KORN FERRY
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Commonwealth of Pennsylvania State Employees' Retirement System

2016 Actuarial Report

COMMONWEALTH OF PENNSYLVANIA

STATE EMPLOYEES' RETIREMENT SYSTEM

2016 ACTUARIAL REPORT

DEFINED BENEFIT PLAN

KORN FERRY HAY GROUP, INC.
JUNE 14, 2017

KORN FERRY
| HayGroup

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June 14, 2017

Mr. David E. Durbin
Executive Director
State Employees' Retirement System
30 North Third Street
Suite 150
Harrisburg, PA 17101-1716

Dear Mr. Durbin:

The purpose of this letter and the enclosed report is to certify the actuarial adequacy of the contributions being made by the Commonwealth of Pennsylvania and other participating agencies to the Pennsylvania State Employees' Retirement System (SERS), and to discuss the approach currently being taken toward meeting the financing objectives of the plan. Use of this letter and the enclosed for purposes other than stated may not be appropriate. The results provided herein are based upon the December 31, 2016 annual actuarial valuation.

The funding objective of the plan is set forth in the State Employees' Retirement Code (SERC). The annual employer contribution is equal to the sum of the following for the fiscal year beginning July 1, 2017:

(1) The employer share of the normal cost.

(2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.

(3) The amortization of the change in liability due to Act 2010-120 (Act 120) over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.

(4) The amortization of legislated benefit changes, including cost-of-living increases, over 10-year periods beginning with the July 1 following the actuarial valuation determining such changes. (Note: There are currently no 10-year amortizations being funded.)

(5) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July 1 following the actuarial funding valuation determining such changes.

The amortization payments are level dollar amounts over the remaining applicable amortization periods. The employer cost is determined as a percent of retirement covered compensation. The total employer cost is the average contribution amount that needs to be received from the employer groups participating in the system. Some employer groups contribute a higher percent of compensation and others contribute a lower percent of compensation, depending on the benefits payable to each group's employees.

The actuarial valuation is based on financial and participant data, which is supplied by SERS staff. We rely on that data and review it for consistency and reasonableness prior to using it in the valuation. The accuracy of the valuation results is dependent on the accuracy of the supplied information.

The actuarial valuation uses various economic and demographic assumptions regarding future plan experience. The current set of assumptions used in the valuation, with the exception of the investment return and inflation assumptions, was adopted by the State Employees' Retirement Board (the Board) based upon our recommendations included in the March 2016 report on the eighteenth investigation of actuarial experience of SERS during the years 2011 through 2015. The investment return and inflation assumptions are selected by the Board based upon a review of the actual plan experience and the prevalent economic outlook. During April of 2017, the Board approved (i) a reduction in the annual investment return assumption from 7.50% to 7.25% and (ii) a reduction in the annual inflation assumption from 2.75% to 2.60%, and both changes became effective with the December 31, 2016 actuarial valuation. We believe these assumptions are appropriate and reasonable for the valuation. We will continue to closely monitor the investment return assumption and will recommend changing it if conditions warrant such change.

Apart from the statutory funding requirements set forth in the SERC, there are also separate accounting standards to which SERS is subject for financial reporting purposes. Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, replaced the requirements of GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans*, effective for financial statements for the fiscal year ended June 30, 2014. GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, which establishes standards for accounting and financial reporting by state and local governments for pensions, replaced the requirements of GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers*, effective for the fiscal year ended June 30, 2015. The actuarial information required under Statements No. 67 and 68 is not included in this report. These results were provided separately to SERS for inclusion in their annual financial reporting to the public and to the participating employers of the system.

Based upon the valuation results, it is our opinion that, provided future employer contributions are made in accordance with current law, the Pennsylvania State Employees' Retirement System is, and will continue to be, adequately funded, in accordance with generally accepted actuarial principles and procedures.

It should be noted that, with the passage of Act 2010-120 (Act 120), significant changes were legislated to many key benefit provisions of SERS. This was in response to the significant funding challenges SERS had been facing, and will continue to face in coming years. By reducing pensions for future commonwealth employees and providing funding relief to SERS' employers through the use of contribution collars, Act 120 addressed both SERS' long-term and short-term funding challenges. Effective with the December 31, 2016 actuarial valuation, for the first time since 2010, the required employer contribution level is below the Act 120 collared contribution level, thereby making the Act 120 collars no longer applicable (for commonwealth FY 17/18 or beyond).

Please note that future actuarial measurements can differ significantly from current measurements due to such factors as plan experience differing from that anticipated by the assumptions, changes in future assumptions, and changes in plan provisions or applicable law. It is beyond the scope of our annual actuarial valuation to perform an analysis of the potential range of such future differences in measurement.

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and all costs and liabilities have been determined in accordance with the applicable actuarial standards of practice and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Respectfully submitted,
Korn Ferry Hay Group, Inc.

By Brent M. Mowery
Brent M. Mowery, F.S.A.
Member American Academy of Actuaries
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By David D. Reichert
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State Employees' Retirement System
Valuation Highlights

	December 31, 2016 Valuation	December 31, 2015 Valuation
Summary of Employer Contributions as a Percent of Total Compensation		
SERS Plan Contribution		
Normal Cost	4.91%	4.52%
Amortization of Liabilities	28.31%	27.62%
Contribution Before Change Prescribed by Law	33.22%	32.14%
Total SERS Plan Contribution	33.22%	29.50% *
Benefits Completion Plan Contribution	0.02%	0.01%
Total Contribution	33.24%	29.51%

* Reflects Rates Prescribed by Act 2010-120

	December 31, 2016 Valuation	December 31, 2015 Valuation
Demographic Characteristics of the Population		
Active Participants:		
Number	104,632	105,025
Average age	46.3	46.4
Average service	11.4	11.6
Average annualized compensation	$ 56,499	$ 56,858
Total annualized compensation	$ 5,911,603,000	$ 5,971,511,000
Funding payroll	$ 6,187,427,000	$ 6,255,189,000
Annuitants and Beneficiaries:		
Number	127,338	124,689
Average age	69.1	69.0
Total annual pension	$ 2,795,080,772	$ 2,664,555,759
Inactive and Vested Participants:		
Number	7,133	6,918
Assets		
Market Value of Assets	$ 26,384,295,023	$ 26,050,326,844
Actuarial Value of Assets	$ 27,596,048,090	$ 26,877,126,928
Funded Status (Market Assets)	55.5%	56.2%
Funded Status (Actuarial Assets)	58.1%	58.0%

Employer Contribution Rate by Group
Fiscal Year 2017 - 2018

	SERS Plan	Benefits Completion Plan	Total
Class A-3 and A-4 Members:			
Age 65 Retirement	23.78%	0.02%	23.80%
Age 55 Retirement	26.34%	0.02%	26.36%
Park Rangers	26.35%	0.02%	26.37%
Capitol Police	26.35%	0.02%	26.37%
State Police	42.90%	0.02%	42.92%
Class AA Members:			
Age 60 Retirement	34.42%	0.02%	34.44%
Age 50 Retirement	38.13%	0.02%	38.15%
Park Rangers	37.87%	0.02%	37.89%
Capitol Police	37.87%	0.02%	37.89%
Enforcement Officers	38.13%	0.02%	38.15%
Class A Members:			
Age 60 Retirement	27.53%	0.02%	27.55%
Age 50 Retirement	30.50%	0.02%	30.52%
Park Rangers	30.41%	0.02%	30.43%
Capitol Police	30.41%	0.02%	30.43%
State Police	47.56%	0.02%	47.58%
Enforcement Officers	30.50%	0.02%	30.52%
Class D-4 Legislators	45.74%	0.02%	45.76%
Class E Members	43.63%	0.02%	43.65%

The above group rates result in employer contribution rates (expressed as a percentage of total projected covered compensation for active members in fiscal year 2017-2018) of 33.22% for the SERS Plan, 0.02% for the Benefits Completion Plan and 33.24% in Total.

General Discussion

The liabilities and costs in this report are based upon actuarial assumptions adopted by the State Employees' Retirement Board (the Board) and funding procedures specified in the SERC. The SERC requires that the Board conduct a study of the actuarial experience of SERS every five years as a basis for setting the actuarial assumptions used in the valuation. A five-year study was conducted and delivered to the Board in March of 2016. The Board approved the recommendations of the actuary and the new assumptions were first used in the December 31, 2015 valuation.

The most important actuarial assumptions are the investment return assumption, also known as the valuation interest rate assumption, and the salary growth assumption. The investment return experience is reviewed annually and as a part of the normal five-year experience study cycle. As a result of the review undertaken during March/April of 2017, the Board approved a reduction in the annual investment return assumption from 7.50 percent to 7.25 percent, which included a reduction in the annual inflation assumption from 2.75 percent to 2.60 percent, with both changes becoming effective with this December 31, 2016 actuarial valuation. Both the investment return and the salary growth assumptions are based upon an underlying inflation rate assumption of 2.60 percent per year. Salary growth is the total of assumed increases in salary rates and career salary growth. It is generally assumed that the salary rates will increase by 2.9 percent per year due to general salary schedule increases and that career salary growth (promotion and longevity growth) will average an additional 2.65 percent per year. Thus, the total average salary increase for an individual will generally be 5.55 percent per year.

The SERS plan employer contribution is determined as a percent of covered compensation that is the total of (1) the employer normal cost percent and (2) the net amortization of the unfunded liability, but not less than any applicable minimum contribution prescribed by the SERC and not more than the total contribution amount that results from applying the collars established by Act 2010-120 to limit the extent of annual increase in the employer contribution rate. The final total pre-collared employer contribution level as of December 31, 2016 is 33.22 percent of covered compensation, which is the sum of (1) the employer normal cost of 4.91 percent of compensation plus (2) the net amortization of the unfunded liability of 28.31 percent of compensation. The maximum 2017-2018 employer contribution rate under Act 2010-120 is 34.00 percent of compensation. Therefore, the 2017-2018 employer contribution rate is not limited under Act 2010-120. See Schedule O for further discussion of the Act 2010-120 employer contribution collars.

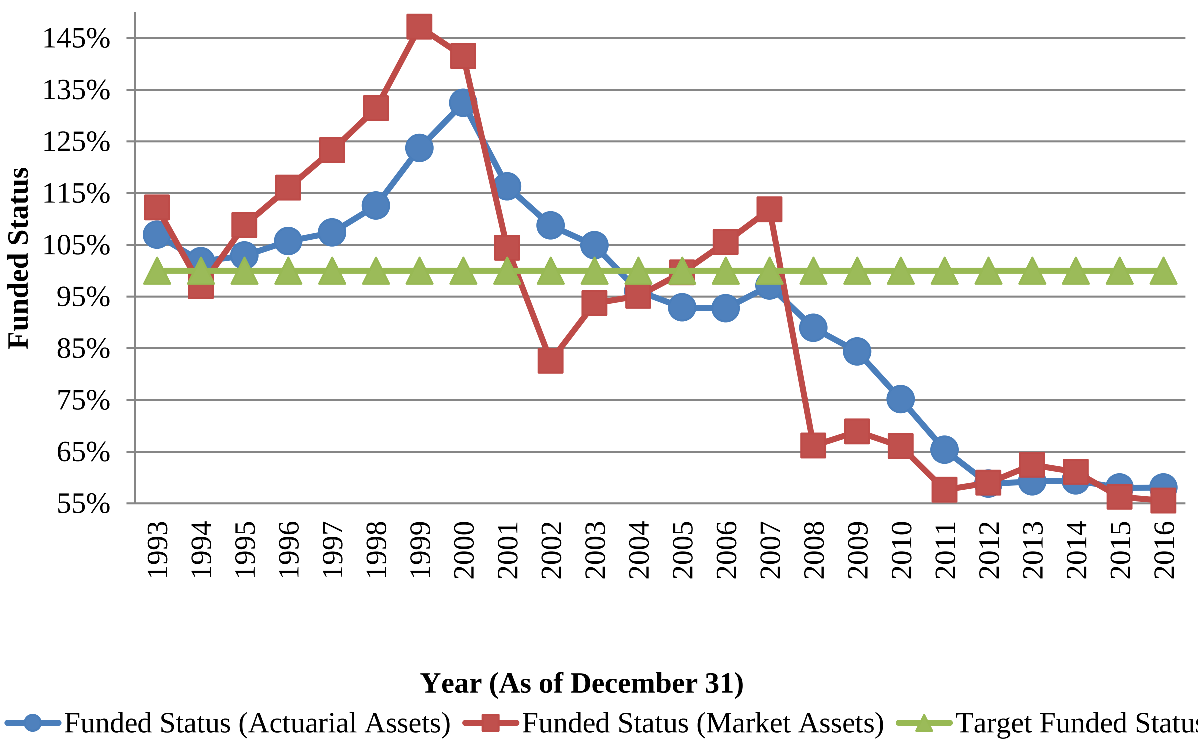
The funded ratio is the ratio of assets to the actuarial accrued liability. As a consequence of the global economic downturn, SERS experienced very unfavorable investment results during calendar 2008. Thus, SERS' funded status, as measured by the funded ratio, declined significantly during 2008, to a level of 66.2 percent based on market value and 89.0 percent based on actuarial value of plan assets as of December 31, 2008. As a result of somewhat more favorable investment results during calendar years 2009 and 2010, the funded ratio based on the market value of assets as of December 31, 2010 was 66.1 percent; however, the funded ratio based on the actuarial value of assets (which recognizes investment losses over a five-year period) decreased to 75.2 percent as of December 31, 2010. With investment results well below expectations during calendar 2011, combined with an increase in the actuarial accrued liability due to the December 31, 2011 interest assumption decrease, the funded ratio based on market value of assets decreased from 66.1 percent to 57.6 percent, and the funded ratio based on actuarial value of assets decreased from 75.2 percent to 65.3 percent.

Investment results above expectations in 2012 resulted in an increase in the funded ratio based on market value from 57.6 percent to 59.0 percent. However, with the final 20 percent of the 2008 investment loss being recognized in 2012, there was a decrease in the funded ratio based on actuarial value from 65.3 percent to 58.8 percent. Favorable investment results in 2013 resulted in an increase in both the market value and actuarial value funded ratios from 59.0 percent to 62.4 percent, and from 58.8 percent to 59.2 percent, respectively.

A market return below expectations in 2014 resulted in a decrease in the market value funded ratio from 62.4 percent to 61.1 percent and recognition of prior asset gains through the smoothing method resulted in the actuarial value funded ratio increasing from 59.2 percent to 59.4 percent. In 2015, a second consecutive annual market return below expectations resulted in decreases in the market value funded ratio from 61.1 percent to 56.2 percent and in the smoothed actuarial value funded ratio from 59.4 percent to 58.0 percent. In 2016, the actuarial accrued liability increased due to the reduction in the investment return (interest rate) assumption. The lower than expected investment return on a market value basis was insufficient to offset the increased liability, resulting in a decrease in the market value funded ratio from 56.2 percent to 55.5 percent, while the actuarial return was sufficient to slightly increase the smoothed actuarial value funded ratio from 58.0 percent to 58.1 percent.

Chart 1 below presents a history of SERS funded ratios, relative to the 100% target funded status.

