



Disability Income Plan Principal Results of Actuarial Valuation as of December 31, 2015

Board of Trustees Meeting
Larry Langer and Mike Ribble
October 27, 2016

Disability Income Plan Principal Results of Actuarial Valuation as of December 31, 2015

Valuation Date	12/31/2015	12/31/2014
Number of active members		
Teachers' and State Employees'		
Retirement System (TSERS)	305,291	307,313
Optional Retirement Program (ORP)	<u>16,427</u>	<u>16,266</u>
Total	321,718	323,579
Reported compensation		
TSERS	\$ 13,145,602,154	\$ 12,932,045,817
ORP	<u>1,573,134,157</u>	<u>1,527,620,790</u>
Total	\$ 14,718,736,311	\$ 14,459,666,607
Valuation compensation*		
TSERS	\$ 13,896,781,214	\$ 13,737,065,885
ORP	<u>1,662,996,217</u>	<u>1,650,076,732</u>
Total	\$ 15,559,777,431	\$ 15,387,142,617
Number of disabled members receiving		
long term disability benefits	6,709	6,900
Annual reported benefits	\$ 75,872,391	\$ 77,682,745

* Reported compensation adjusted to reflect the assumed rate of pay increase prior to the valuation date.

Disability Income Plan Principal Results of Actuarial Valuation as of December 31, 2015

Assets and Liabilities as of	12/31/2015	12/31/2014
Assets		
Actuarial Value	\$ 439,955,539	\$ 450,598,573
Market Value	\$ 427,102,227	\$ 439,705,629
Liability for currently disabled members	\$ 315,692,874	\$ 351,124,308
Deficit/(Surplus)	\$ (124,262,665)	\$ (99,474,265)
GASB 43/45 Results for Fiscal Year Ending	6/30/2018	6/30/2017
Annual required contribution (ARC)		
Normal Cost	0.14%	0.38%
Accrued Liability	<u>0.00%</u>	<u>0.00%</u>
Total	0.14%	0.38%
Impact of Experience Study	N/A	-0.23%
Impact of Legislative Changes	<u>N/A</u>	<u>0.00%</u>
Final ARC	N/A	0.15%

Disability Income Plan

Employer Contribution Rate History

Valuation Date	Fiscal Year Ending	Preliminary ARC	Change due to Legislation*	Final ARC	Appropriated Rate
12/31/2015	6/30/2018	0.14%	N/A	N/A	N/A
12/31/2014	6/30/2017	0.38%	(0.23%)	0.15%	0.38%
12/31/2013	6/30/2016	0.41%	0.00%	0.41%	0.41%
12/31/2012	6/30/2015	0.41%	0.00%	0.41%	0.41%
12/31/2011	6/30/2014	0.43%	0.01%	0.44%	0.44%

* The change due to legislation for the contribution for fiscal year ending June 30, 2017 includes the decrease due to the experience study.

Certification

The assumptions, methods, and plan provisions used in the results presented in this presentation were provided in October 2016 in the “Report on the Annual Valuation of the Disability Income Plan of North Carolina prepared as of December 31, 2015.”

The results were prepared under the direction of Michael Ribble and Larry Langer 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

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

Questions?

THANK YOU

Disability Income Plan of North Carolina

Report on the Annual Valuation
Prepared as of December 31, 2015

October 2016



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October 12, 2016

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Members of the Board:

This report presents the results of the valuation of the Disability Income Plan of North Carolina (referred to as "DIPNC" or the "Disability Income Plan"), prepared as of December 31, 2015.

The valuation has been prepared in accordance with the parameters set forth in Statement Nos. 43 and 45 of the Governmental Accounting Standards Board.

The primary purpose of the valuation report is to determine the required employer contribution rates, to describe the current financial condition of DIPNC, 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 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 Buck to review any statement you wish to make on the results contained in this report. Buck 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 as summarized in this report. Although reviewed for reasonableness and consistency with the prior valuation, these elements have not been audited by Buck 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 GASB Statement Nos. 43 and 45. We prepared this valuation in accordance with the requirements of this standard and in accordance with all applicable ASOPs.

The latest assumptions were adopted for use with the December 31, 2015 actuarial valuation, based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on April 21, 2016. 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.

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, Buck performed no analysis of the potential range of such future differences.

The undersigned actuaries together meet the Qualification Standards of the American Academy of Actuaries (AAA) to render the actuarial opinions contained in this report. Michael A. Ribble and Larry Langer meet the qualification standards of the AAA in the pension practice area and render the opinion related to the long-term aspects of this calculation. Melissa Bissett meets the qualification standards of the AAA in the health practice area and renders the opinion related to the short-term aspects of this calculation. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

Respectfully submitted,



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



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



Melissa A. Bissett, FSA, MAAA
Senior Consultant, Health and Productivity

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Table of Contents

Section 1: Introduction	1
Section 2: Summary of Principal Results	2
Section 3: Membership Data.....	4
Section 4: Assets	5
Section 5: Condition of the Plan.....	6
Section 6: Experience	8
Section 7: Accounting Information	9
Appendices.....	13
Appendix A – Detailed Tabulations of the Active Member Data	13
Appendix B – Detailed Tabulations of the Disabled Member Data	18
Appendix C – Development of Actuarial Value of Assets	23
Appendix D – Statement of Actuarial Assumptions and Methods	24
Appendix E – Summary of Main Benefit Provisions as Interpreted for Valuation Purposes	32

Section 1: Introduction

This report presents the results of the actuarial valuation of the Disability Income Plan of North Carolina, prepared as of December 31, 2015. The purpose of the valuation is to determine the present value of future payments to disabled members as of December 31, 2015, to determine the expected cost of new claims for 2016, and to provide the Annual Required Contribution under GASB Statements 43 and 45 for postemployment benefits.

Appendix A of this report presents detailed tabulations of the active membership of the plan as of the valuation date.

Appendix B of this report presents detailed tabulations of the disabled membership of the plan as of the valuation date.

Appendix C of this report presents the development of the actuarial value of assets.

Appendix D outlines the full set of actuarial assumptions and methods employed.

The valuation was based on provisions of the Plan as amended through December 31, 2015. A summary of the main Plan provisions used for valuation purposes appears in Appendix E.

Section 2: Summary of Principal Results

The table below provides the principal results of the valuation and a comparison with the preceding year's results.

