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Disability Income Plan of North Carolina Principal Actuarial Valuation Results as of December 31, 2017

October 25, 2018 Board of Trustees Meeting

Larry Langer, ASA, FCA, EA, MAAA

Jonathan Craven, ASA, FCA, EA, MAAA



Disability Income Plan
Principal December 31, 2017
Actuarial Valuation Results



Valuation Results as of	December 31, 2017	December 31, 2016
Active Members		
Teachers' and State Employees' Retirement System (TSERS)	304,554	305,013
Optional Retirement Program (ORP)	<u>20,682</u>	<u>18,456</u>
Total	325,236	323,469
Reported compensation		
TSERS	\$13,914,085,325	\$13,497,815,754
ORP	<u>1,849,802,363</u>	<u>1,680,321,122</u>
Total	\$15,763,887,688	\$15,178,136,876
Valuation compensation*		
TSERS	\$15,058,805,483	\$14,282,093,846
ORP	<u>2,026,106,857</u>	<u>1,824,702,864</u>
Total	\$17,084,912,340	\$16,106,796,710
Number of beneficiaries receiving extended short-term or long term disability benefits	6,594	6,617
Annual reported benefits	\$ 77,899,175	\$ 78,501,354

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

Disability Income Plan
Principal December 31, 2017
Actuarial Valuation Results



Assets and Liabilities as of	December 31, 2017	December 31, 2016
Assets		
Actuarial Value	\$ 424,219,638	\$ 442,086,171
Market Value	\$ 416,504,516	\$ 433,946,692
Liability for currently disabled members	\$ 316,191,137	\$ 313,361,174
Deficit / (Surplus) versus Actuarial Value	\$ (108,028,501)	\$ (128,724,997)
ADC Rate for Fiscal Year Ending	June 30, 2020	June 30, 2019
Preliminary actuarially determined contribution (ADC) Rate		
Normal Cost	0.10%	0.13%
Accrued Liability	<u>N/A</u>	<u>N/A</u>
Total	0.15%	0.13%
Impact of Legislative Changes	(0.05%)	0.00%
Final ADC Rate**	0.10%	0.13%

** For FYE 2020, the final ADC Rate may be adjusted to reflect Plan changes that occur after the date of this report.

Disability Income Plan Employer Contribution Rate History



Valuation Date	Fiscal Year Ending	Preliminary ADC Rate	Change Due to Legislation	Final ADC Rate	Appropriated Rate
12/31/2017	6/30/2020	0.15%	(0.05%)	0.10% ¹	TBD
12/31/2016	6/30/2019	0.13%	0.00%	0.13%	0.14%
12/31/2015	6/30/2018	0.14%	0.00%	0.14%	0.14%
12/31/2014	6/30/2017	0.38%	0.00%	0.38%	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%

¹ This ADC Rate is a preliminary rate that will become the final ADC Rate if no legislation is enacted after the date that this report is issued that would affect the determination of the ADC Rate for the fiscal year ending in 2020.



Certification

Cavanaugh Macdonald Consulting, LLC was retained as the actuary for the Disability Income Plan of North Carolina (the Plan) and has prepared this December 31, 2017 actuarial valuation report for the Plan. The information contained in this report is intended to be used by the Board of Trustees for the Teachers' and State Employees' Retirement System of North Carolina (System) for the purposes stated herein, and its use for other purposes may not be appropriate. Calculations for purposes other than those described in this report may produce significantly different results.

Additional information and disclosures related to the census and financial data, assumptions, methods, and plan information provided by the System for valuation purposes can be found in the unabridged December 31, 2017 actuarial valuation report for the Plan. Results prior to December 31, 2017 were provided by the prior consulting actuary.

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, Cavanaugh Macdonald Consulting performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information. **This report does not consider all possible scenarios.**



Certification

The funded status measurements included in this report are based on the assumptions and methods used as of the valuation and/or measurement date. These funded status measurements do not indicate whether or not the Plan would have sufficient assets if it were terminated, nor do they indicate what level of future contributions would be required. Funded status measurements would be also be different if the market value of assets was used in these calculations instead of an actuarial value of assets.

Cavanaugh Macdonald Consulting does not provide legal, investment, or accounting advice. Thus, the information in this report is not intended to supersede or supplant the advice and interpretations of the System, OSC, or their legal, investing, or accounting partners.

The undersigned are familiar with the near-term and/or long-term aspects of other postemployment benefit plan valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained in this report. All sections of this report, including any appendices and attachments, are considered an integral part of the actuarial opinions.



Certification

This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

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

Jonathan T. Craven, ASA, EA, FCA, MAAA
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Alisa Bennett, FSA, EA, FCA, MAAA
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Senior Actuary



Cavanaugh Macdonald
CONSULTING, LLC
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Disability Income Plan of North Carolina

Report on the Annual Valuation
Prepared as of December 31, 2017

October 2018





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 18, 2018

Board of Trustees
Teachers' and State Employees' Retirement System of North Carolina
3200 Atlantic Avenue
Raleigh, NC 27604

Members of the Board:

This report presents the results of the actuarial valuation of the Disability Income Plan of North Carolina (referred to as "DIPNC", "Disability Income Plan", or "Plan"), prepared as of December 31, 2017.

The primary purpose of the valuation report is to provide the actuarially determined employer contribution rates for DIPNC during the fiscal year ending on June 30, 2020, to describe the current financial condition of DIPNC, to analyze changes in such condition, and to summarize the census data, financial information, assumptions, methods, and plan provisions used to prepare these results.

In addition, the report contains information that will be used by the Office of the State Controller (OSC) in its Comprehensive Annual Financial Report (CAFR), and provides the DIPNC information required under Governmental Accounting Standards Board (GASB) Statement No. 74 for the fiscal year ending on June 30, 2018 based on a valuation date of December 31, 2017.

Additional Information and Disclosures

The information contained in this report is intended to be used by the Board of Trustees for the Teachers' and State Employees' Retirement System of North Carolina (System) for Plan funding purposes for the fiscal year ending on June 30, 2020 and Plan accounting purposes for the fiscal year ending on June 30, 2018, and its use for other purposes may not be appropriate. Calculations for purposes other than funding the DIPNC benefits described in this report, or reporting the Plan accounting information required under GASB 74, may produce significantly different results.

This report may also be used in conjunction with other materials for the purposes of auditing the Plan. However, the use of this report for any other purposes or by any parties other than the System, OSC, and its auditors may not be appropriate and may result in mistaken conclusions because of a failure to appreciate the limitations of census and financial data,



understand applicable assumptions and methods, or correctly identify situations that would render the report inappropriate for a given purpose. None of the attached pages should be provided to any other parties without a copy of this cover letter. Moreover, no person or entity may make any representations or warranties based on any statements or conclusions contained in this report without the express written consent of Cavanaugh Macdonald Consulting.

These results supersede all December 31, 2017 actuarial valuation results for DIPNC, including draft versions of this document, issued prior to the date of this report. The System should rely only on the December 31, 2017 actuarial valuation results and actuarially determined contribution (ADC) rates for the fiscal year ending on June 30, 2020 provided herein.

The results contained in this report were prepared by qualified actuaries according to generally accepted actuarial principles and practices, and in compliance with Actuarial Standards of Practice issued by the Actuarial Standards Board. Our understanding is that the System has made no changes to the Plan's funding policy since the prior valuation. Thus, ADC rates as of the valuation date were developed based on the contribution allocation procedure described in GASB Statement Nos. 43 and 45, as approved by the System during prior periods. The financial accounting information provided in this report reflects our current understanding of GASB 74, including any applicable guidance provided by the System, or its audit partners as of the date of this report.

The measurement of Plan obligations used as the basis for much of the information presented in this report was performed as of December 31, 2017 ("the valuation date") based on the following information provided by the System for valuation purposes:

- Census data for active and disabled members as of December 31, 2017;
- Current plan provisions, including changes since December 31, 2016;
- Pertinent financial information as of December 31, 2017; and,
- Unaudited financial information as of June 30, 2018.

This information is summarized throughout this report. We did not audit the supplied information, but it was reviewed for reasonableness and consistency. In certain situations, the supplied information was adjusted to account for normal differences in collection dates and/or methods. As a result, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it is reliable for the purposes stated herein. The results and conclusions contained in this report depend on the integrity of this information, and if any of the supplied information or analyses change, our results and conclusions may be different and this report may need to be revised. Likewise, this report may need to be revised to reflect any significant event that affects the Plan subsequent to the valuation date.

Valuation results as of December 31, 2017 are based on the assumptions and methods adopted by the Board on April 21, 2016 and prescribed for use in the Plan's December 31, 2017 annual actuarial valuation, which are summarized in various sections of this report. All GASB 74 assumptions—including, but not limited to, discount rates, expected rates of return on assets, long-term health care cost trend rates, and expected active employee health care coverage election assumptions—have been selected by the System's governing bodies for the measurement of the Plan's benefit obligations as of June 30, 2018



based on the December 31, 2017 valuation date, and should reflect best estimates of anticipated Plan experience. We have evaluated the assumptions and methods prescribed by the Board, and believe that they are reasonable for the purposes of preparing the measurements described above. We will continue to monitor material assumptions.

The actuarial cost method and the asset valuation method used for funding purposes were selected by the System during prior periods and prescribed for use in the Plan's December 31, 2017 annual actuarial valuation. We believe that these methods are appropriate for funding purposes. Additionally, the actuarial cost method, the asset valuation method, and the amortization methods are prescribed under GASB rules for financial accounting purposes as of the June 30, 2017 and June 30, 2018 measurement dates. Actuarial methods such as the actuarial cost methods, asset valuation methods, and amortization methods used in the contribution allocation procedure (for funding purposes) and cost allocation procedure (for financial accounting purposes) are designed to recognize changes in an orderly fashion over a period of years. In certain situations, the actuarial methods used in an allocation procedure may have the effect of deferring changes in contributions or costs into later years. Likewise, the use of these methods could produce deferred gains or losses if any material underlying assumption is not met over a long period of time.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: retiree group benefits program experience differing from that anticipated by the assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in retiree group benefits program provisions or applicable law. Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, we have not performed an analysis of the potential range of such future differences other than the sensitivity to changes in the discount rate and healthcare cost trend rates required by GASB 74. **This report does not consider all possible scenarios.**

The funded status measurements included in this report are based on the assumptions and methods used to determine the Plan's obligations and asset values as of the valuation and/or measurement date. Funded status measurements for financial accounting purposes may not be appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. Likewise, funded status measurements for financial accounting purposes may not be appropriate for assessing the need for or the amount of future actuarially determined contributions. Funded status measurements would also be different if the market value of assets was used in these calculations instead of an actuarial value of assets.

