October 26, 2017

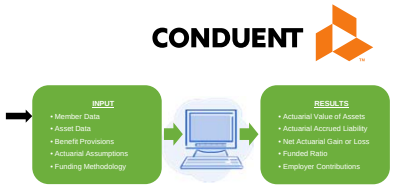
Legislative Retirement System
Principal Results of Actuarial Valuation
as of December 31, 2016

Board of Trustees Meeting
David Driscoll and Mike Ribble

Conduent Human Resource Services

Valuation Input

Membership Data



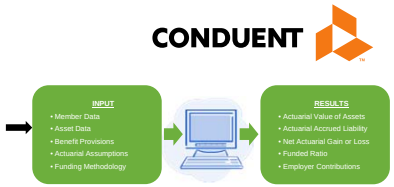
Number as of	12/31/2016	12/31/2015
Active members	170	170
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	91	90
Retired members and survivors of deceased members currently receiving benefits	293	300
Total	554	560
Active Reported Compensation	3,526,412	3,561,167
Active Valuation Compensation	3,706,174	3,708,690
Annual Retirement Allowances	2,293,662	2,338,872

The number of retired members and survivors of deceased members currently receiving benefits decreased by 2.3% from the previous valuation date.

A detailed summary of the membership data used in this valuation is provided in Section 3 and Appendix B of the actuarial report.

Valuation Input

Asset Data: Market Value of Assets



Asset Data as of	12/31/2016	12/31/2015
Beginning of Year Market Value of Assets	$ 26,745,706	$ 28,977,047
Contributions	626,019	216,730
Benefit Payments	(2,353,332)	(2,564,144)
Investment Income	1,586,764	116,073
Net Increase/(Decrease)	(140,549)	(2,231,341)
End of Year Market Value of Assets	$ 26,605,157	$ 26,745,706
Estimated Net Investment Return on Market Value	6.13%	0.42%

The Market Value of Assets is $26.6 million as of December 31, 2016 and was $26.7 million as of December 31, 2015. The investment return for the market value of assets for calendar year 2016 was 6.13%.

A detailed summary of the market value of assets is provided in Section 4 of the actuarial report.

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Valuation Results

Reconciliation of Unfunded Actuarial Accrued Liability (UAAL)

(in millions)		
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2015	$	0.3
Normal Cost during 2016		0.8
Reduction due to Actual Contributions during 2016		(0.6)
Interest on UAAL, Normal Cost, and Contributions		0.0
Asset (Gain)/Loss		0.5
Actuarial Accrued Liability (Gain)/Loss		(0.1)
Impact of Assumption Changes		0.1
Impact of Legislative Changes		0.2
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2016	$	1.2

During 2016, the UAAL increased faster than expected primarily due to asset losses.

The asset loss of $0.5 million means that the asset valuation method resulted in a recognition of $0.5 million of asset losses from 2015 and 2016.

The change in discount rate from the prior valuation of 7.25% to 7.20% increased the unfunded actuarial accrued liability (UAAL), or pension debt, by $0.1 million.

Changes in plan provisions increased the UAAL by $0.2 million.

The net actuarial gain/(loss) is provided in Section 5 of the actuarial report.

Valuation Results

Reconciliation of Actuarially Determined Employer Contribution (ADEC)

Fiscal year ending June 30, 2018 Preliminary ADEC (based on December 31, 2015 valuation)	18.27%
Impact of Legislative Changes*	0.77%
Fiscal year ending June 30, 2018 Final ADEC	19.04%
Change Due to Demographic (Gain)/Loss	0.13%
Change Due to Investment (Gain)/Loss	1.96%
Impact of Assumption Changes	0.61%
Fiscal year ending June 30, 2019 Preliminary ADEC (based on December 31, 2016 valuation)	21.74%

Investment loss is a recognition of asset losses from 2015 and 2016.

* The impact of legislative changes includes the 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017).

A detailed summary of the actuarially determined employer contribution rates is provided in Section 6 of the actuarial report.

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Key Takeaways

Key results of the December 31, 2016 valuation were:

- Market value returns of 6.13% compared to 7.25% assumed
- Decrease in covered payroll of 1.0% compared to approximately 3% expected
- Recent legislation signed into law since the prior valuation
  - 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017)
- Change in discount rate from 7.25% to 7.20% as of December 31, 2016

Key Takeaways (continued)

When compared to the December 31, 2015 valuation, the above resulted in:

- A lower funded ratio (95.9% in the December 31, 2016 valuation compared to 99.0% in the December 31, 2015 valuation)
- A higher actuarially determined employer contribution rate (21.74% for fiscal year ending June 30, 2019 compared to the preliminary contribution rate of 18.27% calculated in the December 31, 2015 valuation for fiscal year ending June 30, 2018)
- Lower projected benefit amounts being accrued by active members

Certification

The assumptions, methods, and plan provisions used in the results presented in this presentation were provided in October 2017 in the "Report on the Actuarial Valuation of the Legislative Retirement System of North Carolina prepared as of December 31, 2016."

The results were prepared under the direction of Michael Ribble and David Driscoll who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about them.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

Michael A. Ribble, FSA, EA, MAAA
Principal, Consulting Actuary

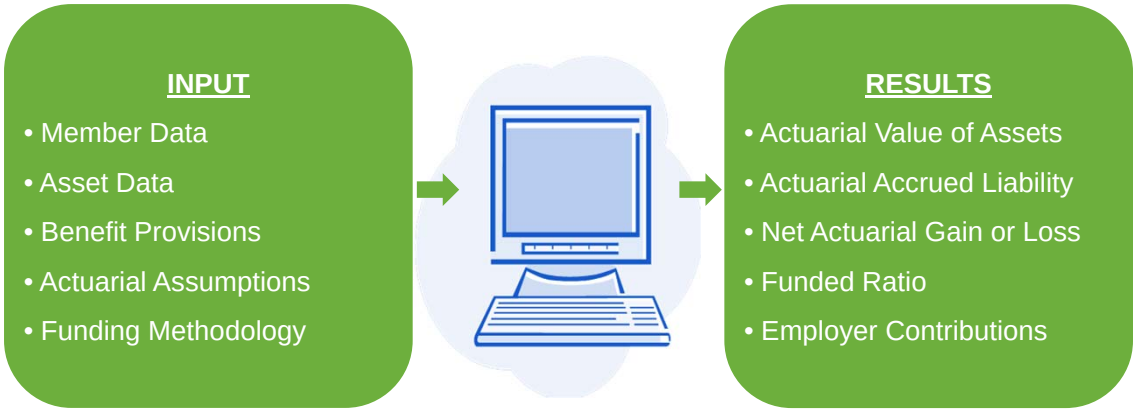
David Driscoll, FSA, EA, MAAA, FCA
Principal, Consulting Actuary

Appendix: Purpose of the Annual Actuarial Valuation

- As of the end of each calendar year:
  - An annual actuarial valuation is performed on LRS
  - The actuary determines the amount of employer contributions to be made to LRS during each member's career that, when combined with investment return and member contributions, such contributions are expected to be sufficient to pay for retirement benefits.
- In addition, the annual actuarial valuation is performed to:
  - Determine the progress on funding LRS
  - Explore why the results of the current valuation differ from the results of the valuation of the previous year
  - Satisfy regulatory and accounting requirements

Appendix: The Valuation Process

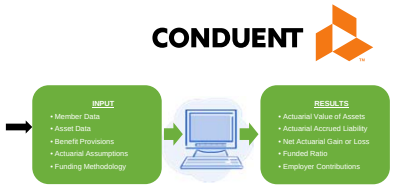
The following diagram summarizes the inputs and results of the actuarial valuation process.



A detailed summary of the valuation process and a glossary of actuarial terms are provided in Appendix A of the actuarial report.

Appendix: Valuation Input

Asset Data: Market Value of Assets and Asset Returns

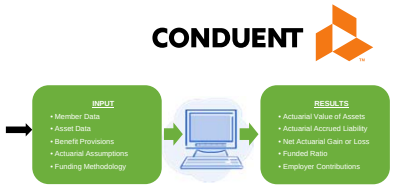


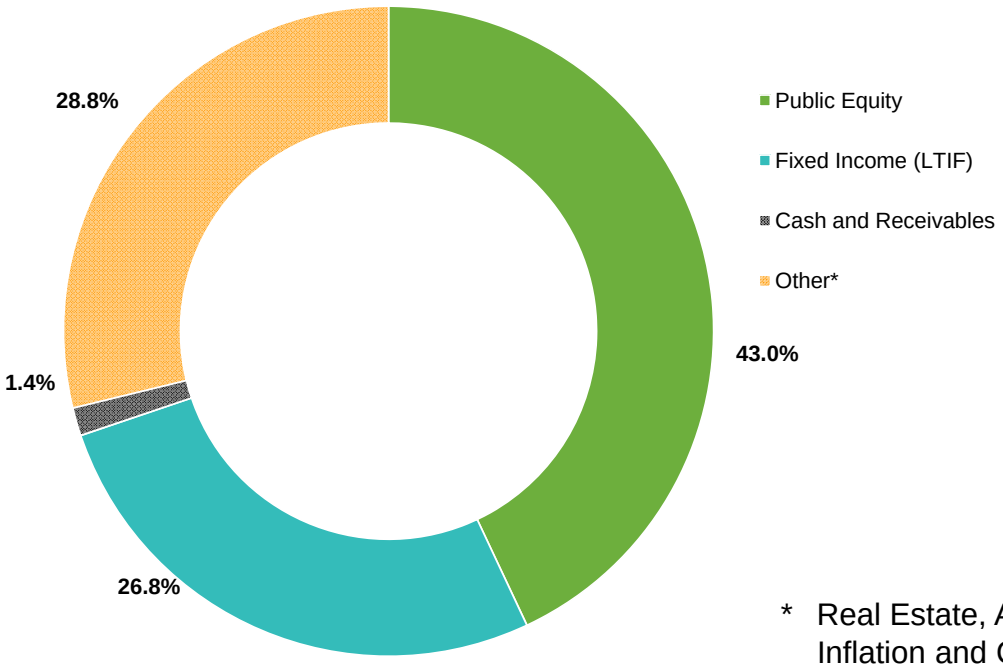
Returns were less than the 7.25% assumed rate of return, resulting in higher contributions and a lower funded ratio than anticipated, all else being equal.

A detailed summary of the market value of assets is provided in Section 4 of the actuarial report.

Appendix: Valuation Input

Asset Data: Allocation of Investments by Category





* Real Estate, Alternatives, Inflation and Credit

Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the last experience study, the 7.20% discount rate used in this valuation is reasonable and appropriate.

A detailed summary of the market value of assets is provided in Section 4 of the actuarial report.

Appendix: Valuation Input

Benefit Provisions

Benefit provisions are described in North Carolina General Statues, Chapter 120.

The valuation reflects the following changes in benefit provisions from the prior year's valuation:

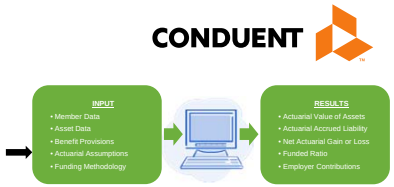
- 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017)

Many Public Sector Retirement Systems in the United States have undergone pension reform where the benefits of members (active or future members) have been reduced.

Because of the well-funded status of LRS due to the legislature contributing the actuarially determined contribution when such contribution is required, benefit cuts have not been needed in North Carolina. Instead, we have seen a modest expansion of benefits this past year based on sound plan design.

Appendix: Valuation Input

Actuarial Assumptions



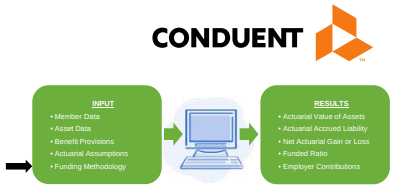
- Demographic (future events that relate to people)
  - Retirement
  - Termination
  - Disability
  - Death
- Economic (future events that relate to money)
  - Interest rate – 7.20% per year
  - Salary increase (individual, varies by service)
- The interest rate was updated from 7.25% to 7.20%

The assumptions used for the December 31, 2016 actuarial valuation are based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016, and a discount rate of 7.20% as adopted by the Board of Trustees on April 20, 2017.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.

Appendix: Valuation Input

Funding Methodology



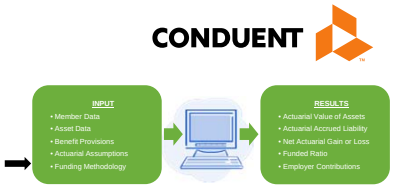
The Funding Methodology is the payment plan for LRS and is composed of the following three components:

- Actuarial Cost Methods allocate costs to the actuarial accrued liability (i.e. the amount of money that should be in the fund) for past service and normal cost (i.e. the cost of benefits accruing during the year) for current service.
  - The Board of Trustees has adopted Entry Age Normal as its actuarial cost method
  - Develops normal costs that stay level as a percent of payroll
- Asset Valuation Methods smooth or average the market value returns over time to alleviate contribution volatility that results from market returns.
  - Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period
  - Assets corridor: not greater than 120% of market value and not less than 80% of market value

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.

Appendix: Valuation Input

Funding Methodology (continued)



- Amortization Methods determine the payment schedule for unfunded actuarial accrued liability (i.e. the difference between the actuarial accrued liability and actuarial value of assets)
  - Payment level: the payment is determined as a level dollar amount, similar to a mortgage payment
  - Payment period: a 12-year closed amortization period was adopted for fiscal year ending 2012. A new amortization base is created each year based on the prior years' experience.

When compared to other Public Sector Retirement Systems in the United States, the funding policy for LRS is quite aggressive in that the policy pays down the pension debt over a much shorter period of time (12 years) compared to the national average of around 24 years. As such it is a best practice in the industry.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.

