease service related disability rate from 60% to 50%
Judicial	Update mortality table

2015 Valuation

1. An administrative expense charge was added to the employer contribution rates to cover administrative expenses.
2. The retirement rates for the Judicial plan were extended to age 73 to reflect the change in the mandatory retirement age to 73.



Schedule E – Summary of Actuarial Assumption and Method Changes

2017 Valuation

Changes to the actuarial assumptions as a result of the experience study for the four-year period ending June 30, 2016 are summarized below. In addition to these, the spouse age difference was changed from spouses being the same age as participants to males being two years older than females.

System	Assumption	Description
State	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Lowered rates at older ages and changed final retirement age from 70 to 75
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Scale	No change
	6. Line of Duty Disability	Increase rate from 14% to 25%
Teachers	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Lowered rates at older ages and changed final retirement age from 70 to 75
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Scale	No change
SPORS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020 and reduced margin for future improvement in accordance with experience
	2. Retirement Rates	Increased age 50 rates, and lowered rates at older ages
	3. Withdrawal Rates	Adjusted rates to better match experience
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Increases	No change
	6. Line of Duty Disability	Increase rate from 60% to 85%
VaLORS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020 and reduced margin for future improvement in accordance with experience
	2. Retirement Rates	Increased age 50 rates, and lowered rates at older ages
	3. Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
	4. Disability Rates	Adjusted rates to better match experience
	5. Salary Increases	No change
	6. Line of Duty Disability	Decrease rate from 50% to 35%
JRS	1. Mortality Rates (Pre-retirement, post-retirement healthy and disabled)	Update to a more current mortality table - RP-2014 projected to 2020
	2. Retirement Rates	Decreased rates at first retirement eligibility
	3. Withdrawal Rates	No change
	4. Disability Rates	Removed disability rates
	5. Salary Increases	No change

In addition to these assumption changes listed above, the method to determine the normal cost rate has changed. Beginning with this valuation, the payroll used to develop the rate will be reduced for those expected to leave during the year. The normal cost rate is also adjusted to reflect that the hybrid payroll as a percent of the total payroll will increase from the rate setting valuation date to when employers make the contribution.



Schedule E – Summary of Actuarial Assumption and Method Changes

2018 Valuation

The assumed payment form was updated to a modified cash refund annuity. This is a form of payment in which the total benefit received by a member and his or her estate cannot be less than the total contributions made by the member while he or she was an active participant.

2019 Valuation

The investment return rate was decreased from 7.00% per annum to 6.75% per annum.



Schedule F – Actuarial Cost Method

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability, termination from service or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 6.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.
2. The employer contributions required to support the benefits of VRS are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf. The normal cost rate has been developed to cover the cost of new hires during the fiscal year and has also been adjusted to reflect the expected allocation of Plan 1, Plan 2, and hybrid membership as of the fiscal year in which the contributions are being made.
4. The unfunded accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the VRS. The accrued liability contribution amortizes the balance of the unfunded accrued liability over a period of years from the valuation date and includes a timing adjustment to reflect the period between the rate setting date and the time employers will actually make contributions.



Schedule G – Summary of Main Plan Provisions

Benefit Provisions which apply to all VRS Plans

Plan Year:	Twelve-month period ending June 30th.
Administration:	All plans are administered by the Board of Trustees of the Virginia Retirement System.
Plan 1:	Members hired prior to July 1, 2010 and who were vested as of January 1, 2013.
Plan 2:	Members hired on or after July 1, 2010, or members hired prior to July 1, 2010 and who were not vested as of January 1, 2013. Members hired after January 1, 2014 in the State Police and Virginia Law Officers Plans are in Plan 2.
Hybrid:	Members hired on or after January 1, 2014 or by member election. There is no Hybrid Plan in the State Police and Virginia Law Officers Plans.
Eligibility:	All full-time, salaried, permanent employees of the Commonwealth of Virginia or of any participating Virginia city, county, town or political subdivision or of any local Virginia school boards are eligible to become members of VRS. This summary covers the provisions relating to state employees.
Employee Contributions:	
Defined Benefit -	Active members in Plan 1 and Plan 2 contribute 5% of their creditable compensation per year. Active members in the Hybrid Plan contribute 4% of their creditable compensation per year. The employer may "pick-up" the member's assessments under the provisions of Internal Revenue Code Section 414(h).
Defined Contribution -	Active members in the Hybrid Plan are required to contribute 1% of their creditable compensation per year to the defined contribution component of the Hybrid Plan. Active members can make voluntary additional contributions of up to 4% of their creditable compensation. The employer matches the required 1% and will match 100% of the first 1% of voluntary contributions plus 50% of additional voluntary contributions up to the 4% maximum.



Schedule G – Summary of Main Plan Provisions

Creditable Compensation: Annual salary minus any overtime pay, payments of a temporary nature, or payments for extra duties.

Optional Forms of Payment: There are optional forms of payment available on an actuarially equivalent basis, as follows:

100% Survivor Option:

Payable for the member's life. Upon the member's death, 100% of the benefit continues to the contingent annuitant.

50% Survivor Option:

Upon the member's death, 50% of the benefit continues to the contingent annuitant.

Leveling Option:

A temporarily increased retirement allowance payable to a date specified by the member and a reduced retirement allowance (on an actuarially equivalent basis) payable after the specified date for the member's remaining lifetime.

