State Police Retirement System of New Jersey

GASB 68 Report as of June 30, 2018

Produced by Cheiron

February 2019

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SECTION I – BOARD SUMMARY

The purpose of this report is to provide accounting and financial disclosure information under Government Accounting Standards Board Statement 68 for the State Police Retirement System of New Jersey (SPRS). This information includes:

- Disclosure of Deferred Inflows and Outflows, and
- Calculation of the Annual Pension Expense.

Highlights

The reporting date for the SPRS is June 30, 2018. Measurements as of the reporting date are based on the fair value of assets as of June 30, 2018 and the Total Pension Liability as of the valuation date, July 1, 2017, updated to June 30, 2018. There was a change in assumptions as the discount rate used to measure the Total Pension Liability was changed as of the measurement date. We are not of any other significant events between the valuation date and the measurement date so the update procedures only included the addition of service cost and interest cost offset by actual benefit payments and an adjustment to reflect the change in discount rate. Additional information about the TPL can be found in the GASB 67 report.

The June 30, 2017 values shown in this report are based on the prior actuary's GASB report.

The following table provides a summary of the key results during this reporting period.

Table I-1
Summary of Results

Measurement Date	6/30/2018	6/30/2017
Net Pension Liability	$ 3,059,669,558	$ 3,362,776,779
Deferred Outflows	(490,383,861)	(757,328,568)
Deferred Inflows	793,217,457	586,283,451
Net Impact on Statement of Net Position	$ 3,362,503,154	$ 3,191,731,662
Pension Expense	$ 245,375,272	$ 310,150,954
Pension Expense (% of Payroll)	86.19%	111.66%

SECTION II – CERTIFICATION

The purpose of this report is to provide accounting and financial reporting information under GASB 67 for the State Police Retirement System of New Jersey (SPRS). This report is for the use of SPRS, the Division of Pensions and Benefits and their auditors in preparing financial reports in accordance with applicable law and accounting requirements. This report is not appropriate for other purposes, including the measurement of funding requirements for SPRS and estimating the price to settle SPRS's obligations.

In preparing our report, we relied on information (some oral and some written) supplied by the Division of Pensions and Benefits. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

For purposes of this report, the calculation of the Total Pension Liability and the projection of the Plan's contributions and projected benefit payments were based on the recommended demographic assumptions of the July 1, 2011 – June 30, 2014 Experience Study prepared by the prior actuary, which was approved by the Board of Trustees on January 26, 2016. Cheiron has reviewed this experience study. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study.

Based on the State Treasurer' recommendation the following economic assumptions are used to determine the Total Pension Liability and the actuarially determined contributions:

- Effective with the July 1, 2017 valuation: 7.50% per annum,
- Effective with the July 1, 2019 valuation: 7.30% per annum,
- Effective with the July 1, 2021 valuation: 7.00% per annum.

In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

SECTION II – CERTIFICATION

This report was prepared for SPRS for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Anu Patel

Janet Cranna, FSA, FCA, MAAA, EA
Principal Consulting Actuary

Anu Patel, FSA, MAAA, EA
Principal Consulting Actuary

SECTION III – DETERMINATION OF DISCOUNT RATE

The discount rate used to measure the Total Pension Liability was 4.42% as of June 30, 2017 and 4.97% as of June 30, 2018. As discussed with the Division of Pensions and Benefits, the projection of cash flows used to determine the discount rate as of June 30, 2018 assumed:

- In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum.

- In accordance with Paragraph 37 of GASB Statement No. 67, the projection of the Plan's contributions and projected benefit payments were based on the recommended demographic assumptions of the July 1, 2011 – June 30, 2014 Experience Study prepared by the prior actuary, which was approved by the Board of Trustees on January 26, 2016.

  Based on the State Treasurer' recommendation the following economic assumptions are used to determine the actuarially determined contributions:

  - Effective with the July 1, 2017 valuation: 7.50% per annum,
  - Effective with the July 1, 2019 valuation: 7.30% per annum,
  - Effective with the July 1, 2021 valuation: 7.00% per annum.

- It is assumed that the State will contribute 50.00% of the actuarially determined contribution and 100% of its Non-Contributory Group Insurance Premium Fund (NCGIPF) contribution. The 50.00% contribution rate is the actual total State contribution rate paid in fiscal year ending June 30, 2018 with respect to the actuarially determined contribution for the fiscal year ending June 30, 2018 for all State administered retirement systems.