Appendix: Valuation Results

Actuarial Value of Assets

Asset Data as of	12/31/2016
Beginning of Year Market Value of Assets	$ 26,745,706
Contributions	626,019
Benefit Payments	(2,353,332)
Net Cash Flow	(1,727,313)
Expected Investment Return	1,876,449
Expected End of Year Market Value of Assets	26,894,842
End of Year Market Value of Assets	26,605,157
Excess of Market Value over Expected Market Value of Assets	(289,685)
80% of 2016 Asset Gain/(Loss)	(231,748)
60% of 2015 Asset Gain/(Loss)	(1,139,801)
40% of 2014 Asset Gain/(Loss)	N/A
20% of 2013 Asset Gain/(Loss)	N/A
Total Deferred Asset Gain/(Loss)	(1,371,549)
Preliminary End of Year Actuarial Value of Assets	27,976,706
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	27,976,706
Estimated Net Investment Return on Actuarial Value	5.25%

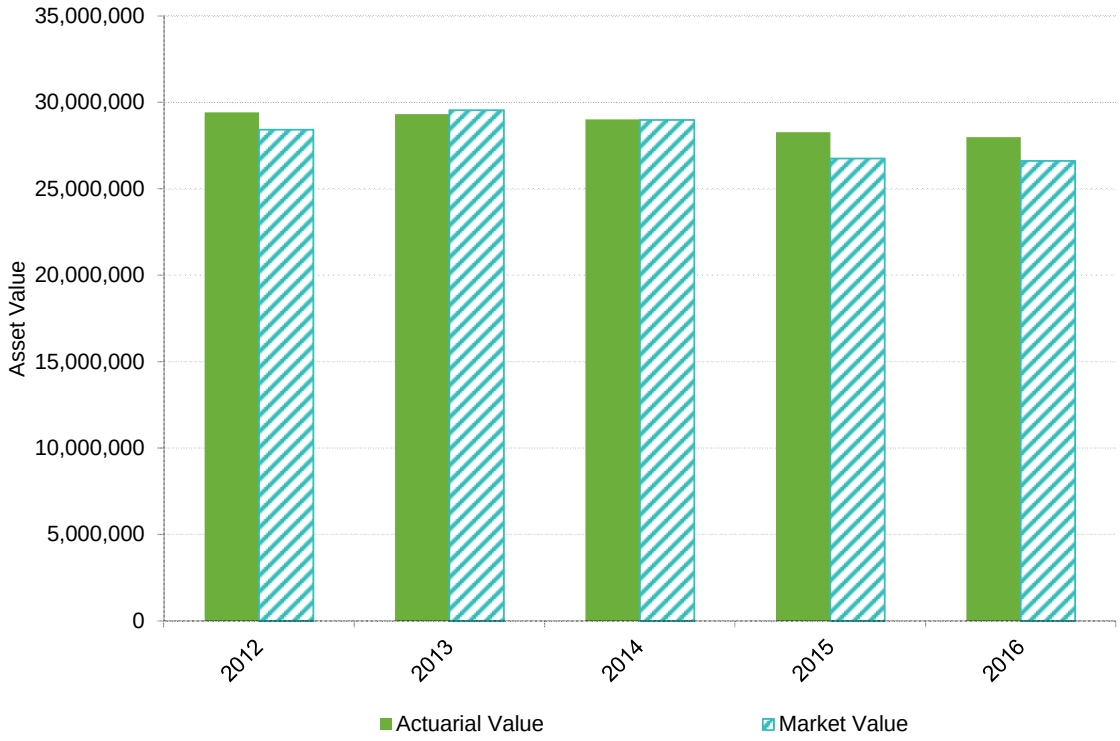
The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution.

Lower than expected market returns in 2015 and 2016 resulted in an actuarial value of asset return for calendar year 2016 of 5.25% and a recognized actuarial asset loss of $0.5 million during 2016.

The actuarial value of assets is provided in Section 4 of the actuarial report.

Appendix: Valuation Results

Actuarial Value of Assets: Compared to Market Value

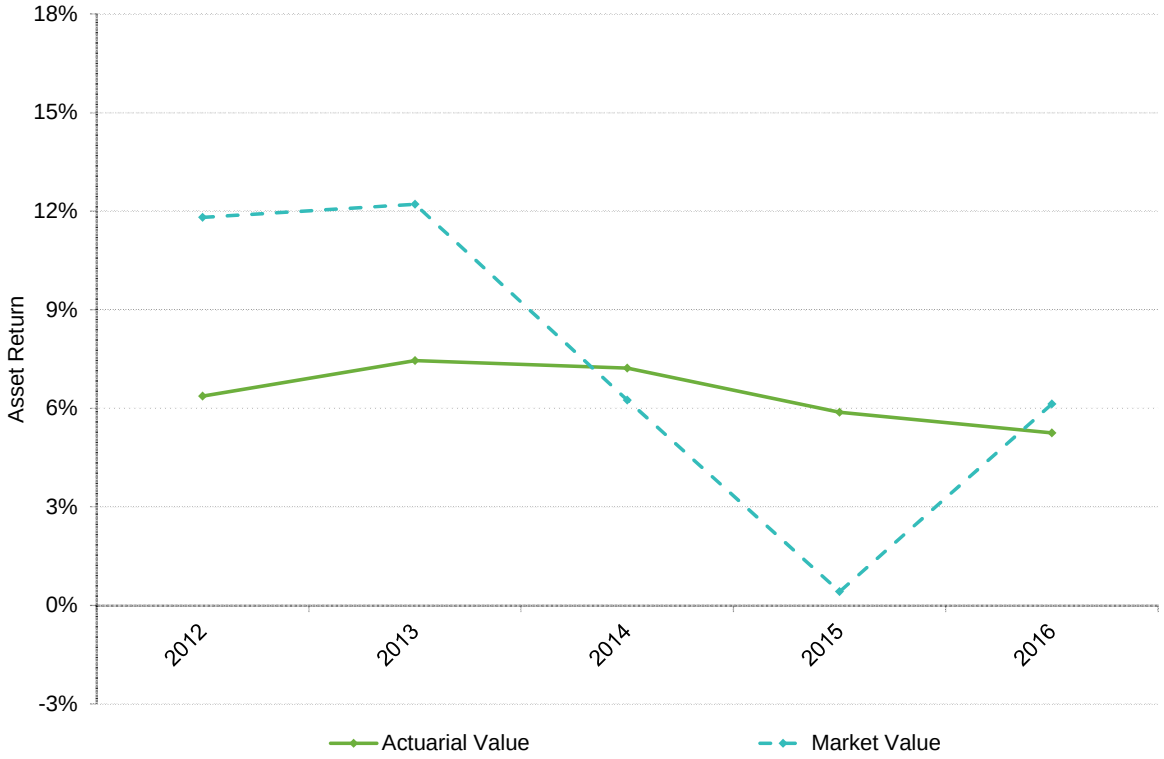


The market value of assets is lower than the actuarial value of assets, which is used to determine employer contributions. This indicates that there are unrecognized asset losses to be recognized in future valuations.

A detailed summary of the actuarial value of assets is provided in Section 4 of the actuarial report.

Appendix: Valuation Results

Asset Returns: Actuarial Value and Market Value

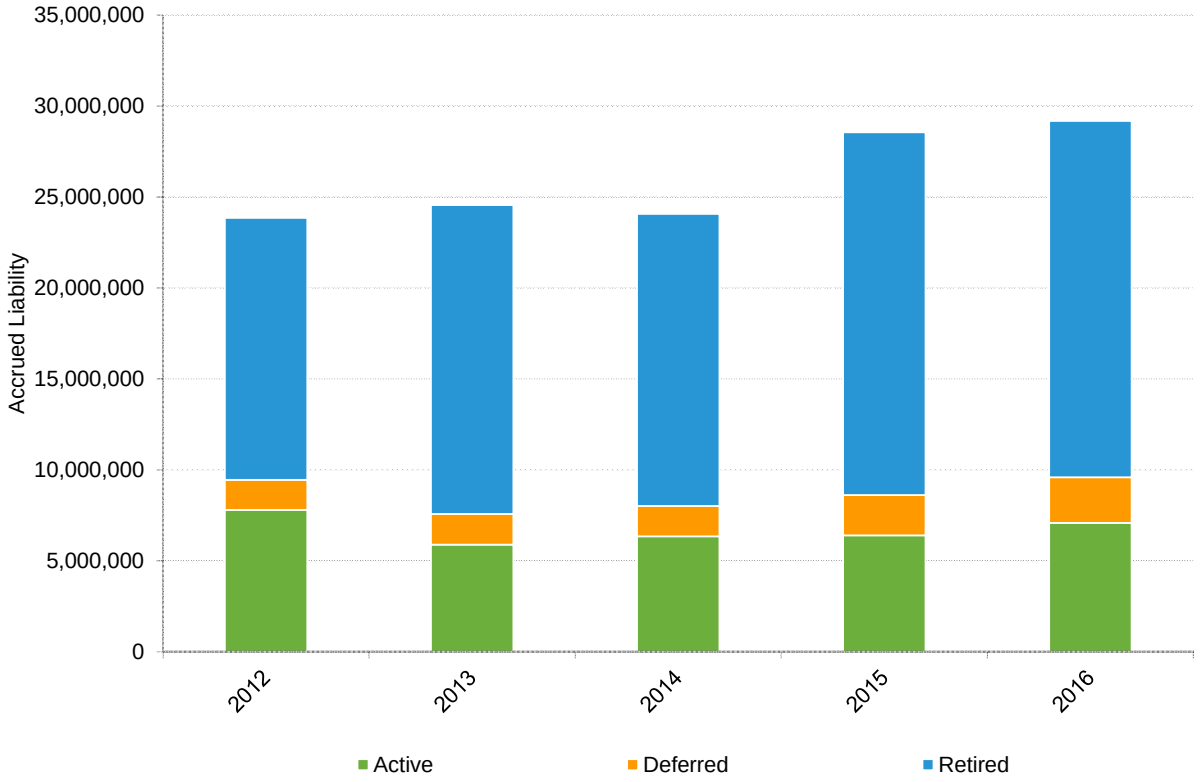


The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution.

A detailed summary of the actuarial value of assets is provided in Section 4 of the actuarial report.

Appendix: Valuation Results

Actuarial Accrued Liability (AAL)



The AAL increased from $28.6 million to $29.2 million during 2016. LRS is an open plan, which means that new members enter the plan each year. In an open plan, liabilities are expected to grow from one year to next as more benefits accrue and the membership approaches retirement.

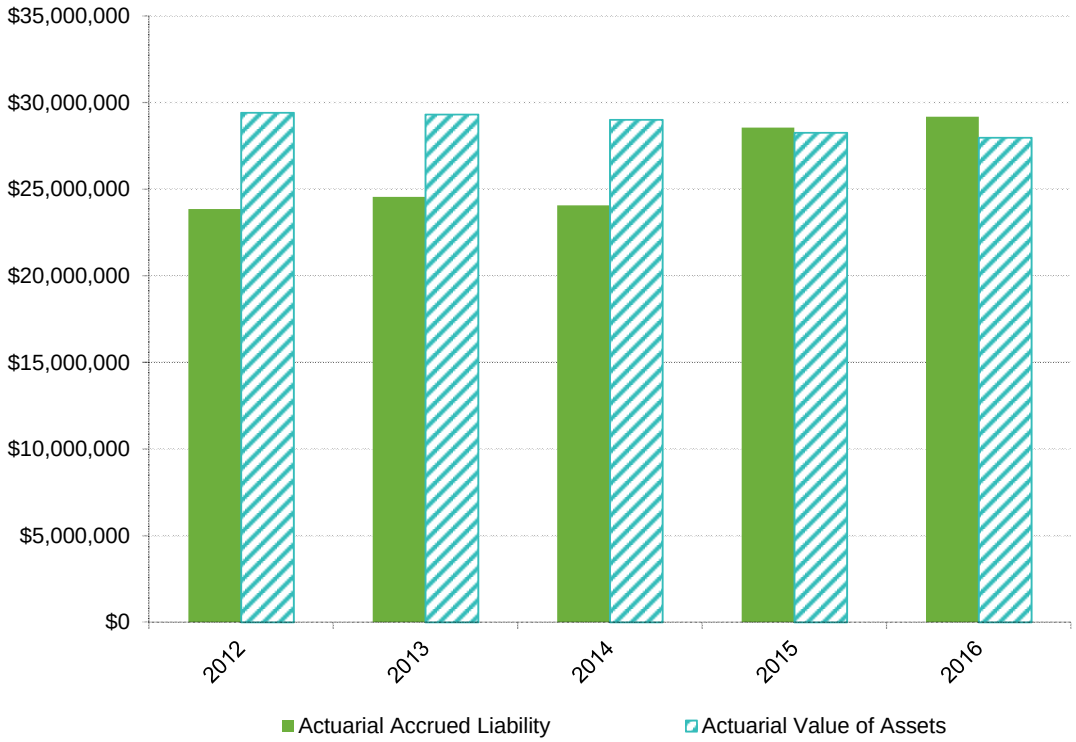
The change in discount rate from the prior valuation of 7.25% to 7.20% increased the AAL by $0.1 million.

Changes in benefit provisions increased the AAL by $0.2 million.

A detailed summary of the AAL is provided in Section 5 of the actuarial report.

Appendix: Valuation Results

Actuarial Accrued Liability (AAL) and Actuarial Value of Assets (AVA)



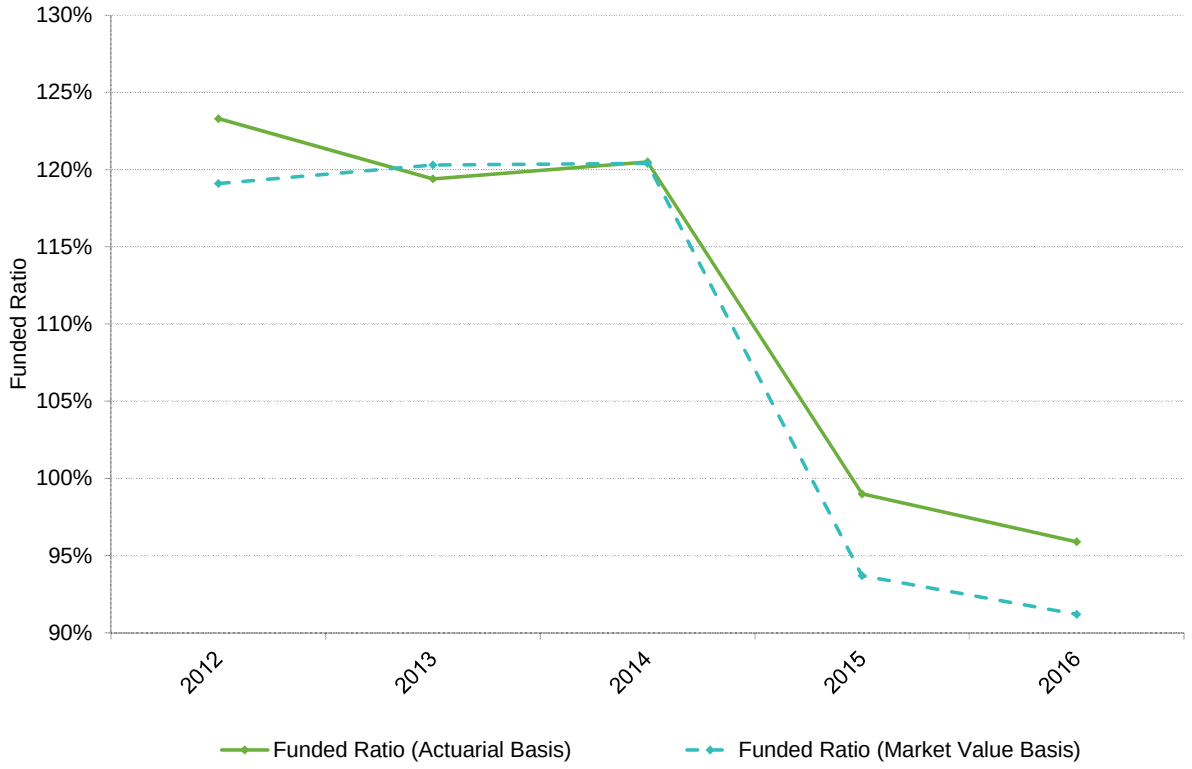
The AVA basis is used for computing contributions to alleviate contribution volatility.

The difference in the AAL and the AVA is the amount of pension debt to be paid off in 12 years.

A detailed summary of the AVA is provided in Section 4 of the actuarial report, and a detailed summary of the AAL is provided in Section 5 of the actuarial report.

Appendix: Valuation Results

Funded Ratio: AAL Divided by AVA



The ratio of assets to liabilities shows the health of the plan on an accrued basis.

The funded ratio on an actuarial basis decreased from 99.0% at December 31, 2015 to 95.9% at December 31, 2016.