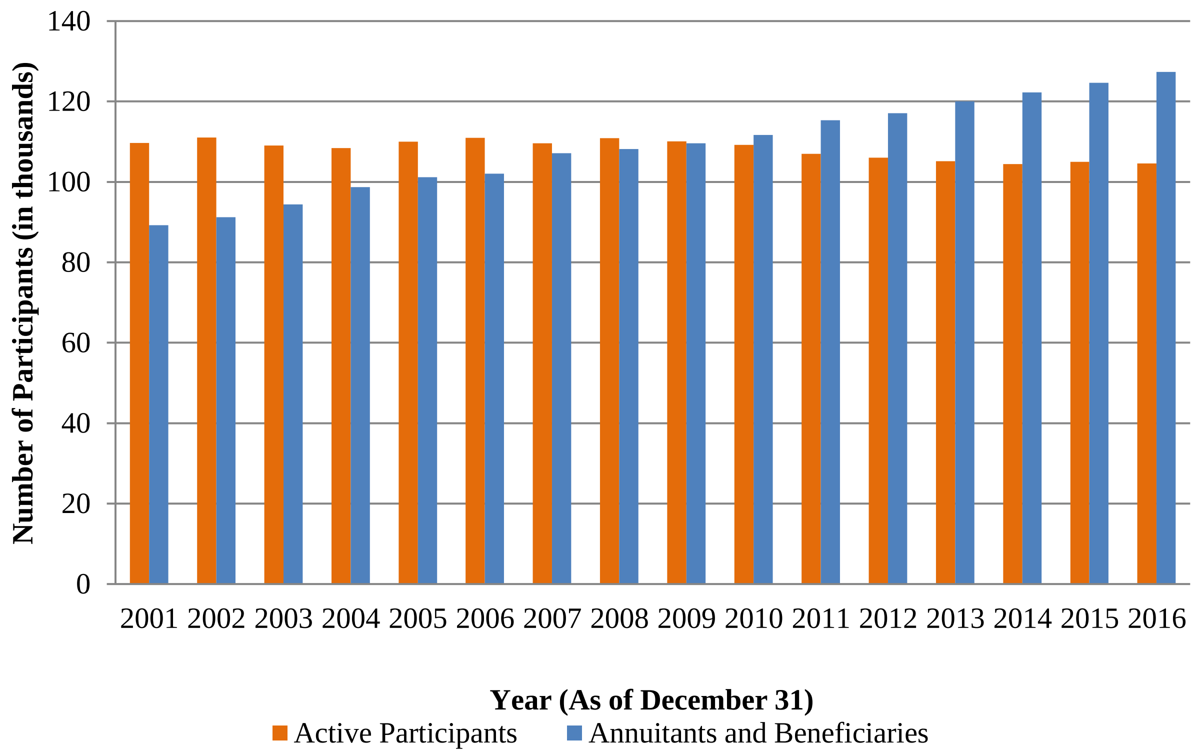
Chart 1
SERS Historical Funded Status =
Assets / Actuarial Accrued Liability



During 2010, the count of pensioners exceeded the count of active participants for the first time in the history of SERS. As of December 31, 2016, the count of pensioners (127,338) further exceeds the count of active participants (104,632), a clear sign of a mature retirement system. Chart 2 below illustrates the maturing of the SERS population since 2001.

Although it was noted previously that the interest rate and salary growth are the most important actuarial assumptions, the maturity of the SERS population heightens the importance of the mortality assumptions. Thus, the updates to the post-retirement mortality assumptions recommended by the actuary every five years based upon SERS' actual ongoing mortality experience, have become increasingly critical to the annual valuation process.

Chart 2
SERS Participation
Pensioner Count First Exceeded Active Count in 2010

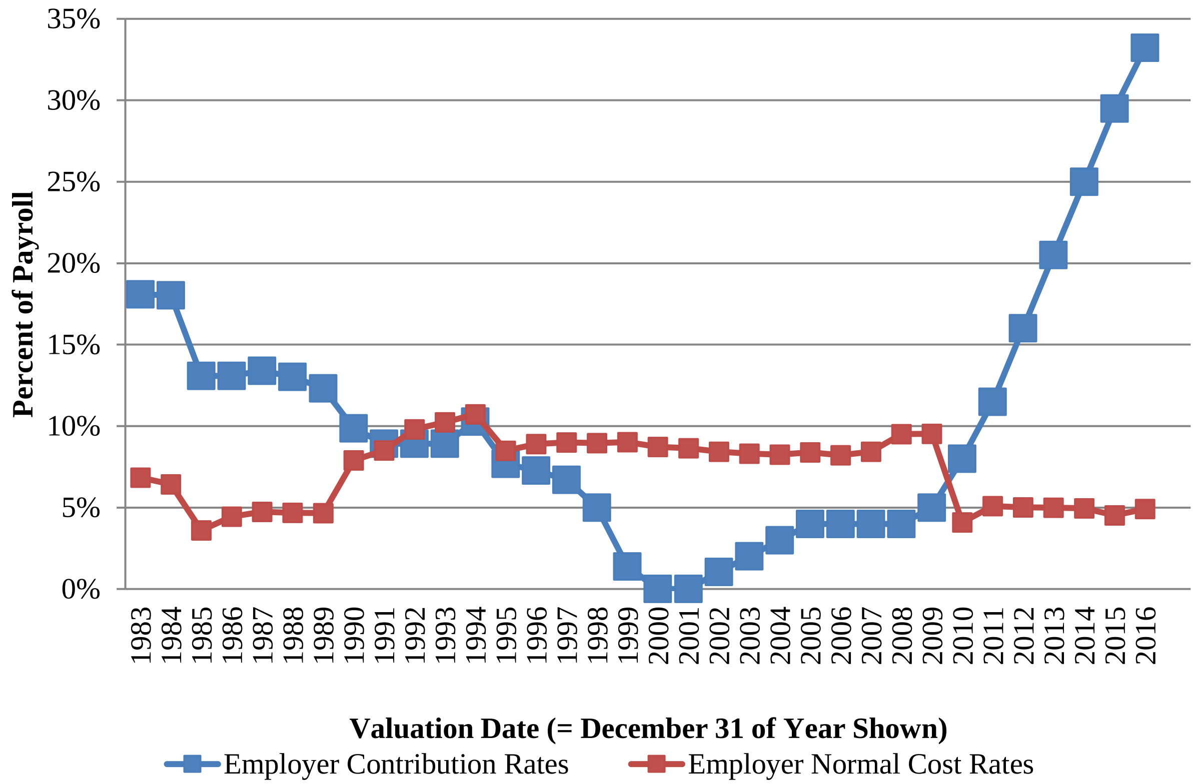


A separate and distinct Benefits Completion Plan provides benefits to certain members whose SERS benefits are limited by IRC Section 415(b) maximum benefit limitations. The Benefits Completion Plan employer contribution requirements for fiscal year 2017-2018, which were determined by a separate December 31, 2016 actuarial valuation, are presented in the Valuation Highlights herein. Otherwise, Benefits Completion Plan costs and liabilities are not included in the schedules of this report.

History of the Employer Contribution Rate

Chart 3 below shows the history of the employer contribution rate from 1983 through 2016. With some fluctuations, the general trend from 1984 through 2001 had been downward, with the rate declining from the 18 percent range in the years 1983 and 1984 to zero in 2000 and 2001. The investment returns were below the actuarial assumption (then 8.5 percent) in 2000 through 2002. The changes to the amortizations under Act 2003-40 and subsequent investment gains would have kept the contributions from increasing, if it had not been for legislated floors that caused the employer contributions to increase between 2002 and 2005. From 2006 through 2015, actual employer contribution rates have been at levels prescribed by law, increasing each year since 2009. Effective with the December 31, 2016 valuation, for the first time since 2010, the employer contribution rate is uncollared (that is, no longer limited by the Act 2010-120 rate collars).

Chart 3
SERS Historical Employer Contribution Rates



The total employer cost is the actual contribution rate during the succeeding fiscal year. For instance, the rate of 33.22 percent of covered compensation for the December 31, 2016 valuation date will be the employer contribution for the fiscal year beginning July 1, 2017.

History of Inflation, Investment Return and Salary Growth

Table 1 below shows the rate of inflation, the nominal and real investment return based on the market value of assets, and the nominal and real salary growth for the past twenty years. The nominal rates are the actual investment rate and salary growth. The real rates are the nominal rates adjusted by removing inflation. The inflation rates shown are based on the Consumer Price Index for All Urban Consumers (CPI-U) data. The nominal rate of salary growth is the percentage increase in general pay levels specified by the predominant collective bargaining agreement. This salary growth includes general pay increases, but excludes career salary growth (that is, pay changes resulting from promotions or longevity growth).

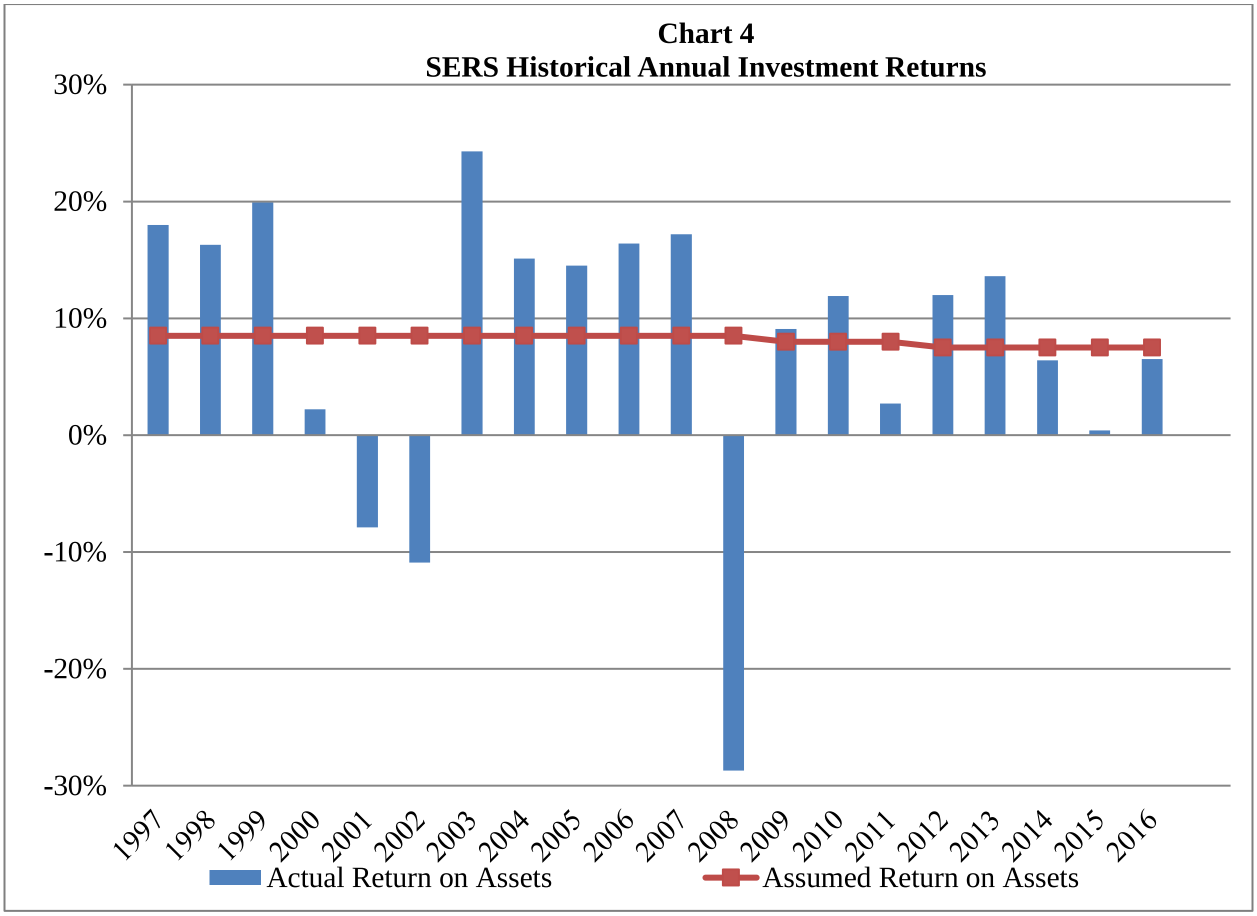
Table 1: Comparison of Annual Rates of Growth

Year	Inflation	Investment Return		Salary Growth	
		Nominal	Real	Nominal	Real
1997	1.7	18.0	16.0	3.0	1.3
1998	1.6	16.3	14.5	3.0	1.4
1999	2.7	19.9	16.8	3.0	0.3
2000	3.4	2.2	(1.1)	3.0	(0.4)
2001	1.6	(7.9)	(9.3)	3.3	1.7
2002	2.4	(10.9)	(13.0)	3.5	1.1
2003	1.9	24.3	22.0	2.0	0.1
2004	3.3	15.1	11.4	1.9	(1.4)
2005	3.4	14.5	10.7	3.0	(0.4)
2006	2.5	16.4	13.6	3.5	1.0
2007	4.1	17.2	12.6	2.8	(1.2)
2008	0.1	(28.7)	(28.8)	3.0	2.9
2009	2.7	9.1	6.2	3.0	0.3
2010	1.5	11.9	10.2	3.0	1.5
2011	3.0	2.7	(0.3)	3.0	0.0
2012	1.7	12.0	10.1	1.0	(0.7)
2013	1.5	13.6	11.9	2.8	1.3
2014	0.8	6.4	5.6	3.5	2.7
2015	0.7	0.4	(0.3)	3.4	2.7
2016	2.1	6.5	4.3	1.8	(0.3)
Average 1997-2016	**2.1%**	**7.2%**	**4.9%**	**2.8%**	**0.7%**

The averages represent the geometric averages of all of the rates over the 20-year period, not the arithmetic averages.

Chart 4 below presents a 20-year history of SERS annual investment returns relative to the actuarially assumed returns of:

- 8.5% for 1997 through 2008,
- 8.0% for 2009 through 2011,
- 7.5% for 2012 through 2016 and
- 7.25%, which will first apply for calendar year 2017



Comments on Schedules

Employer Contribution Rate

Schedules A and B summarize the development of the employer contribution rate before allocation by group. The employer contribution is equal to the sum of (1) the employer share of the normal cost and (2) amortization of the unfunded liability.

The normal cost is the level percentage of compensation needed to fund the liability for any prospective benefits earned by new active members over the period of their actual service. The normal cost calculation uses data for all active members in Class A-3 (65) who had not yet completed one year of credited service. The employer share of the normal cost increased from 4.52 percent in 2015 to 4.91 percent in 2016. The normal cost increased mainly due to the reduction in the assumed annual investment return from 7.50% to 7.25% for the December 31, 2016 actuarial valuation.

Portions of the unfunded liability are amortized over either 10 years or 30 years, as required by the SERC. Under Act 2010-120, the total December 31, 2009 unfunded liability was amortized over 30 years as part of a fresh start that combined all of the unfunded liability amortizations into one amortization. Net losses in 2010 and after were amortized over 30 years. The total unfunded liability as of December 31, 2016 was $19.92 billion. As of December 31, 2015, the total unfunded liability was $19.45 billion.

Schedule B shows the allocation of the total unfunded liability by year into those liabilities being amortized over 30 years. All amortization payments are level dollar amounts over the applicable amortization period. There are currently no 10-year amortizations. The total net charge for the amortization of the unfunded liability is 28.31 percent of the total projected covered compensation for the 2017-2018 fiscal year.

The employer contribution rate is equal to the total of the normal cost and the amortization of the unfunded liabilities, but not less than the normal cost and not more than the rate based on the collar (which limits the contribution increases pursuant to Act 2010-120) applicable to the 2017/2018 employer contribution rate. Because the employer contribution rate collar increase was larger than the actual rate increase, the employer contribution rate calculated at 33.22 percent of covered compensation will be applied for the fiscal year beginning July 1, 2017.

Employer Contribution Rates by Group

Schedule C summarizes the development of the employer contribution rate for each group of members with different benefits. The Class A-3 (65) rate is used to determine the base contribution rate because the majority of new members enter that class. The base employer contribution rate for Class A-3 benefits is 23.78 percent of compensation.

The employer contribution rate for each class is a function of the Class A-3 (65) rate. Three adjustments are made to develop the Class rates. The first is to add the cost of earlier full retirement conditions if applicable. The second is to multiply by the applicable adjustment factor relative to the Class A-3 benefit value. Third, the Park Rangers, Capitol Police and State Police Officers are also charged the amount necessary to fund the past service cost of benefit improvements that were effective in prior years. These charges are further explained in Schedule O. The complete schedule of contributions by group is shown in Table 2.

Table 2 Employer Contribution Rate by Group Fiscal Year 2017/2018 (Excluding Benefits Completion Plan Contribution)	
Class A3/A4	
Age 65 Retirement	23.78%
Age 55 Retirement	26.34
Park Rangers	26.35
Capitol Police	26.35
State Police	42.90
Class AA	
Age 60 Retirement	34.42
Age 50 Retirement	38.13
Park Rangers	37.87
Capitol Police	37.87
Enforcement Officers	38.13
Class A	
Age 60 Retirement	27.53
Age 50 Retirement	30.50
Park Rangers	30.41
Capitol Police	30.41
State Police	47.56
Enforcement Officers	30.50
Class D-4 Legislators	45.74
Class E Members	43.63

Schedule D shows the development of the shared risk member contributions, in accordance with Act 2010-120. No shared risk contribution applies for the 2017-2018 fiscal year.

Change in Employer Contribution Rate

Schedule E contains an analysis of the change in the employer contribution rate and unfunded liability from the 2015 to the 2016 valuation.