- Prior to FYE 2018, it is assumed the State would make pension contributions the June 30th following the valuation date. Effective with FYE 2018, Chapter 83, P.L. 2016 requires the State to make pension contributions on a quarterly basis: at least 25 percent by September 30, at least 50 percent by December 31, at least 75 percent by March 31, and at least 100 percent by June 30.

Based on these assumptions, the pension Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current Plan members through fiscal year 2041. Municipal bond rates of 3.58% as of June 30, 2017 and 3.87% as of June 30, 2018 were used in the development of the blended GASB discount rate after the Plan's fiduciary net position was no longer sufficient to make future benefit payments. As selected by the State Treasurer, the rates are based on the Bond Buyer GO 20-Bond Municipal Bond Index. Based on the long-term rate of return of 7.00% and the municipal bond rate of 3.58% as of June 30, 2017 and the long-term rate of return of 7.00% and the municipal bond rate of 3.87% as of June 30, 2018, the blended GASB discount rates are 4.42% as of June 30, 2017 and **4.97%** as of June 30, 2018. The assumed discount rates have been determined in accordance with the method prescribed by GASB Statement No. 67.

SECTION IV – EMPLOYER REPORTING AMOUNTS

We understand the State has elected to use the 2018 measurement date for its 2019 reporting date. As a result, the schedules in this section will be used by the State for its 2019 reporting.

The impact of experience gains or losses and assumption changes on the TPL are recognized in expense over the average expected remaining service life of all active and inactive members of the System. As of the measurement date, this recognition period was 5.90 years.

The following tables summarize the current balances of deferred outflows and deferred inflows of resources along with the net recognition over the next five years.

Table IV-1
Schedule of Deferred Inflows and Outflows of Resources

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$ 24,240,715	$ 24,599,016
Changes in assumptions	466,143,146	766,942,670
Net differences between projected and actual earnings on pension plan investments	0	1,675,771
Total	**$ 490,383,861**	**$ 793,217,457**

Amounts reported as deferred outflows and deferred inflows of resources will be recognized in pension expense as follows:

Measurement year ended June 30:	
2019	54,141,069
2020	(20,673,930)
2021	(120,985,871)
2022	(154,437,878)
2023	(60,876,986)
Thereafter	$ 0

SECTION IV – EMPLOYER REPORTING AMOUNTS

Table IV-2
Detailed Schedule of Deferred Inflows and Outflows of Resources

Recognition of differences between expected and actual experience

From Measurement Year Ending	Remaining Recognition Period	Remaining Deferred (Inflows) and Outflows*	Recognition Year 2018	2019	2020	2021	2022	2023
2018	5.90	$ (19,592,172)	$ (3,320,707)	$ (3,320,707)	$ (3,320,707)	$ (3,320,707)	$ (3,320,707)	$ (2,988,637)
2017	4.67	19,591,512	4,195,184	4,195,184	4,195,184	4,195,184	2,810,776	0
2016	3.70	(11,411,829)	(3,084,278)	(3,084,278)	(3,084,278)	(2,158,995)	0	0
2015	2.34	15,444,676	6,600,289	6,600,289	2,244,098	0	0	0
Total		$ 4,032,187	$ 4,390,488	$ 4,390,488	$ 34,297	$ (1,284,518)	$ (509,931)	$ (2,988,637)

Recognition of changes in assumptions

From Measurement Year Ending	Remaining Recognition Period	Remaining Deferred (Inflows) and Outflows*	Recognition Year 2018	2019	2020	2021	2022	2023
2018	5.90	$ (379,490,284)	$ (64,320,387)	$ (64,320,387)	$ (64,320,387)	$ (64,320,387)	$ (64,320,387)	$ (57,888,349)
2017	4.67	(574,871,622)	(123,098,849)	(123,098,849)	(123,098,849)	(123,098,849)	(82,476,226)	0
2016	3.70	485,505,611	131,217,732	131,217,732	131,217,732	91,852,415	0	0
2015	2.34	190,920,815	81,590,093	81,590,093	27,740,629	0	0	0
2014	1.14	20,557,016	18,032,471	2,524,545	0	0	0	0
Total		$ (257,378,464)	$ 43,421,060	$ 27,913,134	$ (28,460,875)	$ (95,566,821)	$ (146,796,613)	$ (57,888,349)

Recognition of net differences between projected and actual earnings on pension plan investments