Partial Lump Sum Option:

The member may elect to receive a lump sum payment equal to the sum of 12, 24, or 36 payments of the standard monthly life annuity. The member's monthly benefit will be actuarially reduced to reflect the lump sum payment. The member may then elect to receive the reduced monthly annuity under any of the other optional forms of payment.

Actuarial equivalence is based on tables adopted by the Board of Trustees.



Schedule G – State Employees' Plan Provisions

STATE EMPLOYEES **Plan Specific Benefit Provisions**

Effective Date: March 1, 1952

Type of Plan: VRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered an agent multiple-employer PERS with separate cost-sharing pools for state employees and teachers.

Service: Employees receive credit of one month of service for each month a contribution is made on their behalf to VRS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Average Final Compensation:

Plan 1: The average of the member's highest 36 consecutive months of salary.

Plan 2 and Hybrid: The average of the member's highest 60 consecutive months of salary.

Normal Retirement:

Plan 1: Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Employees' Plan Provisions

Plan 2:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service up to January 1, 2013 plus 1.65% of AFC times years of service from January 1, 2013.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Hybrid:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.00% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Employees’ Plan Provisions

Early Retirement:

Plan 1:

Eligibility:

A member may retire early after reaching age 50 with at least ten years of service credit, or age 55 with credit for at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has credit for thirty years of service at retirement and is at least age 50. For members at least age 55, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is applied for each month that the retirement age precedes 65, or if more favorable, for each month the service at retirement is less than 30. For members younger than 55 at retirement, the reduction factor determined as though the member were 55 is further reduced by multiplying it by a second factor, to reflect a 0.6% reduction for each month retirement precedes age 55.

Payment Form:

Same as for Normal Retirement above.

Plan 2 & Hybrid:

Eligibility:

A member may retire early after reaching age 60 with five years of service, or upon the sum of their age and their service being 90 (Rule of 90).

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor similar to Plan 1. No reduction is applied if the sum of the member’s age and service is equal to 90.

Payment Form:

Same as for Normal Retirement above.



Schedule G – State Employees' Plan Provisions

Disability Retirement - Non-VSDP: Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee:

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)



Schedule G – State Employees’ Plan Provisions

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 65 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 65. If the member dies while disabled before age 65, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Plan 1:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 50 with at least 30 years of service. Reduced benefits may commence at or after age 55 with more than 5 years of service or age 50 with at least 10 years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – State Employees' Plan Provisions

Plan 2 & Hybrid:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits commence unreduced at Social Security Normal Retirement Age. Reduced benefits may commence on or after age 60 with five years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.



Schedule G – State Employees' Plan Provisions

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

Plan 1:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.

Plan 2 and Hybrid:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.

Plans 1, 2 & Hybrid:

The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – Teachers’ Plan Provisions

TEACHERS **Plan Specific Benefit Provisions**

Effective Date: March 1, 1952

Type of Plan: VRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered an agent multiple-employer PERS with separate cost-sharing pools for state employees and teachers.

Service: Employees receive credit of one month of service for each month a contribution is made on their behalf to VRS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Average Final Compensation:

Plan 1: The average of the member’s highest 36 consecutive months of salary.

Plan 2 and Hybrid: The average of the member’s highest 60 consecutive months of salary.

Normal Retirement:

Plan 1: Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – Teachers’ Plan Provisions

Plan 2:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service up to January 1, 2013 plus 1.65% of AFC times years of service from January 1, 2013.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Hybrid:

Eligibility:

A member may retire upon Normal Retirement after reaching Social Security Normal Retirement Age plus five years of service.

Annual Benefit:

1.00% of average final compensation (AFC) times years of service.

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – Teachers’ Plan Provisions

Early Retirement:

Plan 1:

Eligibility:

A member may retire early after reaching age 50 with at least ten years of service credit, or age 55 with credit for at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has credit for thirty years of service at retirement and is at least age 50. For members at least age 55, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is applied for each month that the retirement age precedes 65, or if more favorable, for each month the service at retirement is less than 30. For members younger than 55 at retirement, the reduction factor determined as though the member were 55 is further reduced by multiplying it by a second factor, to reflect a 0.6% reduction for each month retirement precedes age 55.

Payment Form:

Same as for Normal Retirement above.

Plan 2 and Hybrid:

Eligibility:

A member may retire early after reaching age 60 with five years of service or upon the sum of their age and their service being 90 (Rule of 90).

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor similar to Plan 1. No reduction is applied if the sum of the member’s age and service is equal to 90.

Payment Form:

Same as for Normal Retirement above.



Schedule G – Teachers’ Plan Provisions

Disability Retirement (Plan 1 and Plan 2):

Eligibility:

A member is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- **Workers Compensation Guarantee:**

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- **Special Retirement Allowance Guarantee:**

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)



Schedule G – Teachers’ Plan Provisions

Disability Retirement – VLDP (Hybrid Plan):

Provisions applying to Hybrid members: In lieu of the above benefits, these members will be covered by the Virginia Local Disability Program (VLDP). Under VLDP, these members will receive a deferred benefit payable at normal retirement from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and the date of normal retirement. If the member dies while disabled before normal retirement, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Plan 1:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 50 with at least 30 years of service. Reduced benefits may commence at or after age 55 with more than 5 years of service or age 50 with at least 10 years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – Teachers’ Plan Provisions

Plan 2 and Hybrid:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits commence unreduced at Social Security Normal Retirement Age. Reduced benefits may commence on or after age 60 with five years of service.