The largest increase in the unfunded liability – $1.021 billion – resulted from the adoption of new actuarial assumptions (7.25 percent interest rate and 2.60 percent inflation rate) for the December 31, 2016 actuarial valuation. This loss of $1.021 billion resulted in an increase in the employer cost of 0.82 percent of compensation. In addition to the liability increase, the normal cost increased 0.38 percent, resulting in a total increase of 1.20 percent of compensation due to the assumption changes.

Another increase in the unfunded liability – $375.6 million – resulted from underfunding due to the Act 2010-120 employer contribution collars. The loss of $375.6 million resulted in an increase in the employer cost of 0.50 percent of compensation.

The largest decrease in the unfunded liability – $613.9 million – was due to smaller than expected pay increases, and resulted in a decrease in the employer cost of 0.82 percent of compensation.

Another decrease in the unfunded liability was the result of demographic experience. Differences between actual and expected demographic experience of the covered population resulted in a liability decrease of $33.6 million. This decrease in liability resulted in a decrease in the employer cost of 0.10 percent of compensation.

Another decrease in the unfunded liability was due to changes in the demographics of the new entrant population, which resulted in a gain of $6.1 million. The decrease in unfunded liability cost of 0.01 percent was offset by a 0.01 percent increase in the normal cost, for a net change in cost of 0.00 percent of compensation.

The smallest decrease in the unfunded liability – $3.0 million – resulted primarily from recognition (under the five-year asset smoothing method) of two years of asset gains totaling $536.1 million, which more than offset three years of losses totaling $533.1 million. This net gain of $3.0 million resulted in a negligible decrease in the employer cost.

Actuarial Balance Sheet and Account Balance Transfers

Schedule F contains the actuarial balance sheet that compares the total assets and liabilities of $54.6 billion. The assets include current assets and the present value of future contributions. The liabilities include the present value of all benefits to current active and retired members.

Each year the account balances in the three benefit payment accounts are compared to the actuarial liabilities developed in the valuation. If needed, transfers are made to bring the accounts into balance with the liabilities. The accounts go out of balance during the year as a result of differences between actual experience and the reserves set for retirees. In 2016, a transfer of $764.8 million was made from the State Accumulation Account to the Annuity Reserve Account to keep the latter account in balance. There were also transfers of $1.7 million and $22.1 million from the State Accumulation Account to the Enforcement Officers' Benefit Account and the State Police Benefit Account, respectively, to keep these accounts in balance. No other transfers were necessary.

The details of these transfers are shown in Schedule G.

Accounting Disclosure Statements

Schedule H addresses disclosure information required by the Governmental Accounting Standards Board (GASB). Major changes have occurred in GASB's reporting and disclosure requirements over the past few years. Specifically, GASB Statements No. 67 and 68 have replaced prior GASB Statements No. 25 and 27, respectively.

Over past years, this report has presented the disclosure information required under GASB Statement No. 25, including the "Schedule of Funding Progress" and the "Schedule of Employer Contributions," and commentary relating to SERS' annual employer contributions versus the GASB minimum levels. Although these schedules have been discontinued by GASB, the information and our commentary continue to be of interest to readers of this report. Therefore, Schedule H once again includes information as required under the former GASB accounting and disclosure requirements:

Page 2 of Schedule H shows funding progress from December 31, 1997 through December 31, 2016.

Page 3 of Schedule H shows a comparison of the actual contributions to the system over recent years to the Annual Required Contribution (ARC) as defined by GASB Statement No. 25.

GASB Statement No. 25 defined the ARC to be equal to the employer normal cost plus an amount to amortize the unfunded actuarial accrued liability over an acceptable amortization period. The calendar year 2016 contribution was equal to the ARC. Hereafter, provided that employer contributions are made in accordance with current law, we expect employer contributions to continue to exceed the GASB Statement No. 25 minimum.

Schedule I shows the results of the solvency test. A short-term solvency test is one means of checking a pension system's progress under its funding program. In this solvency test, the SERS assets are compared with the actuarial accrued liabilities. The liabilities are classified into:

- Liability for active participant contributions in the Fund,
- Liability for future benefits to present annuitants and beneficiaries, and
- Liability for service already rendered by the active participants.

The schedule shows that from 1992 through 2003 the total actuarial accrued liability was fully covered by the assets. In 2004, the funded ratio dropped below 100 percent and it is currently at 58.1 percent. Absent unusual circumstances, the funded status of defined benefit plans will be below 100 percent and gradually approach 100 percent funding as liabilities become fully amortized. The State Employees' Retirement Fund had exceeded 100 percent of liabilities as a result of the high level of investment returns between 1985 and 1999. The funded ratio dropped below 100 percent largely as a result of the low investment returns of 2000 to 2002 and 2008, the Act 2001-9 benefit increases, the 2002-2003 COLAs, and the amortization schedule. Also, the implementation of Act 2010-120 for the December 31, 2010 valuation led to a lower normal cost and a higher accrued liability (and unfunded accrued liability). The reduction in the assumed annual investment return from 8.0 percent to 7.5 percent on December 31, 2011 and from 7.5 percent to 7.25 percent on December 31, 2016 further increased the actuarial accrued liability (and unfunded accrued liability).

The current funding policy will eventually restore the funded ratio to 100 percent provided that contributions are made as provided in current law. SERS is being funded in accordance with generally accepted actuarial principles and procedures even though the accrued liabilities are temporarily greater than the assets.

Plan Assets

Schedule J summarizes the development of the actuarial value of assets as of December 31, 2016. The assets are based on the financial statements prepared by SERS. The asset valuation method smooths out year-to-year fluctuations in the market value. The approach gradually recognizes, over a 5-year period, the differences between total investment return and the actuarial assumed annual rate of return (8.5 percent prior to 2009; 8.0 percent for 2009 through 2011; 7.5 percent for 2012 through 2016; and 7.25 percent for 2017 and later). This smoothing method recognizes 20 percent of the 2016 asset loss of $382.0 million this year, with the remainder to be recognized over the next four years.

Chart 5
SERS Actuarial (5-Year Smoothed) & Market Values of Assets

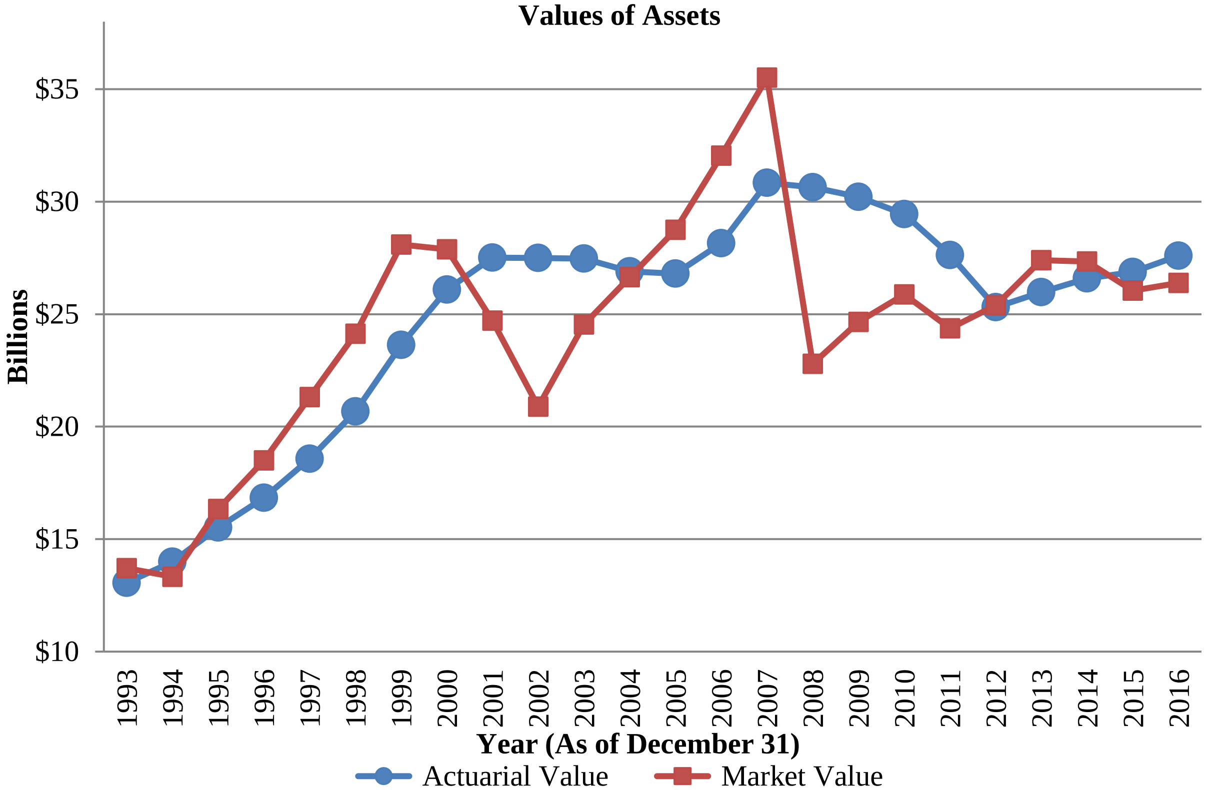


Chart 5 above presents a history since 1993 of SERS asset values, including both the actuarial value and the market value.

Projection

Schedule K shows the number of participants, contributions, and benefits from 1998 through 2016 with a projection through 2027. The first page of Schedule K shows new annuitants, annuitant deaths, new beneficiaries, and beneficiary deaths during the year. The second page of Schedule K shows the projection of employer and employee contributions and a projection of the benefits and expenses. The projected employee and employer contributions are shown in dollars and as a percentage of compensation.

Note: Effective July 1, 2017, the employer contribution rate is no longer limited by the Act 2010-120 collars. Therefore, the two variations of Schedule K (Page 2 of 3 and Page 3 of 3) included in our past actuarial reports, including projections both with and without future Act 120 collars, respectively, are no longer applicable. Schedule K (Page 2 of 2) herein now shows projections that are no longer impacted by the Act 120 collars.

Participant Data

Sections I and II of Schedule L provide a distribution of the total of the active, inactive, and terminated vested participants as of December 31, 2016 by benefit class, sex, age, and length of service. Inactive participants include employees on furlough as well as employees with prior SERS service currently participating in the Pennsylvania Public School Employees' Retirement System (PSERS). The table also shows the average annualized salary in 2016 by age group and sex. Section III of the schedule shows retired annuitants, disabled annuitants, survivors and beneficiaries receiving benefits by age, sex, and benefit amounts.

Although we have made tests to check for reasonableness and consistency, we have not independently audited the data, which were submitted by SERS. As appropriate, we have made certain adjustments to the SERS data, including the use of a minimum annual salary assumption of $20,000.

Section III of Schedule L shows the monthly annuities that were being paid as of December 31, 2016. Total benefits from the fund include lump sum payments and death benefits so these are much higher than the sum of annuities shown in Schedule L and in the highlights.

Plan Provisions

Schedule M contains a summary of the principal provisions of the plan. As a consequence of Act 2010-120 (signed into law in November 2010 and generally effective January 1, 2011), there were significant changes in plan provisions in 2010.

Actuarial Assumptions

Schedule N summarizes the actuarial assumptions used for the valuation. The two types of assumptions are economic assumptions, such as the investment return and salary growth assumptions, and demographic assumptions, such as the assumed rates of retirement and mortality.

As a result of the 2011-2015 actuarial experience study, effective with last year's actuarial valuation, changes were made to most of the actuarial assumptions used for the annual SERS actuarial valuations. Therefore, with two exceptions, the actuarial assumptions used for this December 31, 2016 actuarial valuation are the same as those used in the last (December 31, 2015) valuation.

Based upon a review undertaken during March/April of 2017, the Board approved (i) a reduction in the annual investment return assumption from 7.50% to 7.25% and (ii) a reduction in the annual inflation assumption from 2.75% to 2.60%, and both changes became effective with this December 31, 2016 actuarial valuation.

Actuarial Methods

Schedule O explains the asset valuation and funding method used in the valuation, and the determination of the annual contribution, including a discussion of the Act 2010-120 employer contribution collars. The asset valuation method spreads investment gains and losses over five years. The funding method provides for reasonable levels of contribution that will fund the cost of future benefits with a credit for amortization of the excess of assets over liabilities. Schedule O also explains how the individual class rates are determined. The final section of Schedule O discusses the plan provisions that are not valued.

Glossary

Schedule P defines certain terms used in this actuarial report.

State Employees' Retirement System
Unfunded Liability and Normal Cost as of December 31, 2016

I.	Present Value of Benefits:		
	A) Active and Inactive Participants		
	1) Superannuation and Withdrawal	$	26,060,695,702
	2) Disability		884,504,119
	3) Death		814,707,389
	4) Refunds		62,139,818
	5) Special Police and Enforcement Officer Benefits		-
	6) Subtotal	$	27,822,047,028
	B) Annuitants and Beneficiaries		26,824,305,642
	C) Total	$	54,646,352,670
II.	Present Value of Member and Employer Contributions:		
	A) Employer Portion of Normal Cost	$	3,001,459,267
	B) Member Contributions		3,611,103,714
	C) Administrative Expenses		(237,704,946)
	D) Fiscal Year Amortization Payable		752,531,024
	E) Total	$	7,127,389,059
III.	Actuarial Accrued Liability: (I) - (II)	$	47,518,963,611
IV.	Actuarial Value of Assets	$	27,596,048,090
V.	Unfunded Liability (III) - (IV)	$	19,922,915,521
VI.	Employer Normal Cost Rate		
	A) Total Normal Cost Rate for new active members to fund:		
	1) Superannuation and Withdrawal		9.68%
	2) Disability		0.73%
	3) Death		0.39%
	4) Refunds		0.36%
	5) Total		11.16%
	B) Member Contribution Rate		6.25%
	C) Employer Normal Cost Rate (A) - (B)		4.91%

State Employees' Retirement System
Employer Contribution Rate in Fiscal Year 2017 - 2018

	Funding Period Initial Years	Funding Period From July 1	Initial Amount of Liability	Outstanding Balance as of 12/31/16	Annual Payment Amount	Payment as a Percent of Compensation*
I. Amortization of Liability (Asset) For:						
A) Liability Fresh Start	30	2010	$5,592,323,524	$5,125,976,454	$464,496,726	7.51%
B) Changes in 2010	30	2011	4,192,690,873	3,902,278,778	347,736,022	5.62%
C) Changes in 2011	30	2012	5,018,078,343	4,736,191,207	415,609,788	6.72%
D) Changes in 2012	30	2013	3,244,242,829	3,103,901,157	268,554,153	4.34%
E) Changes in 2013	30	2014	344,271,135	333,514,683	28,483,800	0.46%
F) Changes in 2014	30	2015	482,239,376	472,561,885	39,879,267	0.64%
G) Changes in 2015	30	2016	1,522,849,789	1,508,121,949	125,874,260	2.03%
H) Changes in 2016	30	2017	740,369,408	740,369,408	61,169,038	0.99%
Total				**$ 19,922,915,521**	**$ 1,751,803,054**	**28.31%**
II. Employer Normal Cost						**4.91%**
III. Total Employer Cost before Act 2010-120 = (I) + (II)						**33.22%**
IV. Total Employer Cost (III) after Act 2010-120 (which limits the contribution to 34.00% and therefore does not apply)						**33.22%**

* The payment is expressed as a percentage of the total projected covered compensation for active members in fiscal year 2017-2018 of $6,187,427,000. Percentages may not add due to rounding.