Table 1: Summary of Principal Results

Valuation Date	12/31/2015	12/31/2014
Number of active members		
Teachers' and State Employees' Retirement System (TSERS)	305,291	307,313
Optional Retirement Program (ORP)	<u>16,427</u>	<u>16,266</u>
Total	321,718	323,579
Reported compensation		
TSERS	\$ 13,145,602,154	\$ 12,932,045,817
ORP	<u>1,573,134,157</u>	<u>1,527,620,790</u>
Total	\$ 14,718,736,311	\$ 14,459,666,607
Valuation compensation*		
TSERS	\$ 13,896,781,214	\$ 13,737,065,885
ORP	<u>1,662,996,217</u>	<u>1,650,076,732</u>
Total	\$ 15,559,777,431	\$ 15,387,142,617
Number of disabled members receiving long term disability benefits	6,709	6,900
Annual reported benefits	\$ 75,872,391	\$ 77,682,745
Assets and Liabilities as of	12/31/2015	12/31/2014
Assets		
Actuarial Value	\$ 439,955,539	\$ 450,598,573
Market Value	\$ 427,102,227	\$ 439,705,629
Liability for currently disabled members	\$ 315,692,874	\$ 351,124,308
Deficit/(Surplus)	\$ (124,262,665)	\$ (99,474,265)
GASB 43/45 Results for Fiscal Year Ending	6/30/2018	6/30/2017
Annual required contribution (ARC)		
Normal Cost	0.14%	0.38%
Accrued Liability	<u>0.00%</u>	<u>0.00%</u>
Total	0.14%	0.38%
Impact of Experience Study	N/A	-0.23%
Impact of Legislative Changes	<u>N/A</u>	<u>0.00%</u>
Final ARC	N/A	0.15%

* Reported compensation adjusted to reflect the assumed rate of pay increase prior to the valuation date.

Section 2: Summary of Principal Results

Table 2: Reconciliation of Change in Annual Required Contribution (ARC)

Fiscal year ending June 30, 2017 Preliminary ARC (based on December 31, 2014 valuation)	0.38%
Impact of Experience Study	(0.23%)
Impact of Legislative Changes	<u>0.00%</u>
Fiscal year ending June 30, 2017 Final ARC	0.15%
Change Due to Demographic (Gain)/Loss	(0.01%)
Change Due to Investment (Gain)/Loss	0.00%
Change Due to Contributions Greater than ARC	<u>0.00%</u>
Fiscal year ending June 30, 2018 Preliminary ARC (based on December 31, 2015 valuation)	0.14%

Table 3: History of Annual Required Contributions and Appropriated Rates

Valuation Date	Fiscal Year Ending	Preliminary ARC	Change due to Legislation*	Final ARC	Appropriated Rate
12/31/2015	6/30/2018	0.14%	N/A	N/A	N/A
12/31/2014	6/30/2017	0.38%	(0.23%)	0.15%	0.38%
12/31/2013	6/30/2016	0.41%	0.00%	0.41%	0.41%
12/31/2012	6/30/2015	0.41%	0.00%	0.41%	0.41%
12/31/2011	6/30/2014	0.43%	0.01%	0.44%	0.44%

* The change due to legislation for the contribution for fiscal year ending June 30, 2017 includes the decrease due to the experience study.

Section 3: Membership Data

Data for 305,291 active members of the Teachers' and State Employees' Retirement System with reported compensation of \$13,145,602,154 and 16,427 members of the Optional Retirement Program with reported compensation of \$1,573,134,157 were furnished by the Retirement Systems Division as of December 31, 2015. The reported compensation includes annual longevity payments. The number and reported compensation of active members, distributed by age, as of December 31, 2015 are shown in Appendix A.

The membership service requirement for short term disability benefits under the Plan is one year and the membership service requirement for long term disability benefits under the Plan is five years.

The Retirement Systems Division also supplied data for 6,709 disabled employees in receipt of annual long-term disability benefits totaling \$75,872,391 as of the valuation date. Of this number, 92 disabled employees are grandfathered under all provisions of the old Disability Salary Continuation Plan and 6,617 are receiving long-term disability benefits under the provisions of this Plan. Appendix B presents a comparison of the number and annual amount of benefits payable as of the current and previous valuation dates.

Section 4: Assets

Asset information taken into account in this valuation is based principally on information reported by the Retirement Systems Division. The market value of assets was \$427,102,227 as of December 31, 2015.

The actuarial value of assets as of the valuation date was \$439,955,539. The development of this amount is shown in Appendix C.

The following table shows an allocation of investments by category as of December 31, 2015.

**Table 4: Allocation of Investments by Category
as of December 31, 2015**

Cash and Receivables	7.4%
Fixed Income (LTIF)	92.6%
Public Equity	0.0%
Other*	<u>0.0%</u>
Total	100.0%

* Real Estate, Alternatives, Inflation and Credit.

Section 5: Condition of the Plan

The following table shows the assets and liabilities of the Plan as of the current valuation date of December 31, 2015. The items shown in the table, other than the actuarial value of assets, are present values actuarially determined as of the valuation date.

**Table 5: Statement of Condition of the Plan
as of December 31, 2015**

Present value of prospective benefits payable to all disabled members on LTD as of the valuation date for:	
LTD approved claims	\$ 281,385,094
LTD incurred but not reported claims	27,703,228
STD incurred but not reported claims	<u>6,604,552</u>
Total claim liability	\$ 315,692,874
Actuarial value of assets	\$ 439,955,539
Deficit/(Surplus)	\$ (124,262,665)
Prospective present value of benefits for current active members	\$ 323,903,757
Present value of benefits not covered by actuarial value of assets	\$ 199,641,092
Present value of compensation for active members	\$ 151,783,800,468
Level contribution as a percentage of compensation to fund present value of benefits not covered by actuarial value of assets	0.14%

Claim liabilities are equal to the present value of future claim payments the Plan is obligated to make to members disabled as of the valuation date. The claim liabilities are separated into three classifications, which reflect the status of each claim as of the valuation date.

- Approved claim liabilities are for long term disabilities which have occurred, have been approved, and are in long term payment status as of the valuation date.
- LTD incurred but not reported liabilities are for disabilities which have occurred but are not in payment status as of the valuation date. These liabilities are estimated based on the one-year term cost for expected disablements during the year and a reserve of 14/12 of the term cost is added to account for the time after disability to receive LTD benefits.

Section 5: Condition of the Plan

- (c) STD incurred but not reported liabilities are for disabilities which have occurred but are not in payment status as of the valuation date. These liabilities are estimated based on the one-year term cost for expected disablements during the year and a reserve of 62/72 of the term cost is added to account for the timing of STD payments.

The method of determining claim liabilities and the assumptions used are described in Appendix D.

Section 6: Experience

Section 5 shows that the surplus under the Plan has increased by \$24,788,400 from \$99,474,265 to \$124,262,665 since the previous valuation date.