Payment Form:

Same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.



Schedule G – Teachers’ Plan Provisions

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

Plan 1:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.

Plan 2 and Hybrid:

Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.

Plans 1, 2 & Hybrid:

The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – State Police Plan Provisions

STATE POLICE **Plan Specific Benefit Provisions**

Effective Date:	July 1, 1950
Type of Plan:	SPORS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.
Service:	Employees receive credit of one month of service for each month a contribution is made on their behalf to SPORS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.
Average Final Compensation:	
Plan 1:	The average of the member's highest 36 consecutive months of salary.
Plan 2:	The average of the member's highest 60 consecutive months of salary.
Normal Retirement:	Eligibility: A member may retire upon Normal Retirement on or after age 60 with credit for five years of service. Annual Benefit: 1.85% of average final compensation (AFC) times years of service for retirements on or after July 1, 2007 (1.70% of AFC times years of service for retirements prior to July 1, 2007). Payment Form: Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.



Schedule G – State Police Plan Provisions

Temporary Supplement:

A member hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall receive an additional annual retirement allowance of \$14,244 payable from the date of retirement to their Social Security normal retirement age. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period.

Early Retirement:

Eligibility:

A member may retire early after reaching age 50 with at least five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and reduced by 1/2% for the first 60 months and 4/10% for any additional months of early retirement. This reduction is applied for each month that the retirement age precedes 60, or if more favorable, for each month the service at retirement is less than 25. No reduction applies if the member has credit for 25 years of service at retirement.

Payment Form:

Same as for Normal Retirement above.

Temporary Supplement:

A member hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall receive an additional annual retirement allowance of \$14,244 payable from the date of retirement to their Social Security normal retirement age. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period.



Schedule G – State Police Plan Provisions

Disability Retirement

- Non-VSDP:

Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Monthly Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- **Workers Compensation Guarantee:**

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- **Special Retirement Allowance Guarantee:**

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a



Schedule G – State Police Plan Provisions

lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 60 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 60. If the member dies while disabled before age 60, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 60 or at age 50 with at least 25 years of service. Reduced benefits may commence at or after age 50 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – State Police Plan Provisions

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 50, the member is assumed to be 50 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.



Schedule G – State Police Plan Provisions

Cost-of-Living Increase:

- | | |
|--------------|--|
| Plan 1: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%. |
| Plan 2: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%. This COLA will be deferred until the date at which the member is eligible for unreduced retirement. |
| Plans 1 & 2: | The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service. |



Schedule G – Judicial Plan Provisions

JUDICIAL **Plan Specific Benefit Provisions**

Effective Date:

July 1, 1970

Type of Plan:

JRS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.

Service:

Appointed or elected
prior to 7/1/2010:

Employees receive credit of one month of service multiplied by a weighting factor of 3.5 (2.5 for judges entering JRS on or after January 1, 1995) for each month a contribution is made on their behalf to JRS. This weighted service is used for all purposes under this plan, including determining a member's vested status, determining whether a member is eligible for retirement, computing early retirement reductions, and computing the amount of the benefit. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.

Appointed or elected
on and after 7/1/2010:

Employees receive credit of one month of service multiplied by a tiered weighting factor for each month a contribution is made on their behalf to JRS. First term judges under age 45 at the time of appointment/election use a weighing factor of 1.5, judges age 45 – 54 use a weighing factor of 2.0, and judges age 55 and above use a weighing factor of 2.5. This weighted service is used for all purposes under this plan, including determining a member's vested status, determining whether a member is eligible for retirement, computing early retirement reductions, and computing the amount of the benefit. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.



Schedule G – Judicial Plan Provisions

Average Final Compensation:

Plan 1:	The average of the member's highest 36 consecutive months of salary.
Plan 2 and Hybrid:	The average of the member's highest 60 consecutive months of salary.

Normal Retirement:

Eligibility:

A member may retire upon Normal Retirement on or after age 65 with credit for five years of service. The mandatory retirement age for judges is age 73.

Annual Benefit:

1.70% of average final compensation (AFC) times years of service, not to exceed 78% of AFC. For members appointed or elected on or after January 1, 2013, the benefit multiplier is 1.65% and for members appointed or elected on or after January 1, 2014, the benefit multiplier is 1.00%

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Early Retirement:

Eligibility:

A member may retire early after reaching age 55 with credit for five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and multiplied by a reduction factor. No reduction applies if the member has reached age 60 and has credit for 30 or more years of creditable service. For other members, the reduction is 0.5% per month for the first 60 months and 0.4% per month for the next 60 months. This reduction is measured



Schedule G – Judicial Plan Provisions

from the later of age 60 and the point at which the member would have earned 30 years of service, or if more favorable, from age 65.

Payment Form:

Same as for Normal Retirement above.

Disability Retirement:

Eligibility:

A member is eligible from the first day of employment.

Annual Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit (1.65% if appointed or elected on or after January 1, 2013 and 1.00% if appointed or elected on or after January 1, 2014). Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.



Schedule G – Judicial Plan Provisions

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or at age 60 with at least 30 years of service. Reduced benefits may commence at or after age 55 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.