Appendix: Valuation Results

Actuarially Determined Employer Contribution

Valuation Date ADEC for Fiscal Year Ending	12/31/2016 6/30/2019	12/31/2015 6/30/2018
Normal Cost Rate Calculation		
(a) Normal Cost	$ 844,659	$ 842,368
(b) Valuation Compensation	$ 3,706,174	$ 3,708,690
(c) Total Normal Cost Rate: (a) / (b)	22.79%	22.71%
(d) Employee Contribution Rate	7.00%	7.00%
(e) Expense Assumption	1.00%	1.00%
(f) Employer Normal Cost Rate: (c) - (d) + (e)	16.79%	16.71%
Disability Benefit Rate Calculation		
(g) Disability Benefit Normal Cost	$ 21,950	$ 23,855
(h) Valuation Compensation	$ 3,706,174	$ 3,708,690
(i) Total Normal Cost Rate: (g) / (h)	0.59%	0.64%
Accrued Liability Rate Calculation		
(j) Unfunded Accrued Liability	$ 1,203,154	$ 291,287
(k) Total Amortization Payments*	$ 161,670	$ 34,108
(l) Valuation Compensation	$ 3,706,174	$ 3,708,690
(m) Accrued Liability Rate: (k) / (l)	4.36%	0.92%
Total ADEC (f) + (i) + (m)	21.74%	18.27%
Impact of Legislative Changes	N/A	0.77%
Final ADEC	N/A	19.04%

The actuarially determined employer contribution rate is the amount needed to pay for the cost of the benefits accruing and to pay off the pension debt over 12 years, offset for the 7% of pay contribution the members make.

The 12-year period is a short period for Public Sector Retirement Systems in the United States, with most Systems using a period of 25 years or more to pay off the pension debt. The shorter period results in higher contributions and more benefit security.

The actuarially determined employer contribution rates are provided in Section 6 of the actuarial report.

Conduent Human Resource Service
Retirement Services

CONDUENT

Legislative Retirement System of North Carolina

Report on the Actuarial Valuation Prepared as of December 31, 2016

October 2017

Document Version: 1.0 (November 2016).

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14911 Quorum Drive
Suite 200
Dallas, TX 75254

P: 972.366.2011

October 13, 2017

Board of Trustees
Legislative Retirement
System of North Carolina
3200 Atlantic Avenue
Raleigh, NC 27604

Members of the Board:

We submit herewith our report on the actuarial valuation of the Legislative Retirement System of North Carolina (referred to as "LRS" or the "Legislative Plan") prepared as of December 31, 2016. The report has been prepared in accordance with North Carolina General Statute 120-4.

The primary purpose of the valuation report is to determine the required member and employer contribution rates, to describe the current financial condition of LRS, and to analyze changes in such condition. In addition, the report provides information that the Office of the State Controller (OSC) requires for its Comprehensive Annual Financial Report (CAFR) and it summarizes census data. Use of this report for any other purposes or by anyone other than OSC and its auditors, or North Carolina Retirement Systems Division and Department of State Treasurer Staff may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. The attached pages should not be provided without a copy of this cover letter. Because of the risk of misinterpretation of actuarial results, you should ask Conduent to review any statement you wish to make on the results contained in this report. Conduent will not accept any liability for any such statement made without prior review.

The valuation is based upon membership data and financial information as furnished by the Retirement Systems Division and the Financial Operations Division and as summarized in this report. Although reviewed for reasonableness and consistency with the prior valuation, these elements have not been audited by Conduent and we cannot certify as to the accuracy and completeness of the data supplied. The valuation is also based on benefit and contribution provisions as presented in this report. If you have reason to believe that the plan provisions are incorrectly described, that important plan provisions relevant to this valuation are not described, or that conditions have changed since the calculations were made, you should contact the authors of this actuarial report prior to relying on this information.

The valuation is further based on the actuarial valuation assumptions, approved by the Board of Trustees, as presented in this report. We believe that these assumptions are appropriate and reasonable and also comply with the requirements of Governmental Accounting Standards Board (GASB) Statement No. 67. We prepared this valuation in accordance with the requirements of this standard and in accordance with all applicable Actuarial Standards of Practice (ASOP).

The assumptions used for the December 31, 2016 actuarial valuation are based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016, and a discount rate of 7.20% as adopted by the Board of Trustees on April 20, 2017. The economic assumptions with respect to investment yield, salary increase and inflation have been based upon a review of the existing portfolio structure as well as recent and anticipated experience.

Where presented, references to "funded ratio" and "unfunded accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities. In various places in the report the results also show funded ratios and unfunded liabilities based upon varying sets of assumptions as well as market values of assets as that is required for certain disclosure information required per accounting rules or statutes. Where this has been done it has been clearly indicated.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Conduent performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information.

I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and I am available to answer questions about it.

Respectfully submitted,

Michael A. Ribble, FSA, EA, MAAA

Principal, Consulting Actuary

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Executive Summary

Overview

The North Carolina Retirement Systems Division (RSD) was established in 1941 to provide retirement benefits for public servants in the State of North Carolina. Today, under the management of the Department of State Treasurer, RSD administers seven public pension plans (defined benefit plans), three supplemental retirement plans (voluntary defined contributions plans), a health trust fund, a disability income plan, death benefit funds and a number of other benefit programs. As of December 31, 2016, the RSD defined benefit plans cover over one million current and prior public servants in the state of North Carolina. During the fiscal year ending June 30, 2017, RSD paid nearly $6.0 billion in pensions to more than 290,000 retirees. And as of June 30, 2017, RSD's assets were valued at almost $94 billion.

Under the supplemental retirement plans, the amount of contributions in any given year is defined by law. The amount of benefits derived is dependent on the investment returns the individual achieves. Conversely, under the pension plans, the amount of the benefit paid to a member upon retirement, termination, death or disability is defined by law. The amount of contributions needed to fund these benefits cannot be known with certainty. In North Carolina, like other states, these contributions are paid during a public servant's career so that upon retirement, termination, death, or disability, there are funds available to pay these benefits. These amounts are determined through an actuarial valuation. Actuarial valuations are performed for each of the pension plans administered by RSD and the results are contained in actuarial valuation reports like this.

The Legislative Retirement System (referred to as "LRS" or the "Legislative Plan") provides benefits to all members of the General Assembly. LRS has almost $27 million in assets and 554 members. This actuarial valuation report is our annual analysis of the financial health of LRS. This report, prepared as of December 31, 2016, presents the results of the actuarial valuation of LRS.

Purpose

An actuarial valuation is performed on LRS annually as of the end of the calendar year. The actuary determines the amount of contributions to be made to LRS during each member's career that, when combined with investment return, will be sufficient to pay for retirement benefits.

In addition, the annual actuarial valuation is performed to:

- Determine the progress on funding LRS,
- Explore why the results of the current valuation differ from the results of the valuation of the previous year, and
- Satisfy regulatory and accounting requirements.

A detailed summary of the valuation process and a glossary of actuarial terms are provided in Appendix A.

Executive Summary (continued)

Key Takeaways

The actuarial valuation is performed each year to replace the estimates the actuary assumed for the prior valuation with the actual events that happened. This past year, as expected, some of the assumptions used in the prior valuation were not realized. Key results of the December 31, 2016 valuation were:

- Market value returns of 6.13% compared to 7.25% assumed
- Decrease in covered payroll of 1.0% compared to approximately 3% increase expected
- Recent legislation signed into law since the prior valuation:
    - 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017)
- Change in discount rate from 7.25% to 7.20% as of December 31, 2016

When compared to the December 31, 2015 valuation, the above resulted in:

- Lower funded ratio (95.9% in the December 31, 2016 valuation compared to 99.0% in the December 31, 2015 valuation)
- Higher actuarially determined employer contribution rate (21.74% for fiscal year ending June 30, 2019 compared to the preliminary contribution rate of 18.27% calculated in the December 31, 2015 valuation for fiscal year ending June 30, 2018)
- Lower projected benefit amounts being accrued by active members

LRS is well funded compared to its peers. This is due to:

- Stakeholders working together to keep LRS well-funded since inception
- A history of appropriating and contributing the recommended contribution requirements
- Assumptions that in aggregate are more conservative than peers
- A funding policy that aggressively pays down unfunded liability
- An ad hoc cost-of-living adjustment that supports the health of the system
- Modest changes in benefits when compared to peers

Continued focus on these measures will be needed to maintain the solid status of LRS well into the future.

More details can be found later in this report. We encourage readers to start with Sections 1 and 2 and refer to other sections for additional details as needed.

Section 1: Principal Results

This report, prepared as of December 31, 2016, presents the results of the actuarial valuation of the system. The principal results of the valuation and a comparison with the preceding year's results are summarized below.

Table 1: Summary of Principal Results

Valuation results as of	12/31/2016	12/31/2015
Active Members		
Number	170	170
Reported Compensation	$ 3,526,412	$ 3,561,167
Valuation Compensation*	$ 3,706,174	$ 3,708,690
Retired Members and Survivors of Deceased Members Currently Receiving Benefits		
Number	293	300
Annual Allowances	$ 2,293,662	$ 2,338,872
Assets		
Actuarial Value (AVA)	$ 27,976,706	$ 28,265,441
Market Value	$ 26,605,157	$ 26,745,706
Actuarial Accrued Liability (AAL)	$ 29,179,860	$ 28,556,728
Unfunded Accrued Liability (AAL-AVA)	$ 1,203,154	$ 291,287
Funded Ratio (AVA/AAL)**	95.9%	99.0%
Results for Fiscal Year Ending	**6/30/2019**	**6/30/2018**
Actuarially Determined Employer Contribution (ADEC) of employer, as a percentage of payroll		
Normal Cost	16.79%	16.71%
Disability Benefit	0.59%	0.64%
Accrued Liability	4.36%	0.92%
Total	21.74%	18.27%
Impact of Legislative Changes	N/A	0.77%
Final ADEC	N/A	19.04%
Appropriations Act for Fiscal Year Ending	**6/30/2018**	**6/30/2017**
Employer Contribution Rate as a percentage of payroll		
Normal Cost	16.79%	16.71%
Disability Benefit	0.59%	0.64%
Accrued Liability	1.66%	0.87%
Total	19.04%	18.22%
Preliminary Reserve for Undistributed Gains/(Losses)	(2.70)%	(0.05)%

* Reported compensation adjusted to reflect the assume rate of pay increase prior to the valuation date.
** The Funded Ratio on a Market Value of Assets basis is 91.2% at December 31, 2016.

Section 2: Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process.

A more detailed description of the valuation process is provided in Appendix A.

Valuation Input: Membership Data

As with any estimate, the actuary collects information that we know now. Under the actuarial valuation process, current information about LRS members is collected annually by the Retirement Systems Division staff at the direction of the actuary. Membership data will assist the actuary in estimating benefits that could be paid in the future. Information about benefit provisions and assets held in the trust as of the valuation date is also collected.

The member information the actuary collects includes data elements such as current service, salary and benefit group identifier for members that have not separated service, and actual benefit amounts and form of payment for members that have separated service. Data elements such as gender and date of birth are used to determine when a benefit might be paid and for how long.

Section 2: Valuation Process

Valuation Input: Membership Data (continued)

The table below provides a summary of the membership data used in this valuation compared to the prior valuation.

Number as of	12/31/2016	12/31/2015
Active members	170	170
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	91	90
Retired members and survivors of deceased members currently receiving benefits	293	300
Total	554	560
Active Reported Compensation	3,526,412	3,561,167
Active Valuation Compensation	3,706,174	3,708,690
Annual Retirement Allowances	2,293,662	2,338,872

Commentary: The number of retired members and survivors of deceased members currently receiving benefits decreased by 2.3% from the previous valuation date.

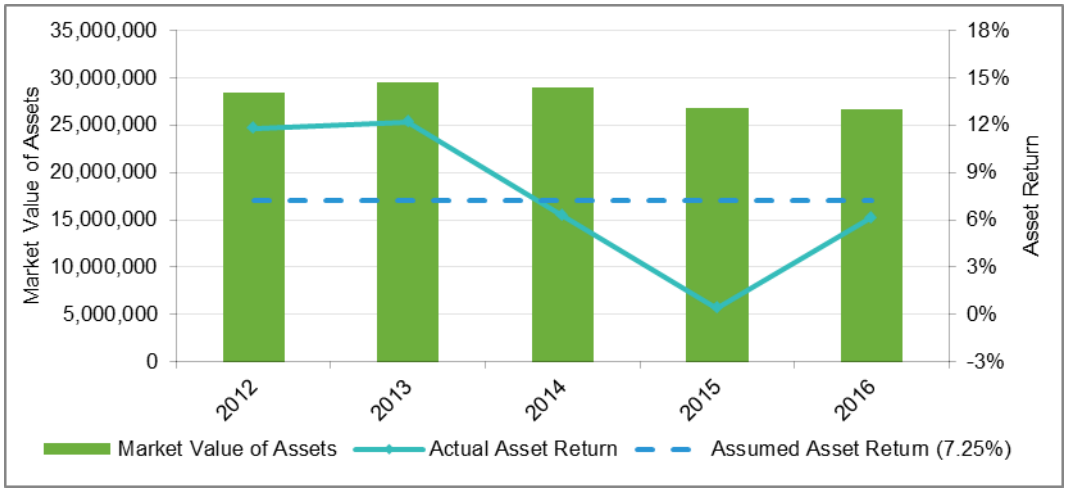
Section 2: Valuation Process

Valuation Input: Asset Data

LRS assets are held in trust and are invested for the exclusive benefit of plan members. The Market Value of Assets is $26.6 million as of December 31, 2016 and $26.7 million as of December 31, 2015. The investment return for the market value of assets for calendar year 2016 was 6.13%.

Graph 1: Market Value of Assets and Asset Returns

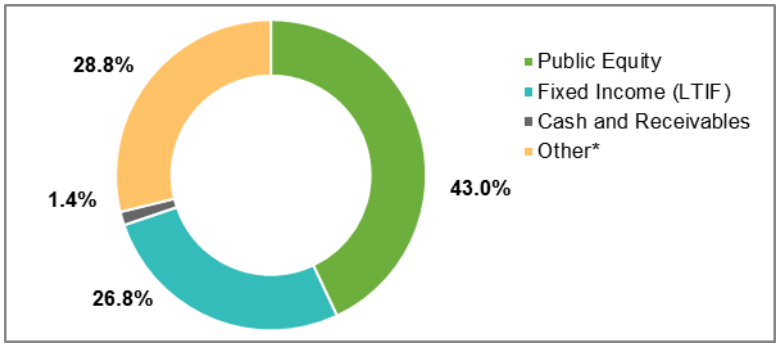
The graph below provides a history of the market value of assets and asset returns over the past five years.



Commentary: Returns were less than the 7.25% assumed rate of return, resulting in higher contributions and lower funded ratio than anticipated, all else being equal.

Graph 2: Allocation of Investments by Category

The graph below provides the breakdown of the market value of assets at December 31, 2016 by asset category.



* Real Estate, Alternatives, Inflation and Credit

Commentary: Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the last experience study, the 7.20% discount rate used in this valuation is reasonable and appropriate.

A detailed summary of the market value of assets is provided in Section 4 of this report.

Section 2: Valuation Process

Valuation Input: Benefit Provisions

Benefit provisions are described in North Carolina General Statues, Chapter 120.

The valuation reflects the following change in benefit provisions from the prior year's valuation.

- 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017)

Highlights of the benefit provisions are described below.