The following table shows a detailed reconciliation of the change in deficit/(surplus) since the prior valuation.

**Table 6: Reconciliation of Change in Deficit/(Surplus)
Since the Prior Valuation**

Prior Year Deficit/(Surplus)	\$ (99,474,265)
Impact of Experience Study	(5,116,421)
Prior Year Term Cost	31,198,636
Actual Contributions	(63,527,655)
Interest Adjustment	(4,528,320)
STD Experience	1,381,006
LTD Experience	12,591,026
Asset Loss/(Gain)	<u>3,213,328</u>
Current Deficit/(Surplus)	\$ (124,262,665)

Commentary: The changes in assumptions and methods from the experience study increased the surplus by \$5.1 million at December 31, 2014.

Section 7: Accounting Information

Statement Nos. 43 and 45 of the Governmental Accounting Standards Board (GASB) set forth certain items of information to be disclosed in the financial statements of the Plan.

The table below provides a distribution of the number of employees by type of membership.

Table 7: Number of Active and Disabled Participants as of December 31, 2015

Group	Number
Disabled participants receiving long-term disability benefits	6,709
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	0
Active members, including those in the waiting period or on short-term disability	<u>321,718</u>
Total	328,427

The table below provides the schedule of funding progress.

Table 8: Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Entry Age Actuarial Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
12/31/09	\$ 352,627,921	\$ 492,731,413	\$ 140,103,492	71.6%	\$ 14,534,661,403	0.96%
12/31/10	377,994,992	498,505,723	120,510,731	75.8%	14,360,373,354	0.84%
12/31/11	406,067,915	511,416,654	105,348,739	79.4%	14,139,467,246	0.75%
12/31/12	432,667,367	503,192,392	70,525,025	86.0%	14,163,204,361	0.50%
12/31/13	442,422,332	522,940,655	80,518,323	84.6%	14,294,017,494	0.56%
12/31/14	450,598,573	503,060,332	52,461,759	89.6%	14,459,666,607	0.36%
12/31/15	439,955,539	395,950,392	(44,005,147)	111.1%	14,718,736,311	-0.30%

The aggregate cost method does not identify or separately amortize unfunded liabilities. Information about the plan's funded status and funding progress have been prepared using the entry age actuarial cost method as an approximation and as required by GASB Statements 43 and 45.

Section 7: Accounting Information

The table below provides a reconciliation of the preliminary employer annual required contribution rate to the final employer annual required contribution for fiscal year ending June 30, 2016. The preliminary annual required contribution rate is based on the December 31, 2013 valuation.

Table 9: Reconciliation of Annual Required Contribution Rate

	Fiscal Year Ending 06/30/2016
Preliminary Annual Required Contribution Rate	
Normal Cost	0.41 %
Accrued Liability	<u>0.00</u>
Total	0.41 %
Impact of Legislative Changes	<u>0.00</u>
Final Annual Required Contribution Rate	0.41 %
Actual payroll for June 30, 2016	\$ <u>15,605,893,802</u>
Annual Required Contribution	\$ 63,984,165

Section 7: Accounting Information

The tables below provide the calculation of the annual OPEB cost and net OPEB obligation for the fiscal year ending June 30, 2016 followed by a three-year trend of the net OPEB obligation.

Table 10: Annual OPEB Cost and Net OPEB Obligation

	Fiscal Year Ending 06/30/2016
(a) Employer annual required contribution	\$ 63,984,165
(b) Interest on OPEB obligation*	(1,205,255)
(c) Adjustment to annual required contribution**	<u>2,351,462</u>
(d) Annual OPEB cost: (a) + (b) + (c)	\$ 65,130,372
(e) Employer contributions made for fiscal year ending 6/30/2016	<u>63,984,165</u>
(f) Increase (decrease) in net OPEB obligation: (d) - (e)	\$ 1,146,207
(g) Net OPEB obligation beginning of fiscal year	<u>(20,960,957)</u>
(h) Net OPEB obligation end of fiscal year: (f) + (g)	\$ (19,814,750)

* Based on the 5.75% investment rate of return assumption used for the December 31, 2013 valuation.

** Based on the ratio of the present value of future salary to valuation compensation for the December 31, 2013 valuation.

Table 11: Trend Information

Fiscal Year Ending	Annual OPEB Cost (AOC)	Percentage of AOC Contributed	Net OPEB Obligation
6/30/2014	\$ 67,039,143	98.0%	\$ (22,165,770)
6/30/2015	64,423,727	98.1%	(20,960,957)
6/30/2016	65,130,372	98.2%	(19,814,750)

Section 7: Accounting Information

The table below provides the annual required contribution (ARC) of the employer as a percentage of payroll, determined in accordance with the parameters of GASB 43/45.

Table 12: 2017/2018 Fiscal Year Annual Required Contribution (ARC) based on the Valuation as of December 31, 2015

Normal Cost	0.14 %
Accrued Liability	0.00
Total	0.14 %

Table 13: Additional Information for GASB 43/45

Valuation Date	12/31/2015
Actuarial Cost Method	Aggregate
Amortization Method	Level percent
Remaining amortization period	The aggregate cost method does not identify or separately amortize unfunded liabilities
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*	3.75%
Projected Salary Increases**	3.50% - 8.10%
*Includes Inflation of	3.00%
**Includes Inflation and Productivity of	3.50%
Cost-of-living Adjustments	3.50% for gross long term disability benefits
Total Claim Liability	\$ 315,692,874
Market Related Value of Assets	439,955,539
Deficit/(Surplus)	\$ (124,262,665)

Appendix A: Detailed Tabulations of the Active Member Data

Table A-1: The Number and Average Reported Compensation of Active Members Distributed by Age and Service as of December 31, 2015