State Employees' Retirement System

Employer Contribution Rate by Group
(excluding Benefits Completion Plan rate)

Employer Group (1)	Base Contribution Rate (2)	Age 50 or 55 Retirement Adjustment (3)	Multiplier Adjustment* (4)	Past Liability Adjustment (5)	Adjusted Contribution Rate** (6)	Projected 2017-2018 Compensation (7)	Employer Contribution Amount (8)
Class A-3 and A-4 - Age 65 Retirement	23.78%		1.0000		23.78%	$ 1,345,136,000	$ 319,873,341
Class AA - Age 60 Retirement	23.78%		1.4472		34.42%	3,092,100,000	1,064,300,820
Class A - Age 60 Retirement	23.78%		1.1578		27.53%	28,628,000	7,881,288
Class A-3 and A-4 - Age 55 Retirement	23.78%	2.56%	1.0000		26.34%	290,581,000	76,539,035
Class AA - Age 50 Retirement (Including Enforcement Officers)	23.78%	2.56%	1.4472		38.13%	830,063,000	316,503,022
Class A - Age 50 Retirement (Including Enforcement Officers)	23.78%	2.56%	1.1578		30.50%	14,709,000	4,486,245
Class A-3 and A-4 - Park Rangers & Capitol Police	23.78%	1.98%	1.0000	0.59%	26.35%	5,341,000	1,407,354
Class AA - Park Rangers & Capitol Police	23.78%	1.98%	1.4472	0.59%	37.87%	9,055,000	3,429,129
Class A - Park Rangers & Capitol Police	23.78%	1.98%	1.1578	0.59%	30.41%	137,000	41,662
Class A-3 and A-4 - State Police	23.78%	2.56%	1.4724	4.12%	42.90%	93,425,000	40,079,325
State Police - Other	23.78%	2.56%	1.6491	4.12%	47.56%	327,470,000	155,744,732
Class D4	23.78%	2.56%	1.7367		45.74%	11,342,000	5,187,831
Class E	23.78%		1.8347		43.63%	139,440,000	60,837,672
					Total***	$ 6,187,427,000	$2,056,311,455

* The multiplier adjustment is the adjustment for the employer group contribution rate. Because the majority of new active members of SERS will be covered under Class A-3 (65), the 2.0 percent accrual rate for that Class is used to determine the base contribution rate. Column (4) is the applicable adjustment factor relative to the Class A-3 benefit value.
** The adjusted contribution rate is [(2) + (3)] times (4) + (5).
*** The total employer contribution ($2,056,311,455) is approximately equal to the average employer contribution rate from Schedule B (33.22 percent) times the total projected covered compensation of $6,187,427,000. The base contribution rate of 23.78 percent was determined as the percentage needed to produce employer contribution amounts by employer group that sum to $2,056,311,455.

NOTE: See Schedule O, Section IV for further discussion of this schedule.

State Employees' Retirement System
Development of Shared Risk Member Contributions

Calendar Year	Actual Return	Expected Return	Excess of Expected Over Actual		
2016	6.5%	7.5%	1.0%		July 1, 2017 Shared Risk Basis
2015	0.4%	7.5%	7.1%		
2014	6.4%	7.5%	1.1%		
2013	13.6%	7.5%	-6.1%	July 1, 2014 Shared Risk Basis	
2012	12.0%	7.5%	-4.5%		
2011	2.7%	8.0%	5.3%		
2011-2013	9.3%/year**	7.7%/year*	-1.6%		
2011-2016	6.8%/year****	7.6%/year***	0.8%		

1) Shared Rate for Class A-3 and Class A-4 Members as of June 30, 2014: 0.0%

2) Calculation of 3-Year Annualized Returns for 2011-2013:
a) * Expected: [(1+0.08) x (1+0.075) x (1+0.075)]^(1/3) - 1 7.7%
b) ** Actual: [(1+0.027) x (1+0.120) x (1+0.136)]^(1/3) - 1 9.3%
c) = a) - b) -1.6%

3) Adjustment to Shared Rate Based on Initial 3-Year Period (2011-2013)
Since 2c) is not greater than 1.0%, Adjustment to Shared Rate = 0% 0.0%

4) New Shared Rate Effective July 1, 2014 = (1) + (3): 0.0%

See Note 1 on Next Page for More on Steps 1) Through 4) Above.

5) Calculation of 6-Year Annualized Returns for 2011-2016:
a) *** Expected: [(1+0.08) x (1+0.075) x (1+0.075) x (1+0.075) x (1+0.075) x (1+0.075)]^(1/6) - 1 7.6%
b) **** Actual: [(1+0.027) x (1+ 0.120) x (1+0.136) x (1+0.064) x (1+0.004) x (1+0.065)]^(1/6) - 1 6.8%
c) = a) - b) 0.8%

6) Adjustment to Shared Rate Based on 6-Year Period (2011-2016)
Since 5c) is not greater than 1.0%, Adjustment to Shared Rate = 0.0% 0.0%

7) New Shared Rate Effective July 1, 2017 = (4) + (6): 0.0%

See Note 2 on Next Page for More on Steps 5) Through 7) Above.

NOTE 1: Shared Rate Effective July 1, 2014

Under the Shared Risk provision of Act 2010-120, higher member contribution rates could have become effective in 2014 and/or in 2017 if SERS investments had underperformed. The first potential Shared Risk Contribution Rate (Shared Rate) was determined based upon the actual SERS investment returns earned during the three calendar year period ended December 31, 2013. The 2011 to 2013 return information and Shared Rate calculations shown above support the conclusion that no Shared Rate was applicable for the fiscal year beginning July 1, 2014. That is, since the expected annual return over the three-year period 2011-2013 (7.7%) was not more than 1.0% greater than the actual annual return (9.3%), the Shared Rate did not increase from 0.0% to 0.5%. Thus, no Shared Rate became effective July 1, 2014, and a 0.0% Shared Rate applied through June 30, 2017.

NOTE 2: Shared Rate Effective July 1, 2017

As of December 31, 2016, the second potential adjustment to the Shared Rate was determined based upon the actual SERS investment returns earned during the six calendar years 2011 through 2016. The 2011 to 2016 return information and Shared Rate calculations shown above support the conclusion that no Shared Rate will be applicable for the fiscal year beginning July 1, 2017. That is, since the expected annual return over the six-year period 2011-2016 (7.6%) was not more than 1.0% greater than the actual annual return (6.8%), the Shared Rate does not increase from 0.0% to 0.5%. Thus, no Shared Rate will become effective July 1, 2017, and a 0.0% Shared Rate will apply through June 30, 2020.

NOTE 3: Shared Rate Effective July 1, 2020 and After

As of December 31, 2019, the Shared Rate adjustment will be measured based upon the returns over the nine calendar years 2011 through 2019. If the expected return over that 9 year period is greater than the actual return by more than 1.0%, then the Shared Rate will increase by 0.5%; otherwise, the Shared Rate will remain unchanged at 0.0%. As of December 31, 2022 and every three years thereafter, the Shared Rate adjustment will be based upon the returns over the preceding ten calendar years.

In no case will the Shared Rate be less than 0.0% or greater than 2.0%. Also, should the employer contribution level be below the amount prescribed under Act 2010-120 in any fiscal year, the Shared Rate will revert to zero.

State Employees' Retirement System

Analysis of the Change in Employer Contribution Rate

		Normal Cost	Unfunded Liability	Total
I.	December 31, 2015 Valuation	4.52%	27.62%	32.14%
II.	Changes in the December 31, 2016 Valuation:			
	A) Assumption changes (7.25% Interest Rate; 2.6% Inflation)	0.38%	0.82%	1.20%
	B) Pay increases different than assumptions		-0.82%	-0.82%
	C) Additional cost due to Act 120 contribution collar restrictions		0.50%	0.50%
	D) Differences between actual and expected demographic experience		-0.10%	-0.10%
	E) Change in demographics of new entrants	0.01%	-0.01%	0.00%
	F) Gain from investment earnings (net, during 2012-2016)		0.00%	0.00%
	G) Change in amortization due to change in payroll	0.00%	0.30%	0.30%
	H) Total change	0.39%	0.69%	1.08%
III.	December 31, 2016 Valuation: I + II(H)	4.91%	28.31%	33.22%

Analysis of the Change in the Unfunded Liability

I.	December 31, 2015 Unfunded Liability	$	19,451,801,625
II.	Expected Amortization Payment		1,728,140,635
III.	Expected Unfunded Liability as of December 31, 2016 [(I x 1.075) - II]	$	19,182,546,112
IV.	Change in Liability Due to:		
	A) Assumption changes (7.25% Interest Rate; 2.6% Inflation)	$	1,021,314,986
	B) Pay increases different than assumptions		(613,858,423)
	C) Additional cost due to Act 120 contribution collar restrictions		375,572,309
	D) Differences between actual and expected demographic experience		(33,564,750)
	E) Change in demographics of new entrants		(6,112,952)
	F) Gain from investment earnings (net, during 2012-2016)		(2,981,761)
	G) Total change	$	740,369,409
V.	December 31, 2016 Unfunded Liability: III + IV(G)	$	19,922,915,521

State Employees' Retirement System
Actuarial Balance Sheet as of December 31, 2016

ASSETS

Present Assets:	
Members' Savings Account	$ 4,869,229,472
Annuity Reserve Account	24,096,865,337
State Police Benefit Account	2,682,414,722
Enforcement Officers' Benefit Account	45,025,583
State Accumulation Account *	(5,309,240,091)
Supplemental Annuity Account	-
Total Present Assets (Market Value)	$ 26,384,295,023
Adjustment to Smooth Market Fluctuations	1,211,753,067
Total Present Assets (Actuarial Value)	$ 27,596,048,090
Present Value of Future Contributions	
Normal Cost Contributions (Employer)	$ 3,001,459,267
Members' Contributions (Employee)	3,611,103,714
Accrued Liability Amortization (Employer)	19,922,915,521
Supplemental Annuity Amortization (Employer)	-
Administrative Expenses	(237,704,946)
Fiscal Year Amortization Payable	752,531,024
Total Future Contributions	$ 27,050,304,580
Total Assets	$ 54,646,352,670

* Includes $3,319,827 in directed commissions.

LIABILITIES

Present Value of Benefits Payable to Annuitants and Beneficiaries from:	
Annuity Reserve Account	$ 24,096,865,337
State Police Benefit Account	2,682,414,722
Enforcement Officers' Benefit Account	45,025,583
Total for Annuitants and Beneficiaries	$ 26,824,305,642
Present Value of Benefits to Active and Inactive Members from:	
Members' Savings Account and State Accumulation Account	
Superannuation and withdrawal	$ 26,060,695,702
Disability	884,504,119
Death	814,707,389
Refunds	62,139,818
Subtotal	$ 27,822,047,028
Total Present Value of Benefits to Active and Inactive Members	$ 27,822,047,028
Total Liabilities	$ 54,646,352,670

State Employees' Retirement System
Required Transfers Within SERS Accounts

I. Annuity Reserve Account

Balance as reported by SERS	$	23,332,041,537
Transfer from State Accumulation Account		764,823,800
Transfer to Supplemental Annuity Account		-
December 31, 2016 balance after transfers	$	24,096,865,337

II. State Accumulation Account *

Balance as reported by SERS	$	(4,520,610,980)
Transfer to Enforcement Officers' Benefit Account		(1,717,263)
Transfer to State Police Benefit Account		(22,088,048)
Transfer to Annuity Reserve Account		(764,823,800)
December 31, 2016 balance after transfers	$	(5,309,240,091)

III. Enforcement Officers' Benefit Account

Balance as reported by SERS	$	43,308,320
Transfer from State Accumulation Account		1,717,263
Transfer from Supplemental Annuity Account		-
December 31, 2016 balance after transfers	$	45,025,583

IV. State Police Benefit Account

Balance as reported by SERS	$	2,660,326,674
Transfer from State Accumulation Account		22,088,048
Transfer from Supplemental Annuity Account		-
December 31, 2016 balance after transfers	$	2,682,414,722

V. Supplemental Annuity Account

Balance as reported by SERS	$	-
Transfer from Annuity Reserve Account		-
Transfer to State Police Benefit Account		-
Transfer to Enforcement Officers' Benefit Account		-
December 31, 2016 balance after transfers	$	-

* Balance includes $3,319,827 in directed commissions.

Accounting Disclosure Statements

Introduction

SERS provides retirement benefits to the employees of the Commonwealth of Pennsylvania and is a cost-sharing, multiple-employer defined benefit pension plan. The Governmental Accounting Standards Board (GASB), pursuant to Statement No. 67, *Financial Reporting for Pension Plans*, and Statement No. 68, *Accounting and Financial Reporting for Pensions* (hereafter Statements 67 and 68), addresses accounting and financial reporting for the activities of pension plans, like SERS, that provide pensions to employees of state governmental employers.

It should be noted that:

- Statement 67 recently replaced the requirements of GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans,* effective for financial statements for fiscal years ending on or after June 30, 2014, and
- Statement 68 recently replaced the requirements of GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers,* effective for fiscal years ending on or after June 30, 2015.

Statement 67 is designed for financial reporting by pension plans and Statement 68 is designed for financial reporting by entities that participate in pension plans. The objective of both statements is to provide more useful, transparent, and comparable financial information related to pensions.

Among the schedules that are no longer required, that had been required disclosures under Statement 25 for many years in the past, are the "Schedule of Funding Progress" and the "Schedule of Employer Contributions." These schedules, both of which have been included in this actuarial report in past years, remain of interest to many readers of this report. Therefore, we have updated these two schedules to reflect the December 31, 2016 actuarial valuation and they are included on the next two pages, for informational purposes. As well, we have included on the pages that follow these schedules, again for informational purposes, our notes and commentary relating to the disclosures formerly required by GASB Statement No. 25.

NOTE: The actuarial information required under Statements No. 67 and 68 is not included in this report. Rather, these actuarial results are provided separately to SERS for inclusion in their annual financial reporting to the public and to the participating employers of the system.

State Employees' Retirement System
Accounting Disclosure Statements (continued)

I. Schedule of Funding Progress as of December 31, 2016
(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATIONAL PURPOSES**; it is no longer a required disclosure under GASB.

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded Actuarial Accrued Liability (UAAL) (b-a)	Funded Ratio (a) / (b)	Funding Payroll (c)	Unfunded Actuarial Accrued Liability as a Percentage of Funding Payroll ((b-a)/c)
12/31/1997	18,565,136	17,288,413	(1,276,723)	107.4%	4,219,034	-30.3%
12/31/1998	20,670,711	18,357,899	(2,312,812)	112.6%	4,446,147	-52.0%
12/31/1999	23,624,267	19,091,840	(4,532,427)	123.7%	4,519,112	-100.3%
12/31/2000*	26,094,306	19,702,278	(6,392,028)	132.4%	4,769,180	-134.0%
12/31/2001	27,505,494	23,658,757	(3,846,737)	116.3%	4,872,375	-78.9%
12/31/2002	27,497,464	25,650,389	(1,847,075)	107.2%	5,093,454	-36.3%
12/31/2003	27,465,615	26,179,761	(1,285,854)	104.9%	4,965,360	-25.9%
12/31/2004	26,900,027	27,999,026	1,099,000	96.1%	5,093,573	21.6%
12/31/2005*	26,793,782	28,851,716	2,057,934	92.9%	5,138,377	40.1%
12/31/2006	28,148,834	30,364,997	2,216,163	92.7%	5,661,675	39.1%
12/31/2007	30,839,877	31,753,971	914,093	97.1%	5,529,069	16.5%
12/31/2008**	30,635,621	34,437,396	3,801,775	89.0%	5,660,319	67.2%
12/31/2009	30,204,693	35,797,017	5,592,324	84.4%	5,935,988	94.2%
12/31/2010*	29,443,945	39,179,594	9,735,649	75.2%	5,851,704	166.4%
12/31/2011***	27,618,461	42,281,862	14,663,401	65.3%	5,890,704	248.9%
12/31/2012	25,302,688	43,055,564	17,752,876	58.8%	5,836,402	304.2%
12/31/2013	25,975,185	43,874,580	17,899,395	59.2%	5,897,627	303.5%
12/31/2014	26,584,948	44,750,670	18,165,722	59.4%	6,021,688	301.7%
12/31/2015*	26,877,127	46,328,929	19,451,802	58.0%	6,255,189	311.0%
12/31/2016****	27,596,048	47,518,964	19,922,916	58.1%	6,187,427	322.0%

* Revised economic and demographic assumptions due to experience review.

** Revised interest rate assumption from 8.5% to 8.0%.

*** Revised interest rate assumption from 8.0% to 7.5%.

**** Revised interest rate assumption from 7.5% to 7.25%.

II. Schedule of Employer Contributions as of December 31, 2016

(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATIONAL PURPOSES**; it is no longer a required disclosure under GASB.

Calendar Year	Annual Required Contribution (ARC)	Actual Contribution	Percentage Contributed
1997	324,093	324,093	100.0%
1998	310,501	310,501	100.0%
1999	269,869	269,869	100.0%
2000	168,002	168,002	100.0%
2001	52,104	76,709	147.2%
2002	22,906	50,831	221.9%
2003	55,079	67,947	123.4%
2004	105,229	105,229	100.0%
2005	319,190	147,163	46.1%
2006	548,745	195,407	35.6%
2007	617,253	242,337	39.3%
2008	584,248	233,138	39.9%
2009	643,861	251,870	39.1%
2010	866,822	272,525	31.4%
2011	913,778	391,189	42.8%
2012	1,044,632	562,883	53.9%
2013	1,314,925	790,996	60.2%
2014	1,407,361	1,081,826	76.9%
2015	1,469,116	1,359,246	92.5%
2016	1,613,626	1,613,626	100.0%

Notes Pertaining to Governmental Accounting Standards Board Statement No. 25 (Although Statement 25 has been replaced by Statement 67, the Statement 25 notes below and on the following pages are provided FOR INFORMATIONAL PURPOSES.)