Cavanaugh Macdonald Consulting does not provide legal, investment, or accounting advice. Thus, the information in this report is not intended to supersede or supplant the advice and interpretations of the System, OSC, or their legal, investing, or accounting partners.



The undersigned are familiar with the near-term and/or long-term aspects of other postemployment benefit plan valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained in this report. All sections of this report, including any appendices and attachments, are considered an integral part of the actuarial opinions.

We are available to answer questions about this report or the information provided herein.

Respectfully submitted,

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

Alisa Bennett, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

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

Jeffrey Gann, FSA, MAAA, FCA, EA
Senior Actuary



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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, 2017. The purpose of the valuation is to determine the present value of future payments to disabled members as of December 31, 2017, to determine the expected cost of new claims for 2017, to provide the actuarially determined employer contribution (ADC) rate based on the System's funding policy, which is centered on the guidance provided in GASB Statements No. 43 and 45, and to provide the financial accounting information required under GASB Statement No. 74 for postemployment benefits.

Appendix A presents detailed tabulations of the active membership of the Plan as of the valuation date. Likewise, Appendix B presents detailed tabulations of the disabled membership of the Plan as of the valuation date.

Appendix C presents the development of the Actuarial Value of Assets.

Appendices D and E provide the full set of actuarial assumptions and methods employed for funding and financial accounting purposes, respectively.

The valuation was based on provisions of the Plan as amended through June 30, 2018. A summary of the main Plan provisions used for valuation purposes appears in Appendix F.

Appendices G and H of this report present the projection of the Plan's fiduciary net position and present value of benefits required under GASB 74.



Section 2: Summary of Principal Results

The principal results of the valuation and a comparison with the preceding year's results are provided in the table below:

Table 1: Summary of Principal Results

Valuation Results as of	December 31, 2017	December 31, 2016
Active Members		
Teachers' and State Employees' Retirement System (TSERS)	304,554	305,013
Optional Retirement Program (ORP)	<u>20,682</u>	<u>18,456</u>
Total	325,236	323,469
Reported compensation		
TSERS	\$ 13,914,085,325	\$ 13,497,815,754
ORP	<u>1,849,802,363</u>	<u>1,680,321,122</u>
Total	\$ 15,763,887,688	\$ 15,178,136,876
Valuation compensation*		
TSERS	\$ 15,058,805,483	\$ 14,282,093,846
ORP	<u>2,026,106,857</u>	<u>1,824,702,864</u>
Total	\$ 17,084,912,340	\$ 16,106,796,710
Number of beneficiaries receiving extended short-term or long-term disability benefits	6,594	6,617
Annual reported benefits	\$ 77,899,175	\$ 78,501,354
Assets and Liabilities as of	December 31, 2017	December 31, 2016
Assets		
Actuarial Value	\$ 424,219,638	\$ 442,086,171
Market Value	\$ 416,504,516	\$ 433,946,692
Liability for currently disabled members	\$ 316,191,137	\$ 313,361,174
Deficit / (Surplus) versus Actuarial Value	\$ (108,028,501)	\$ (128,724,997)
ADC Rate for Fiscal Year Ending (FYE)	June 30, 2020	June 30, 2019
Preliminary Actuarially Determined Contribution (ADC) Rate		
Normal Cost	0.15%	0.13%
Accrued Liability	<u>N/A</u>	<u>N/A</u>
Total	0.15%	0.13%
Impact of Legislative Changes	(0.05%)	0.00%
Final ADC Rate**	0.10%	0.13%

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

** For FYE 2020, the ADC Rate may be adjusted to reflect Plan changes that occur after the date of this report.



Section 2: Summary of Principal Results

Table 2: Reconciliation of the Change in the Actuarially Determined Contribution (ADC) Rate

Fiscal year ending June 30, 2019 Preliminary ADC Rate (Based on the December 31, 2016 valuation)	0.13%
Change Due to the Transition of Actuarial Services	(0.01%)
Update Model to Value Reimbursements for Short-Term Disability State Health Plan Premium Payments ¹	0.01%
Impact of Legislative Changes	<u>0.00%</u>
Fiscal year ending June 30, 2019 Final ADC Rate	0.13%
Change Due to Demographic (Gain) / Loss	0.02%
Change Due to Changes in Assumptions	0.01%
Change Due to Investment (Gain) / Loss	0.00%
Change Due to Contributions (Greater) / Less than ADC	<u>(0.01%)</u>
Preliminary ADC Rate Before Legislative Changes	0.15%
Impact of Legislative Changes ²	<u>(0.05%)</u>
Fiscal year ending June 30, 2020 Preliminary ADC Rate (Based on the December 31, 2017 valuation)	0.10%

Table 3: History of Actuarially Determined Contribution (ADC) Rates and Appropriated Rates

Valuation Date	Fiscal Year Ending	Preliminary ADC Rate	Change Due to Legislation	Final ADC Rate	Appropriated Rate
12/31/2017	6/30/2020	0.15%	(0.05%)	0.10% ³	TBD
12/31/2016	6/30/2019	0.13%	0.00%	0.13%	0.14%
12/31/2015	6/30/2018	0.14%	0.00%	0.14%	0.14%
12/31/2014	6/30/2017	0.38%	0.00%	0.38%	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%

¹ This benefit, which is repealed for disability applications on July 1, 2019 and later, was not included in the Plan's actuarial valuation as of December 31, 2016.

² Reflects the benefit changes effective as of July 1, 2019 under the provisions of the Financial Accountability, Integrity, and Recovery (FAIR) Act of 2018 (Session Law 2018-52).

³ This ADC Rate is a preliminary rate that will become the final ADC Rate if no legislation is enacted after the date that this report is issued that would affect the determination of the ADC Rate for the fiscal year ending in 2020.



Section 2: Summary of Principal Results

The table below provides the schedule of funding progress, which presents multi-year trend information about whether the actuarial value of plan assets is increasing or decreasing over time relative to the actuarial accrued liability for benefits.

The aggregate cost method used for Plan funding purposes does not identify or separately amortize unfunded liabilities. Thus, information about the Plan's funded status and funding progress have been prepared using the entry age normal (level percentage of pay) actuarial cost method as an approximation.

Table 4: Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Entry Age Actuarial Accrued 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)
12/31/10	\$ 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%
12/31/16	442,086,171	392,674,478	(49,411,693)	112.6%	15,178,136,876	-0.33%
12/31/17	424,219,638	383,166,480	(41,053,158)	110.7%	15,763,887,688	-0.26%

Please note that the funded status measures shown above do not indicate whether or not the Plan would have sufficient assets if it were terminated, nor do they indicate what level of future contributions would be required.



Section 3: Membership Data

Data for 304,554 active members of the Teachers' and State Employees' Retirement System with reported compensation of \$13,914,085,325 and 20,682 members of the Optional Retirement Program with reported compensation of \$1,849,802,363 were furnished by the Retirement Systems Division as of December 31, 2017. The reported compensation includes annual longevity payments. The number and reported compensation of active members distributed by age and service as of December 31, 2017, are shown in Appendix A.

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

The Retirement Systems Division also supplied data for 6,594 disabled employees in receipt of annual extended short-term and long-term disability benefits totaling \$77,899,175 as of the valuation date. Of this number, 79 disabled employees are grandfathered under all provisions of the prior Disability Salary Continuation Plan and 6,515 are receiving extended short-term and 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 for the Plan is \$416,504,516 as of December 31, 2017.

The Actuarial Value of Assets for the Plan is \$424,219,638 as of the valuation date based on the “five-year smoothed value” asset valuation method selected by the System. Under this method, investment gains and losses are recognized in equal portions over a five-year period. The development of the Actuarial Value of Assets as of the valuation date is provided in Appendix C.

The following table shows an allocation of investments by category as of December 31, 2017.

**Table 5: Allocation of Investments by Category
as of December 31, 2017**

Cash and Receivables	8.0%
Fixed Income (LTIF)	92.0%
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, 2017. The items shown in the table, other than the Actuarial Value of Assets, are actuarially determined present values or contribution rates as of the valuation date.

Table 6: Statement of Condition of the Plan as of December 31, 2017

Present value of prospective benefits payable to all disabled members as of the valuation date for:	
Extended STD and LTD approved claims	\$ 277,861,059
LTD incurred but not reported claims	29,281,818
STD incurred but not reported claims	<u>9,048,260</u>
Total claim liability	\$ 316,191,137
Actuarial Value of Assets at End of Year	\$ 424,219,638
Deficit / (Surplus) as of December 31, 2017	\$ (108,028,501)
Prospective present value of benefits for current active members	\$ 252,815,040
Present value of benefits not covered by Actuarial Value of Assets	\$ 144,786,539
Present value of future compensation for active members	\$ 168,169,435,272
Level contribution as a percentage of compensation to fund present value of benefits not covered by Actuarial Value of Assets	0.09%
Estimated administrative expenses	<u>0.01%</u>
Actuarially determined contribution rate as of December 31, 2017	0.10%

Claim liabilities are equal to the present value of future claim payments that the Plan is obligated to make to members who are 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.

- (a) Approved claim liabilities are for extended short-term and long-term disabilities which have occurred, have been approved, and are in payment status as of the valuation date.
- (b) 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 following the valuation date and a reserve of 14/12 of the term cost is added to account for the time after disability to receive LTD benefits.
- (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 following the valuation date and a reserve of 62/72 of the term cost is added to account for the timing of STD payments.

The assumptions and methods used to determine claim liabilities are described in Appendix D.



Section 6: Experience

Section 5 shows that the surplus under the Plan has decreased by \$20,696,496 from \$128,724,997 to \$108,028,501 since the previous valuation date.

The following table shows a detailed reconciliation of the change in the Plan's Deficit / (Surplus)—the difference between the Total Claim Liability and the Actuarial Value of Assets—since the prior valuation.