Age	Years of Service										Total
	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	
Under 25	3,180	4,630	26	0	0	0	0	0	0	0	7,836
	13,225	31,418	32,740	0	0	0	0	0	0	0	24,039
25 to 29	3,576	20,596	4,262	47	0	0	0	0	0	0	28,481
	12,269	35,385	38,871	34,271	0	0	0	0	0	0	33,002
30 to 34	2,165	12,613	12,586	5,286	44	0	0	0	0	0	32,694
	13,849	39,034	42,012	44,142	36,946	0	0	0	0	0	39,336
35 to 39	1,695	10,289	9,278	11,812	4,170	28	0	0	0	0	37,272
	13,336	42,901	47,409	48,269	49,641	41,296	0	0	0	0	45,133
40 to 44	1,508	8,973	8,787	9,083	10,217	3,210	29	0	0	0	41,807
	12,267	40,731	48,385	49,476	52,759	55,134	47,793	0	0	0	47,263
45 to 49	1,419	8,561	9,141	9,748	8,552	8,522	2,801	29	0	0	48,773
	11,628	39,972	45,816	49,742	52,065	57,090	58,117	49,069	0	0	48,354
50 to 54	1,074	6,928	7,712	8,960	8,036	5,726	5,922	1,170	12	0	45,540
	11,325	39,982	44,298	46,503	49,899	55,003	60,343	62,636	55,639	0	48,193
55 to 59	855	5,494	6,498	8,018	7,753	6,034	4,540	1,917	439	7	41,555
	12,176	41,284	44,754	45,449	47,936	55,573	61,010	67,536	65,176	48,924	48,967
60 to 64	372	3,154	4,602	5,293	4,828	3,944	2,751	1,265	589	169	26,967
	13,141	43,507	45,441	46,864	50,216	56,467	66,592	78,499	76,476	70,530	52,060
65 to 69	121	902	1,594	1,791	1,352	978	661	436	317	170	8,322
	12,755	47,360	49,167	52,779	58,289	63,853	82,613	101,970	100,514	85,184	60,542
70 & Up	42	275	404	519	415	241	185	115	115	160	2,471
	14,371	40,066	41,894	48,959	56,874	67,713	81,553	99,034	114,811	106,707	60,959
Total	16,007	82,415	64,890	60,557	45,367	28,683	16,889	4,932	1,472	506	321,718
	12,690	38,955	44,937	47,698	50,927	56,354	62,253	72,855	81,108	86,594	45,750

Appendix A: Detailed Tabulations of the Active Member Data

Table A-2: The Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2015

Age	Men		Women	
	Number	Compensation	Number	Compensation
18	2	\$ 22,720	9	\$ 129,871
19	13	85,367	8	86,297
20	60	889,578	26	273,249
21	156	2,326,488	111	1,488,716
22	301	5,567,550	605	10,421,212
23	639	13,764,609	1,904	40,472,619
24	1,110	29,905,416	2,892	82,938,838
25	1,393	41,347,218	3,587	108,624,097
26	1,645	51,187,607	4,028	129,671,327
27	1,738	56,543,383	4,075	135,537,148
28	1,662	56,468,024	4,252	145,056,832
29	1,855	64,665,875	4,246	150,848,280
30	1,911	72,134,971	4,304	156,943,589
31	2,018	78,205,679	4,334	161,844,099
32	2,005	81,875,123	4,385	168,353,217
33	2,127	89,694,932	4,605	183,634,583
34	2,201	95,345,686	4,804	198,009,315
35	2,294	106,396,727	4,913	207,864,333
36	2,390	114,151,854	5,000	211,048,637
37	2,311	113,918,919	5,076	220,799,917
38	2,403	120,499,489	5,153	226,049,819
39	2,445	128,120,368	5,287	233,348,024
40	2,400	125,643,796	5,183	230,251,882
41	2,509	133,601,977	5,622	249,252,495
42	2,579	132,704,512	5,534	250,248,953
43	2,683	142,349,270	5,937	264,637,237
44	3,001	160,000,671	6,359	287,245,172
45	3,307	176,380,080	7,068	320,003,854
46	3,140	176,195,561	7,020	318,177,123
47	3,089	174,583,433	6,671	303,142,515
48	2,935	163,297,863	6,363	282,222,060
49	2,876	163,616,756	6,304	280,753,989
50	2,885	161,592,803	6,168	273,013,274
51	2,854	158,072,048	6,314	279,602,968
52	2,939	168,245,064	6,237	277,979,125
53	2,891	163,589,579	6,182	275,660,576
54	2,786	156,057,833	6,284	280,887,417
55	2,741	153,056,792	6,027	267,048,368
56	2,606	146,811,025	5,874	267,318,229
57	2,668	152,295,079	5,630	252,730,392

Appendix A: Detailed Tabulations of the Active Member Data

Table A-2: The Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2015 (continued)

Age	Men		Women	
	Number	Compensation	Number	Compensation
58	2,586	\$ 149,686,475	5,572	\$ 256,166,174
59	2,499	142,378,768	5,352	247,328,523
60	2,360	133,467,141	4,867	226,250,481
61	2,150	127,323,199	4,109	190,773,115
62	2,013	121,527,795	3,634	172,418,552
63	1,549	98,267,834	2,752	134,183,116
64	1,353	88,728,233	2,180	110,947,541
65	1,120	78,751,883	1,719	86,799,405
66	806	58,905,240	1,093	52,916,739
67	665	50,244,087	770	39,981,473
68	530	42,055,020	598	31,430,632
69	496	36,736,176	525	26,006,529
70	299	23,037,184	300	15,078,902
71	222	16,074,397	225	11,017,725
72	192	13,830,146	157	7,199,137
73	165	12,830,103	140	5,774,576
74	117	9,860,122	92	4,083,848
75	93	5,965,160	63	2,603,766
76	62	4,102,702	39	1,825,550
77	56	3,132,026	29	996,755
78	39	2,752,299	24	831,753
79	31	2,496,399	15	616,806
80	19	935,398	11	499,174
81	13	922,649	9	325,249
82	12	907,217	4	159,368
83	5	394,634	10	348,253
84	7	612,944	4	144,481
85	3	369,034	1	33,107
86	4	356,071	1	45,472
87	1	30,658		
88	1	76,884		
89			3	93,598
90			1	21,235
91	2	246,025		
Total	103,038	\$ 5,358,215,628	218,680	\$ 9,360,520,683