Schedule G – Judicial Plan Provisions

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 55, the member is assumed to be 55 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit. If the death occurs while inactive, benefits payable are described in Section 8(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits, and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.



Schedule G – Judicial Plan Provisions

Cost-of-Living Increase:

Plan 1:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%.
Plan 2 and Hybrid:	Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%.
Plans 1, 2 & Hybrid:	The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service.



Schedule G – Virginia Law Officers’ Plan Provisions

VIRGINIA LAW OFFICERS Plan Specific Benefit Provisions

Effective Date:	October 1, 1999
Type of Plan:	VaLORS is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is considered a single-employer PERS.
Service:	Employees receive credit of one month of service for each month a contribution is made on their behalf to VaLORS. A member may also purchase credit for certain periods, such as time spent in the military, by paying a purchase rate established by the VRS Board. Special rules and limits govern the purchase of additional service.
Average Final Compensation:	
Plan 1:	The average of the member’s highest 36 consecutive months of salary.
Plan 2:	The average of the member’s highest 60 consecutive months of salary.
Normal Retirement:	Eligibility: A member may retire upon Normal Retirement on or after age 60 with credit for five years of service. Annual Benefit: For all employees hired on or after July 1, 2001, the benefit is calculated as 2.00% of average final compensation (AFC) times years of service. Employees hired before July 1, 2001, must make a one-time election to receive benefits under (i) or (ii) below: (i) 1.70% of average final compensation (AFC) times years of service plus the temporary supplement described in 5(d). (ii) 2.00% of average final compensation (AFC) times years of service and no temporary supplement.



Schedule G – Virginia Law Officers' Plan Provisions

Payment Form:

Benefits are paid as a monthly life annuity, with a guarantee that if the payments do not exceed the member's contributions plus interest, determined as of the date at retirement, the balance will be paid in a lump sum to the member's beneficiary. Optional forms of payment are available.

Temporary Supplement:

Temporary Supplement: A member who is hired before July 1, 2001, and who was either (i) hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or (ii) a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall be eligible to receive an additional annual retirement allowance of \$14,244 payable from the date of retirement to age 65. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period. The eligible employee must have made a one-time election to receive benefits under b(i) to receive this supplement.

Early Retirement:

Eligibility:

A member may retire early after reaching age 50 with credit for five years of service.

Annual Benefit:

Calculated the same as the normal retirement benefit, using actual service at retirement and reduced by 0.5% per month for the first 60 months and 0.4% per month for any additional months of early retirement. This reduction is applied for each month that the retirement age precedes 60, or if more favorable, for each month the service at retirement is less than 25. No reduction applies if the member has credit for 25 years of service at retirement.

Payment Form:

Same as for Normal Retirement above.



Schedule G – Virginia Law Officers' Plan Provisions

Temporary Supplement:

Temporary Supplement: A member who is hired before July 1, 2001, and who was either (i) hired on or after July 1, 1974 who has 20 or more years of hazardous service at retirement or (ii) a member hired before July 1, 1974 who is vested under SPORS/VaLORS benefits shall be eligible to receive an additional annual retirement allowance of \$14,244 payable from the date of retirement to age 65. This amount is adjusted biennially based upon increases in Social Security benefits during the interim period. The eligible employee must have made a one-time election to receive benefits under 5(b)(i) to receive this supplement.

Disability Retirement - Non-VSDP:

Eligibility:

A member hired prior to 1/1/1999 and who has declined VSDP coverage is eligible from the first day of employment.

Monthly Benefit:

For members with less than five years of service credit, the minimum guaranteed benefit. For members with greater than five years of service credit, the greater of the minimum guaranteed benefit and 1.70% of AFC times service credit. Benefit is reduced by Worker's Compensation (if any).

Minimum Guaranteed Benefit:

- Workers Compensation Guarantee:

66 2/3% of AFC if member does not qualify for primary Social Security and 50% of AFC if member qualifies for primary Social Security.
- Special Retirement Allowance Guarantee:

50% of AFC if member does not qualify for primary Social Security and 33 1/3% of AFC if member qualifies for primary Social Security.



Schedule G – Virginia Law Officers' Plan Provisions

Service Credit:

If disability occurs before age 60, service is the smaller of 1) twice actual service, and 2) rendered service plus the number of years remaining between age at disability and age 60.

Payment Form:

The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement will be paid in a lump sum to the member's beneficiary. 100% and 50% Survivor Options are also permitted for disability retirement. (A refund of the member's contribution account is paid out for a work-related disability.)

Disability Retirement – VSDP:

Provisions applying to members entering in 1999 or later and continuing members who have elected this benefit: In lieu of the above benefits, these members will be covered by the Virginia Sickness and Disability Program (VSDP). Under VSDP, these members will receive a deferred benefit payable at age 60 from this plan. The deferred benefit will be computed like a normal retirement benefit. For this calculation, a member's creditable service will include the period of disability, and the Average Final Compensation will be adjusted to reflect increases in the cost-of-living between the date of disability and age 60. If the member dies while disabled before age 60, a death benefit will be determined as though the employee were an active member.

Deferred Termination Benefit:

Eligibility:

A member with at least five years of service who does not withdraw his/her contributions from the fund is eligible for a deferred termination benefit.