Table 7: Reconciliation of Change in Deficit / (Surplus) Since the Prior Valuation

Prior Year Deficit / (Surplus)	\$	(128,724,997)
Prior Year IBNR Claims		(34,594,639)
Actual Contributions		(42,745,800)
Interest Adjustment		(6,918,594)
Extended STD Experience		2,115,406
LTD Experience		60,763,153
Asset Loss / (Gain) ¹		3,746,892
Current IBNR Claims		<u>38,330,078</u>
Current Deficit / (Surplus)	\$	(108,028,501)

¹ The Plan's Actuarial Value of Assets is the basis for the asset (gain) / loss reported above.



Section 7: Accounting Information

The section contains accounting information that may be used to satisfy the reporting requirements under Governmental Accounting Standards Board (GASB) Statement No. 74 for the fiscal year ending on June 30, 2018, based on a December 31, 2017 valuation date.

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

Table 8: Number of Active and Disabled Participants as of December 31, 2017¹

Membership Group	Number
Disabled participants currently receiving long-term disability benefits	6,362
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>325,419</u>
Total Membership	331,781

The table below provides a reconciliation of the preliminary employer actuarially determined contribution rate to the final actuarially determined contribution amount for fiscal year ending on June 30, 2018. The preliminary actuarially determined contribution rate is based on the Plan's actuarial valuation as of December 31, 2015.

Table 9: Development of the Actuarially Determined Contribution Amount

Fiscal Year Ending	June 30, 2018
Preliminary Actuarially Determined Contribution Rate	
Normal Cost	0.14%
Accrued Liability	<u>N/A</u>
Total	0.14%
Impact of Legislative Changes	<u>0.00%</u>
Final Actuarially Determined Contribution Rate	0.14%
Actual Payroll for Year Ending June 30, 2018	\$ 16,701,685,446
Actuarially Determined Contribution	\$ 23,382,360

¹ These counts were originally reported in the GASB 74 disclosure information for the Plan that was issued on September 11, 2018. Membership counts were subsequently revised for funding purposes, in large part, to reclassify certain participants who are receiving extended short-term disability benefits as "member in-payment" rather than the initial "active member" assignment displayed above. The revised Plan membership information appears in the other sections of this report.



Section 7: Accounting Information

The table below provides the actuarially determined contribution (ADC) rate for the employer as a percentage of payroll, determined in accordance with the Plan’s funding policy, which is centered on the guidance provided in GASB Statements No. 43 and 45.

Table 10: Fiscal Year 2019 / 2020 Actuarially Determined Contribution (ADC) Rate based on the Valuation as of December 31, 2017

ADC Rate Component	Rate
Normal Cost	0.10%
Actuarial Accrued Liability	<u>N/A</u>
Total	0.10%

Table 11: Additional Information About the Determination of the Fiscal Year 2019 / 2020 ADC Rate for GASB 74 Disclosures

Valuation Date	December 31, 2017
Actuarial Cost Method	Aggregate
Amortization Method	Level percentage of payroll
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
State Health Plan	
Active Subscriber Premiums	
2017 70 / 30 Plan	\$479.48 per month
2018 70 / 30 Plan	\$498.68 per month
Healthcare Cost Trend Rates	6.50% in 2018 grading down to 5.00% in 2024
Future State Health Plan Enrollment	100% of active employees will elect to enroll in the 70 / 30 Plan option
Expected Administrative Expenses Included in Normal Cost	0.01% of payroll



Section 7: Accounting Information

GASB Statement No. 74 requires that certain information be disclosed in the financial statements of the Plan. The tables below provide the schedule of changes in the Net OPEB Liability (Asset) and the schedule of the Net OPEB Liability (Asset).

Table 12: Schedule of Changes in Net OPEB Liability (Asset)

Fiscal Year Ending On	June 30, 2018
Total OPEB Liability	
Service Cost	\$ 25,919,000
Interest	14,654,000
Changes of Benefit Terms	(44,158,000)
Difference between Expected and Actual Experience	48,787,000
Change of Assumptions	6,692,000
Benefit Payments, including Refunds of Member Contributions	<u>(69,949,000)</u>
Net Change in Total OPEB Liability	\$ (18,055,000)
Total OPEB Liability—Beginning of Year	\$ 376,486,000
Total OPEB Liability—End of Year	\$ 358,431,000
Plan Fiduciary Net Position	
Employer Contributions	\$ 23,385,000
Member Contributions	0
Net Investment Income	(1,481,000)
Benefit Payments, including Refund of Member Contributions	(69,949,000)
Administrative Expenses	(777,000)
Other	<u>23,000</u>
Net Change in Fiduciary Net Position	\$ (48,799,000)
Plan Fiduciary Net Position—Beginning of Year	\$ 437,606,000
Plan Fiduciary Net Position—End of Year	\$ 388,807,000



Section 7: Accounting Information

Table 13: Schedule of the Net OPEB Liability (Asset)

Measurement Date as of	June 30, 2018	June 30, 2017
Total OPEB Liability	\$ 358,431,000	\$ 376,486,000
Plan Fiduciary Net Position	<u>388,807,000</u>	<u>437,606,000</u>
Net OPEB Liability (Asset)	\$ (30,376,000)	\$ (61,120,000)
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	108.47%	116.23%
Covered Payroll	\$ 15,763,887,688	\$ 15,178,136,876
Net OPEB Liability (Asset) as a Percentage of Covered Payroll	(0.19%)	(0.40%)

A 3.75% discount rate was used to measure the Plan’s Total OPEB Liability as of June 30, 2018. The projection of cash flows used to determine the discount rate assumed that System contributions will continue to follow the current funding policy, which is centered on the guidance provided in GASB Statements No. 43 and 45. Based on those assumptions, the Plan’s fiduciary net position was projected to be available to make all projected future benefit payments to current Plan members. Please see Appendices G and H for additional details.

However, please note that these fiduciary net position projections are based upon the Plan’s financial status on the valuation date, the set of methods and assumptions described in this report, and the guidance provided in GASB 74. As such, the FNP projections are not reflective of the cash flows and asset accumulations that would occur on an ongoing plan basis, which would also include the impact of future members. Therefore, the results of this test do not necessarily indicate whether or not the fund will actually run out of money, the financial condition of the Plan, or the Plan’s ability to make benefit payments in future years.



Section 7: Accounting Information

The table below provides the sensitivity of the Net OPEB Liability to changes in the discount rate:

Table 14: Sensitivity of the Net OPEB Liability (Asset) at June 30, 2018 to Changes in the Discount Rate

	1% Decrease	Current	1% Increase
Discount Rate	2.75%	3.75%	4.75%
Net OPEB Liability (Asset)	\$ (23,275,000)	\$ (30,376,000)	\$ (37,188,000)

Please keep in mind that the estimates provided in the table above were prepared using streamlined calculation techniques, and they are intended to provide an “order of magnitude” indication of the NOL’s sensitivity to changes in these assumptions. Results based on more refined calculations may yield findings and conclusions different than those suggested by the methodology required under GASB 74, as shown above. For example, one possible refinement would consider the impact of similar changes in bond yields on Plan assets, including (but not limited to) the valuations of certain fixed income investments held by the Plan. However, as required by GASB rules, we have not made any attempt to adjust the Plan’s FNP to reflect a potentially related change in fixed income asset pricing.

The table below provides the sensitivity of the Net OPEB Liability to changes in in healthcare cost trend rates:

Table 15: Sensitivity of the Net OPEB Liability (Asset) at June 30, 2018 to Changes in Healthcare Cost Trend Rates

	1% Decrease	Current	1% Increase
Initial Trend Rate	5.50%	6.50%	7.50%
Ultimate Trend Rate	4.00%	5.00%	6.00%
Net OPEB Liability (Asset)	\$ (30,464,000)	\$ (30,376,000)	\$ (30,293,000)

Please keep in mind that the estimates provided in the table above were prepared using streamlined calculation techniques, and they are intended to provide an “order of magnitude” indication of the NOL’s sensitivity to changes in these assumptions. Results based on more refined calculations may yield findings and conclusions different than those suggested by the methodology required under GASB 74, as shown above.



Appendix A — Detailed Tabulations of Active Member Data

Table A–1: The Number and Average Reported Compensation of Active Members Distributed by Age and Service as of December 31, 2017

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	4,830	5,139	22									9,991
	\$15,583	\$36,271	\$37,327									\$26,272
25 to 29	5,439	19,479	5,280	28								30,226
	\$17,523	\$39,066	\$42,018	\$34,795								\$35,701
30 to 34	3,682	12,867	12,346	4,699	36							33,630
	\$20,084	\$44,125	\$45,676	\$47,662	\$38,126							\$42,550
35 to 39	2,982	10,499	8,814	12,335	3,703	35						38,368
	\$19,950	\$47,576	\$50,763	\$51,920	\$54,174	\$47,819						\$48,195
40 to 44	2,621	9,037	7,895	9,378	9,772	3,010	29					41,742
	\$19,384	\$45,606	\$52,304	\$54,753	\$57,262	\$58,636	\$50,664					\$50,953
45 to 49	2,376	8,569	8,368	10,178	8,566	9,224	2,749	17				50,047
	\$19,718	\$44,500	\$49,498	\$53,148	\$56,869	\$60,839	\$62,864	*				\$52,056
50 to 54	1,817	6,911	6,818	9,031	7,626	5,946	5,595	838	7			44,589
	\$19,389	\$43,443	\$47,326	\$49,606	\$54,426	\$58,522	\$64,062	\$64,993	*			\$51,188
55 to 59	1,441	5,521	5,889	8,258	7,539	5,757	4,167	1,745	275	4		40,596
	\$19,604	\$44,535	\$47,213	\$48,102	\$51,348	\$56,413	\$64,488	\$69,392	\$67,967	*		\$50,991
60 to 64	645	3,274	4,001	5,367	4,616	3,725	2,247	1,107	487	137		25,606
	\$21,827	\$47,412	\$49,015	\$49,766	\$52,333	\$58,467	\$71,676	\$81,777	\$81,315	\$66,380		\$54,368
65 to 69	201	970	1,372	1,717	1,210	850	628	412	266	201		7,827
	\$21,072	\$48,362	\$49,889	\$54,931	\$63,170	\$69,168	\$85,438	\$104,275	\$117,324	\$93,728		\$63,345
70 & Up	68	318	367	569	413	258	204	117	124	176		2,614
	\$14,578	\$45,666	\$49,373	\$51,201	\$56,856	\$68,465	\$90,984	\$104,369	\$112,005	\$120,015		\$64,918
Total	26,102	82,584	61,172	61,560	43,481	28,805	15,619	4,236	1,159	518		325,236
	\$18,560	\$43,239	\$48,135	\$51,260	\$55,020	\$59,237	\$66,246	\$76,034	\$89,528	\$95,158		\$48,469

* Average reported compensation is not shown for age / service groups with fewer than 20 individuals.