The actual contribution amounts in the above table include the employer share of regular contributions, the employer share of purchased service and contributions for employee service under the Public School Employees' Retirement System.

The information presented above was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial funding valuation follows.

Accounting Disclosure Statements (continued)

Valuation Date	December 31, 2016
Actuarial cost method	Variation of Entry-age Actuarial Cost Method
Amortization method	10-year or 30-year schedule with level payments (on a closed amortization basis)
Remaining amortization period	23 to 30 years (rounded equivalent single amortization period: 25 years)
Asset valuation method	5-year smoothed market
Actuarial Assumptions	
Investment rate of return	7.25 percent
Projected compensation increases	Average increase of 5.6 percent (range: 3.70 to 8.90 percent)
Inflation	2.60 percent
Cost-of-living adjustments	None

The annual employer contribution as set forth in the SERC is equal to the sum of the following:

(1) The employer share of the normal cost.
(2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
(3) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
(4) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July 1 following the actuarial valuation determining such changes.

Valuations are performed on December 31 of each year, and the results are presented to the Board as a basis for determining the employer contribution rate for the year beginning July 1 after the valuation date. The Board has adopted the rate from the valuation unless information available after or as part of the valuation supports an adjustment to the valuation rate.

Apart from the statutory funding requirements set forth in the SERC, there are separate accounting standards applicable to SERS. The current reporting requirements of GASB Statements No. 67 and 68 are provided under a separate report.

The former reporting requirements of GASB Statements No. 25 and 27 defined an Annual Required Contribution (ARC) for financial reporting purposes. As long as the statutory annual employer contribution, as defined above, was at least equal to the minimum contribution reported under GASB Statement No. 25, the statutory annual employer contribution was deemed to be the ARC. Whenever the statutory annual employer contribution was less than the minimum contribution reported under GASB, the GASB minimum was deemed to be the ARC.

Accounting Disclosure Statements (continued)

GASB Statement No. 25 defined the ARC to be equal to the employer normal cost plus an amount to amortize the unfunded actuarial accrued liability. The Statement prescribed the maximum acceptable period over which the total unfunded actuarial liability should be amortized. The Statement also required that the "equivalent single amortization period" for all combined amortizations should not exceed the maximum acceptable period. Under the contribution collars from Act 2010-120, the contribution level often resulted in an "equivalent single amortization period" in excess of the maximum acceptable period and thus an actual contribution less than the ARC. In those cases, the ARC was determined using a 30-year amortization period.

The Board adopted slightly different rates in 1993 and 1994 based on information available after the valuation was performed. In 1993, the valuation rate of 9.27 percent was lowered to 8.92 percent because it was determined that the covered compensation reported for the valuation was unusually high and that future covered compensation was expected to be relatively lower. In 1994, the valuation rate of 8.53 percent was increased to 8.92 percent to allow for the extension of the early retirement window and acceleration of the longevity pay scales.

The actuary agreed with the actions taken by the Board that resulted in some difference between the ARC and the actual contribution. The table presented on page 3 of Schedule H shows the ARC based on the actuarial valuation. The effect of the adjustments in 1993 and 1994 extended over three calendar years so the 1993 through 1995 actual contributions are different from the ARCs in those years.

The Board adopted the valuation rate as the contribution rate for 1996 through 2000.

During 2001, 2002, and 2003, actual contributions exceeded the ARC. For the period July 1, 2001 through June 30, 2003, the ARC was set at zero. However, contributions were made by employers of some special class members for the cost of additional benefits including payment of past liabilities for retroactive benefit enhancements. Collection of those amounts resulted in the actual contributions exceeding the ARC for all or part of calendar years 2001, 2002 and 2003.

All amortization payments are currently based upon a 30-year schedule of contributions, which remain level during the amortization period. The employer cost is determined as a percent of covered compensation, and the employer contributes that percent of the compensation of all covered members during each fiscal year.

The employer contribution was below the GASB Statement No. 25 minimum from July 1, 2005 through June 30, 2015. However, since July 1, 2015, the actual employer contributions have exceeded the GASB Statement No. 25 minimum.

State Employees' Retirement System

Solvency Test

Valuation Date	Actuarial Accrued Liabilities For (1) Active Participant Contributions	(2) Annuitants and Beneficiaries	(3) Active Participants (Employer Financed Portion)	Total Actuarial Accrued Liability (AAL)	Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Assets (1)	(2)	(3)	Funded Ratio
	(Amounts in Thousands)								
December 31, 1992	$ 1,994,567	$ 4,621,318	$ 4,872,529	$ 11,488,414	$ 11,769,388	100.0 %	100.0 %	100.0 %	102.4 %
December 31, 1993	2,170,593	4,806,907	5,236,236	12,213,736	13,060,613	100.0	100.0	100.0	106.9
December 31, 1994	2,352,731	5,039,221	6,350,104	13,742,056	13,991,485	100.0	100.0	100.0	101.8
December 31, 1995	2,499,485	5,649,454	6,918,265	15,067,205	15,510,309	100.0	100.0	100.0	102.9
December 31, 1996	2,646,630	6,027,333	7,262,653	15,936,616	16,841,069	100.0	100.0	100.0	105.7
December 31, 1997	2,748,177	6,951,411	7,588,825	17,288,413	18,565,136	100.0	100.0	100.0	107.4
December 31, 1998	2,904,232	7,200,000	8,253,666	18,357,899	20,670,711	100.0	100.0	100.0	112.6
December 31, 1999	2,989,489	7,779,993	8,322,358	19,091,840	23,624,267	100.0	100.0	100.0	123.7
December 31, 2000	3,182,776	8,148,876	8,370,626	19,702,278	26,094,306	100.0	100.0	100.0	132.4
December 31, 2001	3,344,107	8,684,734	11,629,915	23,658,757	27,505,494	100.0	100.0	100.0	116.3
December 31, 2002	3,498,672	10,129,669	12,022,048	25,650,389	27,497,464	100.0	100.0	100.0	107.2
December 31, 2003	3,588,664	11,296,520	11,294,578	26,179,761	27,465,615	100.0	100.0	100.0	104.9
December 31, 2004	3,593,576	12,779,570	11,625,880	27,999,026	26,900,027	100.0	100.0	90.5	96.1
December 31, 2005	3,696,477	14,000,196	11,155,043	28,851,716	26,793,782	100.0	100.0	81.6	92.9
December 31, 2006	3,916,841	14,474,525	11,973,631	30,364,997	28,148,834	100.0	100.0	81.5	92.7
December 31, 2007	3,849,293	16,255,843	11,648,835	31,753,971	30,839,877	100.0	100.0	92.2	97.1
December 31, 2008	4,068,036	17,305,971	13,063,389	34,437,396	30,635,621	100.0	100.0	70.9	89.0
December 31, 2009	4,280,680	17,962,741	13,553,596	35,797,017	30,204,693	100.0	100.0	58.7	84.4
December 31, 2010	4,409,444	18,995,355	15,774,795	39,179,594	29,443,945	100.0	100.0	38.3	75.2
December 31, 2011	4,406,306	21,222,075	16,653,481	42,281,862	27,618,461	100.0	100.0	11.9	65.3
December 31, 2012	4,551,507	22,095,052	16,409,005	43,055,564	25,302,688	100.0	93.9	0.0	58.8
December 31, 2013	4,636,219	23,046,717	16,191,644	43,874,580	25,975,185	100.0	92.6	0.0	59.2
December 31, 2014	4,733,833	23,872,658	16,144,179	44,750,670	26,584,948	100.0	91.5	0.0	59.4
December 31, 2015	4,816,121	25,156,125	16,356,683	46,328,929	26,877,127	100.0	87.7	0.0	58.0
December 31, 2016	4,869,229	26,824,306	15,825,429	47,518,964	27,596,048	100.0	84.7	0.0	58.1

State Employees' Retirement System
Actuarial Value of Assets

I.	Development of 12/31/16 Expected Actuarial Value:		
	A) Actuarial Value as of 12/31/15	$	26,877,126,928
	B) Contributions in 2016		1,996,104,685
	C) Benefits and Expenses in 2016		(3,248,967,450)
	D) Investment return at 7.5% to 12/31/16 on (A)		2,015,784,520
	E) Investment return at 7.5% to 12/31/16 on (B) and (C): 7.5% x .5 x ((B) + (C))		(46,982,354)
	F) Expected Actuarial Value as of 12/31/16: (A) + (B) + (C) + (D) + (E)	$	27,593,066,329
II.	Previous Differences Not Yet Amortized:		
	A) Unrecognized amount of 12/31/12 Difference: .2 x $789,653,676	$	157,930,735
	B) Unrecognized amount of 12/31/13 Difference: .4 x $1,890,838,336		756,335,334
	C) Unrecognized amount of 12/31/14 Difference: .6 x ($429,117,174)		(257,470,304)
	D) Unrecognized amount of 12/31/15 Difference: .8 x ($1,854,494,812)		(1,483,595,850)
	E) Total	$	(826,800,085)
III.	Gain or Loss from 2016		
	A) Market Value of Assets on 12/31/16	$	26,384,295,023
	B) Expected Market Value II(E) + I(F)		26,766,266,244
	C) Gain (loss) from 2016 Investments (A) - (B)	$	(381,971,221)
IV.	Development of Actuarial Value of Assets as of 12/31/16:		
	A) 20% of $789,653,676 (12/31/12 Difference):	$	157,930,735
	B) 20% of $1,890,838,336 (12/31/13 Difference):		378,167,667
	C) 20% of ($429,117,174) (12/31/14 Difference):		(85,823,435)
	D) 20% of ($1,854,494,812) (12/31/15 Difference):		(370,898,962)
	E) 20% of ($381,971,221) (12/31/16 Difference):		(76,394,244)
	F) Total Difference: (A) + (B) + (C) + (D) + (E)	$	2,981,761
	G) Actuarial Value at 12/31/16: I(F) + IV(F)	$	27,596,048,090

Projection of Annuitants, Beneficiaries and Active Participants
Actual Data Through 2016

Calendar Year	New Annuitants During the Year	Annuitant Deaths During the Year	Total Annuitants (End of Year)	New Beneficiaries During the Year	Beneficiary Deaths During the Year	Total Beneficiaries (End of Year)	Total Annuitants and Beneficiaries	Active Participants
1998			78,017			7,817	85,834	108,893
1999			80,095			7,948	88,043	108,035
2000			80,289			8,103	88,392	109,469
2001			80,911			8,306	89,217	109,716
2002			82,805			8,423	91,228	111,059
2003			85,808			8,604	94,412	109,018
2004			89,869			8,858	98,727	108,405
2005			92,120			9,059	101,179	109,981
2006			92,879			9,181	102,060	110,972
2007			97,657			9,473	107,130	109,610
2008			98,492			9,654	108,146	110,866
2009			99,776			9,863	109,639	110,107
2010			101,701			10,012	111,713	109,255
2011			105,096			10,246	115,342	107,021
2012			106,673			10,388	117,061	106,048
2013			109,356			10,696	120,052	105,186
2014			111,328			10,921	122,249	104,431
2015			113,537			11,152	124,689	105,025
2016			115,867			11,471	127,338	104,632
2017	5,540	3,391	118,016	678	543	11,606	129,622	104,632
2018	5,323	3,463	119,876	693	591	11,708	131,584	104,632
2019	5,234	3,510	121,600	702	631	11,779	133,379	104,632
2020	5,076	3,569	123,107	714	665	11,828	134,935	104,632
2021	4,964	3,636	124,435	727	699	11,856	136,291	104,632
2022	4,811	3,707	125,539	741	726	11,871	137,410	104,632
2023	4,571	3,743	126,367	749	747	11,873	138,240	104,632
2024	4,331	3,792	126,906	758	760	11,871	138,777	104,632
2025	4,033	3,851	127,088	770	771	11,870	138,958	104,632
2026	3,799	3,932	126,955	786	789	11,867	138,822	104,632
2027	3,659	4,014	126,600	803	803	11,867	138,467	104,632

The retirement projections in Schedule K are based upon the current retirement assumptions used for the valuation.

State Employees' Retirement System

Projection of Population, Benefits, and Contributions

Projection of Expected Contributions and Benefits
Actual Data Through 2016 (Dollars in Millions)

	Calendar Year Contributions (After 2016, Based Upon Blended Fiscal Projections)		Contributions as a Percent of Pay: Calendar Year Contributions (Employer Rates Based Upon Blended Fiscal Projections)		Contributions as a Percent of Pay: Actual Projected Employer Rate (Fiscal Year Beginning July 1)	Calendar Year Benefits and Expenses
Year	Employee	Employer	Employee	Employer		
1998	$ 222	$ 311				$ 1,080
1999	224	270				1,248
2000	232	168				1,198
2001	240	77				1,266
2002	304	51				1,450
2003	308	68				1,656
2004	302	106				1,880
2005	306	147				1,966
2006	317	196				1,943
2007	334	242				2,361
2008	337	233				2,231
2009	349	252				2,297
2010	349	273				2,473
2011	351	391				2,730
2012	348	563				2,690
2013	352	791				2,862
2014	366	1,082				2,967
2015	372	1,359				3,101
2016	375	1,622				3,249
2017	380	1,951	6.3%	31.4%	33.2%	3,400
2018	383	2,073	6.3%	33.0%	32.8%	3,536
2019	395	2,121	6.3%	32.8%	32.8%	3,678
2020	406	2,179	6.3%	32.8%	32.7%	3,816
2021	418	2,219	6.3%	32.4%	32.2%	3,954
2022	430	2,241	6.3%	31.8%	31.5%	4,089
2023	442	2,259	6.3%	31.2%	30.9%	4,213
2024	455	2,277	6.3%	30.6%	30.2%	4,334
2025	468	2,294	6.3%	29.9%	29.6%	4,446
2026	482	2,311	6.3%	29.3%	29.0%	4,558
2027	496	2,329	6.3%	28.7%	28.4%	4,671

This projection is based upon these assumptions: a projected investment return of 7.25 percent in 2017 and after; general pay increases of 2.90 percent; no future COLAs. The employer contributions are no longer subject to the Act 2010-120 collars effective with the July 1, 2017 employer contribution rates. Therefore, only the first half of the calendar year 2017 contribution is limited.

State Employees' Retirement System

I. Age, Service and Salary Profile of Active Participants as of December 31, 2016

Active Participants*

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	32	0	0	0	0	0	0	32	$ 27,988
20-24	956	4	0	0	0	0	0	960	31,367
25-29	2,266	458	15	0	0	0	0	2,739	39,219
30-34	1,771	1,370	475	8	0	0	0	3,624	46,088
35-39	1,464	1,163	1,264	295	3	0	0	4,189	51,058
40-44	1,225	1,016	1,008	840	238	4	0	4,331	54,771
45-49	1,218	986	1071	986	979	369	15	5,624	57,735
50-54	1,245	945	1,019	860	831	1,028	509	6,437	59,677
55-59	1,055	935	1,032	876	739	953	1,123	6,713	60,066
60-64	779	781	892	705	443	432	516	4,548	59,432
65+	402	436	486	320	158	124	281	2,207	59,755
Total	12,413	8,094	7,262	4,890	3,391	2,910	2,444	41,404	$ 54,845

Average Age 47.44
Average Service 11.60

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	38	0	0	0	0	0	0	38	$ 23,805
20-24	1,063	5	0	0	0	0	0	1,068	29,792
25-29	2,324	398	17	0	0	0	0	2,739	37,036
30-34	1,933	1,288	462	22	0	0	0	3,705	42,702
35-39	1,622	1,136	1,140	406	17	0	0	4,321	47,648
40-44	1,381	997	973	764	290	31	0	4,436	49,616
45-49	1,415	1,087	1,106	847	767	511	54	5,787	51,481
50-54	1,291	1,139	1,062	865	726	792	624	6,499	52,445
55-59	1,127	1,080	1,179	968	791	765	909	6,819	52,983
60-64	622	774	845	716	420	373	399	4,149	51,309
65+	200	286	321	329	126	95	163	1,520	51,708
Total	13,016	8,190	7,105	4,917	3,137	2,567	2,149	41,081	$ 48,925

Average Age 46.79
Average Service 11.10

* The following three pages contain information on members in special categories. These include selected hazardous duty members, legislators, judges and district justices. The above information is for all other active members. Page five of Schedule L is the total of all active categories. Page six is the total of all active participants and inactive and vested participants.