Appendix A: Detailed Tabulations of the Active Member Data

Table A-3: The Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2015

Service	Men		Women	
	Number	Compensation	Number	Compensation
0	4,808	\$ 63,406,011	11,199	\$ 139,717,504
1	8,409	304,562,325	17,064	560,142,946
2	7,186	320,315,218	14,096	543,095,922
3	6,474	292,637,302	13,232	511,506,545
4	5,403	254,323,979	10,551	423,864,932
5	4,548	222,618,712	8,769	364,234,647
6	3,852	186,552,605	7,352	311,038,138
7	3,294	179,736,668	6,538	277,410,094
8	5,091	253,501,600	10,710	450,243,123
9	4,594	240,464,277	10,142	430,179,581
10	4,466	234,360,716	10,440	446,671,462
11	4,000	209,449,269	9,148	404,636,571
12	3,743	204,777,693	8,525	384,095,872
13	3,314	184,531,316	7,417	343,364,679
14	2,833	165,203,853	6,671	311,358,397
15	2,937	172,112,542	7,333	338,851,973
16	2,890	170,595,223	7,029	330,107,687
17	2,694	161,258,467	6,650	313,545,622
18	2,447	146,731,165	5,883	284,913,381
19	2,249	135,521,808	5,255	256,770,970
20	2,132	133,000,943	4,791	239,029,242
21	1,906	117,650,278	4,182	216,659,740
22	2,050	131,707,596	3,834	201,980,888
23	1,640	113,626,357	3,486	189,664,260
24	1,608	106,615,659	3,054	166,463,548
25	1,197	84,856,558	2,384	137,644,600
26	1,437	99,713,555	2,481	142,239,000
27	1,203	81,797,281	2,381	136,471,075
28	1,124	79,442,276	2,188	126,432,825
29	846	62,855,300	1,647	99,883,814
30	532	42,460,326	1,072	67,073,704
31	434	37,675,103	826	51,985,370
32	383	34,156,574	604	38,827,189
33	266	24,732,100	357	24,532,156
34	181	17,882,881	276	19,927,475
35	166	15,686,131	199	12,992,096
36	125	11,930,916	208	13,483,283
37	133	13,648,753	180	12,351,411
38	119	13,477,018	152	10,216,667
39	88	8,407,322	102	7,197,059

Appendix A: Detailed Tabulations of the Active Member Data

Table A-3: The Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2015 (continued)

Service	Men		Women	
	Number	Compensation	Number	Compensation
40	51	\$ 5,365,661	76	\$ 5,497,975
41	48	4,753,370	45	3,634,484
42	34	3,388,508	49	3,194,989
43	22	2,199,668	27	1,865,980
44	32	2,888,854	22	1,647,000
45	7	758,886	16	1,122,083
46	15	1,760,974	16	1,129,873
47	5	603,906	6	541,026
48	14	1,570,659	4	277,367
49	2	224,752	1	87,166
50	2	380,356		
51	1	82,210	1	63,682
52	1	101,670		
53			5	422,438
54			1	42,187
55	1	95,031	1	49,410
56	1	57,447	1	66,633
60			1	72,942
Total	103,038	\$ 5,358,215,628	218,680	\$ 9,360,520,683

Appendix B: Detailed Tabulations of the Disabled Member Data

Table B-1: The Number and Annual Amount of Long Term Disability Benefits Reported

Group	As of December 31, 2015		As of December 31, 2014	
	Number	Annual Reported Benefits	Number	Annual Reported Benefits
Disabled prior to January 1, 1988	92	\$ 187,444	105	\$ 205,551
Disabled after January 1, 1988	<u>6,617</u>	<u>75,684,947</u>	<u>6,795</u>	<u>77,477,194</u>
Total	6,709	\$ 75,872,391	6,900	\$ 77,682,745

Appendix B: Detailed Tabulations of the Disabled Member Data

Table B-2: The Number and Annual Long Term Disability Benefits of Disabled Members by Age as of December 31, 2015
Disabled Prior to January 1, 1988

Age	Men		Women	
	Number	Allowances	Number	Allowances
55			1	\$ 4,973
59			1	4,478
60			4	9,171
61			3	6,365
62	1	\$ 471	3	10,488
63	1	1,078		
64	1	2,315	3	7,031
65	2	4,351	1	176
66	2	3,621	1	472
67			1	3,078
68	1	2,652	2	3,477
69	2	3,661	6	18,589
70	1	2,663		
71	1	2,140	2	3,023
72	1	2,090		
73	1	2,203	1	353
74	1	1,127	3	3,377
75	2	2,955	3	6,170
76			2	3,948
78	1	307	1	2,298
79			1	1,764
80	1	2,717	1	1,059
81			1	6,443
83			1	1,209
84			2	3,774
85			2	3,911
86			2	914
87	1	2,354	3	5,994
88			4	11,912
89			2	318

Appendix B: Detailed Tabulations of the Disabled Member Data

Table B-2: The Number and Annual Long Term Disability Benefits of Disabled Members by Age as of December 31, 2015 (continued)

Disabled Prior to January 1, 1988

Age	Men		Women	
	Number	Allowances	Number	Allowances
90			1	\$ 4,645
91			4	9,735
92			1	622
93	1	\$ 1,144	3	3,184
94			2	1,948
96			1	1,052
98			1	2,660
100			1	984
Total	21	\$ 37,849	71	\$ 149,595

Appendix B: Detailed Tabulations of the Disabled Member Data

Table B-3: The Number and Annual Long Term Disability Benefits of Disabled Members by Age as of December 31, 2015
Disabled After January 1, 1988

Age	Men		Women	
	Number	Allowances	Number	Allowances
27			1	\$ 17,653
30	3	\$ 16,892		
31			1	2,051
32	1	9,719	6	122,686
33	1	9,980	7	140,210
34	5	63,294	12	191,812
35	5	43,987	8	98,783
36	4	70,807	14	204,519
37	9	135,686	21	255,029
38	10	123,223	22	385,304
39	10	141,555	39	654,811
40	14	187,096	39	525,176
41	20	327,078	36	520,337
42	21	264,285	35	505,886
43	23	250,152	51	754,984
44	23	255,512	71	1,045,034
45	30	420,501	85	1,031,172
46	38	470,268	113	1,590,444
47	44	577,993	101	1,493,538
48	63	733,647	124	1,908,640
49	55	633,009	135	1,889,294
50	72	963,986	153	1,977,930
51	79	907,575	189	2,570,550
52	81	917,734	197	2,437,173
53	104	1,249,171	193	2,406,306
54	92	842,041	220	2,657,319
55	88	1,016,547	282	3,129,323
56	111	1,191,093	253	3,132,355
57	133	1,419,310	266	2,951,000
58	133	1,184,966	293	3,182,451
59	158	1,546,569	289	2,984,926
60	118	1,084,937	289	3,228,664
61	103	930,458	249	2,623,128
62	110	795,441	251	2,640,038

Appendix B: Detailed Tabulations of the Disabled Member Data

Table B-3: The Number and Annual Long Term Disability Benefits of Disabled Members by Age as of December 31, 2015 (continued)

Disabled After January 1, 1988

Age	Men		Women	
	Number	Allowances	Number	Allowances
63	105	\$ 711,958	216	\$ 2,371,095
64	108	775,544	220	2,125,148
65	56	445,462	97	1,059,477
66			4	96,543
68			1	17,988
69	1	11,648		
72			1	9,399
73	1	9,398		
74	1	8,249		
Total	2,033	\$ 20,746,771	4,584	\$ 54,938,176