Appendix A — Detailed Tabulations of Active Member Data

Table A-2: The Number and Reported Compensation of Active Members Distributed by Age and Gender as of December 31, 2017

Age	Male		Female	
	Number	Compensation	Number	Compensation
18	5	\$ *	11	\$ *
19	48	630,603	36	460,286
20	96	1,525,305	101	1,359,103
21	232	4,778,473	222	3,518,986
22	520	11,759,936	1,189	21,092,823
23	912	23,539,717	2,335	61,703,742
24	1,199	36,392,734	3,085	95,624,703
25	1,450	46,339,177	3,633	121,186,382
26	1,677	56,081,915	4,046	138,962,044
27	1,822	65,523,298	4,638	165,795,647
28	1,943	73,163,214	4,484	164,095,319
29	1,912	74,012,757	4,621	173,934,857
30	1,983	80,279,238	4,448	172,877,074
31	2,053	88,561,906	4,506	181,914,138
32	2,081	92,248,480	4,692	192,374,613
33	2,175	101,072,089	4,683	199,008,844
34	2,250	112,422,742	4,759	210,198,741
35	2,369	115,437,465	5,091	227,561,192
36	2,341	119,921,986	5,167	233,878,612
37	2,499	131,645,110	5,308	246,433,206
38	2,412	130,636,837	5,382	252,909,830
39	2,448	135,291,046	5,351	255,417,532
40	2,504	141,656,057	5,681	268,953,162
41	2,537	145,462,522	5,495	266,540,184
42	2,500	143,911,722	5,638	269,275,055
43	2,664	153,214,227	5,963	289,358,056
44	2,771	157,988,687	5,989	290,523,795
45	2,916	170,750,315	6,364	308,751,823
46	3,143	184,824,829	7,056	339,033,210
47	3,293	194,526,740	7,428	363,775,262
48	3,194	193,307,842	7,013	345,593,987
49	2,977	179,793,126	6,663	324,912,596
50	2,829	171,050,506	6,467	309,791,768
51	2,815	168,609,829	6,137	289,236,703
52	2,776	167,464,943	6,000	282,131,940
53	2,741	163,123,251	6,201	292,140,719
54	2,748	164,471,288	5,875	274,384,639
55	2,715	162,288,791	5,934	278,465,652
56	2,589	145,854,353	5,879	277,015,704
57	2,516	151,997,592	5,576	264,856,460
58	2,474	146,638,206	5,344	254,288,082

* Total reported compensation is not shown for groups with fewer than 20 individuals.



Appendix A — Detailed Tabulations of Active Member Data

Table A-2: The Number and Reported Compensation of Active Members Distributed by Age and Gender as of December 31, 2017 (continued)

Age	Male		Female	
	Number	Compensation	Number	Compensation
59	2,382	\$ 142,344,598	5,187	\$ 246,264,189
60	2,279	139,606,089	4,614	223,645,780
61	2,058	125,525,872	4,111	200,777,272
62	1,740	109,191,903	3,256	164,023,308
63	1,522	99,283,420	2,590	130,272,266
64	1,301	90,080,463	2,135	109,736,919
65	1,056	74,552,039	1,590	86,613,476
66	805	59,111,092	1,065	58,615,644
67	655	53,338,241	721	39,326,277
68	520	38,923,557	556	28,266,564
69	426	34,800,673	433	22,256,893
70	360	30,336,483	334	17,574,546
71	264	19,566,800	228	11,477,273
72	187	15,439,392	150	7,532,823
73	149	11,219,101	125	5,571,450
74	127	9,760,457	101	4,565,810
75	101	8,096,305	77	3,609,027
76	68	5,621,700	50	2,138,373
77	39	2,940,234	37	1,467,620
78	36	2,394,083	24	998,972
79	30	1,659,970	12	*
80	28	2,362,992	12	*
81	11	*	4	*
82	6	*	9	*
83	9	*	2	*
84	8	*	4	*
85	1	*	5	*
86	3	*	1	*
87	3	*		
88	3	*		
89	1	*		
90				
91			2	*
92				
93	1	*	1	*
94				
95				
96				
97				
98			1	*
Total	103,308	\$ 5,687,718,044	221,928	\$ 10,076,169,644

* Total reported compensation is not shown for groups with fewer than 20 individuals.



Appendix A — Detailed Tabulations of Active Member Data

Table A-3: The Number and Reported Compensation of Active Members Distributed by Service and Gender as of December 31, 2017

Service	Male		Female	
	Number	Compensation	Number	Compensation
0	8,331	\$ 176,029,921	17,771	\$ 308,423,577
1	8,317	380,109,390	17,494	675,112,847
2	6,978	341,017,904	14,272	580,789,302
3	6,052	294,121,706	12,677	530,520,050
4	5,540	279,389,266	11,254	489,789,494
5	5,238	266,583,405	10,905	471,321,261
6	3,930	214,791,201	7,835	356,286,779
7	4,079	215,393,250	7,891	361,718,791
8	2,575	144,009,146	5,911	277,806,257
9	4,096	232,269,116	8,712	404,364,577
10	4,377	245,634,411	9,645	451,014,274
11	4,162	240,831,033	9,402	449,829,179
12	3,691	214,956,774	8,604	417,954,149
13	3,417	199,706,567	8,052	391,132,134
14	3,158	189,640,931	7,052	354,842,126
15	2,519	156,463,951	6,066	313,854,652
16	2,611	171,142,987	6,331	322,893,871
17	2,676	166,966,982	6,634	338,091,773
18	2,520	163,026,663	6,284	322,520,350
19	2,264	148,866,452	5,576	288,502,946
20	2,100	137,558,690	4,783	256,913,926
21	1,829	122,536,911	4,461	243,819,074
22	1,735	116,818,397	3,824	212,846,666
23	1,710	115,668,001	3,544	201,432,951
24	1,666	116,908,880	3,153	181,829,280
25	1,438	107,202,164	2,776	165,655,624
26	1,105	84,531,352	2,046	126,092,889
27	1,128	84,351,595	1,901	119,014,934
28	1,056	79,519,878	1,955	120,527,378
29	694	54,429,253	1,520	93,376,577
30	486	40,069,279	942	60,693,460
31	344	31,572,478	569	38,925,408
32	292	26,580,065	484	33,394,604
33	235	22,944,024	403	27,827,814
34	200	20,503,709	281	19,567,818
35	145	17,053,512	180	14,402,651
36	97	10,412,802	135	10,072,791
37	113	11,630,657	123	8,304,602
38	86	8,566,891	119	7,901,619
39	69	8,546,140	92	6,871,754
40	59	8,132,003	89	6,561,454

* Total reported compensation is not shown for groups with fewer than 20 individuals.



Appendix A — Detailed Tabulations of Active Member Data

Table A-3: The Number and Reported Compensation of Active Members Distributed by Service and Gender as of December 31, 2017 (continued)

Service	Male		Female	
	Number	Compensation	Number	Compensation
41	45	\$ 5,215,187	45	\$ 3,524,390
42	28	3,328,832	29	2,385,002
43	36	3,850,317	36	2,754,159
44	18	*	20	1,245,616
45	17	*	15	*
46	13	*	8	*
47	8	*	13	*
48	6	*	3	*
49	6	*	3	*
50	10	*		
51	1	*		
52	1	*	1	*
53				
54				
55			3	*
56			2	*
57	1	*	1	*
58				
59				
60				
61			1	*
62				
Total	103,308	\$ 5,687,718,044	221,928	\$ 10,076,169,644

* Total reported compensation is not shown for groups with fewer than 20 individuals.



Appendix B — Detailed Tabulations of Disabled Member Data

Table B-1: The Number and Annual Amount of Disability Benefits Reported for Each Disability Group

Disability Group	As of December 31, 2017		As of December 31, 2016	
	Number	Annual Reported Benefits	Number	Annual Reported Benefits
Disabled prior to January 1, 1988	79	\$ 161,826	85	\$ 172,088
Disabled after December 31, 1987	<u>6,515</u>	<u>77,737,349</u>	<u>6,532</u>	<u>78,329,266</u>
Total	6,594	\$ 77,899,175	6,617	\$ 78,501,354



Appendix B — Detailed Tabulations of Disabled Member Data

Table B-2: The Number and Annual Long-Term Disability Benefits of Members Disabled Prior to January 1, 1988 by Age and Gender as of December 31, 2017

Age	Male		Female	
	Number	Allowances	Number	Allowances
57			1	\$ *
58				
59				
60				
61			2	*
62			5	*
63	1	\$ *	2	*
64			2	*
65	2	*	3	*
66	1	*		
67	2	*	1	*
68			1	*
69			2	*
70	2	*	5	*
71	1	*	2	*
72	1	*		
73			1	*
74	2	*		
75			2	*
76	2	*	4	*
77	1	*	3	*
78				
79			1	*
80	1	*	1	*
81				
82	1	*	1	*
83			1	*
84			1	*
85				
86			1	*
87			1	*
88			3	*
89			3	*
90			2	*
91			1	*
92			2	*
93			2	*
94				
95	1	*	4	*
96			1	*
Total	18	\$ *	61	\$ *

* To protect the privacy of beneficiary information, total allowances are not shown for groups with fewer than 20 individuals.