- An unreduced retirement allowance is payable to members who retire from service after attaining age 65 and five years of creditable service
- The unreduced retirement allowance is equal to 4.02% of a member's highest annual compensation multiplied by the number of years of creditable service
- A reduced retirement allowance is payable to members who retire from service:
  - after attaining age 50 and 20 years of creditable service; or
  - after attaining age 60 and five years of creditable service
- Ancillary benefits are also payable upon the death or disability of a member
- LRS does not provide for explicit cost of living increases as part of the benefit package. Instead, increases may be provided if certain financial conditions are met and/or the legislature passes a budget that provides for a cost-of-living adjustment

Commentary: Many Public Sector Retirement Systems in the United States have undergone pension reform where the benefits of members (current retirees and active or future members) have been reduced. Because of the well-funded status of LRS due to the legislature contributing the actuarially determined employer contribution when such contribution is required, benefit cuts have not been needed in North Carolina as they have been in most other states. Instead, we have seen a modest expansion of benefits in recent years based on sound plan design. However, if North Carolina's investment policy shifts substantively, the system should review likely impacts of the shift and consider corresponding changes to actuarial assumptions, funding policy and/or benefit levels.

A detailed summary of the benefit provisions is provided in Appendix C of this report.

Valuation Input: Actuarial Assumptions

Actuarial assumptions bridge the gap between the information that we know with certainty as of the valuation date (age, gender, service, pay, and benefits of the members) and what may happen in the future. The actuarial assumptions of LRS are reviewed at least every five years. Based on this review, the actuary will make recommendations on the demographic and economic assumptions.

Demographic assumptions describe future events that relate to people such as retirement rates, termination rates, disability rates, and mortality rates. Economic assumptions describe future events that relate to the assets of LRS such as the interest rate, salary increases, the real return, and payroll growth.

Section 2: Valuation Process

The assumptions used for the December 31, 2016 actuarial valuation are based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016. The discount rate was updated to be 7.20% as adopted by the Board of Trustees on April 20, 2017.

Valuation Input: Funding Methodology

The Funding Methodology is the payment plan for LRS and is composed of the following three components:

- Actuarial Cost Methods allocate costs to the actuarial accrued liability (i.e. the amount of money that should be in the fund) for past service and normal cost (i.e. the cost of benefits accruing during the year) for current service.
  - The Board of Trustees has adopted Entry age Normal as its actuarial cost method
  - Develops normal costs that stay level as a percent of payroll
- Asset Valuation Methods smooth or average the market value returns over time to alleviate contribution volatility that results from market returns.
  - Asset return in excess of or less than the expected return on market value of assets reflected over a five-year period
  - Assets corridor: not greater than 120% of market value and not less than 80% of market value
- Amortization Methods determine the payment schedule for unfunded actuarial accrued liability (i.e. the difference between the actuarial accrued liability and actuarial value of assets)
  - Payment level: the payment is determined as a level dollar amount, similar to a mortgage payment
  - Payment period: a 12-year closed amortization period was adopted for fiscal year ending 2018. A new amortization base is created each year based on the prior year's experience.

When compared to other Public Sector Retirement Systems in the United States, the funding policy for LRS is quite aggressive in that the policy pays down the pension debt over a much shorter period of time (12 years) compared to the national average of around 24 years. As such it is a best practice in the industry.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of this report.

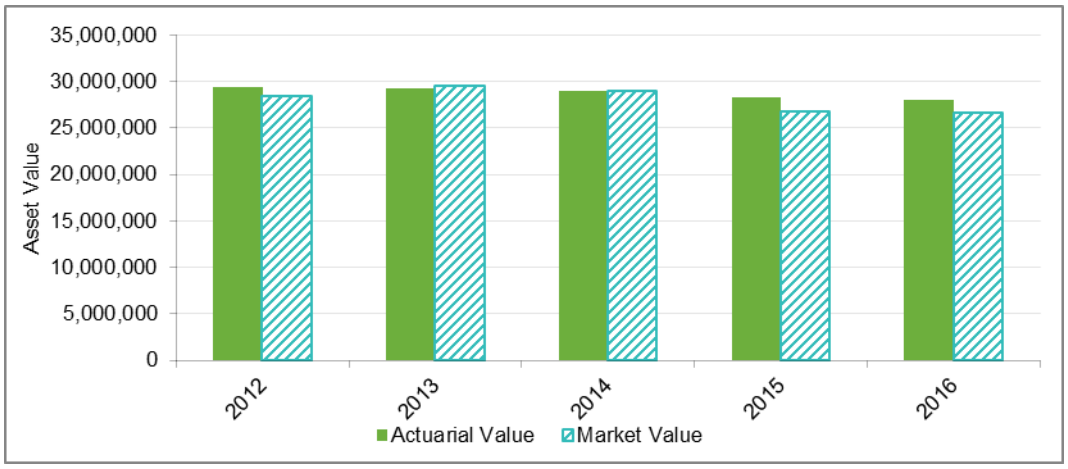
Section 2: Valuation Process

Valuation Results: Actuarial Value of Assets

In order to reduce the volatility that investment gains and losses can have on required contributions and funded status of LRS, the Board adopted an asset valuation method to determine the Actuarial Value of Assets used for funding purposes. The Actuarial Value of Assets is $28.0 million as of December 31, 2016 and $28.3 million as of December 31, 2015.

Graph 3: Actuarial Value and Market Value of Assets

The graph below provides a history of the market value and actuarial value of assets over the past five years.



Commentary: The market value of assets is lower than the actuarial value of assets, which is used to determine employer contributions. This indicates that there are unrecognized asset losses to be recognized in future valuations.

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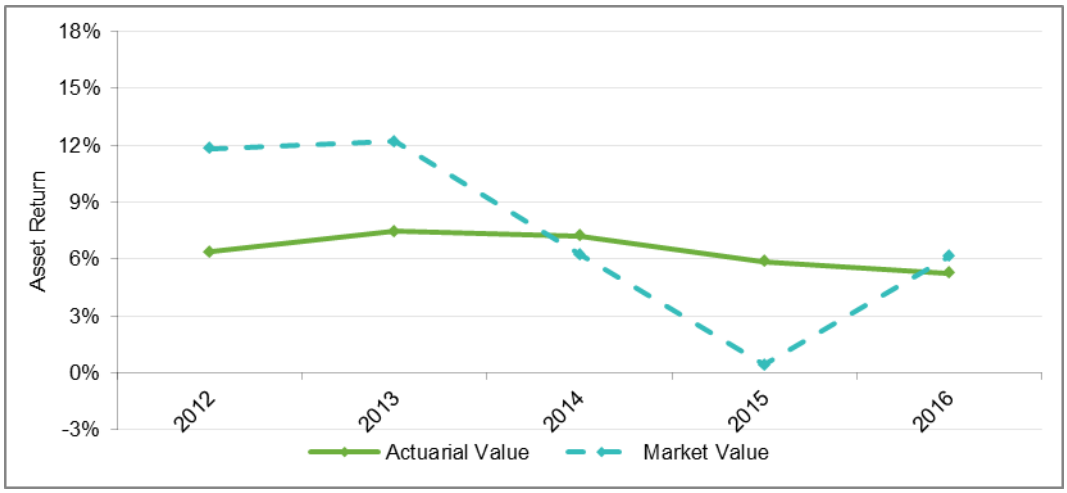
Section 2: Valuation Process

Valuation Results: Actuarial Value of Assets (continued)

Graph 4: Asset Returns

The graph below provides a history of the market value and actuarial value of asset returns over the past five years.



Commentary: The investment return for the market value of assets for calendar year 2016 was 6.13%. The actuarial value of assets smoothes investment gains and losses. Lower than expected market returns in 2015 and 2016 resulted in an actuarial value of asset return for calendar year 2016 of 5.25% and a recognized actuarial asset loss of $0.5 million during 2016.

A detailed summary of the Actuarial Value of Assets is provided in Section 4 of this report.

Section 2: Valuation Process

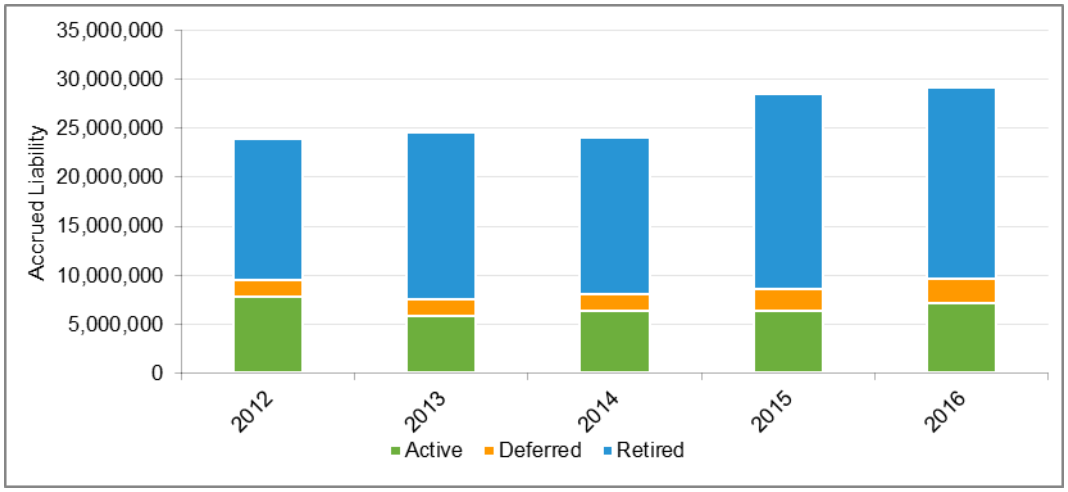
Valuation Results: Actuarial Accrued Liability

Using the provided membership data, benefit provisions, and actuarial assumptions, the future benefit payments of LRS are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of LRS. The PVFB is an estimate of the current value of the benefits promised to all members as of a valuation date.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), normal cost (NC) and present value of future normal costs (PVFNC). The AAL is also referred to as the amount of money LRS should ideally have in the trust. The NC is also referred to as the cost of benefits accruing during the year.

Graph 5: Actuarial Accrued Liability

The graph below provides a history of the actuarial accrued liability over the past five years.



Commentary: The AAL increased from $28.6 million to $29.2 million during 2016. LRS is an open plan, which means that new members enter the plan each year. In an open plan, liabilities are expected to grow from one year to next as more benefits accrue and the membership approaches retirement. Assumption changes increased the AAL by $0.1 million. Legislation increased the AAL by $0.2 million.

A detailed summary of the AAL is provided in Section 5 of this report.

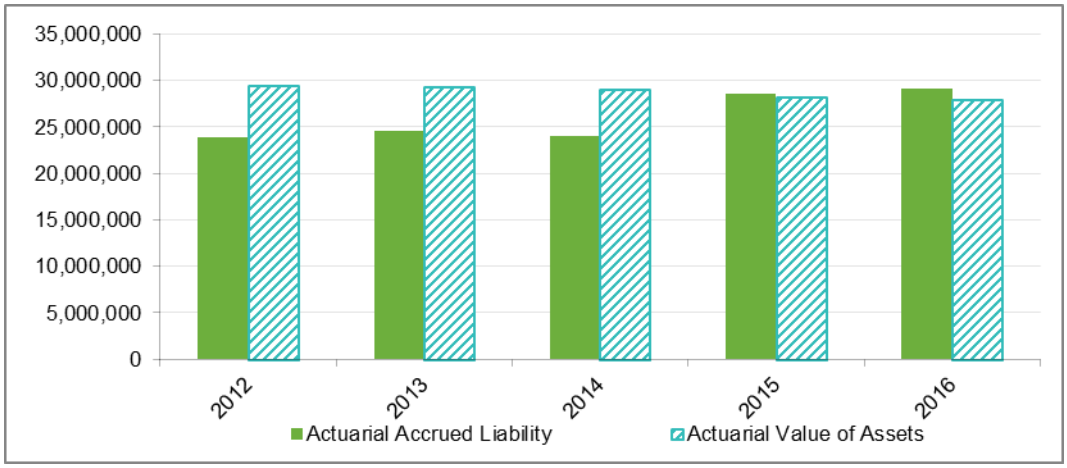
Section 2: Valuation Process

Valuation Results: Funded Ratio

The funded ratio is a measure of the progress that has been made in funding the plan as of the valuation date. It is the ratio of how much money LRS actually has in the fund to the amount LRS should have in the fund.

Graph 6: Actuarial Accrued Liability and Actuarial Value of Assets

The graph below provides a history of the actuarial accrued liability and actuarial value of assets over the past five years.



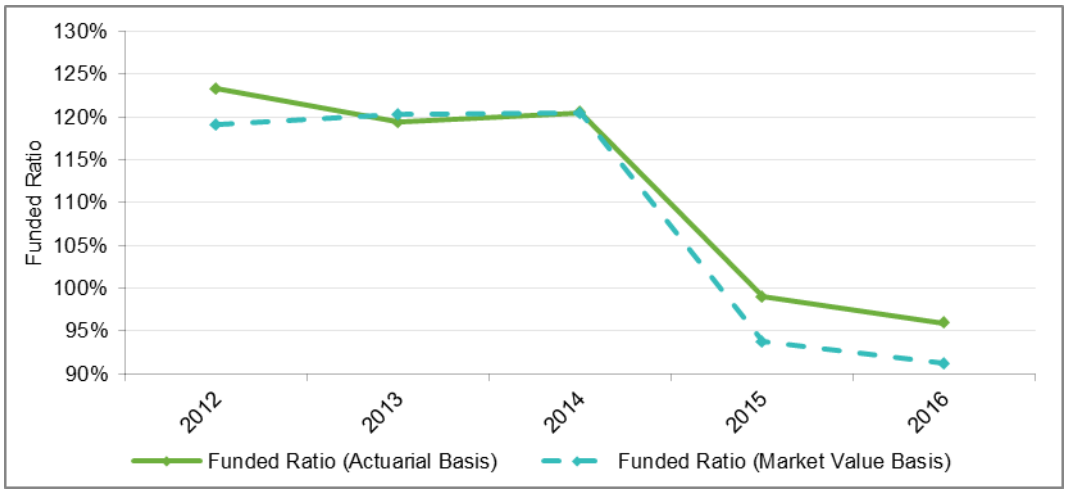
Commentary: The actuarial value of assets basis is used for computing contributions to alleviate contribution volatility. The difference in the actuarial accrued liability and the actuarial value of assets is the amount of pension debt to be paid off in 12 years.

Section 2: Valuation Process

Valuation Results: Funded Ratio (continued)

Graph 7: Funded Ratios

The graph below provides a history of the funded ratio on a market and actuarial basis over the past five years.



Commentary: The ratio of assets to liabilities shows the health of the plan on an accrued basis. The funded ratio on an actuarial basis decreased from 99.0% at December 31, 2015 to 95.9% at December 31, 2016.

Section 2: Valuation Process

Valuation Results: Employer Contributions

G.S. 120-4.20 provides that the contributions of employers shall consist of a normal contribution and an accrued liability contribution.

The December 31, 2015 valuation suggested that the preliminary total employer contribution rate be set at 18.27% of payroll for the fiscal year ending June 30, 2018. Subsequently, the 2017 Appropriations Act (Session Laws 2017-57) set contributions at 19.04% of payroll effective for the fiscal year ending June 30, 2018, in order to account for recent legislation passed into law. As a result of this December 31, 2016 valuation, the preliminary actuarially determined employer contribution rate is 21.74% of payroll for the fiscal year ending June 30, 2019, subject to the impact of any future legislative changes effective during that fiscal year. On this basis, there is no preliminary reserve from undistributed gains that could be used for a cost-of-living adjustment or other benefit improvements.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 6 of this report.

Valuation Results: Accounting Information

The Governmental Account Standards Board (GASB) issues statements which establish financial reporting standards for defined benefit pension plans and accounting for pension expenditures and expenses for governmental employers.