Annual Benefit:

Same as normal retirement benefit, but both AFC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 60 or at age 50 with at least 25 years of service.



Schedule G – Virginia Law Officers' Plan Provisions

Reduced benefits may commence at or after age 50 if the member is not eligible for an unreduced benefit.

Payment Form:

The form of payment is the same as for Normal Retirement above.

Death Benefit:

The beneficiary of a member who dies after leaving active service but before retiring is entitled to receive a lump sum distribution of the deceased member's contribution account.

Withdrawal (Refund) Benefit:

Eligibility:

All members leaving covered employment with less than five years of service are eligible. Optionally, vested members (those with five or more years of service) may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit:

The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 4%.

Death Benefit:

Eligibility:

Death must have occurred while an active or inactive, non-retired member.

Benefit:

Upon the death of a non-vested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, if death occurs while in active service the qualifying survivor of the member is entitled to receive a benefit determined as though the member retired, elected the 100% Survivor Option, then died. If the member dies before reaching age 50, the member is assumed to be 50 for benefit calculation purposes. The qualifying survivor may elect to receive a refund of the contributions plus interest in lieu of the monthly benefit.



Schedule G – Virginia Law Officers’ Plan Provisions

If the death occurs while inactive, benefits payable are described in Section 9(d).

Work-Related Death:

Qualifying survivor would receive 50% of AFC if beneficiary does not qualify for Social Security survivor benefits and 33 1/3% of AFC if beneficiary qualifies for Social Security survivor benefits. This benefit is reduced by Worker's Compensation. In addition, a refund of the member's contribution account is paid to the beneficiary.

Cost-of-Living Increase:

- | | |
|--------------|--|
| Plan 1: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 3% of the Consumer Price Index increase plus half of each percentage increase from 3% to 7%. |
| Plan 2: | Members qualify for cost-of-living increases on July 1 of the second calendar year after retirement. Automatic cost-of-living increases are calculated as the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 4%, with the maximum cost-of-living increase of 3%. |
| Plans 1 & 2: | The COLA is deferred for one full calendar year after the member reaches unreduced retirement age. The deferred COLA does not apply to employees within five years of eligibility for unreduced retirement as of January 1, 2013 and to members who retire with twenty or more years of service. |



Schedule G – Summary of Plan Changes

Summary of Plan Changes

1996 Valuation

1. Any member with at least 25 years of service may purchase prior service credit for a) active duty military service in the armed forces of the United States, b) certified creditable service in the retirement system of another state, or c) both at the rate of 5% of current compensation or average final compensation, if greater, times years of service purchased.
2. VRS may enter into an agreement with any political subdivision of the Commonwealth of Virginia which has a defined benefit plan that is not supplemental to VRS to permit portability of service credit on a cost-neutral basis.
3. Early retirement is allowed at age 50 with 10 years of service. The early retirement benefit is determined as if the member is age 55 (but using actual service and AFC) reduced by 0.6% for each month the member is younger than age 55. This benefit can be no smaller than the value of the member's contributions and interest paid in monthly installments over the member's lifetime.
4. The service multiplier for judges entering the Retirement System after January 1, 1995 is 2.5.
5. Effective 7/1/98, a health credit of \$1.50 per month per year of service (up to 30 years) is automatically provided to teachers in VRS who retire with at least 15 years of service. An additional credit of \$1.00 per month per year of service (up to 30 years) can be provided.

1998 Valuation

1. Effective January 1, 1999, the retirement benefit became 1.7% of average final pay times years of service. The 3% benefit adjustment was eliminated for future retirees. A 1.6% ad hoc benefit increase was provided for all retirees and beneficiaries receiving benefits as of December 31, 1999.
2. On January 1, 1999, the Virginia Sickness and Disability Program became effective. All future new members will be covered by this program, and will only receive a deferred retirement benefit from VRS. Members joining before 1999 were allowed to make a one-time irrevocable election to join this program. (Applies to State Employees and State Police.)
3. Effective July 1, 1999, state employees, teachers and employees of participating local units that had not elected out of this benefit may retire with an unreduced benefit if they are at least 50 years old and they have earned at least 30 years of service.

1999 Valuation

1. 100% Joint and Survivor Option is payable in the case of death of a member who dies while in active service.
2. 100% Joint and Survivor Option is payable for disability retirement.



Schedule G – Summary of Plan Changes

2000 Valuation

1. On October 1, 1999, the Virginia Law Officers' Retirement System (VaLORS) became effective.
2. The Board of Trustees adopted the use of a "pooled" contribution rate for State Employees and Teachers.

2001 Valuation

1. The State Police System had their temporary supplement starting at retirement extended from age 65 to their Social Security Retirement Age.
2. VaLORS changed their benefit multiplier from 1.70% to 2.00% of pay with no temporary supplement for all new hires and rehires after July 1, 2001 as well as for current participants who have made an election to change formulas.
3. The Partial Lump Sum Option was added as an additional optional form of payment. This option provides the retiring member with a lump sum payment equal to the sum of 12, 24, or 36 payments of the standard monthly life annuity. The member's monthly annuity is actuarially reduced to reflect the lump sum payment.

2003 Valuation

No actuarially material changes were made to the plan provisions. Listed below are the two minor changes of note.