Appendix B — Detailed Tabulations of Disabled Member Data

Table B-3: The Number and Annual Disability Benefits of Members Disabled After December 31, 1987 by Age and Gender as of December 31, 2017

Age	Male		Female	
	Number	Allowances	Number	Allowances
26			1	\$ *
27				
28				
29	1	\$ *	2	*
30			3	*
31	1	*	4	*
32	1	*	5	*
33	3	*	7	*
34			11	*
35	4	*	10	*
36	8	*	12	*
37	5	*	18	*
38	5	*	17	*
39	12	*	34	542,347
40	11	*	33	479,705
41	14	*	54	992,061
42	19	*	46	722,552
43	25	467,834	55	905,039
44	27	334,926	47	724,577
45	30	510,326	78	976,506
46	37	500,290	96	1,497,055
47	35	496,444	112	1,692,881
48	44	533,446	138	1,961,246
49	57	686,684	146	2,278,609
50	64	832,506	146	2,209,988
51	67	771,884	188	2,720,624
52	70	882,096	208	2,701,797
53	100	1,192,317	239	3,387,348
54	87	1,058,926	233	2,905,882
55	102	1,051,251	233	3,028,931
56	103	1,010,344	303	3,141,496
57	91	1,046,396	314	3,324,963
58	133	1,336,133	294	3,221,803
59	166	1,684,762	295	3,224,550
60	115	1,117,468	260	2,896,484
61	120	1,141,982	251	2,731,771
62	103	854,634	250	2,588,965
63	104	837,796	235	2,409,391
64	92	616,506	210	2,168,084

* To protect the privacy of beneficiary information, total allowances are not shown for groups with fewer than 20 individuals.



Appendix B — Detailed Tabulations of Disabled Member Data

Table B-3: The Number and Annual Disability Benefits of Members Disabled After December 31, 1987 by Age and Gender as of December 31, 2017 (continued)

Age	Male		Female	
	Number	Compensation	Number	Compensation
65	14	\$ *	17	\$ *
66	1	*	2	*
67	1	*	4	*
68	1	*	3	*
69			2	*
70	1	*	6	*
71			1	*
72	1	*	1	*
73			2	*
74			2	*
75			1	*
76				
77				
78			1	*
79	2	*		
80			3	*
81				
82			1	*
83			1	*
84				
85			1	*
86				
87				
88				
89			1	*
90			1	*
91				
92				
93				
94				
95				
96				
97				
98				
Total	1,877	\$ 20,331,736	4,638	\$ 57,405,613

* To protect the privacy of beneficiary information, total allowances are not shown for groups with fewer than 20 individuals.



Appendix C — Development of the Actuarial Value of Assets

The Actuarial Value of Assets is determined using a method that attempts to “flatten” the peaks and valleys inherent in market values of assets. Under the “five-year smoothed value” asset valuation method selected by the System, investment gains and losses are recognized in equal portions over a five-year period. The calculation of the Actuarial Value of Assets is based on a formula that is mathematically equivalent to the process described above:

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

where,

MV is the market value of assets as of the valuation date; and,
G/(L)_i is the asset gain or (loss) for the i-th year preceding the valuation date.

However, the resulting Actuarial Value of Assets cannot be less than 80% or more than 120% of the market value of assets as of the measurement date. The development of the Actuarial Value of Assets as of December 31, 2017 is shown in the table below:

Development of the Actuarial Value of Assets for the Year Ending	December 31, 2017
Market Value of Assets Without Receivables, Beginning of Year	\$ 433,946,692
Employer Contributions	\$ 41,197,627
Employer Contributions Receivable	1,548,173
Benefit Payments	<u>(72,855,548)</u>
Net Cash Flow	\$ (30,109,748)
Expected Investment Return	\$ 15,684,878
Expected Market Value of Assets, End of Year	\$ 419,521,822
Market Value of Assets, End of Year	\$ 416,504,516
Excess of Market Value over Expected Market Value of Assets	\$ (3,017,306)
80% of 2017 Asset Gain / (Loss)	\$ (2,413,845)
60% of 2016 Asset Gain / (Loss)	1,125,379
40% of 2015 Asset Gain / (Loss)	(6,426,656)
20% of 2014 Asset Gain / (Loss)	<u>N/A¹</u>
Total Deferred Asset Gain / (Loss)	\$ (7,715,122)
Preliminary Actuarial Value of Assets, End of Year	\$ 424,219,638
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	\$ 424,219,638
Estimated Net Investment Return on Actuarial Value ²	3.24%

¹ The Actuarial Value of Assets was reset to the market value of assets as of December 31, 2014.

² Dollar-weighted rate of return assuming monthly net cash flows exclusive of receivables / payables.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

Unless otherwise indicated below, the following assumptions and methods were developed based on an investigation of demographic and economic experience over the five-year period from January 1, 2010 to December 31, 2014 prepared by the prior actuary, adopted by the Board of Trustees on April 21, 2016, and prescribed for use in the Plan's December 31, 2017 annual actuarial valuation.

ECONOMIC ASSUMPTIONS

Discount Rate: 3.75% per year, compounded annually.

Expected Rate of Return on Assets: 3.75% per year, net of investment expenses.

Expected Long-term Rates of Inflation: Both general and wage inflation are assumed to be 3.00% per year.

Expected Long-term Real Wage Growth: 0.50% per year.

Expected Across-the-Board Salary Increases:

For disability events that first occur on or after January 1, 1988, extended STD and LTD benefits (before reductions) are assumed to increase 3.50% per year. Otherwise, no increases have been assumed.

Expected Long-term National Average Wage Growth:

3.50% per year for the purposes of calculating Social Security benefits.

Expected Future Increases in Social Security Benefits:

For disability events that first occur on or after January 1, 1988, Social Security disability benefits are assumed to increase by 3.00% per year. Otherwise, no increases have been assumed.

Expected Administrative Expenses Included in Normal Cost:

Estimated administrative expenses equal to 0.01% of payroll were included in the normal cost rate (adopted December 31, 2017).

Expected Claims Administration Expenses:

None. Our understanding is that approximately \$70,000 is budgeted for annual expenses related to claims administration during the 2018 calendar year. As a result, budgeted claims administration expenses are immaterial to the Plan's actuarially determined contribution rate calculations as of December 31, 2017.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

ECONOMIC ASSUMPTIONS

Employers' Share of State Health Plan Monthly Active Subscriber Premiums (adopted December 31, 2017)

Calendar Year	Monthly Premium Per Active Subscriber
2017	\$479.48
2018	\$498.68

Long-term Health Care Cost Trend Rates:

Annual health care premium rates are expected to increase in future years as a result of medical inflation, utilization, leverage in the plan design, and improvements in technology adjusted for any implicit and/or explicit cost containment features. The assumed rates of increases in expected active (non-Medicare primary) subscriber 70 / 30 plan health care premium rates vary by year, as shown in the table below (adopted December 31, 2017):

Calendar Year	Rate of Increase in Active Subscriber Premium Amounts
2018 ¹	6.50%
2019	6.25%
2020	6.00%
2021	5.75%
2022	5.50%
2023	5.25%
2024+	5.00%

¹ The initial trend rate (for the 2018 calendar year) was used to project premium rates backward from 2017 to entry year in measurements of benefit obligations based on the Entry Age Normal actuarial cost method. Actual active subscriber 70 / 30 plan premium rates were used during 2017.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Mortality and Mortality Improvement Rates:

Pre-Retirement RP-2014 total dataset mortality with fully generational projected mortality improvements using MP-2015 for general employees and law enforcement officers. RP-2014 white collar employee mortality with fully generational projected mortality improvements using MP-2015 for teachers, librarians, counselors and other education employees.

Post Retirement RP-2014 total dataset mortality prior to age 50, and RP-2014 healthy annuitant mortality after age 49 with fully generational projected mortality improvements using MP-2015 for general employees and law enforcement officers. RP-2014 white collar total dataset mortality prior to age 50, and RP-2014 white collar healthy annuitant mortality after age 49 with fully generational projected mortality improvements using MP-2015 for teachers, librarians, counselors and other education employees. Generationally projected healthy annuitant mortality rates for males and females in certain employee groups were further adjusted by the factors in the following tables:

Employee Group	Male Retiree Adjustment Factors	
	Ages 50 – 78	Ages 79+
General Employees	108%	124%
Teachers, Librarians, Counselors and Other Education Employees	92%	120%

Employee Group	Female Retiree Adjustment Factors	
	Ages 50 – 78	Ages 79+
General Employees	81%	113%
Teachers, Librarians Counselors, and Other Education Employees	78%	108%

Post-Disablement RP-2014 disabled retiree mortality with no projection of mortality improvements. RP-2014 disabled retiree mortality rates for males and females have been adjusted to reflect 103% and 99%, respectively, of gender-specific table rates at each age.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Mortality and Mortality Improvement Rates (continued)

The table below provides pre-retirement base mortality rates (as of 2014) for males and females in each employee group at sample ages:

<u>Age</u>	<u>General Employees</u>		<u>Teachers, Librarians and Counselors</u>		<u>Law Enforcement Officers</u>		<u>Other Education Employees</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	0.0005	0.0002	0.0003	0.0001	0.0005	0.0002	0.0003	0.0001
30	0.0005	0.0002	0.0003	0.0002	0.0005	0.0002	0.0003	0.0002
35	0.0005	0.0003	0.0004	0.0002	0.0005	0.0003	0.0004	0.0002
40	0.0006	0.0004	0.0004	0.0003	0.0006	0.0004	0.0004	0.0003
45	0.0010	0.0007	0.0007	0.0006	0.0010	0.0007	0.0007	0.0006
50	0.0017	0.0011	0.0012	0.0009	0.0017	0.0011	0.0012	0.0009
55	0.0028	0.0017	0.0020	0.0014	0.0028	0.0017	0.0020	0.0014
60	0.0047	0.0024	0.0033	0.0021	0.0047	0.0024	0.0033	0.0021
65	0.0083	0.0037	0.0058	0.0031	0.0083	0.0037	0.0058	0.0031
69	0.0125	0.0057	0.0092	0.0049	0.0125	0.0057	0.0092	0.0049

Withdrawal Rates:

The following tables contain age, service, and gender based annual rates of separation from active service (for causes other than death, disability or retirement) for the employee groups listed below. For rates that vary based on age, sample ages have been provided.