The valuation has been prepared in accordance with the parameters of Statement No. 67 of the GASB and all applicable Actuarial Standards of Practice. The Net Pension Liability (Asset) under GASB 67 for the fiscal year ending June 30, 2017, is $1,721,000 (compared to $2,233,000 for fiscal year ending June 30, 2016). The required financial reporting information for the Retirement System under GASB No. 67 can be found in Section 7 of this report.

Section 3: Membership Data

The Retirement Systems Division provided membership data as of the valuation date for each member of LRS. The membership data assists the actuary in estimating benefits that could be paid in the future. The tables below provide a summary of the membership data used in this valuation. Detailed tabulations of data are provided in Appendix B.

Table 2: Active Member Data

	Member Count	Average Age	Average Service	Reported Compensation
Male	131	58.21	6.52	$ 2,740,918
Female	39	63.61	7.58	785,494
Total	170	59.45	6.76	$ 3,526,412

Table 3: Vested Terminated Member Data

	Member Count	Average Age	Average Service	Deferred Retirement Allowance
Male	36	56.45	9.82	$ 306,642
Female	9	54.47	9.54	71,284
Total	45	56.05	9.76	$ 377,926

The table above includes terminated members entitled to retirement benefits but not yet receiving benefits.

Section 3: Membership Data

Table 4: Non-Vested Terminated Member Data

	Member Count	Average Age	Average Service	Accumulated Contributions
Male	39	55.01	2.89	$ 221,246
Female	7	54.48	2.10	29,949
Total	46	54.93	2.77	$ 251,195

The table above includes non-vested terminated members who have not received a refund of contributions.

Table 5: Data for Members Currently Receiving Benefits

	Member Count	Average Age	Annual Retirement Allowances
Retired Members (Healthy at Retirement)			
Male	181	77.34	$ 1,485,582
Female	50	77.16	426,910
Total	231	77.30	$ 1,912,492
Survivors of Deceased Members			
Male	3	74.69	$ 21,199
Female	59	77.43	359,971
Total	62	77.30	$ 381,170
Grand Total	293	77.30	$ 2,293,662

Section 4: Asset Data

Assets are held in trust and are invested for the exclusive benefit of LRS members. The tables below provide the details of the Market Value of Assets for the current and prior years' valuations.

Table 6: Market Value of Assets

Asset Data as of	12/31/2016	12/31/2015
Beginning of Year Market Value of Assets	$ 26,745,706	$ 28,977,047
Contributions	626,019	216,730
Benefit Payments	(2,353,332)	(2,564,144)
Investment Income	1,586,764	116,073
Net Increase/(Decrease)	(140,549)	(2,231,341)
End of Year Market Value of Assets	$ 26,605,157	$ 26,745,706
Estimated Net Investment Return on Market Value	6.13%	0.42%

Table 7: Allocation of Investments by Category of the Market Value of Assets

Asset Data as of	12/31/2016	12/31/2015
Allocation by Dollar Amount		
Public Equity	$ 11,448,002	$ 11,387,201
Fixed Income (LTIF)	7,119,224	7,544,319
Cash and Receivables	374,653	475,149
Other*	7,663,278	7,339,037
Total Market Value of Assets	$ 26,605,157	$ 26,745,706
Allocation by Percentage of Asset Value		
Public Equity	43.0%	42.6%
Fixed Income (LTIF)	26.8%	28.2%
Cash and Receivables	1.4%	1.8%
Other*	28.8%	27.4%
Total Market Value of Assets	100.0%	100.0%

***** Real Estate, Alternatives, Inflation and Credit

Section 4: Asset Data

In order to reduce the volatility that investment gains and losses can have on the required contributions and funded status of LRS, the Board adopted an asset valuation method to determine the Actuarial Value of Assets used for funding purposes. The table below provides the calculation of the Actuarial Value of Assets at the valuation date.

Table 8: Actuarial Value of Assets

Asset Data as of	12/31/2016
Beginning of Year Market Value of Assets	$ 26,745,706
Contributions	626,019
Benefit Payments	(2,353,332)
Net Cash Flow	(1,727,313)
Expected Investment Return	1,876,449
Expected End of Year Market Value of Assets	26,894,842
End of Year Market Value of Assets	26,605,157
Excess of Market Value over Expected Market Value of Assets	(289,685)
80% of 2016 Asset Gain/(Loss)	(231,748)
60% of 2015 Asset Gain/(Loss)	(1,139,801)
40% of 2014 Asset Gain/(Loss)	N/A
20% of 2013 Asset Gain/(Loss)	N/A
Total Deferred Asset Gain/(Loss)	(1,371,549)
Preliminary End of Year Actuarial Value of Assets	27,976,706
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	27,976,706
Estimated Net Investment Return on Actuarial Value	5.25%

Commentary: The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution. The asset valuation method recognizes asset returns in excess of or less than the expected return on the market value of assets over a five-year period. Actuarial value of assets was reset to the market value of assets at December 31, 2014.

Lower than expected market returns in 2015 and 2016 resulted in an actuarial value of asset return for calendar year 2016 of 5.25% and a recognized actuarial asset loss of $0.5 million during 2016.

Section 5: Liability Results

Using the provided membership data, benefit provisions, and actuarial assumptions, the future benefit payments of LRS are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits. The Present Value of Future Benefits is allocated to past, current and future service, respectively known as the actuarial accrued liability, normal cost and present value of future normal costs. The table below provides these liability numbers for the current and prior years' valuations.

Table 9: Liability Summary

Valuation Results as of	12/31/2016	12/31/2015
(a) Present Value of Future Benefits		
(1) Active Members	$ 12,498,444	$ 12,020,392
(2) Terminated Members	2,502,807	2,221,225
(3) Members Currently Receiving Benefits	19,595,683	19,944,862
(4) Total	$ 34,596,934	$ 34,186,479
(b) Present Value of Future Normal Costs	$ 5,417,074	$ 5,629,751
(c) Actuarial Accrued Liability: (a4) - (b)	$ 29,179,860	$ 28,556,728
(d) Actuarial Value of Assets	$ 27,976,706	$ 28,265,441
(e) Unfunded Accrued Liability: (c) - (d)	$ 1,203,154	$ 291,287

Section 5: Liability Results

The table below provides a reconciliation of the prior year's unfunded actuarial accrued liability to the current year's unfunded actuarial accrued liability.

Table 10: Reconciliation of Unfunded Actuarial Accrued Liability

(in millions)	
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2015	$ 0.3
Normal Cost during 2016	0.8
Reduction due to Actual Contributions during 2016	(0.6)
Interest on UAAL, Normal Cost, and Contributions	0.0
Asset (Gain)/Loss	0.5
Actuarial Accrued Liability (Gain)/Loss	(0.1)
Impact of Assumption Changes	0.1
Impact of Legislative Changes	0.2
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2016	$ 1.2

Commentary: During 2016, the UAAL increased faster than expected primarily due to asset losses. The change in discount rate from the prior valuation of 7.25% to 7.20% increased the unfunded actuarial accrued liability (UAAL), or pension debt, by $0.1 million. Additionally, changes in plan provisions increased the UAAL by $0.2 million.

Section 6: Actuarially Determined Employer Contribution

The actuarially determined employer contribution consists of a normal cost rate and an accrued liability rate. The normal cost rate is the employer's portion of the cost of benefits accruing during the year after reducing for the member contribution. The accrued liability rate is the payment toward the unfunded accrued liability in order to pay off the unfunded accrued liability over 12 years. The Disability benefit rate is the Normal Cost rate necessary to provide the disability benefit on a one-year term basis.

The table below provides the calculation of the actuarially determined employer contribution for the current and prior years' valuations.

Table 11: Calculation of the Actuarially Determined Employer Contribution (ADEC)

Valuation Date ADEC for Fiscal Year Ending	12/31/2016 6/30/2019	12/31/2015 6/30/2018
Normal Cost Rate Calculation		
(a) Normal Cost	$ 844,659	$ 842,368
(b) Valuation Compensation	$ 3,706,174	$ 3,708,690
(c) Total Normal Cost Rate: (a) / (b)	22.79%	22.71%
(d) Employee Contribution Rate	7.00%	7.00%
(e) Expense Assumption	1.00%	1.00%
(f) Employer Normal Cost Rate: (c) - (d) + (e)	16.79%	16.71%
Disability Benefit Rate Calculation		
(g) Disability Benefit Normal Cost	$ 21,950	$ 23,855
(h) Valuation Compensation	$ 3,706,174	$ 3,708,690
(i) Total Normal Cost Rate: (g) / (h)	0.59%	0.64%
Accrued Liability Rate Calculation		
(j) Unfunded Accrued Liability	$ 1,203,154	$ 291,287
(k) Total Amortization Payments*	$ 161,670	$ 34,108
(l) Valuation Compensation	$ 3,706,174	$ 3,708,690
(m) Accrued Liability Rate: (k) / (l)	4.36%	0.92%
Total ADEC (f) + (i) + (m)	21.74%	18.27%
Impact of Legislative Changes	N/A	0.77%
Final ADEC	N/A	19.04%

*See Table 14 for more detail.

Section 6: Actuarially Determined Employer Contribution

The table below provides a reconciliation of the actuarially determined employer contribution.

Table 12: Reconciliation of the Change in the ADEC

Fiscal year ending June 30, 2018 Preliminary ADEC (based on December 31, 2015 valuation)	18.27%
Impact of Legislative Changes*	0.77%
Fiscal year ending June 30, 2018 Final ADEC	19.04%
Change Due to Demographic (Gain)/Loss	0.13%
Change Due to Investment (Gain)/Loss	1.96%
Impact of Assumption Changes	0.61%
Fiscal year ending June 30, 2019 Preliminary ADEC (based on December 31, 2016 valuation)	21.74%

* The impact of legislative changes includes the 1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017)

Section 6: Actuarially Determined Employer Contribution

Amortization methods determine the payment schedule for the unfunded actuarial accrued liability. LRS adopted a 12-year closed amortization period for fiscal year ending 2018. A new amortization base is created each year based on the prior year's experience. The tables below provide the calculation of the new amortization base and the amortization schedule for the current year's valuation.

Table 13: Calculation of the New Amortization Base

Calculation as of	12/31/2016
(a) Unfunded Actuarial Accrued Liability	$ 1,203,154
(b) Prior Years' Outstanding Balances	$ 267,338
(c) New Amortization Base: (a) - (b)	$ 935,816
(d) New Amortization Payment	$ 127,652

Table 14: Amortization Schedule for Unfunded Accrued Liability

Date Established	Original Balance	12/31/2016 Outstanding Balance	Annual Payment
December 31, 2015	$ 249,266	$ 267,338	$ 34,018
December 31, 2016	935,816	935,816	127,652
Total		$ 1,203,154	$ 161,670

Commentary: This is the payment schedule for the pension debt of LRS.

Section 6: Actuarially Determined Employer Contribution

The table below provides the cost of benefit enhancements for the current and prior years' valuation.

Table 15: Cost of Benefit Enhancements

Calculation as of	12/31/2016	12/31/2015
Increase in ADEC for a 1% COLA*	0.75%	0.77%

* The 1% COLA calculated at the December 31, 2016 valuation would be effective July 1, 2018. The COLA would be paid in full to retired members and survivors of deceased members on the retirement roll on July 1, 2017 and would be prorated for retired members and survivors of deceased members who commence benefits after July 1, 2017 but before June 30, 2018.

Section 7: Accounting Results

The section contains the accounting information for Governmental Accounting Standards Board (GASB) Statement No. 67 for fiscal year ending June 30, 2017 based on a valuation date of December 31, 2016.

Please note that GASB Statement No. 67 (*Financial Reporting for Pension Plans)* is applicable for fiscal years ending 2014 and later.

The June 30, 2017 total pension liability presented in this section was determined by an actuarial valuation as of December 31, 2016, based on the assumptions, methods and plan provisions described in this report. The actuarial cost method used to develop the total pension liability is the Entry Age Normal Cost method, as required by GASB Statement No. 67.

GASB Statement No. 67 set forth certain items of information to be disclosed in the financial statements of the Plan. The tables below provide a distribution of the number of employees by type of membership.

Table 16: Number of Active and Retired Members as of December 31, 2016

Group	Number
Retired members and survivors of deceased members currently receiving benefits	293
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	91
Active members	170
Total	554

Section 7: Accounting Results

GASB Statement No. 67 set forth certain items of information to be disclosed in the financial statements of the Plan. The tables below provide the schedule of changes in Net Pension Liability (Asset).

Table 17: Schedule of Changes in Net Pension Liability (Asset)

Calculation as of	June 30, 2017
Total Pension Liability	
Service Cost	$ 872,000
Interest	2,056,000
Changes of Benefit Terms	215,000
Difference between Expected and Actual Experience	(122,000)
Change of Assumptions	121,000
Benefit Payments, including Refund of Member Contributions	(2,437,000)
Net Change in Total Pension Liability	$ 705,000
Total Pension Liability - Beginning of Year	$ 28,705,000
Total Pension Liability - End of Year	$ 29,410,000
Plan Fiduciary Net Position	
Employer Contributions	$ 675,000
Member Contributions	253,000
Net Investment Income	2,744,000
Benefit Payments, including Refund of Member Contributions	(2,437,000)
Administrative Expenses	(18,000)
Other	0
Net Change in Fiduciary Net Position	$ 1,217,000
Plan Fiduciary Net Position - Beginning of Year	$ 26,472,000
Plan Fiduciary Net Position - End of Year	$ 27,689,000

Table 18: Net Pension Liability (Asset)

Calculation as of	June 30, 2017	June 30, 2016
Total Pension Liability	$ 29,410,000	$ 28,705,000
Plan Fiduciary Net Position	27,689,000	26,472,000
Net Pension Liability (Asset)	$ 1,721,000	$ 2,233,000
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	94.15%	92.22%

Section 7: Accounting Results

The table below is the sensitivity of the net pension liability to changes in the discount rate.

Table 19: Sensitivity of the Net Pension Liability (Asset) at June 30, 2017 to Changes in the Discount Rate

	1% Decrease	Current	1% Increase
Discount Rate	6.20%	7.20%	8.20%
Net Pension Liability (Asset)	4,372,000	1,721,000	(559,000)

The discount rate used to measure the total pension liability was 7.20%. The projection of cash flows used to determine the discount rate assumed that System contributions will continue to follow the current funding policy. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Please see Appendix E for additional detail.

The table below provides the methods and assumptions used to calculate the actuarially determined contribution rate.

Table 20: Additional Information for GASB Statement No. 67

Valuation Date	12/31/2016
Actuarial Cost Method	Entry Age
Amortization Method	Level dollar closed
Amortization Period	12 years
Asset Valuation Method	Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period (not greater than 120% of market value and not less than 80% of market value)
Actuarial Assumptions	
Investment Rate of Return*	7.20%
Projected Salary Increases**	5.50%
*Includes Inflation of	3.00%
**Includes Inflation and Productivity of	3.50%
Cost-of-living Adjustments	N/A

Appendix A: Valuation Process and Glossary of Actuarial Terms

Purpose of an Actuarial Valuation

The majority of Public Sector Retirement Systems in the State of North Carolina are defined benefit (DB) retirement systems. Under a DB Retirement System, the amount of benefits payable to a member upon retirement, termination, death or disability is defined in various contracts and legal instruments and is based, in part, on the member's years of credited service and final compensation. The amount of contribution needed to fund these benefits cannot be known with certainty. A primary responsibility of the Board of Trustees of a Retirement System is to establish and monitor a funding policy for the contributions made to the Retirement System.