State Employees' Retirement System
I. Age, Service and Salary Profile of Active Participants as of December 31, 2016

Selected Hazardous Duty*

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	2	0	0	0	0	0	0	2	$ 33,301
20-24	301	0	0	0	0	0	0	301	44,047
25-29	1,620	112	0	0	0	0	0	1,732	52,214
30-34	1,097	964	313	0	0	0	0	2,374	62,654
35-39	546	693	867	221	4	0	0	2,331	69,359
40-44	317	468	647	806	309	2	0	2,549	75,658
45-49	239	339	518	803	1,318	452	10	3,679	83,595
50-54	161	222	316	437	576	455	81	2,248	81,818
55-59	99	129	189	276	200	152	89	1,134	76,764
60-64	33	74	111	178	84	59	35	574	74,217
65+	7	31	47	64	32	16	16	213	73,921
Total	4,422	3,032	3,008	2,785	2,523	1,136	231	17,137	$ 72,585

Average Age 42.44
Average Service 11.97

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	$ -
20-24	82	0	0	0	0	0	0	82	39,546
25-29	346	28	0	0	0	0	0	374	47,771
30-34	268	189	43	1	0	0	0	501	54,460
35-39	184	184	162	33	0	0	0	563	60,618
40-44	139	150	163	119	27	0	0	598	63,117
45-49	127	119	119	137	119	20	0	641	68,051
50-54	84	102	100	101	68	28	6	489	66,891
55-59	43	80	74	59	28	26	11	321	68,890
60-64	14	43	44	38	21	14	2	176	69,426
65+	1	8	12	8	11	6	2	48	76,123
Total	1,288	903	717	496	274	94	21	3,793	$ 61,846

Average Age 42.68
Average Service 9.09

* Enforcement officers, correction officers, psychiatric security aides, and officers of the Pennsylvania State Police and the Delaware River Port Authority

State Employees' Retirement System

I. Age, Service and Salary Profile of Active Participants as of December 31, 2016

Legislators*

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	1	0	0	0	0	0	0	1	86,478
30-34	5	4	0	0	0	0	0	9	86,478
35-39	4	4	4	0	0	0	0	12	89,713
40-44	4	4	2	2	0	0	0	12	88,933
45-49	8	6	5	3	1	0	0	23	88,396
50-54	3	7	6	5	1	0	0	22	90,684
55-59	3	5	10	6	6	3	2	35	92,682
60-64	4	2	6	4	3	3	5	27	91,972
65+	3	5	6	1	5	4	8	32	89,760
Total	35	37	39	21	16	10	15	173	$ 90,382

Average Age 54.36

Average Service 13.20

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	1	0	0	0	0	0	0	1	86,478
30-34	1	0	0	0	0	0	0	1	86,478
35-39	1	1	0	0	0	0	0	2	86,478
40-44	2	1	0	0	0	0	0	3	86,478
45-49	1	2	0	0	0	1	0	4	89,511
50-54	2	2	2	0	1	0	0	7	86,478
55-59	2	2	0	0	1	2	0	7	90,835
60-64	2	2	0	1	1	0	1	7	86,478
65+	1	0	3	1	3	0	1	9	87,826
Total	13	10	5	2	6	3	2	41	$ 87,814

Average Age 55.17

Average Service 11.05

*Legislators are not required to join the retirement system, therefore the total participant count may not add to 253.

State Employees' Retirement System

I. Age, Service and Salary Profile of Active Participants as of December 31, 2016

Judges And Magisterial District Judges

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	0	0	0	0	0	0	0	0	-
30-34	5	0	0	0	0	0	0	5	88,433
35-39	4	3	1	0	0	0	0	8	99,361
40-44	17	9	3	2	0	0	0	31	109,119
45-49	23	32	7	5	1	0	0	68	123,824
50-54	18	37	13	14	6	3	1	92	121,128
55-59	24	33	28	24	15	9	1	134	126,479
60-64	16	44	46	36	30	20	8	200	131,219
65+	7	22	30	42	30	29	15	175	144,304
Total	114	180	128	123	82	61	25	713	$ 129,914

Average Age 58.30
Average Service 12.98

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	1	0	0	0	0	0	0	1	88,293
30-34	1	2	1	0	0	0	0	4	88,327
35-39	3	0	1	0	0	0	0	4	136,737
40-44	5	5	3	2	0	0	0	15	129,509
45-49	10	12	9	7	0	0	0	38	130,200
50-54	13	20	9	7	5	1	0	55	133,235
55-59	8	18	13	12	6	4	1	62	146,701
60-64	6	15	14	13	14	9	2	73	143,735
65+	2	3	3	8	7	5	10	38	152,658
Total	49	75	53	49	32	19	13	290	$ 139,986

Average Age 55.90
Average Service 12.86

State Employees' Retirement System
I. Age, Service and Salary Profile of Active Participants as of December 31, 2016

All Active Participants

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	34	0	0	0	0	0	0	34	$ 28,301
20-24	1,257	4	0	0	0	0	0	1,261	34,394
25-29	3,887	570	15	0	0	0	0	4,472	44,263
30-34	2,878	2,338	788	8	0	0	0	6,012	52,725
35-39	2,018	1,863	2,136	516	7	0	0	6,540	57,711
40-44	1,563	1,497	1,660	1,650	547	6	0	6,923	62,764
45-49	1,488	1,363	1,601	1,797	2,299	821	25	9,394	68,416
50-54	1,427	1,211	1,354	1,316	1,414	1,486	591	8,799	66,054
55-59	1,181	1,102	1,259	1,182	960	1,117	1,215	8,016	63,681
60-64	832	901	1,055	923	560	514	564	5,349	63,867
65+	419	494	569	427	225	173	320	2,627	66,902
Total	16,984	11,343	10,437	7,819	6,012	4,117	2,715	59,427	$ 60,965

Average Age 46.15
Average Service 11.73

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	38	0	0	0	0	0	0	38	$ 23,805
20-24	1,145	5	0	0	0	0	0	1,150	30,487
25-29	2,672	426	17	0	0	0	0	3,115	38,357
30-34	2,203	1,479	506	23	0	0	0	4,211	44,155
35-39	1,810	1,321	1,303	439	17	0	0	4,890	49,230
40-44	1,527	1,153	1,139	885	317	31	0	5,052	51,473
45-49	1,553	1,220	1,234	991	886	532	54	6,470	53,609
50-54	1,390	1,263	1,173	973	800	821	630	7,050	54,111
55-59	1,180	1,180	1,266	1,039	826	797	921	7,209	54,534
60-64	644	834	903	768	456	396	404	4,405	53,620
65+	204	297	339	346	147	106	176	1,615	55,010
Total	14,366	9,178	7,880	5,464	3,449	2,683	2,185	45,205	$ 50,629

Average Age 46.51
Average Service 10.95

State Employees' Retirement System

II. Age and Service Profile of Active Participants and Inactive and Vested Participants

As of December 31, 2016

Active Participants and Inactive and Vested Participants

Males - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
Less than 20	34	0	0	0	0	0	0	34
20-24	1,257	4	0	0	0	0	0	1,261
25-29	3,901	591	15	0	0	0	0	4,507
30-34	2,896	2,507	806	8	0	0	0	6,217
35-39	2,041	2,107	2,215	523	7	0	0	6,893
40-44	1,590	1,734	1,758	1,675	547	6	0	7,310
45-49	1,529	1,622	1,739	1,848	2,323	844	25	9,930
50-54	1,468	1,437	1,488	1,379	1,456	1,527	599	9,354
55-59	1,228	1,282	1,381	1,250	1,001	1,150	1,250	8,542
60-64	888	999	1,126	969	599	543	613	5,737
65+	545	531	606	449	238	184	340	2,893
Total	17,377	12,814	11,134	8,101	6,171	4,254	2,827	62,678

Average Age 46.37
Average Service 11.66

Females - Full Years of Service to December 31, 2016

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
Less than 20	38	0	0	0	0	0	0	38
20-24	1,146	5	0	0	0	0	0	1,151
25-29	2,686	455	17	0	0	0	0	3,158
30-34	2,234	1,666	525	23	0	0	0	4,448
35-39	1,849	1,621	1,384	445	17	0	0	5,316
40-44	1,579	1,452	1,223	908	319	31	0	5,512
45-49	1,626	1,510	1,375	1,051	904	545	55	7,066
50-54	1,480	1,552	1,346	1,033	834	835	637	7,717
55-59	1,282	1,473	1,452	1,105	855	825	954	7,946
60-64	767	974	993	814	496	422	427	4,893
65+	314	347	362	356	160	116	187	1,842
Total	15,001	11,055	8,677	5,735	3,585	2,774	2,260	49,087

Average Age 46.80
Average Service 10.80

Superannuation Annuitants

	Male		Female		Total	
Age	Number	Annual Annuity	Number	Annual Annuity	Number	Annual Annuity
Under 25	-	$ -	-	$ -	-	$ -
25-29	-	-	-	-	-	-
30-34	-	-	-	-	-	-
35-39	-	-	-	-	-	-
40-44	-	-	-	-	-	-
45-49	-	-	-	-	-	-
50-54	711	33,401,779	148	5,148,526	859	38,550,305
55-59	1,667	69,325,648	906	37,962,033	2,573	107,287,681
60-64	4,882	175,457,806	4,166	140,653,012	9,048	316,110,818
65-69	9,067	283,698,766	6,223	173,623,390	15,290	457,322,156
70-74	7,910	246,213,481	4,906	116,894,491	12,816	363,107,972
75-79	5,180	153,427,048	3,636	72,729,616	8,816	226,156,664
80-84	3,499	85,155,094	2,680	41,192,171	6,179	126,347,265
85-89	2,362	51,283,344	2,111	25,399,062	4,473	76,682,406
90 & over	1,379	24,563,217	1,882	19,063,482	3,261	43,626,699
Total	36,657	$ 1,122,526,183	26,658	$ 632,665,783	63,315	$ 1,755,191,966

Average Age	72.3
Average Annual Annuity	$27,722

Early Retirement Annuitants

	Male		Female		Total	
Age	Number	Annual Annuity	Number	Annual Annuity	Number	Annuity
Under 25	-	$ -	-	$ -	-	$ -
25-29	22	19,770	39	26,143	61	45,913
30-34	198	236,763	264	246,697	462	483,460
35-39	431	685,594	494	647,072	925	1,332,666
40-44	555	1,797,811	618	1,222,449	1,173	3,020,260
45-49	1,388	33,855,731	928	4,010,474	2,316	37,866,205
50-54	1,829	52,535,977	1,223	11,436,419	3,052	63,972,396
55-59	2,333	54,936,736	2,492	37,062,355	4,825	91,999,091
60-64	3,301	74,428,423	4,433	77,776,677	7,734	152,205,100
65-69	4,621	108,311,087	4,640	77,849,832	9,261	186,160,919
70-74	4,212	93,337,851	2,717	40,812,794	6,929	134,150,645
75-79	1,983	32,924,309	1,481	16,641,623	3,464	49,565,932
80-84	1,079	16,432,556	1,020	9,620,555	2,099	26,053,111
85-89	589	8,649,018	617	5,536,000	1,206	14,185,018
90 & over	167	2,347,207	300	2,283,742	467	4,630,949
Total	22,708	$ 480,498,833	21,266	$ 285,172,832	43,974	$ 765,671,665

Average Age	64.3
Average Annual Annuity	$17,412

Disabled Annuitants

	Male		Female		Total	
Age	Number	Annual Annuity	Number	Annual Annuity	Number	Annuity
Under 25	-	$ -	-	$ -	-	$ -
25-29	2	27,522	2	22,593	4	50,115
30-34	7	96,452	16	197,434	23	293,886
35-39	44	628,270	42	586,422	86	1,214,692
40-44	91	1,490,147	85	1,114,736	176	2,604,883
45-49	221	3,940,594	214	3,167,932	435	7,108,526
50-54	431	8,142,066	387	6,164,941	818	14,307,007
55-59	625	12,330,237	677	11,622,914	1,302	23,953,151
60-64	871	15,658,215	969	15,824,962	1,840	31,483,177
65-69	837	13,212,415	897	13,057,050	1,734	26,269,465
70-74	512	6,554,500	557	6,988,962	1,069	13,543,462
75-79	254	2,537,240	320	3,001,260	574	5,538,500
80-84	130	1,164,536	177	1,501,750	307	2,666,286
85-89	57	559,031	96	718,179	153	1,277,210
90 & over	24	203,604	33	254,065	57	457,669
Total	4,106	$ 66,544,829	4,472	$ 64,223,200	8,578	$ 130,768,029

Average Age	63.4
Average Annual Annuity	$15,245

Beneficiaries and Survivor Annuitants

	Male		Female		Total	
Age	Number	Annual Annuity	Number	Annual Annuity	Number	Annuity
Under 25	16	$ 147,695	21	$ 142,014	37	$ 289,709
25-29	21	201,107	16	114,028	37	315,135
30-34	9	59,951	18	133,635	27	193,586
35-39	28	275,449	26	238,600	54	514,049
40-44	21	335,942	58	587,749	79	923,691
45-49	54	548,453	128	1,202,200	182	1,750,653
50-54	43	319,947	301	3,766,310	344	4,086,257
55-59	89	782,419	467	5,986,628	556	6,769,047
60-64	138	1,474,591	875	12,010,320	1,013	13,484,911
65-69	197	2,331,804	1,285	19,653,801	1,482	21,985,605
70-74	196	2,524,511	1,422	21,925,503	1,618	24,450,014
75-79	186	1,857,674	1,433	20,680,075	1,619	22,537,749
80-84	125	1,190,615	1,470	17,931,843	1,595	19,122,458
85-89	115	1,093,164	1,345	14,666,505	1,460	15,759,669
90 & over	76	535,936	1,292	10,730,647	1,368	11,266,583
Total	1,314	$ 13,679,258	10,157	$ 129,769,858	11,471	$ 143,449,116

Average Age	74.5
Average Annual Annuity	$12,505

Benefit and Contribution Provisions as of December 31, 2016
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

The State Employees' Retirement System makes provision for retirement, disability, and death benefits for all State employees, except those specifically excluded under Section 5301 of the SERC, and certain other eligible groups. The major provisions are summarized as follows:

Eligible Employees

Class A-3 -	All eligible employees hired after December 31, 2010, except members of the judiciary. Certain groups have effective dates after December 31, 2010 that are tied to the expiration of collective bargaining agreements. Members of the General Assembly who joined SERS on or after December 1, 2010 are also part of this class.
Class A-4 -	Same as Class A-3 except that this class is for members who elect to pay a higher member contribution amount and receive a higher benefit.
Class AA -	All eligible employees hired after June 30, 2001 but prior to January 1, 2011, except State Police Officers, members of the judiciary and legislators, and employees hired before July 1, 2001, who elected Class AA by December 31, 2001.
Class A -	State Police Officers hired on or after March 1, 1974 but prior to July 1, 2012, members of the judiciary who have not elected Class E-1 or E-2, legislators elected and became members before July 1, 2001, who have not elected Class AA or Class D-4 and Class A employees hired before July 1, 2001, who remained in Class A.
Class D-4 -	Legislators coming into service after June 30, 2001 but prior to December 1, 2010, who elect to be SERS members, and legislators who elected Class D-4 before July 1, 2001.
Class E-1 -	Judges who elect Class E-1.
Class E-2 -	Magisterial District Judges who elect Class E-2.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

Age and Service Requirements for Superannuation (full formula benefits)

Class A-3 & Class A-4

General Conditions	Age 65 with three years of credited state service; or a total attained age and years of credited service of 92 (the "Rule of 92") with credited service being at least 35 years.
Legislators and certain correction officers and enforcement officers	Age 55 with three years of credited state service.
Park Rangers & Capitol Police	Age 55 with 20 years of Park Ranger or Capitol Police credited service. If total credited service is less than 20 years, General Conditions apply.
State Police	Age 55. State Police are eligible for special unreduced benefits after 20 years of credited service, regardless of age; however, age 55 remains their superannuation age.