Appendix C: Development of Actuarial Value of Assets

Development of Actuarial Value of Assets for the Year Ending December 31, 2015

Asset Data as of	12/31/2015
Beginning of Year Market Value of Assets	\$ 439,705,629
Contributions	63,527,655
Benefit Payments	(76,313,641)
Net Cash Flow	(12,785,986)
Expected Investment Return	16,249,224
Expected End of Year Market Value of Assets	443,168,867
End of Year Market Value of Assets	427,102,227
Excess of Market Value over Expected Market Value of Assets	(16,066,640)
80% of 2015 Asset Gain/(Loss)	(12,853,312)
60% of 2014 Asset Gain/(Loss)	N/A
40% of 2013 Asset Gain/(Loss)	N/A
20% of 2012 Asset Gain/(Loss)	N/A
Total Deferred Asset Gain/(Loss)	(12,853,312)
Preliminary End of Year Actuarial Value of Assets	439,955,539
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	439,955,539
Estimated Net Investment Return on Actuarial Value	3.01%

Commentary: The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution. The asset valuation method was changed during the experience study from a method that calculated the actuarial value of assets as 20% of the market value of assets plus 80% of the expected actuarial value of assets to a method that recognizes asset returns in excess of or less than the expected return on the market value of assets over a five-year period.

The new asset valuation method re-set the actuarial value of assets to the market value of assets at December 31, 2014, effective for the December 31, 2015 valuation. Lower than expected market returns in 2015 resulted in an actuarial value of asset return for calendar year 2015 of 3.01% and an asset loss of \$3.2 million during 2015.

The actuarial value of assets would have been \$456,103,972 as of December 31, 2015 under the asset valuation method used in the prior valuation.

Appendix D: Statement of 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 April 21, 2016 for use with the December 31, 2015 annual actuarial valuation.

Interest Rate: 3.75% 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.

Separations From Active Service: Representative values of the assumed rates of separation from active service are as follows:

Service	Annual Rates of Withdrawal							
	General		Classroom		Law Enforcement		Other	
	Employees		Teachers		Officers		Education	
	Male	Female	Male	Female	Male	Female	Male	Female
0	.180	.195	.190	.170	.130	.130	0.190	0.165
1	.155	.170	.160	.145	.100	.100	0.160	0.135
2	.130	.145	.140	.135	.090	.090	0.130	0.120
3	.110	.115	.120	.120	.060	.060	0.115	0.100
4	.090	.100	.095	.100	.060	.060	0.100	0.085

Age	General Employees Annual Rates of			
	Withdrawal and Vesting*		Base Mortality**	
	Male	Female	Male	Female
25	.0800	.1100	.0005	.0002
30	.0700	.0850	.0005	.0002
35	.0525	.0600	.0005	.0003
40	.0400	.0450	.0006	.0004
45	.0350	.0375	.0010	.0007
50	.0350	.0375	.0017	.0011
55	.0350	.0375	.0028	.0017
60	.0350	.0375	.0047	.0024
65			.0083	.0037
69			.0125	.0057

* These rates apply only after five years of membership in the system.

** Base mortality rates as of 2014.

Appendix D: Statement of Actuarial Assumptions and Methods

Classroom Teachers

Annual Rates of

Age	<u>Withdrawal and Vesting*</u>		<u>Base Mortality**</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	.0800	.0900	.0003	.0001
30	.0700	.0750	.0003	.0002
35	.0450	.0450	.0004	.0002
40	.0350	.0340	.0004	.0003
45	.0325	.0325	.0007	.0006
50	.0325	.0325	.0012	.0009
55	.0325	.0325	.0020	.0014
60	.0325	.0325	.0033	.0021
65			.0058	.0031
69			.0092	.0049

* These rates apply only after five years of membership in the system.

** Base mortality rates as of 2014.

Other Education Employees

Annual Rates of

Age	<u>Withdrawal and Vesting*</u>		<u>Base Mortality**</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	.0800	.1200	.0003	.0001
30	.0600	.0700	.0003	.0002
35	.0450	.0450	.0004	.0002
40	.0400	.0400	.0004	.0003
45	.0400	.0375	.0007	.0006
50	.0400	.0375	.0012	.0009
55	.0400	.0375	.0020	.0014
60	.0400	.0375	.0033	.0021
65			.0058	.0031
69			.0092	.0049

* These rates apply only after five years of membership in the system.

** Base mortality rates as of 2014.

Appendix D: Statement of Actuarial Assumptions and Methods

Law Enforcement Officers

Annual Rates of

Age	Withdrawal and Vesting*		Base Mortality**	
	Male	Female	Male	Female
25	.0400	.0400	.0005	.0002
30	.0350	.0350	.0005	.0002
35	.0300	.0300	.0005	.0003
40	.0300	.0300	.0006	.0004
45	.0400	.0400	.0010	.0007
50	.0400	.0400	.0017	.0011
55	.0400	.0400	.0028	.0017
60	.0400	.0400	.0047	.0024
65			.0083	.0037
69			.0125	.0057

* These rates apply only after five years of membership in the system.

** Base mortality rates as of 2014.

Retirements: Representative values of the assumed rates of retirement from active service are as follows:

General Employees - Males

Age	Service						
	5	10	15	20	25	30	35
50				0.0350	0.0800	0.3500	0.2000
55				0.0500	0.1000	0.3500	0.2000
60	0.0850	0.0850	0.0850	0.0850	0.2750	0.3000	0.2250
65	0.2500	0.2750	0.2750	0.2750	0.2750	0.2750	0.2750
70	0.3250	0.2250	0.2250	0.2250	0.2250	0.2250	0.2250
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

General Employees - Females

Age	Service						
	5	10	15	20	25	30	35
50				0.0350	0.0600	0.4000	0.3000
55				0.0500	0.0800	0.3250	0.2250
60	0.0950	0.0950	0.0950	0.0950	0.2500	0.3000	0.2000
65	0.4000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
70	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Appendix D: Statement of Actuarial Assumptions and Methods

Classroom Teachers - Males

	Service						
Age	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50				0.0250	0.0650	0.3000	0.3000
55				0.0450	0.0900	0.3250	0.2500
60	0.1200	0.1200	0.1200	0.1200	0.3000	0.2500	0.2500
65	0.3000	0.3250	0.3250	0.3250	0.2000	0.2000	0.2000
70	0.2250	0.2250	0.2250	0.2250	0.2250	0.2250	0.2250
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Classroom Teachers - Females

	Service						
Age	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50				0.0350	0.0550	0.2750	0.2750
55				0.0600	0.0950	0.4000	0.3000
60	0.1350	0.1350	0.1350	0.1350	0.4500	0.5000	0.3250
65	0.3500	0.3750	0.3750	0.3750	0.3500	0.3500	0.3500
70	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Other Education Employees - Males