1. School superintendents with five years of service may now purchase an additional ten years of out-of-state service. The superintendent must not be eligible for an out-of-state benefit.
2. The leveling option was restored as an optional form of payment. Benefits may be leveled to age 62 or older, and the benefit cannot reduce more than 50%. Any COLAs are calculated on the basic benefit amount.

2007 Valuation

The State Police changed their benefit multiplier from 1.70% to 1.85% of pay.



Schedule G – Summary of Plan Changes

2011 Valuation

In 2010, VRS adopted a second retirement plan. All employees hired on or after July 1, 2010 are automatically enrolled in this plan. The differences between Plan 1 and Plan 2 are listed below:

1. The Average Final Compensation is now based on the highest 60 consecutive months of service.
2. The Cost of Living Adjustment was adjusted to be the first 2% increase of the Consumer Price Index plus half of each percent from 2% to 10%, with the maximum cost-of-living increases of 6%.
3. The Normal Retirement Age is Social Security Normal Retirement Age plus five years of service. A member is eligible for unreduced early retirement when the sum of his or her age plus years of service is 90 (Rule of 90). Eligibility for reduced early retirement is at age 60 with five years of service.
4. Judges service weight has been changed. For first term judges less than age 45 the service weight is 1.5; for judges age 45 – 54 the service weight is 2.0; finally, for judges age 55 and above the service weight is 2.5.

The State Employees Plan and the Teachers Plan adopted changes 1, 2, and 3 listed above. The State Police Plan and the Virginia Law Officers Plan adopted changes 1 and 2 listed above. The Judicial Plan adopted changes 1, 2, and 4

2012 Valuation

In, 2012 HB 1130 / SB 498 was enacted and will go into effect on January 1, 2013. A summary of this bill is listed below:

1. Active non-vested members in Plan 1 will have their Average Final Compensation based on the highest 60 consecutive months of service instead of the highest 36 consecutive months of service. This provision applies to all plans.
2. Active non-vested members in Plan 1 and all Plan 2 members will accrue benefits at 1.65% as of the effective date. This provision applies only to the State and Teacher Plans as well as members in political subdivision plans not covered by hazardous duty benefits members.
3. Active members in the Judicial plan hired after January 1, 2013 will accrue benefits at 1.65%.
4. Active non-vested members in Plan 1 will now have to satisfy the Rule of 90 (sum of age and service at least 90) or reach their Social Security Normal Retirement Age to be eligible for Unreduced Retirement. These same members must attain age 60 with five years of service to be eligible for Early Retirement. This provision applies only to the State and Teachers Plans as well as members in political subdivision plans not covered by hazardous duty benefits members.



Schedule G – Summary of Plan Changes

5. Active non-vested members in Plan 1 and all Plan 2 members will only be able to receive a maximum COLA of 3%. This provision applies to all plans.
6. All active employees not within five years of eligibility for unreduced retirement as of January 1, 2013 and retiring with less than 20 years of service will have their COLA deferred to one year after their unreduced retirement date after beginning to receive benefits. All active employees within five years of eligibility for unreduced retirement as of January 1, 2013 are grandfathered into the old provisions with no deferral of the COLA.

2014 Valuation

The 2014 valuation includes Hybrid Plan members for the first time. The Hybrid Plan covers eligible employees hired on or after January 1, 2014 in the State, Teachers and Judicial plans. The Hybrid Plan does not apply to members in the State Police and VaLORS plans. The Hybrid Plan consists of defined benefit plan and defined contribution plan components.

Defined benefit plan component

The benefits under the defined benefit plan are similar to Plan 2 benefits except that the benefit accrual rate is 1.00% under the Hybrid Plan.

Defined contribution plan component

Active members in the Hybrid Plan are required to contribute 1% of their creditable compensation per year to the defined contribution component of the Hybrid Plan. Active members can make voluntary additional contributions of up 4% of their creditable compensation. The maximum employee contribution is 5% of pay.

Employers are also required to contribute 1% of pay to the defined contribution component for members in the Hybrid Plan. In addition, employers match the employee's first 1% of voluntary contributions and 0.5% match for each additional 1% of voluntary employee contributions. The maximum employer contribution is 3.5% of pay of members in the defined contribution component of the Hybrid Plan.

2015 Valuation

The mandatory retirement age for Judges was increased from age 70 to age 73.



Schedule H – Schedules of Active Member Data

**STATE EMPLOYEES
As of June 30, 2019**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	73	0	0	0	0	0	0	73	\$ 1,917,932
20 to 24	1,867	6	0	0	0	0	0	1,873	\$ 67,697,438
25 to 29	4,889	489	4	0	0	0	0	5,382	\$ 231,136,920
30 to 34	4,505	2,006	435	7	0	0	0	6,953	\$ 352,550,596
35 to 39	3,813	2,163	1,589	399	10	0	0	7,974	\$ 448,874,631
40 to 44	3,039	1,874	1,725	1,046	304	16	0	8,004	\$ 475,041,681
45 to 49	2,829	1,881	1,755	1,311	966	369	34	9,145	\$ 560,460,553
50 to 54	2,478	1,763	1,777	1,424	1,143	1,013	658	10,256	\$ 625,983,917
55 to 59	2,112	1,594	1,834	1,495	1,246	1,202	1,933	11,416	\$ 702,234,080
60	295	280	328	271	213	243	488	2,118	\$ 132,824,684
61	255	273	310	258	214	196	481	1,987	\$ 126,102,446
62	216	250	287	241	219	173	499	1,885	\$ 122,880,539
63	186	192	273	222	169	196	421	1,659	\$ 105,791,708
64	139	201	224	200	170	170	425	1,529	\$ 99,309,692
65	111	113	183	176	116	97	308	1,104	\$ 74,832,426
66	66	109	134	106	93	84	240	832	\$ 56,811,162
67	46	61	96	76	71	62	170	582	\$ 40,538,678
68	47	71	90	70	58	57	142	535	\$ 37,488,212
69	16	45	60	61	36	32	122	372	\$ 26,851,511
70 & Over	75	79	174	152	112	100	428	1,120	\$ 85,732,195
Total	27,057	13,450	11,278	7,515	5,140	4,010	6,349	74,799	\$ 4,375,061,001