<u>Service</u>	<u>General Employees</u>		<u>Teachers, Librarians and Counselors</u>		<u>Law Enforcement Officers</u>		<u>Other Education Employees</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
0	0.1800	0.1950	0.1900	0.1700	0.1300	0.1300	0.1900	0.1650
1	0.1550	0.1700	0.1600	0.1450	0.1000	0.1000	0.1600	0.1350
2	0.1300	0.1450	0.1400	0.1350	0.0900	0.0900	0.1300	0.1200
3	0.1100	0.1150	0.1200	0.1200	0.0600	0.0600	0.1150	0.1000
4	0.0900	0.1000	0.0950	0.1000	0.0600	0.0600	0.1000	0.0850



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Withdrawal Rates (continued)

<u>Age</u>	<u>General Employees*</u>		<u>Teachers, Librarians and Counselors*</u>		<u>Law Enforcement Officers*</u>		<u>Other Education Employees*</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	0.0800	0.1100	0.0800	0.0900	0.0400	0.0400	0.0800	0.1200
30	0.0700	0.0850	0.0700	0.0750	0.0350	0.0350	0.0600	0.0700
35	0.0525	0.0600	0.0450	0.0450	0.0300	0.0300	0.0450	0.0450
40	0.0400	0.0450	0.0350	0.0340	0.0300	0.0300	0.0400	0.0400
45	0.0350	0.0375	0.0325	0.0325	0.0400	0.0400	0.0400	0.0375
50	0.0350	0.0375	0.0325	0.0325	0.0400	0.0400	0.0400	0.0375
55	0.0350	0.0375	0.0325	0.0325	0.0400	0.0400	0.0400	0.0375
60	0.0350	0.0375	0.0325	0.0325	0.0400	0.0400	0.0400	0.0375

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

Retirement Rates:

The following tables contain age, service, and gender based annual rates of retirement at sample ages for the employee groups listed below:

General Employees—Male							
Years of Service							
<u>Age</u>	<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	0.3500	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—Female							
Years of Service							
<u>Age</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50				0.0350	0.0600	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 — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Retirement Rates (continued)

Teachers, Librarians and Counselors—Male							
Years of 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

Teachers, Librarians and Counselors—Female							
Years of 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



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Retirement Rates (continued)

Other Education Employees—Male							
Years of 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—Female							
Years of 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

Law Enforcement Officers							
Years of Service							
Age	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>
50			0.0900	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



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Salary Increase Rates:

Rates of salary increases for each employee group are constructed geometrically based on the expected long-term rate of inflation plus the expected productivity component (currently, 3.50%), and a variable expected merit component that is dependent on years of service. The following table provides a sample of the service-based rates of salary increases that are used to project a member's total salary as of the valuation date to future years. Salary increases are assumed to occur on July 1 of each year.

Total Annual Salary Increase Rates				
<u>Service</u>	<u>General Employees</u>	<u>Teachers, Librarians and Counselors</u>	<u>Law Enforcement Officers</u>	<u>Other Education Employees</u>
0	5.50%	7.55%	8.10%	7.00%
5	4.50%	6.05%	6.10%	6.25%
10	4.00%	5.10%	4.40%	5.50%
15	3.50%	4.35%	3.95%	4.75%
20	3.50%	3.65%	3.65%	4.00%
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%

Disability Rates:

The table below provides age and gender based annual rates of disability per 1,000 lives exposed at sample ages:

<u>Age</u>	<u>Male</u>	<u>Female</u>
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



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Decrement Timing and Adjustment:

Decrements—retirement, withdrawal, death, and disability—are assumed to occur at the middle of the year, except that 100% retirement is assumed to occur at the beginning of the year.

Decrement rates (or “probabilities”) are assumed to be uniformly distributed throughout the year, and reflect multiple decrement effects.

Rates of Termination of Disability:

Monthly select rates of termination of disability were used for the first 24 months of disability. The following tables contain age-at-disability and gender based rates of disability termination per 1,000 lives for sample durations of disability:

Duration of Disability (Months)	Male								
	Age at Disability								
	<u>20–24</u>	<u>25–29</u>	<u>30–34</u>	<u>35–39</u>	<u>40–44</u>	<u>45–49</u>	<u>50–54</u>	<u>55–59</u>	<u>60–64</u>
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

Duration of Disability (Months)	Female								
	Age at Disability								
	<u>20–24</u>	<u>25–29</u>	<u>30–34</u>	<u>35–39</u>	<u>40–44</u>	<u>45–49</u>	<u>50–54</u>	<u>55–59</u>	<u>60–64</u>
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 — Summary of Actuarial Assumptions and Methods for Funding Purposes

DEMOGRAPHIC ASSUMPTIONS

Rates of Termination of Disability (continued)

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. The following tables contain age-at-disability and gender based rates of disability termination per 1,000 lives for sample durations of disability:

Duration of Disability (Years)	Male								
	Age at Disability								
	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	<u>50-54</u>	<u>55-59</u>	<u>60-64</u>
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

Duration of Disability (Years)	Female								
	Age at Disability								
	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	<u>50-54</u>	<u>55-59</u>	<u>60-64</u>
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

Future State Health Plan Enrollment:

100% of active employees will elect to enroll in the 70 / 30 Plan option.

Assumed Social Security Disability Benefit Approvals:

Future Disabled Members: 50% of members are assumed to receive approval for Social Security disability benefits from the conclusion of the waiting period and prior to the completion of four years of disability.

Current Disabled Members: Actual Social Security disability benefit approval information is used where available. Otherwise, 50% of currently disabled members are assumed to receive approval for Social Security disability benefits.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

OTHER ASSUMPTIONS AND METHODS

Other Offsets:

No additional offsets—including but not limited to Worker’s Compensation, VA benefits, and Outside Earnings—other than those reported, have been assumed.

Reported Compensation:

Calendar year compensation provided 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.

Valuation Date: December 31, 2017

Benefits Not Valued:

None.

Actuarial Cost Method:

The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (currently 3.75%), of each member’s expected benefits at retirement is determined, based upon age, service, and gender. The calculations take into account the probability of a member’s death, retirement, or termination of employment prior to receiving benefits under the Plan. The present value of the expected benefits payable on account of active members is added to the present value of the expected future payments to currently disabled members to obtain the present value of all expected benefits payable by the Plan.

The actuarial cost method is a procedure for allocating the actuarial present value of postemployment benefits and expenses to time periods. The method used for funding purposes is known as the Aggregate actuarial cost method, and has the following characteristics:

- (i) The annual normal cost is determined for the entire group active participants rather than individually for each participant.
- (ii) This cost method does not identify or separately amortize unfunded actuarial liabilities. Thus, actuarial gains (losses), as they occur, reduce (increase) future normal costs.

The Aggregate actuarial cost method allocates the actuarial present value of postemployment benefits for all active participants and currently disabled members in excess of the Actuarial Value of Assets on a level basis over the present value of projected compensation for all active participants between the valuation date and the date that the last employee retires (collectively).



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

OTHER ASSUMPTIONS AND METHODS

Actuarial Cost Method (continued)

The portion of the actuarial present value allocated to the valuation year is called the normal cost. Under the Aggregate actuarial cost method, the annual normal cost is a percentage of the year-by-year projected total covered compensation for all employees. This actuarial cost method does not produce an Actuarial Accrued Liability, so the Actuarial Accrued Liability based on the Entry Age Normal (Level Percentage of Pay) actuarial cost method is often reported in connection with results based on the Aggregate actuarial cost method.

The actuarial cost method was prescribed by the System for the purposes of preparing the actuarially determined employer contribution rate for the Plan as of December 31, 2017.

Asset Valuation Method:

The Actuarial Value of Assets for this purpose is determined using the “five-year smoothed value” asset valuation method, which attempts to “flatten” the peaks and valleys inherent in market values of assets. Under this method, investment gains and losses are recognized in equal portions over a five-year period. Investment gains and losses are determined by comparing the actual return on market value for a given period to the anticipated earnings over the same period if the market value of assets at the beginning of the period, contributions, benefit payments, and administrative expenses during the period earned the expected rate of return for the portion of the period that each was expected to be including in, or excluded from, plan assets. The expected rate of return for this purpose is equal to the expected long-term rate of return assumption selected at the beginning of the experience period (in this case, 3.75% as of January 1, 2017). The resulting Actuarial Value of Assets cannot be less than 80% or more than 120% of the market value of assets. Please see Appendix C for the development of the Actuarial Value of Assets as of the valuation date.

The asset valuation method was prescribed by the System for the purposes of preparing the actuarially determined employer contribution rate for the Plan as of December 31, 2017.

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.

Other Assumptions and Methods:

Unless otherwise stated above, all other actuarial assumptions and methods are the same as those used for the purpose of determining periodic funding contributions as of December 31, 2016.

Please see the December 31, 2016 actuarial valuation report for additional information about the data, assumptions, methods, and plan provisions used to prepare results as of the December 31, 2016 measurement date. Likewise, additional information concerning historical results can be found in the relevant actuarial valuation report for each valuation date.



Appendix D — Summary of Actuarial Assumptions and Methods for Funding Purposes

OTHER ASSUMPTIONS AND METHODS

Changes Since the Prior Valuation:

The December 31, 2017 measurements used in the development of actuarially determined contribution rates reflect the following non-prescribed changes in assumptions and methods:

- Cavanaugh Macdonald Consulting, LLC was retained as the actuary for the Plan in January 2018 for the actuarial valuation to be performed as of December 31, 2017. As a result, these measurements reflect the changes in miscellaneous assumptions and methods—including but not limited to rounding conventions, valuation approaches, and calculation techniques—that are typical in situations involving a transition of actuarial service providers;
- A change in the rate associated with expected administrative expenses included in Normal Cost to better reflect anticipated Plan experience; and,
- Changes in assumed employers' share of State Health Plan monthly active subscriber premiums, long-term health care cost trend rates, and future State Health Plan enrollment percentages needed to value a liability for the state reimbursements to employers for their costs toward health insurance premiums during the "second six months" of short-term disability. This benefit, which is repealed for disability applications on July 1, 2019 and later, was not included in the prior valuation.

The aggregate effect of the changes described above was an increase in the Plan's actuarial present value of projected benefits and the normal cost rate measured as of December 31, 2017.



Appendix E — Summary of Actuarial Assumptions and Methods for Financial Accounting Purposes

ECONOMIC AND OTHER ASSUMPTIONS AND METHODS

Discount Rate: 3.75% per year, compounded annually.

Expected Rate of Return on Assets: 3.75% per year, net of investment expenses.

Expected Administrative Expenses Included in Service Cost: None.