	Service						
Age	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50				0.0350	0.0800	0.3000	0.1500
55				0.0400	0.1000	0.2500	0.2000
60	0.0900	0.0900	0.0900	0.0900	0.2250	0.2500	0.2500
65	0.2750	0.3000	0.3000	0.3000	0.2750	0.2750	0.2750
70	0.2250	0.2250	0.2250	0.2250	0.2250	0.2250	0.2250
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Other Education Employees - Females

	Service						
Age	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50				0.0400	0.0550	0.3250	0.2250
55				0.0500	0.0900	0.2250	0.2250
60	0.1100	0.1100	0.1100	0.1100	0.2500	0.2500	0.2500
65	0.2500	0.2750	0.2750	0.2750	0.3500	0.3500	0.3500
70	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Appendix D: Statement of Actuarial Assumptions and Methods

Law Enforcement Officers							
Age	Service						
	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50			0.0900	0.0900	0.0900	0.6000	0.6000
55	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
60	0.2000	0.2000	0.2000	0.2000	0.2000	0.5000	0.5000
65	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
70	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Salary Increases: Representative values of the assumed annual rates of salary increases are as follows:

Annual Rate of Salary Increase				
<u>Service</u>	<u>Classroom Teachers</u>	<u>Other Education Employees</u>	<u>General Employees</u>	<u>Law Enforcement Officers</u>
0	7.55%	7.00%	5.50%	8.10%
5	6.05	6.25	4.50	6.10
10	5.10	5.50	4.00	4.40
15	4.35	4.75	3.50	3.95
20	3.65	4.00	3.50	3.65
25	3.50	3.50	3.50	3.50
30	3.50	3.50	3.50	3.50
35	3.50	3.50	3.50	3.50
40	3.50	3.50	3.50	3.50
45	3.50	3.50	3.50	3.50
50	3.50	3.50	3.50	3.50

Deaths Prior to Retirement: Mortality Rates are based on the RP-2014 Total Data Set Employee Mortality Table for general employees and law enforcement officers. Mortality rates are based on the RP-2014 White Collar Employee Mortality Table for teachers and other education employees.

Mortality Projection (Non-Disabled): 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 on July 1 of each year.

Appendix D: Statement of Actuarial Assumptions and Methods

Rates of Disability: The assumed rates of disability per 1,000 lives exposed are as follows:

Rate of Disability Per 1,000 Lives		
Age	Males	Females
20-24	0.621	0.779
25-29	0.684	0.889
30-34	0.802	1.186
35-39	1.045	1.766
40-44	1.529	2.309
45-49	2.649	3.444
50-54	4.826	5.307
55-59	8.551	7.696
60-64	12.054	9.040

Rates of Termination of Disability: Monthly select rates of termination of disability were used for the first 24 months of disability. Sample rates of termination per 1,000 lives are as follows:

Males									
Duration of Disability (in months)	Age at Disability								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
5	187.7	166.3	150.7	135.4	121.8	108.3	94.4	83.9	75.6
10	51.5	44.4	38.3	33.3	29.5	26.6	23.1	21.2	19.8
15	32.7	27.9	23.7	20.2	17.8	16.1	13.8	12.6	12.0
20	23.0	20.1	17.1	14.7	12.8	11.6	9.6	9.0	8.6
24	20.6	18.1	15.4	13.3	11.4	10.2	8.3	7.7	7.3

Females									
Duration of Disability (in months)	Age at Disability								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
5	177.5	157.7	139.5	126.0	115.0	106.0	96.0	88.7	81.3
10	46.5	40.8	36.5	33.2	31.0	29.1	26.3	24.6	22.6
15	29.7	25.8	22.6	20.2	18.4	17.1	15.2	14.1	13.0
20	21.8	18.7	16.3	14.3	12.8	11.8	10.2	9.5	8.9
24	19.8	16.8	14.6	12.7	11.2	10.3	8.6	8.1	7.5

Appendix D: Statement of Actuarial Assumptions and Methods

Annual select and ultimate rates of termination of disability were used after the first 24 months of disability, with select rates effective from 5 to 25 years. Sample rates per 1,000 lives are as follows:

Males

Duration of Disability (in years)	Age at Disability								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
5	94.7	83.8	72.9	63.5	56.3	51.2	42.3	43.8	43.2
10	42.0	40.3	36.3	32.2	30.0	31.2	34.3	38.0	40.9
15	29.2	28.3	28.4	27.3	28.3	32.2	35.9	40.8	47.2
20	25.2	26.3	29.3	31.4	36.1	42.2	47.8	58.5	68.4
25	28.3	28.5	33.6	36.2	38.1	53.1	59.6	88.8	129.4

Females

Duration of Disability (in years)	Age at Disability								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
5	90.9	76.3	64.7	55.4	48.5	44.4	37.2	38.5	37.1
10	40.0	35.6	29.3	25.4	23.0	23.0	24.5	27.9	29.5
15	28.5	26.5	22.4	20.6	20.5	22.2	25.1	26.2	37.5
20	26.8	23.8	21.8	21.5	24.2	27.7	31.9	39.8	55.7
25	27.6	25.5	25.1	24.2	27.1	41.7	41.5	76.6	130.2

Social Security Assumptions: The assumed rate of approval for Social Security disability benefits prior to completion of four years of disability from the conclusion of the waiting period is 50%.

National Average Wage: National average wage growth is assumed to be 3.50% per year for purposes of calculating Social Security benefits.

Future Increases in Social Security Benefits: Social Security disability benefits are assumed to increase by 3.00% per year. This impacts those disabled on or after January 1, 1988.

Across-the-Board Salary Increases: 3.50% per year. This impacts the LTD benefits (before reductions) for those disabled on or after January 1, 1988.

Other Offsets: No additional offsets due to Worker's Compensation or Outside Earnings, other than those reported, have been assumed.

Appendix D: Statement of Actuarial Assumptions and Methods

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

Valuation Compensation: Reported compensation adjusted based on the assumed annual rates of salary increase to reflect the assumed rate of pay as of the valuation date.

Administrative Expenses: No allowance made. It is assumed that the administrative costs of the plan are provided for out of the general operating funds of the state.

Valuation Method: Aggregate.

Asset Valuation Method: Actuarial value, as developed in Appendix C. 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

Incurred But Not Reported Claims (IBNR): IBNR claims are based on the one-year term cost for expected disablements during the year. For short-term disability, a reserve of 62/72 of the term cost is added to account for the timing of STD payments. That reserve includes an allowance for STD that has been incurred but not reported, as well as STD in pay status. For long-term disability, a reserve of 14/12 of the term cost is added to account for the waiting time after disability to receive LTD benefits.