While somewhat uncommon, in some jurisdictions, contributions are made by the plan sponsor as benefits come due. This is known as pay-as-you-go financing. More commonly, contributions for benefits are made in advance during the course of active employment of the members. This is known as actuarial pre-funding. For example, the State of North Carolina mandates for the Teachers' and State Employees' Retirement System (the "State Plan") that "on account of each member there shall be paid into the pension accumulation fund by employers an amount equal to a certain percentage of the actual compensation of each member to be known as the 'normal contribution'…" and further "the normal rate of contribution shall be determined by the actuary after each valuation."

The Actuarial Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process. A narrative of the process follows the diagram. The reader may find it worthwhile to refer to the diagram from time to time.

Under the actuarial valuation process, current information about Retirement System members is collected annually by staff at the direction of the actuary, namely member data, asset data and information on benefit provisions. Member data is collected for each member of the Retirement System. The member data will assist the actuary in estimating benefits that could be paid in the future. The member information the actuary collects to estimate the amount of benefit includes elements such as current service, salary and benefit group identifier for members that have not separated service; for those that have, the actual benefit amounts are collected. The actuary collects information such as gender and date of birth to determine when a benefit might be paid and for how long. The actuary collects summary information about assets as of the valuation date and information on cash flows for the year ending on the valuation date. Information about benefit

Appendix A: Valuation Process and Glossary of Actuarial Terms

provisions as of the valuation date is also collected. To bridge the gap between the information collected and potential benefits to be paid in the future, the actuary must make assumptions about future activities. These assumptions are recommended by the actuary to the Boards based on the results of an experience review. An experience review is a review of the Retirement System over a period of time, typically five years, where the actuary analyzes the demographic and economic assumptions of the Retirement System. Based on this review, the actuary will make recommendations on the demographic assumptions, such as when members will be projected to retire, terminate, become disabled and/or die in the future, as well as the economic assumptions, such as what rate of return is projected to be earned by the fund based on the Retirement System investment policy and what level of future salary increases is expected for members. To maintain the assumptions, the Board should adopt a prudent policy of having an experience review being performed every five years. The next experience review for the North Carolina Retirement Systems will be based on the five-year period ending on December 31, 2019 and will be presented during 2020. Using these assumptions, the actuary is able to use the member data, asset data and benefit provision information collected to project the benefits that will be paid from the Retirement System to current members. These projected future benefit payments are based not only on service and pay through the valuation date but includes future pay and service, which has not yet been earned by the members but is expected to be earned.

These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is an estimate of the value of the benefits promised to all members as of a valuation date. If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.

The PVFB is a large sum of money, typically much larger than the amount of Retirement System assets held in the trust. The next step is for the actuary to apply the Funding Policy as adopted by the Board to determine the employer contributions to be made to the Retirement System so that the gap between the PVFB and assets is systematically paid off over time. The Funding Policy is adopted by the Board based on discussions with the actuary. When the Board develops a funding policy, a balance between contributions which are responsive to the needs of the Retirement System yet stable should be struck. There are many different funding policies for the Board to consider, and the actuary is responsible for discussing the various features of the funding policies under consideration. Funding Policies are generally reviewed during an experience review, but it is not uncommon to review a funding policy in between, particularly during period where large increases or decreases in contributions are expected. The Funding Policy is composed of three components: the actuarial cost method, the asset valuation method, and the amortization method.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), normal cost (NC) and present value of future normal costs (PVFNC). The actuary computes the liability components (PVFB, NC, AAL, and PVFNC) for each participant in the Retirement System at the valuation date. These liability components are then totaled for the Retirement System. There are many actuarial cost methods. Different actuarial methods will produce different contribution patterns, but do not change the ultimate cost of the benefits. The entry age normal cost method is the most prevalent method used for public sector

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plans in the United States, because the expected normal cost is calculated in such a way that it will tend to stay level as a percent of pay over a member's career. Most of the North Carolina Retirement Systems use the entry age normal cost method.

The actuarial accrued liability (AAL) is also referred to as the amount of money the Retirement System should ideally have in the trust. The unfunded actuarial accrued liability (UAAL) is the portion of actuarial accrued liability that is not covered by the assets of the Retirement System. The UAAL can be a negative number, which means that the Retirement System has more assets than actuarial accrued liability. We refer to this condition as overfunded liability in this summary. Having UAAL does not indicate that the Retirement System is in failing actuarial health. UAAL is a common occurrence. Currently, many Retirement Systems in the United States have UAAL as a result of the Great Recession of 2008. Another related statistic of the Retirement System is the funded ratio. The funded ratio is the percent of the actuarial accrued liabilities covered by the actuarial value of assets. The assets used for these purposes are an actuarial value of assets (AVA), not market. The actuarial value of assets is based on the asset valuation method as recommended by the actuary and adopted by the Board. An actuarial value of assets is a smoothed, or averaged, value of assets, which is used to limit employer contribution volatility. Typically, assets are smoothed, or averaged, over a period of 3 to 5 years, although longer periods are becoming more common. By averaging returns, the UAAL is not as volatile, which we will see later results in contributions that are not as volatile as well. The North Carolina Retirement Systems use an actuarial value of assets with a smoothing period of 5 years.

While having UAAL is common, it is acceptable only if it is systematically being paid off. The method by which the UAAL is paid off is known as the amortization method. The concept is similar to that of a mortgage payment. The Board adopts the amortization method used to pay off the UAAL over a period of time. The amortization method is composed of the amortization period, the amount of payment increase, whether the period is open or closed and by the amount of amortization schedules. The amortization period is the amount of time over which the UAAL will be paid off. This is generally a period of thirty years or less, but actuaries are beginning to recommend shorter periods. The payments can be developed to stay constant from year to year like a mortgage, but often they are developed to increase each year at the same level payroll increases. Amortization type can be closed or open. Under a closed period, the UAAL is expected to be paid off over the amortization period. This is similar to a typical mortgage. Under an open period, the amortization period remains unchanged year after year. The concept is similar to re-mortgaging annually. In many instances, an amortization schedule is developed, whereby the UAAL is amortized over a closed period from the point the UAAL is incurred. Finally, some amortization methods are defined by a schedule of payments, where a new schedule of payments is added with each valuation. Regardless of the amortization type or period, the funding policy should generate a contribution that pays off the UAAL, which results in the funded ratio trending to 100% over time. Caution should be used when an open method is used, because typically an open amortization policy does not result in the UAAL being paid off. North Carolina pays off a much larger amount of UAAL compared to other states. While many states struggle to pay a 30-year level percent of pay UAAL contribution, which doesn't even reduce the amount of UAAL, North Carolina pays down the UAAL with level dollar payments over 12 years. This aggressive payment of UAAL results in North Carolina being home to many of the best funded Public Retirement Systems in the United States.

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To satisfy the requirements of the State of North Carolina, the actuary calculates the total annual contribution to the Retirement System as the normal cost plus a contribution towards UAAL. Said another way, this contribution is sufficient to pay for the cost of benefits accruing during the year (normal cost) plus the mortgage payment (UAAL payment). The total contribution is reduced by the amount of member contributions, if any, to arrive at the employer contribution. For the aggressive North Carolina contribution policy to be effective, the amounts that Conduent calculates need to be contributed. With very limited exception, North Carolina has contributed the amounts that Conduent has calculated, which has resulted in the North Carolina Retirements Systems being among the best funded in the United States.

An actuarial valuation report is produced annually, which contains the contribution for the fiscal year as well as the funded ratio of the Retirement System. The primary purpose of performing an actuarial valuation annually is to replace the estimated activities from the previous valuation, which were based on assumptions, with the actual experience of the Retirement System for the prior year. The experience gain (loss) is the difference between the expected and the actual UAAL of the Retirement System. An experience loss can be thought of as the amount of additional UAAL over and above the amount that was expected from the prior year due to deviation of actual experience from the assumption. Similarly, an experience gain can be thought of as having less UAAL than that which was expected from the prior year assumptions. As an example, if the Retirement System achieves an asset return of 15% when the assumption was a 7.20% return, an actuarial gain is said to have happened, which typically results in lower contributions and higher funded ratio, all else being equal. Alternatively, a return of 2% under the same circumstances would result in an actuarial loss, requiring an increase in contributions and a funded ratio that is lower than anticipated. Experience gains and losses are common within the valuation process. Typically gains and losses offset each other over time. To the extent that does not occur, the reasons for the gains and losses should be understood, and appropriate recommendations should be made by the actuary after an experience review to adjust the assumptions.

The actuarial valuation report will contain histories of key statistics from prior actuarial valuation reports. In particular, a history of the funded ratio of the Retirement System is an important exhibit. Trustees should understand the reason for the trend of the funded ratio of the Retirement System over time. The actuary will discuss the reasons for changes in the funded ratio of the Retirement System with each valuation report. To the extent that there are unexplained changes in funded ratio corrective action should be explored and the actuary will make recommendations as to whether there should be changes in the assumptions, funding policy, or some other portion of the actuarial valuation process.

In addition to historical information, projections of contributions and funded ratio based on current assumptions can sometimes be found in an actuarial valuation report. Projections of contributions can allow the employer to plan their budget accordingly. Surprises in Retirement System contributions to be paid by the employer serve no one. A one-year projection based on “bad” asset returns can provide ample time for the employer to plan, or allow for a discussion of changing the funding policy to occur. Contribution surprises are a primary contributor to employers considering pension reform. It is important to keep the employer apprised of future contribution requirements. A projection of funded ratio can serve the Trustees by illustrating the trend of the funded ratio over time. The funded ratio, under a prudent funding policy, should trend to 100% over a period of less than 30 years. (It is worthwhile to note that while 30 years has served as an industry standard for

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the longest period over which 100% funding should be achieved, that period is coming under scrutiny by the actuarial community and will likely be shortened.) If a projection of funded ratio does not trend to 100% over time, consideration should be given to fixing the funding policy to achieve this goal. For the North Carolina Retirement Systems, projections are generally performed for the January Board meetings. While the projection period has tended to be limited to five years, a longer projection would show the funded ratio trend to 100% much faster than other Public Retirement Systems.

The actuarial report will contain schedules of information about the census, plan and asset information submitted by Retirement System staff upon which the actuarial valuation is based. It is important that the Board of Trustees review that information and determine if the information is consistent with their understanding of the Retirement System. If after questioning staff, the Board of Trustees is not comfortable that the information provided is correct, the actuary should be notified to determine if the actuarial valuation report should be corrected.

Finally, the valuation report and/or presentation should contain sufficient information in an understandable fashion to allow the Board to take action and adopt the contribution rate for the upcoming year. It should also allow stakeholders to understand key observations over the past year that resulted in contributions increasing (or decreasing) and where contributions are headed. The actuary is always open to making the results understandable. Conduent works with the North Carolina Retirement Division to make your reports and presentations understandable and actionable. If something doesn't make sense – speak up!!

Appendix A: Valuation Process and Glossary of Actuarial Terms

Glossary

Note that the first definitions given are the "official" definitions of the term. For some terms there is a second definition, in italics, which is the unofficial definition.

Actuarial Accrued Liability (AAL). The portion of the Present Value of Projected Benefits (PVFB) allocated to past service. Also difference between (i) the actuarial present value of future benefits, and (ii) the present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability." *The amount of money that should be in the Fund. The funding target.*

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, retirement, investment income and salary increases. Demographic ("people") assumptions (rates of mortality, separation, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic ("money") assumptions (salary increases and investment income) consist of an underlying rate appropriate in an inflation-free environment plus a provision for a long-term average rate of inflation. *Estimates of future events used to project what we know now- current member data, assets, and benefit provisions – into an estimate of future benefits.*

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the Present Value of Projected Benefits (PVFB) between the normal costs to be paid in the future and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Methods. The collective term for the Actuarial Cost Method, the Amortization Payment for UAAL Method, and the Asset Valuation Method used to develop the contribution requirements for the Retirement System. *The Funding Policy*.

Actuarial Equivalent. Benefits whose actuarial present values are equal.

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

Actuarial Value of Assets (AVA). A smoothed value of assets which is used to limit contribution volatility. Also known as the funding value of assets. *Smoothed value of assets.*

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Amortization Payment for UAAL. Payment of the unfunded actuarial accrued liability by means of periodic contributions of interest and principal, as opposed to a lump sum payment. The components of the amortization payment for UAAL includes:

- Amortization Period Length – Generally amortization periods of up to 15 to 20 years (and certainly not longer than 25) are allowed. Similar to a mortgage, the shorter the amortization period, the higher the payment and the faster the UAAL is paid off.
- Amortization payment increases – Future payments can be level dollar, like a mortgage, or as a level percent of pay. Most Retirement Systems amortize UAAL as a level percent of pay which when combined with the employer normal cost that is developed as a level percent of pay can result in contributions that are easier to budget.
- Amortization type Amortization schedule can be closed or open. A closed amortization schedule is similar to a mortgage – at the end of the amortization period the UAAL is designed to be paid off. An open amortization period is similar to refinancing the UAAL year after year.
- Amortization schedule UAAL can be amortized over a single amortization period, or it can be amortized over a schedule.

The amortization payment for UAAL can be thought of as the UAAL mortgage payment.

Asset Valuation Method. The components of how the actuarial value of assets is to be developed.

Experience Gain Loss. A measure of the difference between actual experience and experience anticipated by a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used. *The experience Gain (Loss) represents how much the actuary missed the mark in a given year.*

Funded Ratio. The percent of the actuarial accrued liabilities covered by the actuarial value of assets. Also known as the funded status. *The ratio of how much money you actually have in the fund to the amount you should have in the fund.*

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” An amortization payment toward the unfunded actuarial accrued liability is paid in addition to the normal cost to arrive at the total contribution in a given year. *The cost of benefits accruing during the year*.