Measurement Date: June 30, 2018

Measurement Period: July 1, 2017 to June 30, 2018

Actuarial Cost Method:

The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (currently 3.75%), of each member's expected benefits at retirement is determined, based upon age, service, and gender. The calculations take into account the probability of a member's death, retirement, or termination of employment prior to receiving benefits under the Plan. The present value of the expected benefits payable on account of active members is added to the present value of the expected future payments to currently disabled members to obtain the present value of all expected benefits payable by the Plan.

The actuarial cost method is a procedure for allocating the actuarial present value of postemployment benefits and expenses to time periods. The method used for financial accounting purposes is known as the Entry Age Normal (Level Percentage of Pay) actuarial cost method, and has the following characteristics:

- (i) The annual service costs for each individual active participant are sufficient to accumulate the value of the participant's postemployment benefits at time of retirement.
- (ii) Each annual service cost is a constant percentage of the participant's year-by-year projected covered compensation.

The Entry Age Normal (Level Percentage of Pay) actuarial cost method allocates the actuarial present value of each participant's projected benefits on a level basis over the participant's assumed compensation rates between the entry age of the participant and the assumed ages at which the participant will leave active service.

The portion of the actuarial present value allocated to the valuation year is called the service cost (SC). The portion of the actuarial present value of expected benefits not provided for by the actuarial present value of future service costs is called the Total OPEB Liability (TOL). The difference between the TOL and the Actuarial Asset Value is the Net OPEB Liability (NOL).

The actuarial cost method is prescribed by GASB 74 and 75 for financial accounting purposes.

Asset Valuation Method:

The Actuarial Asset Value for financial accounting purposes is equal to the market value of plan assets.

The asset valuation method is prescribed by GASB 74 and 75 for financial accounting purposes.



Appendix E — Summary of Actuarial Assumptions and Methods for Financial Accounting Purposes

ECONOMIC AND OTHER ASSUMPTIONS AND METHODS

Applicable Accounting Standards:

Our understanding is that the State has determined that the Plan's liability for short-term disability benefits associated with currently active employees is not measurable. As a result, the System accounts for all Plan benefits under Governmental Accounting Standards Board Statement No. 74 (GASB 74), "Financial Reporting For Postemployment Benefit Plans Other Than Pension Plans", and Statement No. 75 (GASB 75), "Accounting and Financial Reporting For Postemployment Benefits Other Than Pensions".

Other Assumptions and Methods:

Unless otherwise stated above, all other actuarial assumptions and methods are the same as those used for the purpose of determining periodic funding contributions as of December 31, 2017.

Please see the December 31, 2016 actuarial valuation report for additional information about the data, assumptions, methods, and plan provisions used to prepare financial accounting results as of the June 30, 2017 measurement date.

Changes Since the Prior Valuation:

The December 31, 2017 measurements used in the development of June 30, 2018 financial accounting results for the Plan reflect the following non-prescribed changes in assumptions and methods:

- Cavanaugh Macdonald Consulting, LLC was retained as the actuary for the Plan in January 2018 for the actuarial valuation to be performed as of December 31, 2017. As a result, these measurements reflect the changes in miscellaneous assumptions and methods—including but not limited to rounding conventions, valuation approaches, and calculation techniques—that are typical in situations involving a transition of actuarial service providers; and,
- Changes in assumed employers' share of State Health Plan monthly active subscriber premiums, long-term health care cost trend rates, and future State Health Plan enrollment percentages needed to value a liability for the state reimbursements to employers for their costs toward health insurance premiums during the "second six months" of short-term disability. This benefit, which is repealed for disability applications on July 1, 2019 and later, was not included in the prior valuation.

The aggregate effect of the changes described above was an increase in the Plan's Total OPEB Liability and service cost measured as of December 31, 2017.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

This summary of main benefit provisions is intended to describe only the principal features of the Disability Income Plan of North Carolina (DIPNC, or the Plan), a cost-sharing, multiple employer defined benefit OPEB plan sponsored by the Teachers' and State Employees' Retirement System of North Carolina (the System) as interpreted for valuation purposes. All actual eligibility requirements and benefit amounts will be determined in accordance with the Plan document and any System practices, processes, and procedures.

Overview of the Plan:

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.

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 (TSERS) or the UNC Optional Retirement Program (ORP) on or after January 1, 1988 are eligible to participate in the Plan.

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.

Definition of Base Rate of Compensation:

The regular monthly rate of compensation not including pay for shift premiums, overtime, or other types of extraordinary pay as determined by the Board of Trustees.

Definition of Annual Longevity Payment:

Full-time and part-time (20 hours or more) permanent, probationary, and time-limited employees are eligible for annual longevity payments; whereas, part-time (less than 20 hours) and temporary employees are not eligible for these payments.

Annual longevity pay amounts are based on the length of total State service and a percentage of the eligible employee's annual base rate of compensation on the date of eligibility. Longevity pay amounts are determined by multiplying the eligible employee's annual base rate of compensation by the appropriate percentage from the following table:

Years of Total State Service	Longevity Pay Percentage
Under 10 years	0.00%
10 but less than 15 years	1.50%
15 but less than 20 years	2.25%
20 but less than 25 years	3.25%
25 or more years	4.50%



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

SHORT-TERM DISABILITY BENEFITS

Eligibility for Short-Term Disability Benefits:

Prior to June 25, 2018, any participant 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 System may be eligible for STD benefits.

Effective June 25, 2018, any participant who becomes disabled and is no longer able to perform his or her usual occupation may be eligible for STD benefits provided all of the following conditions are met:

- (1) Application for the benefit occurs at least 365 calendar days succeeding the participant's date of initial employment as a teacher or employee;
- (2) The participant has at least one year of contributing membership service earned within 36 calendar months immediately preceding the date of disability. Salary continuation (see below) used during the period shall count toward this one-year requirement;
- (3) The member applies for short-term disability within one year of the end of the waiting period;
- (4) The participant's employer and attending physician certify that the participant is mentally or physically incapacitated for the further performance of duty; and,
- (5) The participant's incapacity was incurred at the time of active employment and has been continuous thereafter.

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, the day that the physician certified the disability, 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:

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.

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.

Commencement of STD Benefits:

The STD benefit commences on the first day succeeding the waiting period.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

SHORT-TERM DISABILITY BENEFITS

Monthly STD Benefit Amounts:

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 to which the beneficiary would be eligible, to a maximum of \$3,000 per month, reduced by a percentage of certain other benefits that are payable to the beneficiary including but not limited to:

- (1) 66 2/3% of monthly temporary total Workers' Compensation payments by any employer¹;
- (2) 100% of monthly Veterans Administration (VA) disability payments for the same (or for a related) disability;
- (3) 100% of monthly benefits payable under other Federal or certain statutory disability plans;
- (4) 100% of monthly wages or other income paid by public or private employers in excess of the participant's earnable allowance. If a beneficiary has earnings in excess of the STD benefit, the STD benefit shall be also reduced on a dollar-for-dollar basis by the amount that exceeds the STD benefit; and,
- (5) 100% of monthly severance pay as a result of a reduction-in-force from the State.

State Health Plan Coverage Benefit:

The employer's-share of the premium for State Health Plan coverage under the 70 / 30 Plan option will continue to be paid by the employer on behalf of beneficiaries who have five or more years of contributing membership service on the date that STD payments begin. Beneficiaries who do not meet this requirement are permitted to enroll in a State Health Plan option while they are receiving STD benefits, but they must pay the associated premium for the coverage option that they elect.

Post Disability Benefit Adjustments:

The compensation upon which the STD benefit is calculated may be increased by any percentage across-the-board salary increases granted by the General Assembly.

Duration of STD Benefits:

STD benefits are payable for up to 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 also paid by the employer outside of the trust. However, the employer may request reimbursement from the trust for short-term disability benefits and State Health Plan premiums paid during this "second six month" period.

Effective July 1, 2019, the Plan will no longer reimburse employers for short-term disability or State Health Plan premiums paid during the "second six month" period for disabilities occurring on or after that date.

¹ However, STD benefits are not offset by permanent, partial Workers' Compensation benefits.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

EXTENDED SHORT-TERM DISABILITY BENEFITS

Eligibility for Extended Short-Term Disability Benefits:

Any beneficiary who completes 365 days of short-term disability benefits may be eligible to receive extended STD benefits if the disability is expected to end during the extended period, and the extension is approved by the Medical Board.

Waiting Period:

There is no waiting period for extended STD benefits.

Salary Continuation Benefits:

Same as for STD benefits.

Commencement of Extended STD Benefits:

The extended STD benefit commences on the first day succeeding the conclusion of the short-term disability period.

Monthly Extended STD Benefit Amounts:

Same as STD benefit amounts.

State Health Plan Coverage Benefit:

The State Health Plan trust pays the employer's share of the premium for beneficiaries who are receiving extended STD benefits.

Post Disability Benefit Adjustments:

Same as for STD benefits.

Duration of Extended STD Benefits:

Extended STD benefits are payable for up to an additional 365 days beyond the initial 365 day short-term period. During this extended period, STD benefits are paid directly from the trust.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

LONG-TERM DISABILITY BENEFITS

Eligibility for Long-Term Disability Benefits:

Any beneficiary who has five or more years of contributing membership service in the System, earned within the 96 calendar months prior to the conclusion of the short-term disability period or the conclusion of salary continuation, whichever is later, may be eligible to receive LTD benefits from the Plan upon approval by the Board of Trustees provided that the disability is likely to be permanent, and the beneficiary or participant withdraws from active service by terminating employment as a teacher or State employee.

Waiting Period:

There is no waiting period for LTD benefits.

Salary Continuation Benefits:

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.

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.

Monthly LTD Benefit Amounts:

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 to which the beneficiary would be eligible, to a maximum of \$3,900 per month, reduced by a percentage of certain other benefits that are payable to the beneficiary including but not limited to:

- (1) 100% of monthly 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;

- (2) 66 2/3% of monthly temporary total or partial Workers' Compensation payments by any employer;



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

LONG-TERM DISABILITY BENEFITS

Monthly LTD Benefit Amounts (continued)

- (3) 100% of monthly Veterans Administration (VA) disability payments for the same (or for a related) disability;
- (4) 100% of monthly benefits payable under other Federal or certain statutory disability plans;
- (5) 100% of monthly benefits payable from TSERS, or other retirement systems supported by the State;
- (6) 100% of monthly benefits payable through other insurance plans to which the State contributes;
- (7) 100% of monthly wages or other income paid by public or private employers in excess of the participant's earnable allowance; and,
- (8) 100% of monthly severance pay as a result of a reduction-in-force from the State.