Class AA & Class A

General Conditions	Age 60 with three years of credited state service; or 35 or more years of credited service, regardless of age.
Legislators and certain correction officers and enforcement officers	Age 50 with three years of credited state service.
Park Rangers & Capitol Police	Age 50 with 20 years of Park Ranger or Capitol Police credited service. If total credited service is less than 20 years, General Conditions apply.
State Police	Age 50. State Police are eligible for special unreduced benefits after 20 years of credited service, regardless of age; however, age 50 remains their superannuation age.

Class D-4	Age 50 with three years of credited state service.
Class E-1 & Class E-2	Age 60 with three years of credited state service; or 35 or more years of credited service, regardless of age.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

Formula for Superannuation Annuity

The single life annuity applicable to members of Class AA and Class A-4 is equal to 2.5 percent of the high 3-year final average salary (FAS) of the member multiplied by the years and fractions of credited service.

The single life annuity applicable to members of Class A and Class A-3 is equal to 2 percent of the high 3-year final average salary of the member multiplied by the years and fractions of credited service.

The single life annuity applicable to Class A State Police is 50 percent of the highest full calendar year of compensation, other than the year in which the member retires, if the member has 20 but less than 25 years of service. With more than 25 years of service the benefit is 75 percent of the highest annual salary, other than the year in which the member retires.

The benefit accrual rates for other classes of members are as follows:

Class	Benefit Accrual Rate
D-4	3.0 percent
E-1	4.0 percent for each of the first 10 years of judicial service, dropping to 3.0 percent for each subsequent year of judicial service.
E-2	3.0 percent for each year of judicial service.

Members who have 41 or more years of combined Class A-3, A-4, A and AA service are entitled to a supplemental benefit ranging from 2 percent of the applicable single life annuity for members with 41 years of service to 10 percent of the applicable single life annuity for members with 45 or more years of service.

The benefit for a member who works past age 70 is at least equal to a benefit that is the actuarial equivalent of the prior year's benefit. This determination is made each year after age 70.

In addition to the above benefits, a member who has elected Social Security Integration Coverage is entitled to a single life annuity of 2 percent of the member's "Average Non-Covered Salary" for each year of Social Security Integration (SSI) coverage. All Class E members can elect SSI coverage. Other members must have elected SSI coverage before March, 1974. "Average Non-Covered Salary" is the average annual salary received while covered by the Retirement System since January 1, 1956 in excess of the maximum covered wages under Social Security.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

Limitations on Annuity

In almost all cases, SERS benefits are limited to no more than 100 percent of compensation. An exception to this limit is the actuarial increase portion of the benefit for certain members eligible for actuarial increases due to retirement beyond age 70. For such members, the 100 percent of salary limit only applies to the base benefit. Also, the amount of annual retirement benefit a member may receive shall not exceed the dollar limit specified under Section 415(b) of the Internal Revenue Code. Benefits in excess of the 415(b) limit are paid through the Benefits Completion Plan.

Age and Service Requirements for Disability Retirement

A member is eligible for disability retirement, if, as determined by a member of the SERS medical review staff, he or she is unable to perform their current job and has at least 5 years of credited service. An officer of the State Police or an enforcement officer does not have a minimum service requirement.

Formula for Disability Benefit

The disability benefit is equal to the benefit calculated as of normal retirement age, based on years of credited service at disability, if the result is greater than or equal to 33-1/3 percent of FAS at time of disability. If the benefit so calculated is less than 33-1/3 percent of FAS, the disability benefit is equal to the smaller of:

(a) the benefit calculated as of normal retirement age based on Service projected to retirement date, or

(b) 33-1/3 percent of FAS at time of disability.

For service connected disabilities, the disability benefit payable will be increased, as needed, so that the sum of the plan benefit and the benefits paid or payable under the Workers' Compensation Act, The Pennsylvania Occupational Disease Act, and the Social Security Act equals 70 percent of FAS.

Eligibility for Vested Benefit

All Class A-3 and A-4 members have a vested entitlement to an annuity after 10 years of credited service. All other classes are vested after 5 years of credited service.

Vested Benefit

The vested benefit is equal to the benefit calculated using years of credited service at the time of leaving the plan. The former member can receive the full benefit beginning at normal retirement age, or an actuarially reduced withdrawal annuity beginning at any date after separation but before normal retirement age.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

For those not in Classes A-3 or A-4, the withdrawal annuity is reduced from the earlier of age 60, or the age at which the member would have 35 years of credited service. Benefits for Park Rangers and Capitol Police who have 20 years of credited service (as Park Rangers and Capitol Police) are reduced from age 50. Benefits for other members who have an age 50 superannuation age are reduced from age 50 irrespective of the amount of credited service they have.

For Classes A-3 and A-4, the withdrawal annuity is reduced from age 65. If prior to age 65 the member has both reached 35 years of credited service and met the conditions of the Rule of 92, then the member is eligible for unreduced benefits. Benefits for Park Rangers and Capitol Police who have 20 years of credited service (as Park Rangers and Capitol Police) are reduced from age 55. Benefits for other members who have an age 55 superannuation age are reduced from age 55 irrespective of the amount of credited service they have.

Eligibility for Death Benefit Prior to Retirement

A member is eligible if the member (1) is under superannuation age with 5 years (or 10 years under Classes A-3 and A-4) of credited service or (2) has attained superannuation age with 3 years of credited state service.

Amount of Death Benefit Prior to Retirement

An eligible beneficiary receives the full present value of the benefits to which the member would have been entitled had the member retired the day before he or she died, assuming the member had elected Option 1 if no other option had been elected. This death benefit includes the present value associated with benefits, if any, to which the member may not have been entitled because they exceeded the member's highest consecutive twelve months of salary and are limited by appropriate IRS limitations.

Death Benefits After Retirement

A member who elects the maximum single life annuity is entitled to a refund of the unpaid balance of the accumulated member contributions and interest at the time of retirement. A member may elect one of several optional reduced pensions in lieu of the maximum single life annuity to provide additional death benefit protection. The optional forms of benefit are actuarially equivalent to the maximum single life annuity benefit using 4.0 percent interest per annum, compounded annually, and the actuarial equivalence factors described below.

The beneficiary of a disabled member who did not elect an alternative option receives benefits determined under Option 1. Option 1 provides that the beneficiary will receive a benefit equal to the present value of the maximum single life annuity at retirement reduced by any payments received by the annuitant. The Option 1 benefit is provided to a disabled member without any reduction in the member's benefit.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

A Supplemental Death Benefit is payable to a beneficiary of a member who had a retirement benefit limited by 100 percent of final compensation. The Supplemental Death Benefit is the present value of the excess of the retirement benefit payable to the member before applying the 100 percent of final compensation limit, over the 100 percent of final compensation limit, subject to limits imposed by IRC Section 401(a)(9). If the benefit payable to the member is larger than the IRC Section 415(b) limit, the part of the Supplemental Death Benefit in excess of the IRC Section 415(b) limit will be payable from the Benefits Completion Plan. The Supplemental Death Benefit payment is in addition to any death benefit that may be paid as a result of the optional election.

The "Extra Piece"

The SERC provides for an "extra piece" to be added to the annual benefit if the member's accumulated deductions exceed one-half of the actuarially equivalent value of the annual benefit. The extra piece is equal to the difference between the total accumulated deductions and one-half of the actuarially equivalent value of the annual benefit. This provision does not apply to Classes A-3 and A-4.

Cost-of-Living Allowances (COLAs)

Supplemental annuities applying cost-of-living increases to the benefits of annuitants have been instituted from time to time. The last cost-of-living increase was a two-stage increase under Act 2002-38. The first stage was applicable to annuitants who retired on or before July 1, 1990, and it became effective in July of 2002. The second stage provided cost-of-living increases to annuitants who retired after July 1, 1990, but prior to July 2, 2002, and it became effective in July of 2003.

Rate of Member Contribution

(i) Regular member contributions, excluding Social Security Integration contributions

Class A-3 - 6.25 percent of total compensation

Class A-4 - 9.30 percent

Class AA - 6.25 percent

Class A - 5.00 percent

Class D-4 - 7.50 percent

Class E-1 - 10.00 percent during the first 10 years of judicial service and 7.50 percent thereafter.

Class E-2 - 7.50 percent

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

(ii) Additional contribution for Social Security Integration Credit

Any member who elects the Social Security Integration Credit pays 5.00 percent of any salary in excess of the amount of salary covered by Social Security during the year for which contributions are being made. A member electing to end additional contributions is ineligible to make future contributions or accrue future benefits.

Interest Credited on Member Contributions

A rate of 4 percent compounded annually, the statutory rate of interest, has been credited on the member contributions since the inception of the system.

Refund of Accumulated Member Contributions

On the death of a member not qualifying for death benefits, the accumulated member contributions and interest will be paid to the beneficiary. Upon application, a member terminating service when not eligible for another form of benefit is paid a refund of the accumulated contributions and interest. Other terminating members may elect to receive a lump sum payment of a portion of the present value of their benefit, not to exceed their accumulated contributions and interest under Option 4 as part of the members' option. Their lump sum payment results in a decrease to the annuity benefit otherwise payable. Under Act 120, Classes A-3 and A-4 are not eligible to receive a lump sum and reduced annuity under Option 4.

Employer Contributions

The employer pays the balance of the cost in excess of the members' contributions with payment schedules determined by law. Act 2010-120 made changes to the SERS funding rules which have significantly affected the required employer contributions. See Section III of Schedule O for the details.

Actuarial Equivalence

The actuarial table used to determine optional and early retirement benefits for members who entered service after August 1983 is the 1983 Group Annuity Mortality (1983 GAM) Unisex table.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

Members who entered service before August 1983 receive the better of benefits based on the 1983 GAM table or a variation of the 1971 Group Annuity Mortality (1971 GAM) male table. The 1971 GAM table that applies in determining the benefits for members who entered service before August 1983 is:

For service before August, 1983:

Males (members or survivors) – 1971 GAM for males
Females (members or survivors) – 1971 GAM for males, set back 6 years

For service after August, 1983:

Members (male or female) – 1971 GAM for males, set back 6 years
Survivors (male or female) – 1971 GAM for males

Military Service

Act 2012-181, effective December 31, 2012, brought SERS into compliance with the federal Heroes Earnings Assistance and Relief Tax Act of 2008 (HEART Act) and Uniformed Services Employment and Reemployment Rights Act of 1994 (USERRA) for State employees who go on military leave, and revised the purchase price formula for nonintervening military service for members seeking to purchase nonstate service credit for military service that does not qualify for USERRA benefits or that was performed before becoming a State employee. The primary impacts of Act 181 are:

(i) Employees who return from USERRA qualified military leave receive vesting credit, even though they do not make member contributions to purchase credited service for the military leave.

(ii) Employees who return from USERRA qualified military leave may make the member contributions that they would have made had they not gone on military leave and if they do so will be treated as if they remained in active State service for that time.

(iii) Employees who die on military leave receive all SERS benefits that they would have received, except benefit accruals, as if they had returned to State service the day before their death.

(iv) The Pennsylvania Military and Veterans Code provisions allowing State employees on military leave to continue to make member contributions and remain active members of SERS while on military leave have been repealed.

Benefit and Contribution Provisions as of December 31, 2016 (continued)
(as embodied in Act 31 of 1974, and amended through Act 93 in December 2015)

(v) The purchase price for nonintervening military service for Class A-3 and Class A-4 members has been revised from the full actuarial value formula established in Act 2010-120 to the formula used by State employees who are members of the other classes of service, which is based on employee and employer normal contribution rates and the employees' compensation.

Given the past approach to funding the impact of military service-related events among SERS members, and considering the overall changes in benefits related to military service and military leave resulting from Act 181, it was determined that Act 181 had no material impact on the future actuarial funding of SERS and thus did not produce a cost added by legislated benefit improvements that needed to be reflected in the final contribution rate.

Compliance With Federal and State Laws

Act 2015-93, signed into law in December of 2015, instituted several technical, tax-related requirements for SERS in an effort to maintain the SERC's compliance with federal and state laws, including the Internal Revenue Code. Many of these technical changes were transparent to SERS members, and most of the other changes affected only a few State employees.

These changes included:

- Retiree return to service rules, allowing annuitants to return to active service in limited circumstances, were structured to satisfy federal requirements
- Minimum vesting standards were established in the event the SERS pension plan is closed
- Benefit limits for higher salaried or longer service employees and the handling of pickup contributions
- Maximum contribution and minimum distribution rules, and death benefit parameters
- Coordination of retirement benefits between SERS and PSERS to ensure that any combined benefit does not exceed the IRS maximum distribution limit

SERS' actuaries have determined that Act 2015-93 had no material impact on the future actuarial funding of SERS, and thus did not produce a cost added by legislated benefit improvements that needed to be reflected in the final contribution rate.

Actuarial Assumptions

This schedule shows the actuarial assumptions used for the valuation. With the exception of the investment return assumption, the inflation assumption, and the salary growth assumption, these assumptions were adopted by the Board in March of 2016 based upon a review of SERS experience from 2011 through 2015. To ensure that the investment return assumption remains up-to-date and appropriate for every actuarial valuation, it is reviewed annually by the SERS actuaries and Board. As a result of the review undertaken during March/April of 2017, the Board approved (i) a reduction in the annual investment return assumption from 7.50% to 7.25% and (ii) a reduction in the annual inflation assumption from 2.75% to 2.60%, and both changes became effective with this December 31, 2016 actuarial valuation.

Schedule N contains an extract of the full set of rates used in the valuation. The full set of rates is in the March 9, 2016 report, *Commonwealth of Pennsylvania State Employees' Retirement System 18th Investigation of Actuarial Experience – January 1, 2011 to December 31, 2015*, which can be obtained from SERS. The rates are the probabilities that an event will occur in the year after the valuation and are all assumed to occur at the beginning of the year. For example, the male retirement rate of 25.0 percent at age 60 means that 250 of every 1,000 male employees age 60 and who are eligible for full benefits are expected to retire at the date of the valuation.

Interest Rate (Investment Return): 7.25 percent compounded annually. The assumed interest rate of 7.25 percent is the investment return less investment expenses.

Inflation Rate: 2.60 percent compounded annually.

Mortality After Retirement:

Non-disabled Retirees, Beneficiaries and Survivors: The RP-2000 Male and Female Combined Healthy Mortality Tables projected (using Projection Scale AA) to 2016 for males and to 2020 for females, and then further adjusted to ensure sufficient margin for improvement in certain age ranges. Each table includes a margin for future improvement in life expectancy.

Disability Retirees: The RP-2000 Male and Female Disabled Retiree Mortality Tables projected (using Projection Scale AA) to 2021 for males and to 2017 for females. Each table includes a margin for future improvement in life expectancy.

Spouse Age Difference: Females are assumed to be 2 years younger than males.

Actuarial Assumptions (continued)

Demographic Assumptions for General Employees while Active Members

Rates of Separation for Eligibility for Full Unreduced Benefits
(35 years of credited service under age 60; 3 years of credited service over age 60)

Representative Rates of Separation for Eligibility for Full Unreduced Benefits		
Age	Male	Female
53	20.0%	23.0%
54-55	23.0	23.0
56-57	24.0	23.0
58	27.0	23.0
59	30.0	25.0
60	25.0	25.0
61	20.0	20.0
62	25.0	25.0
63 – 64	20.0	20.0
65 – 66	25.0	25.0
67 – 70	23.0	23.0
71 – 79	20.0	20.0
80	100.0	100.0

Rates of Separation for Eligibility for Reduced Benefits
(only apply to members not eligible for full unreduced benefits)

Representative Rates of Separation for Eligibility for Reduced Benefits				
	5 – 14 Years of Credited Service		15 or More Years of Credited Service	
Age	Male	Female	Male	Female
25	2.0%	3.7%	N/A	N/A
30	1.6	1.9	N/A	N/A
35	1.6	1.9	1.0%	1.2%
40	1.6	1.9	1.0	1.2
45	1.35	1.9	1.0	1.6
50	1.35	1.9	2.0	2.0
55	1.35	1.9	6.0	6.0

Actuarial Assumptions (continued)

Rates of Separation Due to Withdrawal
It is assumed that the benefit will be reduced from age 58 for general members (to factor 35 years of service before age 60) and from age 50 for members eligible for age 50 retirement.