Changes Since Prior Valuation: The discount rate, the withdrawal rates, the retirement rates, the mortality assumption, the annual rates of salary increase, the disability rates, the termination of disability rates, and the asset valuation method were changed based on the experience study prepared as of December 31, 2014 and adopted by the Board of Trustees on April 21, 2016.

Appendix E: Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

The Disability Income Plan of North Carolina became effective January 1, 1988. The Plan replaced the Disability Salary Continuation Plan for Teachers and State Employees of North Carolina (DSC Plan). Those beneficiaries disabled prior to January 1, 1988 continue to be covered under the provisions of the DSC Plan as in effect December 31, 1987. Beneficiaries disabled on or after January 1, 1988 are covered under the provisions of the Disability Income Plan. The following summary describes the main membership, benefit and contribution provisions of the Plan as interpreted for the valuation.

Membership in the Plan

All teachers and other employees who are in active service and are members of the Teachers and State Employees' Retirement System or the Optional Retirement Program on or after January 1, 1988 are eligible to participate in the Plan.

Benefits

Definition of Disability	The mental or physical incapacity for the further performance of duty of a beneficiary; provided that such incapacity was not the result of terrorist activity, of active participation in a riot, of the commission or attempt to commit a felony, or of the intentional self-infliction of an injury.
Waiting Period	A beneficiary shall receive no benefits from the Plan for a period of 60 continuous calendar days from the onset of disability determined as the last actual day of service or the day succeeding at least 365 calendar days after the commencement of service as a teacher or employee, whichever is later.
Salary Continuation Benefits	<p>During the waiting period, a beneficiary may be paid such salary continuation as provided by an employer through the use of sick leave, vacation leave or any other salary continuation.</p> <p>A disabled beneficiary may elect to receive any such salary continuation in lieu of STD benefits provided such election shall not extend the 365 days duration of the STD period.</p> <p>A disabled beneficiary may elect to receive any such salary continuation in lieu of LTD benefits provided such election shall not extend the first 36 consecutive calendar months of the LTD period.</p>

Appendix E: Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

Eligibility for Short Term Disability	Any beneficiary who becomes disabled and is no longer able to perform his usual occupation after at least 365 calendar days succeeding his date of initial employment and at least one year of contributing membership service in the Teachers' and State Employees' Retirement System (TSERS) may be eligible for STD benefits.
Commencement of STD Benefits	The STD benefit commences on the first day succeeding the waiting period.
Duration of STD Benefits	These benefits are payable for 365 days following the waiting period. The first six months of benefits are payable by the employer outside of the trust. The remaining six months are paid by the employer outside of the trust but the employer is reimbursed by the trust quarterly. STD benefits may be extended up to an additional 365 days if the Medical Board determines that the beneficiary's disability is temporary and is likely to end within the extended period. During this extended period, STD benefits are paid directly from the trust.
Amount of Monthly STD Benefits	50% of 1/12th of the annual base rate of compensation last payable to the beneficiary prior to the beginning of the STD period plus 50% of 1/12th of the annual longevity payment (see below) to which the beneficiary would be eligible, to a maximum of \$3,000 per month, reduced by monthly payments for Workers' Compensation. Provided that a beneficiary has earnings in excess of the STD benefit, the STD benefit shall be reduced on a dollar-for-dollar basis by the amount that exceeds the STD benefit.
Eligibility for Long Term Disability	Any beneficiary who has five or more years of (LTD) Benefits membership service may receive LTD benefits from the Plan upon approval by the Board of Trustees provided that the disability is likely to be permanent.

Appendix E: Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

Commencement of LTD Benefits	Benefits commence on the first day succeeding the conclusion of the short-term disability period provided the beneficiary makes application for such benefits within 180 days after the short-term disability period ceases or after salary continuation payments cease, whichever is later.
Duration of LTD Benefits	The LTD benefit is payable until the earliest date at which the beneficiary is eligible for an unreduced service retirement allowance from TSERS as described in the December 31, 2012 valuation report for TSERS.
Amount of Monthly LTD Benefits	65% of 1/12th of the annual base rate of compensation last payable to the beneficiary prior to the beginning of the STD benefit period plus 65% of 1/12th of the annual longevity payment (see below) to which the beneficiary would be eligible, to a maximum of \$3,900 per month, reduced by benefits payable from other plans including but not limited to the "Plan Offsets" (listed below).
Post Disability Benefit Adjustments	The compensation upon which the short-term or long-term disability benefit is calculated may be increased by any percentage across-the-board salary increases granted by the General Assembly. Benefits shall be reduced by future increases granted by the Social Security Administration.
Plan Offsets	(1) Primary Social Security disability benefits. For beneficiaries not approved for Primary Social Security disability benefits, upon completion of four years from the conclusion of the waiting period, the beneficiary's benefit shall be reduced by an amount as determined by the Board of Trustees, equal to a Primary Social Security disability benefit to which the beneficiary might be entitled had the beneficiary been awarded Social Security disability benefits. For members with less than five years of service as of July 31, 2007, the LTD benefit ceases after 36 months if the member has not been approved for Social Security disability benefits.

Appendix E: Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

- (2) Workers' Compensation and statutory disability plans.
- (3) Teachers' and State Employees' Retirement System, or other retirement systems supported by the State.
- (4) Other insurance plans to which the State contributes.
- (5) Wages or other income paid by public or private employers.

Annual Longevity Payments

These payments are based on service and are additional components of the STD and LTD benefit formulas.

<u>Years of Service</u>	<u>Percentage of Base Salary</u>
less than 10	0.00%
10 - 14	1.50%
15 - 19	2.25%
20 - 24	3.25%
25 and over	4.50%

Benefits for Participants Disabled Prior to January 1, 1988 and Receiving Payments Under Former Disability Salary Continuation Plan

The LTD benefit is payable until termination of disability and pays 60% of monthly salary to a maximum of \$1,000 per month reduced by benefits payable from other plans including but not limited to the "Plan Offsets."

Plan Offsets include:

- Social Security benefits payable:
Prior to July 1, 1974 - Full family benefits.
July 1, 1974 and after - Primary benefits only.
- Workers' Compensation and statutory disability plans.

Appendix E: Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

- Teachers' and State Employees' Retirement System, or other retirement systems supported by the State.
- Other insurance plans to which the State contributes.
- Wages or other income paid by public or private employers.

Benefits shall not be increased by future across-the-board salary increases granted by the General Assembly nor decreased by any future increases granted by the Social Security Administration.

Contributions

All contributions are to be made by the State or Employing Units.

Changes Since Prior Valuation: None