However, in any event, the monthly LTD benefit payable after all offsets have been deducted cannot be less than \$10 per month.

State Health Plan Coverage Benefit:

The State Health Plan trust pays the employer's share of the premium for beneficiaries who are receiving LTD benefits.

Post Disability Benefit Adjustments:

The compensation upon which the 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.

Duration of LTD Benefits:

Under N.C. G.S. § 135-112, some participants who were actively employed on January 1, 1988 and started receiving LTD benefits before completing 5 years of contributory membership service will receive lifetime benefits in lieu of service accruals under the System.

For all other participants, the LTD benefit is payable until the earliest date at which the beneficiary is eligible for an unreduced service retirement allowance from TSERS, or the termination of disability, whichever occurs first.

Please see the December 31, 2017 actuarial valuation report for TSERS for a complete description of the eligibility requirements related to TSERS unreduced service retirement allowances for various employee groups.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

DSC PLAN LONG-TERM DISABILITY BENEFITS

Eligibility for DSC Plan Long-Term Disability Benefits:

Only participants who were first disabled prior to January 1, 1988 and are currently receiving LTD payments are eligible for LTD benefits under the predecessor Disability Salary Continuation Plan (DSC Plan).

Monthly DSC Plan LTD Benefit Amounts:

60% of monthly salary to a maximum of \$1,000 per month reduced by benefits payable from other plans including but not limited to:

- (1) Social Security benefits payable:
 - Before July 1, 1974 — full family benefits.
 - July 1, 1974 and after — primary benefits only;
- (2) Workers' Compensation, and other Federal and certain statutory disability benefits;
- (3) Benefits payable from TSERS, or other retirement systems supported by the State;
- (4) Benefits payable through other insurance plans to which the State contributes; and,
- (5) Wages or other income paid by public or private employers in excess of the participant's earnable allowance.

Post Disability Benefit Adjustments:

DSC Plan LTD 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.

Duration of DSC Plan LTD Benefits:

The LTD benefit under the DSC Plan is payable until the termination of disability.



Appendix F — Summary of Main Benefit Provisions as Interpreted for Valuation Purposes

Termination of Disability Benefits:

Disability benefits will end—and all future disability benefits will be forfeited—if a beneficiary receives a refund of his or her contributions or, in the case of STD benefits, starts receiving a retirement benefit from the System. Disability benefits can also be terminated by member request.

Plan benefits may be terminated by the System for reasons including but not limited to:

- (1) The beneficiary returns to a contributing membership position with TSERS or ORP;
- (2) Beneficiary earnings consistently exceed his or her earnable allowance;
- (3) A medical professional does not continue to certify the beneficiary's disability when a reexamination is requested by the Medical Board;
- (4) The Medical Board certifies that the beneficiary is no longer disabled;
- (5) The beneficiary did not have 5 years of service as of July 31, 2007 and was denied or did not receive approval for Social Security disability benefits after receiving 36 months of LTD payments;
- (6) The beneficiary becomes eligible (or would have become eligible) for a TSERS unreduced service retirement benefit while he or she is receiving LTD benefits; or
- (7) The beneficiary dies.

Contributions:

The Plan is funded solely through contributions made by the State and/or employing units. Participants do not contribute.

Changes Since the Prior Valuation:

The Plan was amended during the fiscal year ending on June 30, 2018 by the provisions of H.B. 1056, which became Session Law 2018-52—the Financial Accountability, Integrity, and Recovery (FAIR) Act of 2018—on June 25, 2018. The legislation amended the Plan's eligibility criteria for STD benefits to require, among other things, that members apply for short-term disability within one year of the end of the waiting period, and eliminates employer reimbursements for the “second six months” of short-term disability benefits that begin on or after July 1, 2019.

We have reflected these changes in the Plan's liabilities and the development of the actuarially determined contribution rate as of December 31, 2017, and in the measurement of the Plan's benefit obligations for financial accounting purposes as of June 30, 2018.



Appendix G — GASB 74 Fiduciary Net Position Projection

Table G-1: Projection of Fiduciary Net Position (\$ in Thousands)

Calendar Year	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position
2018	\$ 416,505	\$ 0	\$ 14,951	\$ 83,344	\$ 770	\$ 14,334	\$ 361,676
2019	360,490	0	13,978	82,103	721	12,284	305,113
2020	299,822	0	13,184	61,154	682	10,538	266,999
2021	260,930	0	12,499	48,781	648	9,326	239,396
2022	232,851	0	11,891	44,994	617	8,351	214,027
2023	207,776	0	11,293	41,780	588	7,449	190,400
2024	184,563	0	10,732	38,927	560	6,606	168,251
2025	162,834	0	10,185	34,860	532	5,841	148,885
2026	143,886	0	9,649	32,158	506	5,156	131,026
2027	126,437	0	9,117	28,791	479	4,539	115,412
2028	111,233	0	8,594	26,784	452	3,982	100,751
2029	96,975	0	8,077	23,962	426	3,475	87,915
2030	84,518	0	7,561	21,947	400	3,027	76,156
2031	73,118	0	7,050	19,300	374	2,621	66,153
2032	63,446	0	6,546	17,562	348	2,270	57,058
2033	54,663	0	6,048	15,503	323	1,958	49,238
2034	47,131	0	5,560	14,368	298	1,677	41,810
2035	39,978	0	5,086	12,715	273	1,421	35,329
2036	33,748	0	4,626	11,433	250	1,194	29,465
2037	28,118	0	4,181	10,131	226	990	24,280
2038	23,145	0	3,753	8,938	204	810	19,701
2039	18,759	0	3,346	7,823	183	652	15,693
2040	14,924	0	2,963	6,903	162	512	12,103
2041	11,492	0	2,594	5,845	143	391	9,100
2042	8,623	0	2,235	4,969	124	288	6,530
2043	6,171	0	1,868	3,942	104	204	4,556
2044	4,291	0	1,529	2,987	86	142	3,154
2045	2,961	0	1,227	2,473	69	94	1,933
2046	1,800	0	954	1,663	54	58	1,228
2047	1,137	0	708	1,223	41	36	707
2048	647	0	504	643	29	23	563
2049	517	0	365	456	21	19	470
2050	435	0	268	350	16	16	388
2051	362	0	196	264	12	13	321
2052	301	0	143	205	9	11	261
2053	246	0	104	155	6	9	213
2054	201	0	75	120	5	7	170
2055	161	0	54	90	3	6	136
2056	130	0	38	69	2	5	108
2057	103	0	27	51	2	4	85
2058	82	0	19	39	1	3	67
2059	65	0	14	28	1	2	54
2060	53	0	10	21	1	2	44
2061	43	0	7	15	0	1	37
2062	37	0	5	11	0	1	32
2063	32	0	3	8	0	1	29
2064	28	0	2	6	0	1	26
2065	26	0	1	4	0	1	25
2066	24	0	1	3	0	1	24
2067	24	0	0	2	0	1	23



Appendix H — GASB 74 Present Value of Projected Benefits

Table H-1: Present Value of Projected Benefit Payments (\$ in Thousands)

Calendar Year	Beginning Fiduciary Net Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments		
					Funded Payments at 3.75%	Unfunded Payments at 3.87%	Using Single Discount Rate of 3.75%
2018	\$ 416,505	\$ 83,344	\$ 83,344	\$ 0	\$ 81,824	\$ 0	\$ 81,824
2019	360,490	82,103	82,103	0	77,692	0	77,692
2020	299,822	61,154	61,154	0	55,777	0	55,777
2021	260,930	48,781	48,781	0	42,884	0	42,884
2022	232,851	44,994	44,994	0	38,125	0	38,125
2023	207,776	41,780	41,780	0	34,122	0	34,122
2024	184,563	38,927	38,927	0	30,643	0	30,643
2025	162,834	34,860	34,860	0	26,449	0	26,449
2026	143,886	32,158	32,158	0	23,517	0	23,517
2027	126,437	28,791	28,791	0	20,294	0	20,294
2028	111,233	26,784	26,784	0	18,197	0	18,197
2029	96,975	23,962	23,962	0	15,691	0	15,691
2030	84,518	21,947	21,947	0	13,853	0	13,853
2031	73,118	19,300	19,300	0	11,741	0	11,741
2032	63,446	17,562	17,562	0	10,298	0	10,298
2033	54,663	15,503	15,503	0	8,762	0	8,762
2034	47,131	14,368	14,368	0	7,827	0	7,827
2035	39,978	12,715	12,715	0	6,676	0	6,676
2036	33,748	11,433	11,433	0	5,786	0	5,786
2037	28,118	10,131	10,131	0	4,942	0	4,942
2038	23,145	8,938	8,938	0	4,202	0	4,202
2039	18,759	7,823	7,823	0	3,545	0	3,545
2040	14,924	6,903	6,903	0	3,015	0	3,015
2041	11,492	5,845	5,845	0	2,461	0	2,461
2042	8,623	4,969	4,969	0	2,016	0	2,016
2043	6,171	3,942	3,942	0	1,542	0	1,542
2044	4,291	2,987	2,987	0	1,126	0	1,126
2045	2,961	2,473	2,473	0	899	0	899
2046	1,800	1,663	1,663	0	582	0	582
2047	1,137	1,223	1,223	0	413	0	413
2048	647	643	643	0	209	0	209
2049	517	456	456	0	143	0	143
2050	435	350	350	0	106	0	106
2051	362	264	264	0	77	0	77
2052	301	205	205	0	58	0	58
2053	246	155	155	0	42	0	42
2054	201	120	120	0	31	0	31
2055	161	90	90	0	23	0	23
2056	130	69	69	0	17	0	17
2057	103	51	51	0	12	0	12
2058	82	39	39	0	9	0	9
2059	65	28	28	0	6	0	6
2060	53	21	21	0	4	0	4
2061	43	15	15	0	3	0	3
2062	37	11	11	0	2	0	2
2063	32	8	8	0	1	0	1
2064	28	6	6	0	1	0	1
2065	26	4	4	0	1	0	1
2066	24	3	3	0	0	0	0
2067	24	2	2	0	0	0	0