Present Value of Future Normal Cost (PVFNC). The portion of the Present Value of Projected Benefits (PVFB) allocated to future service. *The value in today’s dollars of the amount of contribution to be made in the future for benefits accruing for members in the Retirement System as of the valuation date. Note that in practice, this number is rarely discussed.*

Appendix A: Valuation Process and Glossary of Actuarial Terms

Present Value of Future Benefits (PVFB). The projected future benefit payments of the plan are discounted into today's dollars using an assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is the discounted value of the projected benefits promised to all members as of a valuation date, including future pay and service for members which has not yet been earned. *If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.*

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability (UAAL). The difference between the actuarial accrued liability (AAL) and actuarial value of assets (AVA). The UAAL is sometimes referred to as "unfunded accrued liability." *Funding shortfall, or prefunded amount if negative.*

Valuation Date. The date that the actuarial valuation calculations are performed as of. *Also known as the "snapshot date".*

Appendix B: Detailed Tabulations of Member Data

Table B-1: The Number and Average Reported Compensation of Active Members Distributed by Age and Service as of December 31, 2016

Age	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	1	0	0	0	0	0	0	0	0	1
	0	20,659	0	0	0	0	0	0	0	0	20,659
30 to 34	1	5	1	0	0	0	0	0	0	0	7
	7,560	20,659	20,659	0	0	0	0	0	0	0	18,788
35 to 39	0	7	0	1	0	0	0	0	0	0	8
	0	19,089	0	20,659	0	0	0	0	0	0	19,285
40 to 44	0	4	3	1	0	0	0	0	0	0	8
	0	20,659	20,659	20,659	0	0	0	0	0	0	20,659
45 to 49	0	11	5	3	0	0	0	0	0	0	19
	0	19,414	20,659	33,730	0	0	0	0	0	0	22,002
50 to 54	1	4	2	1	1	0	0	0	0	0	9
	7,860	20,659	20,659	20,659	20,659	0	0	0	0	0	19,237
55 to 59	2	7	7	2	0	0	0	0	0	0	18
	7,497	20,659	20,659	20,659	0	0	0	0	0	0	19,197
60 to 64	0	12	6	5	2	0	0	0	0	0	25
	0	20,659	20,659	22,411	37,883	0	0	0	0	0	22,387
65 to 69	0	19	11	4	3	0	0	0	0	0	37
	0	20,659	20,659	21,754	24,363	0	0	0	0	0	21,078
70 & Up	1	10	10	7	4	2	3	0	1	0	38
	2,927	20,659	21,770	20,659	20,659	20,659	20,659	0	20,659	0	20,485
Total	5	80	45	24	10	2	3	0	1	0	170
	6,668	20,350	20,906	22,840	25,215	20,659	20,659	0	20,659	0	20,744

Appendix B: Detailed Tabulations of Member Data

Table B-2: The Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2016

	Men		Women	
Age	Number	Compensation	Number	Compensation
26	1	$ 20,659		
32	2	41,318		
34	5	90,196		
35	3	56,123		
36	1	20,659		
38	1	22,119	2	34,719
39	1	20,659		
40	1	20,659		
42	2	41,318		
43	3	61,977		
44	1	20,659	1	20,659
45	2	41,318		
46	4	121,850		
47	3	55,779	1	20,659
48	5	103,295		
49	3	54,480	1	20,659
50	3	61,977		
51	1	7,860		
52	2	41,318		
53	2	41,318		
54	1	20,659		
55	2	41,318	1	20,659
56	4	69,919	1	7,053
57	1	20,659	1	20,659
58	2	41,318	3	61,975
59	3	61,973		
60	3	61,977		
61	4	87,017	2	41,318
62	6	128,335		
63	5	103,295	1	20,659
64	4	117,084		
65	5	103,295	6	123,954
66	3	73,089	3	61,977
67	8	165,272	2	41,318
68	7	148,994	1	20,659
69	1	20,659	1	20,659
70	7	126,881	2	41,318
71	3	61,977		
72	2	41,318	5	103,295
73	2	41,318	2	41,318

Appendix B: Detailed Tabulations of Member Data

Table B-2: The Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2016 (continued)

	Men		Women	
Age	Number	Compensation	Number	Compensation
74	1	$ 20,659	1	$ 20,659
75	2	41,318		
76	2	41,318		
77	1	20,659	1	20,659
78	2	41,318		
79	1	20,659		
80	1	31,771		
81			1	20,659
85	1	20,659		
86	1	20,659		
Total	131	$ 2,740,918	39	$ 785,494

Appendix B: Detailed Tabulations of Member Data

Table B-3: The Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2016

	Men		Women	
Service	Number	Compensation	Number	Compensation
0	4	$ 26,288	1	$ 7,053
1	5	83,747	1	14,060
2	19	392,520	4	82,636
3	3	61,977	2	41,318
4	35	724,524	11	227,249
5	3	61,977		
6	28	589,562	4	82,634
8	6	123,954	3	61,977
9	1	20,659		
10	3	66,358	5	103,295
11	1	25,040		
12	7	148,994	1	20,659
13			1	20,659
14	4	121,850	2	41,318
16	6	169,514	1	20,659
17	1	20,659		
18	1	20,659		
19	1	20,659		
20			1	20,659
22			1	20,659
26	1	20,659		
28	1	20,659	1	20,659
37	1	20,659		
Total	131	$ 2,740,918	39	$ 785,494

Appendix B: Detailed Tabulations of Member Data

Table B-4: The Number and Deferred Retirement Allowance of Terminated Vested Members Distributed by Age as of December 31, 2016

	Men		Women	
Age	Number	Allowance	Number	Allowance
39	1	$ 8,997		
42	1	4,983		
46			1	$ 4,983
48	1	4,429		
50	2	12,665	1	4,983
51	1	9,966		
52	2	15,217	1	4,983
53	3	19,655		
54	3	23,658	1	8,651
55	1	6,345		
56	2	22,706		
57	4	30,313	4	42,701
58	2	15,200		
59	2	23,115	1	4,983
60	3	30,037		
61	3	20,762		
64	2	11,627		
67	1	15,494		
70	1	15,979		
71	1	15,494		
Total	36	$ 306,642	9	$ 71,284

Appendix B: Detailed Tabulations of Member Data

Table B-5: The Number and Accumulated Contributions of Non-Vested Terminated Members Distributed by Age as of December 31, 2016

	Men		Women	
Age	Number	Contributions	Number	Contributions
34	1	$ 2,316		
35			1	5,145
37	1	4,343		
40	1	6,581		
41	1	4,723		
43	2	8,990		
45	3	13,027		
47	2	12,054		
48			1	8,404
50	2	14,325		
51	1	7,184		
52	2	10,093	1	578
54	2	12,327		
55	1	6,006		
56	1	4,383		
57	1	7,184		
59	2	15,240	1	5,441
60	2	15,617	1	1,539
61	2	9,665	1	3,733
63	2	9,621		
64	2	14,734		
65	2	12,493		
66	1	4,723	1	5,109
67	2	10,412		
68	2	11,503		
69	1	3,702		
Total	39	$ 221,246	7	$ 29,949

Appendix B: Detailed Tabulations of Member Data

Table B-6: The Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Age as of December 31, 2016

	Men		Women	
Age	Number	Allowances	Number	Allowances
47	1	$ 10,231		
50			2	$ 14,968
54			2	6,601
55			1	5,192
60			1	1,904
61	1	4,879		
62	3	23,108	1	7,169
63	1	7,870		
64	3	42,226	3	14,016
65	4	23,683		
66	2	8,208		
67	4	43,073	4	25,354
68	10	72,168	3	24,874
69	2	21,739	3	8,777
70	7	108,947	3	22,451
71	8	69,654	9	62,683
72	8	54,533	2	9,141
73	7	59,583	3	24,751
74	12	73,754	6	44,512
75	10	71,491	5	30,230
76	10	83,018	2	5,055
77	2	8,203	6	59,385
78	3	22,763	3	30,885
79	9	73,450	3	16,810
80	10	71,388	2	26,993
81	6	59,867	5	36,771
82	12	136,003	3	31,165
83	2	14,988	4	29,639
84	8	57,140	4	20,560
85	7	29,431	5	57,880
86	5	38,457	5	38,235
87	6	57,222	3	22,729
88	3	15,025	1	13,406
89	3	13,981	5	16,835
90	4	19,008	1	756

Appendix B: Detailed Tabulations of Member Data

Table B-6: The Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Age as of December 31, 2016 (continued)

	Men		Women	
Age	Number	Allowances	Number	Allowances
91	4	$ 31,874	2	$ 12,413
92	3	43,058	2	17,968
93	1	2,703	1	770
94	2	33,417	1	27,653
95	1	638	1	2,323
97			2	16,027
Total	184	$ 1,506,781	109	$ 786,881

Appendix B: Detailed Tabulations of Member Data

Table B-7: The Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Annuity Type as of December 31, 2016

	Men		Women	
Annuity Type	Number	Allowances	Number	Allowances
Maximum	76	$ 670,561	45	$ 399,806
Option 1	2	12,189		
Option 2	90	672,676	5	27,104
Option 3	13	130,156		
Option 4				
Option 5-2				
Option 5-3				
Option 6-2				
Option 6-3				
Other				
Survivors of Deceased Members	3	21,199	59	359,971
Total	184	$ 1,506,781	109	$ 786,881

Appendix C: Summary of Main Benefit and Contribution Provisions

All members of the General Assembly are eligible for membership.

"Compensation" means salary and expense allowance paid for service as a legislator in the General Assembly, exclusive of travel and per diem. "Highest annual compensation" means the 12 consecutive calendar months of compensation during a member's final legislative term for the highest position that a member held as a member of the General Assembly. "Creditable service" includes all service rendered as a member of the General Assembly.

BENEFITS

Service Retirement Allowance

Conditions for Allowance	A service retirement allowance is payable to any member who retires from service and: (a) has attained age 50 and completed 20 or more years of creditable service; or (b) has attained age 60 and completed five or more years of creditable service.
Unreduced Allowance	An unreduced annual service retirement allowance is payable to a member who has attained age 65 and completed five years of creditable service. The Service Retirement Allowance is equal to 4.02% of a member's highest annual compensation multiplied by the number of years of creditable service.
Reduced Allowance	A reduced annual service retirement allowance is payable to a member who retires from service after attaining age 60 and completing five years of creditable service. The reduced amount is an allowance as computed above reduced by 1/4% for each month that the member's retirement date precedes the date upon which the member would have attained age 65 had he remained in service. OR A reduced annual service retirement allowance is payable to a member who retires from service after attaining age 50 and completing 20 years of creditable service. The reduced amount is an allowance as computed above reduced by 5/12 of 1% for each month that the member's retirement date precedes the date upon which the member would have attained age 60, plus 1/4% for each month that

Appendix C: Summary of Main Benefit and Contribution Provisions

the member's retirement date precedes the date upon which the member would have attained age 65.

Maximum Amount	The maximum annual service retirement allowance (on an unreduced basis) is 75% of the member's highest annual compensation.
Disability Retirement Allowance	
Condition for Allowance	Any member who becomes permanently and totally disabled prior to the attainment of age 60 and who has completed at least five years of creditable service may be retired by the Board of Trustees on a disability retirement allowance.
Amount of Allowance	The disability retirement allowance is computed as an unreduced service retirement allowance based on the number of years of creditable service the member would have had had he remained in service to age 60.
Deferred Allowance	Any member who separates from service after completing five years of creditable service and who leaves his total accumulated contributions in the system may receive a deferred allowance, beginning at age 50, computed in the same way as a service retirement allowance on the basis of his creditable service and compensation to the date of separation.
Return of Contributions	Upon the withdrawal of a member without a retirement allowance and upon his request, the member’s contributions are returned, together with accumulated regular interest. Upon the death of a member before retirement, his contributions, together with the full accumulated regular interest thereon, are paid to his estate or to person(s) designated by the member unless the designated beneficiary, if eligible, elects the survivor's alternate benefit described below. The current interest rate on member contributions is 4%.
Survivor's Alternate Benefit	Upon the death of a member in service who has met conditions (a) or (b) below, his designated beneficiary may elect to receive a benefit equal to that which would have been payable under the provisions of Option 2 had the member retired on the first day of the month following his death and elected such option, in lieu of the member's accumulated contributions, provided the member had not instructed the Board of Trustees in writing that he did not wish the alternate benefit to apply.

Appendix C: Summary of Main Benefit and Contribution Provisions

	(a) attainment of age 60 and completion of five years of creditable service; (b) completion of 12 years of creditable service.
Lump Sum Death Benefit	Upon the death of a member in active service after completing one year of creditable service, a lump sum payment equal to the deceased members highest annual compensation to a maximum of $15,000 is made to his designated beneficiary or estate.
Death After Retirement	Upon the death of a beneficiary who did not retire under an effective election of Option 2 or Option 3, an amount equal to the excess if any, of his accumulated contributions at retirement over the retirement allowance payments received is paid to a designated person or to the beneficiary's estate. Upon the death of the survivor of a beneficiary who retired under an effective election of Option 2 or Option 3, an amount equal to the excess, if any, of the beneficiary's accumulated contributions at retirement over the total retirement allowance payments received is paid to such other person designated by the beneficiary or to the beneficiary's estate.
Optional Arrangements at Retirement	In lieu of the full retirement allowance, any member may elect to receive a reduced retirement allowance equal in value to the full allowance, with the provision that: Option 1 - A member retiring prior to July 1, 1993, may elect that at his death within 10 years from his retirement date, an amount equal to his accumulated contributions at retirement, less 1/120 for each month he has received a retirement allowance, is paid to his estate, or to a person(s) designated by the member, or Option 2 - At the death of the member his allowance shall be continued throughout the life of such other person as the member shall have designated at the time of his retirement, or Option 3 - At the death of the member one-half of his allowance shall be continued throughout the life of such other person as the member shall have designated at the time of his retirement.

Appendix C: Summary of Main Benefit and Contribution Provisions

Post-Retirement Increases in Allowance	Future increases in allowances may be granted at the discretion of the State.
Contributions	
Member Contributions	Each member contributes 7% of his annual compensation.
Employer Contributions	The State makes annual contributions consisting of a normal contribution and an accrued liability contribution. The normal contribution covers the liability on account of current service and is determined by the actuary after each valuation. The accrued liability contribution covers the liability on account of service rendered before the establishment of the retirement system and the liability on account of increases in benefits for service rendered prior to the effective date of any amendment.
Changes Since Prior Valuation	A1.0% cost-of-living adjustment effective July 1, 2017 for retired members and survivors of deceased members receiving benefits as of July 1, 2016 (and a prorated increase for those who retired after July 1, 2016 but before June 30, 2017).

Appendix D: Actuarial Assumptions and Methods

Assumptions are based on the experience investigation prepared as of December 31, 2014 and adopted by the Board of Trustees on January 21, 2016 for use beginning with the December 31, 2015 annual actuarial valuation. The interest rate of 7.20% was adopted by the Board of Trustees on April 20, 2017.**Interest Rate:** 7.20% per annum compounded annually.

Inflation: Both general and wage inflation are assumed to be 3.00% per annum.

Real Wage Growth: 0.50% per annum.

Annual Rate of Salary Increase: 5.50%.

Separations Before Retirement: Representative values of the assumed annual rates of separation are as follows:

		Annual Rate of		
Age	Disability	Base Mortality*		Withdrawal
		Male	Female	
25	.0001	.0005	.0002	.0500
30	.0004	.0005	.0002	.0500
35	.0010	.0005	.0003	.0500
40	.0029	.0006	.0004	.0500
45	.0049	.0010	.0007	.0500
50	.0084	.0017	.0011	.0500
55	.0144	.0028	.0017	.0500
60		.0047	.0024	.0500
64		.0074	.0034	.0500

* Base mortality rates as of 2014

Service Retirement: Representative values of the assumed annual rates of service retirement are as follows:

	Service					
Age	5	10	15	20	25	30
60	.100	.100	.100	.100	.100	.100
65	.250	.250	.250	.250	.250	.250
70	.150	.150	.150	.150	.150	.150
75	1.000	1.000	1.000	1.000	1.000	1.000

Appendix D: Actuarial Assumptions and Methods

Post-Retirement Mortality Rates: Representative values of the assumed post-retirement mortality rates are as follows:

Annual Rate of Death after Retirement
(Retired Members and Survivors of Deceased Members)

	Retirees (Healthy at Retirement)		Survivors of Deceased Members		Retirees (Disabled at Retirement)	
Age	Male	Female	Male	Female	Male	Female
55	.0057	.0036	.0057	.0036	.0234	.0145
60	.0078	.0052	.0078	.0052	.0266	.0170
65	.0110	.0080	.0110	.0080	.0317	.0209
70	.0168	.0129	.0168	.0129	.0403	.0282
75	.0268	.0209	.0268	.0209	.0543	.0410
80	.0447	.0348	.0447	.0348	.0766	.0610

Deaths After Retirement (Members Healthy at Retirement): Mortality rates are based on the RP-2014 Total Data Set for Healthy Annuitants Mortality Table. The RP-2014 annuitant tables have no rates prior to age 50. The RP-2014 Total Data Set Employee Mortality Table (with no adjustments) is used for ages less than 50.