Average Age: 47.81

Average Service: 11.71



Schedule H – Schedules of Active Member Data

**TEACHERS
As of June 30, 2019**

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Payroll*
Under 20	26	0	0	0	0	0	0	26	\$ 604,792
20 to 24	3,972	6	0	0	0	0	0	3,978	\$ 164,126,210
25 to 29	11,741	3,135	4	0	0	0	0	14,880	\$ 689,155,507
30 to 34	6,595	7,924	2,209	7	0	0	0	16,735	\$ 841,581,998
35 to 39	4,953	4,023	7,168	2,269	6	0	0	18,419	\$ 1,001,438,132
40 to 44	4,649	3,077	4,061	5,560	1,504	7	0	18,858	\$ 1,073,534,095
45 to 49	4,506	3,447	3,860	4,158	4,547	1,272	10	21,800	\$ 1,277,813,568
50 to 54	3,396	3,004	3,792	3,541	2,824	3,120	809	20,486	\$ 1,207,758,983
55 to 59	2,354	2,122	3,305	3,584	2,387	1,827	2,148	17,727	\$ 1,004,075,944
60	356	291	549	621	468	333	440	3,058	\$ 173,799,670
61	279	256	499	527	427	320	406	2,714	\$ 155,983,026
62	235	219	366	521	401	282	400	2,424	\$ 139,758,041
63	180	181	290	410	346	275	316	1,998	\$ 114,917,468
64	139	144	252	353	304	237	313	1,742	\$ 103,154,076
65	103	120	195	280	196	152	206	1,252	\$ 74,061,439
66	80	80	132	141	159	109	169	870	\$ 52,452,967
67	80	59	111	128	90	77	123	668	\$ 37,764,695
68	56	45	77	93	67	49	102	489	\$ 28,428,900
69	33	28	57	60	46	36	63	323	\$ 18,411,607
70 & Over	103	93	144	179	120	100	210	949	\$ 51,307,585
Total	43,836	28,254	27,071	22,432	13,892	8,196	5,715	149,396	\$ 8,210,128,703

Average Age: 45.03

Average Service: 11.74

* Actual annual compensation provided by VRS.



Schedule H – Schedules of Active Member Data

**STATE POLICE
As of June 30, 2019**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	0	0	0	0	0	0	0	0	\$ -
20 to 24	116	0	0	0	0	0	0	116	\$ 5,647,039
25 to 29	178	82	0	0	0	0	0	260	\$ 13,751,006
30 to 34	70	161	36	0	0	0	0	267	\$ 15,110,104
35 to 39	22	56	122	81	1	0	0	282	\$ 18,432,211
40 to 44	15	31	39	129	49	0	0	263	\$ 18,381,709
45 to 49	7	22	28	77	133	17	0	284	\$ 21,436,587
50 to 54	3	14	17	29	46	70	48	227	\$ 19,123,372
55 to 59	1	9	13	10	13	27	68	141	\$ 12,850,105
60	0	1	0	2	1	0	7	11	\$ 1,002,356
61	0	0	0	0	3	1	13	17	\$ 1,662,785
62	0	0	0	0	1	2	11	14	\$ 1,490,605
63	0	0	1	1	1	0	8	11	\$ 1,063,321
64	0	0	1	0	1	0	7	9	\$ 887,839
65	0	0	0	0	0	0	2	2	\$ 248,812
66	0	0	0	0	0	0	4	4	\$ 422,756
67	0	0	0	0	0	0	2	2	\$ 262,244
68	0	0	0	0	0	0	3	3	\$ 340,093
69	0	0	0	0	0	0	1	1	\$ 117,021
70 & Over	0	0	0	0	0	0	0	0	\$ -
Total	412	376	257	329	249	117	174	1,914	\$ 132,229,965