Representative Rates of Separation Due to Withdrawal								
	Male				Female			
	Years of Credited Service				Years of Credited Service			
Age	0	5	9	14	0	5	9	14
20	24.2%	N/A	N/A	N/A	28.4%	N/A	N/A	N/A
25	18.5	3.0%	2.1%	N/A	22.4	3.7%	2.3%	N/A
30	16.4	3.0	2.1	1.0%	19.2	3.3	2.3	1.7%
35	15.6	2.4	1.3	1.0	15.0	3.2	2.3	1.2
40	15.0	2.4	1.3	1.0	13.4	3.2	1.2	1.0
45	14.4	2.4	0.7	1.1	13.1	2.7	1.2	1.0
50	14.4	2.6	0.7	1.1	13.1	2.7	1.5	1.0
55	14.4	1.9	0.8	0.8	13.1	1.8	1.0	1.6

Rates of Separation Due to Death and Disability
(Disability rates only apply to members not eligible for full retirement)

Representative Rates of Separation Due to Death and Disability				
	Death		Disability	
Age	Male	Female	Male	Female
20	0.04%	0.02%	N/A	N/A
25	0.04	0.02	0.02%	0.04%
30	0.05	0.02	0.06	0.09
35	0.06	0.03	0.11	0.14
40	0.09	0.04	0.17	0.19
45	0.13	0.06	0.30	0.30
50	0.24	0.09	0.42	0.45
55	0.29	0.14	0.55	0.57
60	0.35	0.24	N/A	N/A

Actuarial Assumptions (continued)

For Special Benefit Classes if Different from General Employee Rates:

Rates of Separation Due to Withdrawal			
Years of Service	State Police/ Hazardous Duty	Legislators	Judicial Officers
0	9.0%	4.0%	1.0%
1	4.0	4.0	1.0
2	3.0	4.0	0.3
3	3.0	4.0	0.3
4	2.0	4.0	0.3
5	1.0	4.0	0.3
6	1.0	4.0	0.3
7	0.5	12.0	0.3
8	0.5	12.0	0.3
9	0.5	12.0	0.3
10+	0.2	1.6	0.3

Rates of Separation Due to Early Retirement at Any Age		
State Police/ Hazardous Duty	Legislators	Judicial Officers
1.4%	2.7%	0.2%*

* The Judicial Officer rate increases to 1.8% beginning at age 50.

Representative Rates of Separation Due to Retirement other than State Police with 19 or More Years of Credited Service			
Age	State Police/ Hazardous Duty	Legislators	Judicial Officers
50	10.0%	5.0%	N/A
55	10.0	5.0	5.0%
60	19.0	5.0	5.0
65	27.0	11.0	10.0
70	32.0	15.0	100.0
75	32.0	15.0	N/A
80	100.0	100.0	N/A

Actuarial Assumptions (continued)

Rates of Separation due to Retirement for State Police with 19* or More Years of Credited Service			
Years of Service	Rate	Years of Service	Rate
19* – 23	1.0%	30	50.0%
24*	50.0	31 – 32	40.0
25	70.0	33 – 39	50.0
26 – 29	40.0	40+	100.0

* State Police with 19 and 24 years of service at the beginning of the year are assumed to retire at the point they reach 20 and 25 years respectively during the year and to receive the FOP award.

Years of Service Purchased by Eligible Members

Service	Number of Years Purchased
0	0.4
1	0.3
2	0.2
3	0.1
4+	0.0

It is assumed that the member will elect to pay for the reduction through an actuarial debt and that all purchased service is a 2 percent accrual. Under Act 2010-120 and Act 2012-181, the assumed years purchased as shown above were reduced by 9% for Classes A-3 and A-4.

Form of Payment: Members are assumed to elect the maximum benefit 32 percent of the time, some form of joint and survivor annuity 25 percent of the time, and some form of guaranteed present value (including joint and survivor with a guaranteed present value) 43 percent of the time. Also, 80 percent of members are assumed to elect a full Option 4 withdrawal of contributions and interest.

Career Salary Increases

The career salary scale shown on the following page includes average increases in the employee salary due to promotions and longevity growth. The average career salary growth is 2.65 percent per year.

Actuarial Assumptions (continued)

In addition, it is assumed that the salary schedules will increase by 2.9 percent per year. The scale below does not include the assumed 2.9 percent general salary increase.

Career Salary Scale for Members			
Years of Credited Service	**Annual Increase**	**Years of Credited Service**	**Annual Increase**
1	6.00%	16	2.10%
2	4.50	17	2.05
3	4.00	18	2.00
4	3.75	19	1.95
5	3.50	20	1.90
6	3.25	21	1.85
7	3.00	22	1.75
8	2.90	23	1.65
9	2.80	24	1.55
10	2.70	25	1.45
11	2.60	26	1.25
12	2.50	27	1.05
13	2.40	28	0.90
14	2.30	29	0.85
15	2.20	30+	0.80

The above scale does not apply to members in Classes D and E. It is assumed that only the general salary increase (2.9 percent per year) would apply to members in these classes.

Class A-3 and A-4 Assumptions

The following tables are the early and superannuation retirement rates applicable to Class A-3 and A-4 members.

Actuarial Assumptions (continued)

Early Retirement Rates for Class A-3 and Class A-4 Active Employees with 10 or more Years of Service	
Age	**Rate**
35	1.5%
40	1.5
45	1.5
50	2.0
55	5.5
60	5.5
61	6.0
62	20.0
63	10.0
64	15.0
65	N/A

Superannuation Retirement Rates for Class A-3 and Class A-4 Employees	
Age	**Rate**
55	15.0%
56	16.0
57	17.0
58	18.0
59	19.0
60	20.0
61	20.0
62	25.0
63	20.0
64	20.0
65	25.0
66 to 79	20.0
80	100.0

Actuarial Methods

I. Asset Valuation

The actuarial value of assets is developed by recognizing the difference between the expected actuarial value of assets and the market value of assets over a five-year period. The expected actuarial value is last year's actuarial value brought forward to reflect actual contributions, benefit payments and expenses, and assumed investment income. Each year, 20 percent of the difference between this expected value and the market value is recognized in determining the current actuarial value of assets with the remaining 80 percent to be recognized over the next four years.

II. Funding Method

The State Employees' Retirement System's funding policy provides that the actuary determine employer contribution rates that will amortize liabilities over a ten-year or 30-year period beginning with the July following the measurement of the liability. See Section III below for details regarding the specific liabilities subject to amortization and the applicable amortization periods. This policy assures that the SERS is appropriately funded and also that the fund will accumulate sufficient assets to pay benefits when they are due. The policy is set by the State Employees' Retirement Board in conformance with specific legal requirements as to the method of funding.

A variation of the Entry-Age Actuarial Cost Method is used to determine the liabilities and costs related to all SERS' benefits including retirement, withdrawal, death and disability benefits. The significant difference between the method used for SERS and the typical Entry-Age Actuarial Cost Method is that the normal cost is based on the benefits and contributions for new employees rather than for all current employees from their date of entry. SERS' variation should produce approximately the same results as the typical method over the long run.

III. Determination of the Annual Contribution

The annual employer contribution is equal to the sum of the following:

(1) The employer share of the normal cost.
(2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
(3) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
(4) The amortization of legislated benefit changes, including cost-of-living increases, over 10-year periods beginning with the July 1 following the actuarial valuation determining such changes. (Note: There are currently no 10-year amortizations being funded.)
(5) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July 1 following the actuarial valuation determining such changes.

Actuarial Methods (continued)

The amortization payments are level amounts over the remaining applicable amortization period. The employer cost is determined as a percent of compensation, and the employer contributes that percent of the compensation of all covered members during each fiscal year. The pre-collared employer contribution level for fiscal year 2017/2018 is the total of (1) the employer normal cost percent and (2) the net amortization payment for fiscal year 2017/2018 divided by the projected covered compensation for the fiscal year. However, Act 2010-120 established employer contribution collars for the purpose of temporarily limiting the extent of annual increase in the employer contribution rate.

To determine the maximum 2017/2018 employer contribution rate under Act 2010-120, we add the fiscal 2017/2018 contribution collar of 4.5 percent of payroll to the final 2016/2017 employer contribution requirement of 29.50 percent of payroll, to produce a result of 34.00 percent of compensation. The uncollared 2017/2018 employer contribution rate is 33.22 percent, so the collar ceases to apply. Uncollared contribution rates will apply going forward (subject to a minimum employer contribution rate equal to the employer normal cost percent).

The assumptions used in determining the actuarial cost are stated in Schedule N, and the employer cost, as a percent of covered compensation, is determined in Schedules A and B. Except for the 7.25 percent investment return assumption and the 2.60 percent inflation assumption, which were changed for the December 31, 2016 valuation, the assumptions used for the current valuation were based upon an evaluation of SERS experience from 2011 through 2015.

The annual investment return assumption is 7.25 percent compounded annually. Salary growth is the total of assumed increases in salary rates and career salary growth. It is generally assumed that the total payroll will increase at 2.9 percent per year and that employee career salary growth (promotion and longevity growth) will average an additional 2.65 percent per year. Therefore, the average total salary growth for an individual will generally be 5.55 (2.9 plus 2.65) percent per year. The investment return and the salary rate increase assumptions are based on an assumed underlying inflation of 2.60 percent per year.

All costs and liabilities have been determined in conformance with generally accepted actuarial principles and procedures in accordance with the principles of practice prescribed by the Actuarial Standards Board of the American Academy of Actuaries. The calculations were performed on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

Actuarial Methods (continued)

IV. Allocation of the Annual Contribution Among Employer Groups

The annual employer contribution (total employer cost) is expressed as a percentage of the total projected covered compensation for active members. This amount is reflected on Schedule B, line IV, and is referred to as the total employer cost. The total employer cost is the average contribution amount that needs to be received from the employer groups participating in the system. Therefore, some employer groups contribute a higher percent of compensation, and some employer groups contribute a lower percent of compensation.

Schedule C develops the contribution rate for each of the employer groups. The allocation method used to determine the employer rate takes into consideration the cost of additional benefits for special classes of members. For example, the contribution rate for Class E members takes into consideration the additional accrual rate those members receive at retirement. The Base Contribution Rate (column 2 on Schedule C) is determined as the percentage needed to produce employer contribution amounts by class that, when added together, equal the total employer contribution.

The following is an explanation of the elements of Schedule C.

<u>Column (1)</u> is the employer group.

<u>Column (2)</u> is the Base Contribution Rate. The Base Contribution Rate is the amount needed to fund the benefits for Class A-3 (65) members. Because the majority of SERS new entrants will be covered under Class A-3 (65), the 2.0 percent accrual rate for that class is used to determine the base contribution rate.

<u>Column (3)</u> is the additional cost for members who are eligible to retire with unreduced benefits at age 50 or 55. The age 50/55 normal cost is determined for two groups of members: members who can retire at age 50/55 if they have 3 years of credited service, and members who can retire at age 50/55 once they obtain 20 service credits. Park Rangers and Capitol Police fall into the latter category. The additional cost for members who can retire at age 50/55 if they have 3 years of credited service is larger than the additional cost for members who can retire at age 50/55 if they have 20 years of credited service.

<u>Column (4)</u> is the multiplier adjustment to the basic benefit, which is applicable to members in classes that receive a different percent accrual rate than the accrual rate for Class A-3 members. The normal cost is determined for members who would receive the standard 2.0 percent single life annuity set by Act 120 (Class A-3). For example, members in Class AA receive an annuity equal to 1.25 times the standard Class A-3 single life annuity. The multiplier adjustment (Column (4)) for Class AA is 1.4472, which includes the 1.25 multiplier plus some additional adjustments (e.g., differences in superannuation age and limitations on Option 4 withdrawals under Act 120). There currently are no multiplier adjustments less than the 1.0.

Actuarial Methods (continued)

Column (5) is the past-service liability component for certain employee groups. These employee groups were granted benefit improvements that were retroactive at the date of passage and, therefore, cover all credited service for the class. Upon establishment of a benefit improvement it was determined that the employers of the individual employee group, not the Commonwealth, would fund the benefit improvement.

At implementation of the new benefit provision, a liability is established for the members who are eligible for the new benefit provisions, and a schedule is determined to pay off the increase in liability. For example, Park Rangers and Capitol Police Officers were formerly covered under the age 60 retirement provisions. Effective with the valuation at December 31, 1992, Park Rangers and Capitol Police Officers became eligible to retire at age 50 upon attaining 20 years of service (as Park Rangers and Capitol Police Officers). At that valuation, a liability was established that would fund the increase in benefits.

The liability for the increase in benefits for past service is paid off in equal installments by the employers of the member group. Each year, the annual contribution as a percent of payroll is determined as the annual payment divided by the funding payroll for the group. The outstanding balance is carried forward with interest each year.

The following table shows the payment schedule for the two groups of employees who have a past service liability.

Amortization Schedule for Past Liabilities		
Employer Group	**Payment**	**Last Payment (fiscal year beginning)**
State Police	$17,352,103	July 2029
Park Rangers / Capitol Police	$86,057	July 2027

Column (6) is the adjusted contribution rate, and is equal to column (2) plus column (3), multiplied by column (4). Column (5) is added.

Column (7) is the projected compensation for the class of employees. The projected compensation is for the fiscal year to which the contribution rate is applicable.

Column (8) is the dollar amount of the employer group contribution. Except when the base employer contribution rate is zero, the sum of the dollar amounts for each group is (approximately) equal to the total employer contribution (as a percent of covered compensation) multiplied by the total projected covered compensation for the active members.

Actuarial Methods (continued)

V. Plan Provisions Not Valued

The cost effect of two plan provisions was not included in this valuation because the effect of the provisions is minimal. These are the limit on the amount of retirement benefit imposed by Section 5702(c) (100 percent limit) and the supplemental death benefit payable when the retirement benefit is limited by Section 5702(c).

These two provisions are not valued because they only apply to very few SERS members. Since by definition the liability for the supplemental death benefit is lower than the reduction in liability for the 100 percent limit, the net effect of not including these provisions in the actuarial valuation is a minimal overstatement in the total employer cost.

VI. Determination of Present Value of Benefits for Inactive and Vested Members

The present value of benefits for inactive members not currently receiving benefits is determined using the same methods and procedures as for active members. They are valued using the final average compensation and service as of separation and are assumed to begin receiving benefits in accordance with the active employee assumptions.

Glossary

Accrued Service. Service credited under the system, which was rendered before the date of the actuarial valuation.

Active Participants. Active members who are in a position covered by SERS and on payroll, on leave with pay, or on certain unpaid leave (e.g., military leave). Inactive members on leave without pay are also included as active participants if there is an expectation they will return to paid service.

Actuarial Accrued Liability. The portion of the actuarial present value of benefits not provided for by the actuarial present value of future normal costs. Also referred to as Past Service Liability.

Actuarial Assumptions. Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, investment income and salary growth. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the actuarial present value of future benefits between future normal costs and the actuarial accrued liability.

Actuarial Present Value. The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting projected future payments at assumed rates of interest and probabilities of payment.

Amortization. Paying off an amount with periodic payments of interest and principal -- as opposed to paying off with a lump sum payment.

Annuitants. Participants of SERS who are currently receiving benefits for reason of superannuation retirement, early retirement, deferred retirement, or disability retirement.

Beneficiaries and other payment recipients. Beneficiaries, survivors or alternate payees who are receiving benefits as a result of the death of an active member or annuitant or due to a divorce (based upon a domestic relations order).

Funding Payroll. The contribution determinations for the funding of SERS are based on a fiscal year running from July 1 to June 30. The Total Annualized Compensation is adjusted to an appropriate fiscal year Funding Payroll using the salary scale assumption and expected turnover and replacement estimates.

Inactive and Vested Participants. In general, inactive and vested participants are former active members who are not expected to return to paid service in a position covered by SERS. Inactive and vested participants include employees on furlough as well as employees with prior SERS service currently participating in the Pennsylvania Public School Employees' Retirement System (PSERS).

Glossary (continued)

All inactive and vested participants are entitled to either a refund of accumulated deductions from SERS or a monthly benefit. Inactive and vested participants will eventually change statuses; for example, they may terminate non-vested and receive a refund of their accumulated deductions, they may retire and commence annuity payments, they may return to active membership, etc.

Total Annualized Compensation. The Total Annualized Compensation is a snapshot of compensation on December 31. For full-time employees, it is equal to the compensation during the calendar year ending December 31. For part-time employees, compensation is annualized using the current rate of compensation times the appropriate number of pay periods.

Total Normal Cost. The portion of the actuarial present value of future benefits that is allocated to the current year by the actuarial cost method.

Unfunded Actuarial Accrued Liability. The difference between actuarial accrued liability and the actuarial value of assets.

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