Death After Retirement (Members Disabled at Retirement): Mortality rates are based on the RP-2014 Total Data Set for Disabled Annuitants Mortality Table.

Deaths Prior to Retirement: Mortality rates are based on the RP-2014 Total Data Set Employee Mortality Table.

Mortality Projection: All mortality rates are projected from 2014 using generational improvement with Scale MP-2015.

Timing of Assumptions: All withdrawals, deaths, disabilities, retirements and salary increases are assumed to occur July 1 of each year.

Liability for Inactive Members: The liability for members who terminated prior to five years of creditable service is estimated to be 100% of the member's accumulated contributions. The liability for members who terminated after completing five years of creditable service is estimated based on the member's current age and the service and reported compensation at termination of employment.

Administrative Expenses: 1.00% of payroll.

Reported Compensation: Calendar year compensation as furnished by the system's office.

Valuation Compensation: Reported compensation adjusted to reflect the assumed rate of pay as of the valuation date.

Appendix D: Actuarial Assumptions and Methods

Actuarial Cost Method: Entry age normal cost method. Entry age is established on an individual basis.

Amortization Period: 12-year closed, level-dollar amount. The first amortization base was created for the contribution payable for fiscal year ending 2018.

Asset Valuation Method: Actuarial value, as developed in Table 8. Actuarial value of assets is based upon a smoothed market value method. Under this method, asset returns in excess of or less than the expected return on market value of assets will be reflected in the actuarial value of assets over a five-year period. The calculation of the Actuarial Value of Assets is based on the following formula:

$MV - 80\% \times G/(L)_1 - 60\% \times G/(L)_2 - 40\% \times G/(L)_3 - 20\% \times G/(L)_4$

MV = the market value of assets as of the valuation date

$G/(L)_i$ = the asset gain or (loss) for the i-th year preceding the valuation date

Changes Since Prior Valuation: The interest rate was changed from 7.25% to 7.20%.

Appendix E: GASB 67 Fiduciary Net Position Projection

Table E-1: Projection of Fiduciary Net Positions
(in thousands)

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2017	$ 26,605	$ 259	$ 680	$ 2,543	$ 38	$ 1,857	$ 26,820
2018	26,820	233	717	2,541	34	1,873	27,068
2019	27,068	219	758	2,578	32	1,890	27,325
2020	27,325	204	765	2,603	30	1,908	27,569
2021	27,569	185	772	2,630	27	1,924	27,793
2022	27,793	168	763	2,675	25	1,939	27,963
2023	27,963	155	719	2,724	23	1,947	28,037
2024	28,037	142	686	2,731	21	1,950	28,063
2025	28,063	132	638	2,790	20	1,947	27,970
2026	27,970	120	605	2,809	18	1,939	27,807
2027	27,807	111	568	2,795	16	1,927	27,602
2028	27,602	101	549	2,778	15	1,910	27,369
2029	27,369	94	518	2,768	14	1,895	27,094
2030	27,094	90	417	2,743	13	1,872	26,717
2031	26,717	84	304	2,720	12	1,840	26,213
2032	26,213	78	222	2,695	12	1,803	25,609
2033	25,609	74	144	2,642	11	1,758	24,932
2034	24,932	70	96	2,599	10	1,709	24,198
2035	24,198	65	83	2,553	10	1,656	23,439
2036	23,439	62	73	2,497	9	1,604	22,672
2037	22,672	58	65	2,435	9	1,551	21,902
2038	21,902	55	58	2,363	8	1,497	21,141
2039	21,141	52	52	2,299	8	1,444	20,382
2040	20,382	49	48	2,230	7	1,391	19,633
2041	19,633	46	44	2,153	7	1,340	18,903
2042	18,903	44	40	2,076	7	1,291	18,195
2043	18,195	42	35	2,025	6	1,241	17,482
2044	17,482	39	28	1,975	6	1,191	16,759
2045	16,759	35	24	1,913	5	1,141	16,041
2046	16,041	32	19	1,859	5	1,091	15,319
2047	15,319	28	16	1,796	4	1,040	14,603
2048	14,603	24	15	1,729	4	991	13,900
2049	13,900	22	11	1,671	3	943	13,202
2050	13,202	19	8	1,611	3	895	12,510
2051	12,510	16	8	1,546	2	848	11,834
2052	11,834	14	7	1,482	2	800	11,171
2053	11,171	12	7	1,414	2	755	10,529
2054	10,529	11	4	1,358	2	711	9,895
2055	9,895	9	4	1,296	1	666	9,277
2056	9,277	8	3	1,232	1	625	8,680
2057	8,680	7	2	1,165	1	583	8,106
2058	8,106	5	1	1,116	1	544	7,539
2059	7,539	3	1	1,065	0	505	6,983
2060	6,983	2	0	1,005	0	468	6,448
2061	6,448	1	0	947	0	431	5,933
2062	5,933	1	0	886	0	396	5,444
2063	5,444	1	0	827	0	363	4,981
2064	4,981	1	0	770	0	331	4,543
2065	4,543	0	1	716	0	301	4,129
2066	4,129	0	1	667	0	273	3,736

Appendix E: GASB 67 Fiduciary Net Position Projection

Table E-1: Projection of Fiduciary Net Positions (continued)
(in thousands)

Calendar Year	Beginning Fiduciary Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Position
2067	$ 3,736	$ 0	$ 0	$ 616	$ 0	$ 247	$ 3,367
2068	3,367	0	0	567	0	222	3,022
2069	3,022	0	0	521	0	199	2,700
2070	2,700	0	0	476	0	178	2,402
2071	2,402	0	0	434	0	157	2,125
2072	2,125	0	0	393	0	139	1,871
2073	1,871	0	0	355	0	122	1,638
2074	1,638	0	0	319	0	106	1,425
2075	1,425	0	0	286	0	93	1,232
2076	1,232	0	0	254	0	80	1,058
2077	1,058	0	0	224	0	67	901
2078	901	0	0	197	0	58	762
2079	762	0	0	172	0	49	639
2080	639	0	0	148	0	41	532
2081	532	0	0	127	0	34	439
2082	439	0	0	108	0	28	359
2083	359	0	0	90	0	22	291
2084	291	0	0	75	0	19	235
2085	235	0	0	61	0	15	189
2086	189	0	0	49	0	11	151
2087	151	0	0	39	0	9	121
2088	121	0	0	31	0	8	98
2089	98	0	0	24	0	6	80
2090	80	0	0	18	0	5	67
2091	67	0	0	14	0	4	57
2092	57	0	0	10	0	4	51
2093	51	0	0	8	0	4	47
2094	47	0	0	5	0	2	44
2095	44	0	0	4	0	4	44
2096	44	0	0	3	0	3	44
2097	44	0	0	2	0	3	45
2098	45	0	0	1	0	3	47
2099	47	0	0	1	0	4	50
2100	50	0	0	0	0	3	53
2101	53	0	0	0	0	4	57
2102	57	0	0	0	0	3	60
2103	60	0	0	0	0	5	65
2104	65	0	0	0	0	4	69
2105	69	0	0	0	0	5	74
2106	74	0	0	0	0	6	80
2107	80	0	0	0	0	5	85
2108	85	0	0	0	0	7	92
2109	92	0	0	0	0	6	98
2110	98	0	0	0	0	7	105
2111	105	0	0	0	0	8	113
2112	113	0	0	0	0	8	121
2113	121	0	0	0	0	9	130
2114	130	0	0	0	0	9	139
2115	139	0	0	0	0	10	149
2116	149	0	0	0	0	11	160

Appendix E: GASB 67 Fiduciary Net Position Projection

Table E-2: Actuarial Present Value of Projected Benefit Payments
(in thousands)

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments		
					Funded Payments at 7.20%	Unfunded Payments at 3.13%	Using Single Discount Rate of 7.20%
2017	$ 26,605	$ 2,543	$ 2,543	$ 0	$ 2,456	$ 0	$ 2,456
2018	26,820	2,541	2,541	0	2,289	0	2,289
2019	27,068	2,578	2,578	0	2,167	0	2,167
2020	27,325	2,603	2,603	0	2,041	0	2,041
2021	27,569	2,630	2,630	0	1,923	0	1,923
2022	27,793	2,675	2,675	0	1,825	0	1,825
2023	27,963	2,724	2,724	0	1,734	0	1,734
2024	28,037	2,731	2,731	0	1,621	0	1,621
2025	28,063	2,790	2,790	0	1,545	0	1,545
2026	27,970	2,809	2,809	0	1,451	0	1,451
2027	27,807	2,795	2,795	0	1,347	0	1,347
2028	27,602	2,778	2,778	0	1,249	0	1,249
2029	27,369	2,768	2,768	0	1,161	0	1,161
2030	27,094	2,743	2,743	0	1,073	0	1,073
2031	26,717	2,720	2,720	0	993	0	993
2032	26,213	2,695	2,695	0	917	0	917
2033	25,609	2,642	2,642	0	839	0	839
2034	24,932	2,599	2,599	0	770	0	770
2035	24,198	2,553	2,553	0	705	0	705
2036	23,439	2,497	2,497	0	644	0	644
2037	22,672	2,435	2,435	0	585	0	585
2038	21,902	2,363	2,363	0	530	0	530
2039	21,141	2,299	2,299	0	481	0	481
2040	20,382	2,230	2,230	0	435	0	435
2041	19,633	2,153	2,153	0	392	0	392
2042	18,903	2,076	2,076	0	353	0	353
2043	18,195	2,025	2,025	0	321	0	321
2044	17,482	1,975	1,975	0	292	0	292
2045	16,759	1,913	1,913	0	264	0	264
2046	16,041	1,859	1,859	0	239	0	239
2047	15,319	1,796	1,796	0	215	0	215
2048	14,603	1,729	1,729	0	193	0	193
2049	13,900	1,671	1,671	0	174	0	174
2050	13,202	1,611	1,611	0	157	0	157
2051	12,510	1,546	1,546	0	140	0	140
2052	11,834	1,482	1,482	0	126	0	126
2053	11,171	1,414	1,414	0	112	0	112
2054	10,529	1,358	1,358	0	100	0	100
2055	9,895	1,296	1,296	0	89	0	89
2056	9,277	1,232	1,232	0	79	0	79
2057	8,680	1,165	1,165	0	70	0	70
2058	8,106	1,116	1,116	0	62	0	62
2059	7,539	1,065	1,065	0	55	0	55
2060	6,983	1,005	1,005	0	49	0	49
2061	6,448	947	947	0	43	0	43
2062	5,933	886	886	0	37	0	37
2063	5,444	827	827	0	33	0	33
2064	4,981	770	770	0	28	0	28
2065	4,543	716	716	0	25	0	25
2066	4,129	667	667	0	21	0	21

Appendix E: GASB 67 Fiduciary Net Position Projection

Table E-2: Actuarial Present Value of Projected Benefit Payments (continued)

(in thousands)

Calendar Year	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments: Funded Payments at 7.20%	Present Value of Benefit Payments: Unfunded Payments at 3.13%	Present Value of Benefit Payments: Using Single Discount Rate of 7.20%
2067	$ 3,736	$ 616	$ 616	$ 0	$ 18	$ 0	$ 18
2068	3,367	567	567	0	16	0	16
2069	3,022	521	521	0	14	0	14
2070	2,700	476	476	0	12	0	12
2071	2,402	434	434	0	10	0	10
2072	2,125	393	393	0	8	0	8
2073	1,871	355	355	0	7	0	7
2074	1,638	319	319	0	6	0	6
2075	1,425	286	286	0	5	0	5
2076	1,232	254	254	0	4	0	4
2077	1,058	224	224	0	3	0	3
2078	901	197	197	0	3	0	3
2079	762	172	172	0	2	0	2
2080	639	148	148	0	2	0	2
2081	532	127	127	0	1	0	1
2082	439	108	108	0	1	0	1
2083	359	90	90	0	1	0	1
2084	291	75	75	0	1	0	1
2085	235	61	61	0	1	0	1
2086	189	49	49	0	0	0	0
2087	151	39	39	0	0	0	0
2088	121	31	31	0	0	0	0
2089	98	24	24	0	0	0	0
2090	80	18	18	0	0	0	0
2091	67	14	14	0	0	0	0
2092	57	10	10	0	0	0	0
2093	51	8	8	0	0	0	0
2094	47	5	5	0	0	0	0
2095	44	4	4	0	0	0	0
2096	44	3	3	0	0	0	0
2097	44	2	2	0	0	0	0
2098	45	1	1	0	0	0	0
2099	47	1	1	0	0	0	0
2100	50	0	0	0	0	0	0
2101	53	0	0	0	0	0	0
2102	57	0	0	0	0	0	0
2103	60	0	0	0	0	0	0
2104	65	0	0	0	0	0	0
2105	69	0	0	0	0	0	0
2106	74	0	0	0	0	0	0
2107	80	0	0	0	0	0	0
2108	85	0	0	0	0	0	0
2109	92	0	0	0	0	0	0
2110	98	0	0	0	0	0	0
2111	105	0	0	0	0	0	0
2112	113	0	0	0	0	0	0
2113	121	0	0	0	0	0	0
2114	130	0	0	0	0	0	0
2115	139	0	0	0	0	0	0
2116	149	0	0	0	0	0	0

Appendix F: Data for Section 2 Graphs

The tables below provide the numbers associated with the graphs in Section 2 of this report.

Graph 1: Market Value of Assets and Asset Returns

	Market Value of Assets	Asset Return
2012	$ 28,414,270	11.81%
2013	29,541,619	12.21%
2014	28,977,047	6.25%
2015	26,745,706	0.42%
2016	26,605,157	6.13%

Graph 3: Actuarial Value and Market Value of Assets

	Actuarial Value of Assets	Market Value of Assets
2012	$ 29,415,872	$ 28,414,270
2013	29,318,253	29,541,619
2014	29,012,219	28,977,047
2015	28,265,441	26,745,706
2016	27,976,706	26,605,157

Graph 4: Asset Returns

	Asset Returns (Actuarial Value)	Asset Returns (Market Value)
2012	6.37%	11.81%
2013	7.45%	12.21%
2014	7.22%	6.25%
2015	5.88%	0.42%
2016	5.25%	6.13%

Appendix F: Data for Section 2 Graphs

Graph 5: Actuarial Accrued Liability

	Liability for Active Members	Liability for Deferred Members	Liability for Retired Members	Total Liability
2012	$ 7,790,758	$ 1,652,463	$ 14,408,568	$ 23,851,789
2013	5,879,560	1,695,813	16,981,822	24,557,195
2014	6,336,348	1,679,451	16,051,662	24,067,461
2015	6,390,641	2,221,225	19,944,862	28,556,728
2016	7,081,370	2,502,807	19,595,683	29,179,860

Graph 6: Actuarial Accrued Liability and Actuarial Value of Assets

	Actuarial Accrued Liability	Actuarial Value of Assets
2012	$ 23,851,789	$ 29,415,872
2013	24,557,195	29,318,253
2014	24,067,461	29,012,219
2015	28,556,728	28,265,441
2016	29,179,860	27,976,706

Graph 7: Funded Ratios

	Funded Ratio (Actuarial Basis)	Funded Ratio (Market Value Basis)
2012	123.3%	119.1%
2013	119.4%	120.3%
2014	120.5%	120.4%
2015	99.0%	93.7%
2016	95.9%	91.2%