Average Age: 41.02

Average Service: 14.16



Schedule H – Schedules of Active Member Data

**JUDICIAL
As of June 30, 2019**

Attained Age	Completed Years of Service								Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	
Under 20	0	0	0	0	0	0	0	0	\$ -
20 to 24	0	0	0	0	0	0	0	0	\$ -
25 to 29	0	0	0	0	0	0	0	0	\$ -
30 to 34	2	0	0	0	0	0	0	2	\$ 316,504
35 to 39	6	1	0	0	0	0	0	7	\$ 1,125,338
40 to 44	24	1	0	0	0	0	0	25	\$ 4,026,596
45 to 49	35	10	6	0	0	0	0	51	\$ 8,374,262
50 to 54	31	15	19	5	1	0	0	71	\$ 11,698,710
55 to 59	42	16	16	12	5	0	0	91	\$ 15,230,788
60	10	1	6	3	3	0	0	23	\$ 3,779,545
61	7	2	6	2	2	1	0	20	\$ 3,332,100
62	3	6	7	3	3	1	0	23	\$ 3,897,850
63	3	7	4	8	1	0	0	23	\$ 3,882,582
64	6	5	4	3	0	1	0	19	\$ 3,200,137
65	6	1	3	5	3	1	0	19	\$ 3,186,666
66	2	1	1	5	1	4	1	15	\$ 2,549,520
67	2	6	3	4	4	4	1	24	\$ 4,039,378
68	2	5	5	2	2	1	0	17	\$ 2,841,476
69	0	0	2	3	0	1	0	6	\$ 1,036,773
70 & Over	1	1	5	5	7	5	2	26	\$ 4,329,887
Total	182	78	87	60	32	19	4	462	\$ 76,848,112

Average Age: 58.12

Average Service: 9.55



Schedule H – Schedules of Active Member Data

**VIRGINIA LAW OFFICERS
As of June 30, 2019**

Attained Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	60	0	0	0	0	0	0	60	\$ 2,038,255
20 to 24	905	1	0	0	0	0	0	906	\$ 32,957,189
25 to 29	1,304	203	1	0	0	0	0	1,508	\$ 57,637,651
30 to 34	693	337	145	3	0	0	0	1,178	\$ 47,412,465
35 to 39	433	208	297	49	5	0	0	992	\$ 41,987,219
40 to 44	312	158	217	152	138	1	0	978	\$ 43,444,086
45 to 49	221	171	234	197	301	67	0	1,191	\$ 55,446,041
50 to 54	164	108	210	144	146	61	17	850	\$ 39,971,115
55 to 59	94	94	161	128	110	30	27	644	\$ 30,055,058
60	6	11	22	18	14	4	2	77	\$ 3,658,565
61	15	9	23	21	14	6	2	90	\$ 4,174,320
62	5	11	16	9	11	6	5	63	\$ 3,145,535
63	1	5	10	8	6	0	5	35	\$ 1,733,878
64	3	4	8	7	8	2	3	35	\$ 1,660,156
65	4	2	10	4	6	2	5	33	\$ 1,808,197
66	1	1	2	3	2	2	1	12	\$ 639,949
67	1	2	6	3	0	1	2	15	\$ 749,252
68	1	2	2	1	0	0	1	7	\$ 342,628
69	1	1	1	0	1	1	0	5	\$ 280,541
70 & Over	1	0	3	4	1	3	1	13	\$ 633,922
Total	4,225	1,328	1,368	751	763	186	71	8,692	\$ 369,776,022

Average Age: 39.44

Average Service: 8.18



Schedule I – Schedules of Retiree and Beneficiary Data

RETIREE AND BENEFICIARY DATA
As of June 30, 2019

Employer	Prior Year Total Retirees and Beneficiaries	Retirees and Beneficiaries		Current Year Total Retirees and Beneficiaries	Current Annual Allowances (000s)	Prior Annual Allowances (000s)	%Increase in Annual Allowances	Average Annual Allowances	Prior Year Average Annual Allowances	%Increase in Average Annual Allowances
		Added	Removed							
State	57,173	3,490	1,956	58,707	\$ 1,362,160	\$ 1,291,501	5.5%	\$ 23,203	\$ 22,589	2.7%
Teacher	90,030	6,064	2,060	94,034	2,344,606	2,202,632	6.4%	24,934	24,466	1.9%
Political	53,915	3,952	1,668	56,199	1,080,487	1,003,716	7.6%	19,226	18,617	3.3%
Total VRS	201,118	13,506	5,684	208,940	\$ 4,787,253	\$ 4,497,849	6.4%	\$ 22,912	\$ 22,364	2.5%
State Police	1,380	78	21	1,437	60,695	57,572	5.4%	42,237	41,719	1.2%
VaLORS	4,761	345	83	5,023	110,886	103,588	7.0%	22,076	21,758	1.5%
Judicial	526	29	12	543	43,406	41,562	4.4%	79,937	79,015	1.2%
Totals	207,785	13,958	5,800	215,943	\$ 5,002,240	\$ 4,700,571	6.4%	\$ 23,165	\$ 22,622	2.4%

CHANGE IN ALLOWANCES FOR RETIREES AND BENEFICIARIES
As of June 30, 2019

	Prior Year Annual Allowances	COLA	Additions	Deletions	Current Year Annual Allowances
State	\$ 1,291,501	\$ 31,507	\$ 84,116	\$ 44,964	\$ 1,362,160
Teacher	2,202,632	53,737	141,756	53,519	2,344,606
Political	1,003,716	24,491	82,544	30,264	1,080,487
Total VRS	\$ 4,497,849	\$ 109,735	\$ 308,416	\$ 128,747	\$ 4,787,253
State Police	57,572	1,405	3,568	1,850	60,695
VaLORS	103,588	2,527	8,106	3,335	110,886
Judges	41,562	1,014	2,055	1,225	43,406
Totals	\$ 4,700,571	\$ 114,681	\$ 322,145	\$ 135,157	\$ 5,002,240