From Measurement Year Ending	Remaining Recognition Period	Remaining Deferred (Inflows) and Outflows*	Recognition Year 2018	2019	2020	2021	2022	2023
2018	5.00	$ (35,656,678)	$ (7,131,336)	$ (7,131,336)	$ (7,131,336)	$ (7,131,336)	$ (7,131,334)	$ 0
2017	4.00	(68,012,787)	(17,003,197)	(17,003,197)	(17,003,197)	(17,003,196)	0	0
2016	3.00	95,661,541	31,887,180	31,887,180	31,887,181	0	0	0
2015	2.00	28,169,601	14,084,801	14,084,800	0	0	0	0
2014	1.00	(30,509,417)	(30,509,417)	0	0	0	0	0
Total		$ (10,347,740)	$ (8,671,969)	$ 21,837,447	$ 7,752,648	$ (24,134,532)	$ (7,131,334)	$ 0
Grand Total		**$ (263,694,017)**	**$ 39,139,579**	**$ 54,141,069**	**$ (20,673,930)**	**$ (120,985,871)**	**$ (154,437,878)**	**$ (60,876,986)**

** As of the beginning of the measurement year*

SECTION IV – EMPLOYER REPORTING AMOUNTS

The annual pension expense recognized by the State can be calculated two different ways. First, it is the change in the amounts reported on the Statement of Net Position that relate to SPRS and are not attributable to employer contributions. That is, it is the change in NPL plus the changes in deferred outflows and inflows plus employer contributions.

Alternatively, annual pension expense can be calculated by its individual components. While GASB does not require or suggest the organization of the individual components shown in the following table, we believe it helps to understand the level and volatility of pension expense.

First, there are components referred to as operating expenses. These are items directly attributable to the operation of the plan during the measurement year. Service cost less employee contributions represents the increase in employer-provided benefits attributable to the year, and administrative expenses are the cost of operating SPRS for the year.

Second, there are the financing expenses: the interest on the Total Pension Liability less the expected return on assets.

The final category is changes. This category will drive most of the volatility in pension expense from year to year. It includes any changes in benefits made during the year and the recognized amounts due to assumption changes, gains or losses on the TPL, and investment gains or losses.

The following table shows the development of pension expense for the State through both of these methodologies.

SECTION IV – EMPLOYER REPORTING AMOUNTS

Table IV-3
Calculation of Pension Expense

Measurement Year Ending	2018	2017
Change in Net Pension Liability	$ (303,107,221)	$ (615,967,430)
Change in Deferred Outflows	266,944,707	301,324,426
Change in Deferred Inflows	206,934,006	571,787,344
Employer Contributions	74,603,780	53,006,614
Pension Expense	**$ 245,375,272**	**$ 310,150,954**
Pension Expense as % of Payroll	**86.19%**	**111.66%**
Operating Expenses		
Service cost	$ 119,718,797	$ 139,506,057
Employee contributions	(22,416,571)	(23,721,785)
Administrative expenses	377,193	294,745
Total	$ 97,679,419	$ 116,079,017
Financing Expenses		
Interest cost	$ 226,928,605	$ 202,545,532
Expected return on assets	(118,372,331)	(122,385,606)
Total	$ 108,556,274	$ 80,159,926
Changes		
Benefit changes	$ 0	$ 0
Recognition of assumption changes	43,421,060	107,741,447
Recognition of liability gains and losses	4,390,488	7,711,195
Recognition of investment gains and losses	(8,671,969)	(1,540,631)
Total	$ 39,139,579	$ 113,912,011
Pension Expense	**$ 245,375,272**	**$ 310,150,954**

APPENDIX A – MEMBERSHIP INFORMATION

Plan Membership	July 1, 2017	July 1, 2016
Contributing Actives	2,762	2,680
Non-Contributing Actives	50	45
Terminated Vested	0	0
Inactive Receiving Benefits*	3,337	3,566
Total	6,149	6,291
Annual Compensation for Contributing Actives	$284,707,387	$277,771,135
Annual Retirement Allowances for Those Receiving Benefits	$215,636,675	$213,292,784

* QDRO recipients are excluded from the July 1, 2017 counts

The July 1, 2017 membership information shown in the table above is based on Cheiron's processed data and may not match the prior actuary's report.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Investment Rate of Return for determining Actuarially Determined Contributions

- July 1, 2017 valuation: 7.50% per annum, compounded annually.
- July 1, 2018 valuation: 7.50% per annum, compounded annually.
- July 1, 2019 valuation: 7.30% per annum, compounded annually.
- July 1, 2020 valuation: 7.30% per annum, compounded annually.
- July 1, 2021 and later valuations: 7.00% per annum, compounded annually.

2. Long-Term Expected Rate of Return

7.00% per annum, compounded annually.

3. GASB 67 Effective Discount Rate

- June 30, 2017: 4.42% per annum, compounded annually.
- June 30, 2018: 4.97% per annum, compounded annually.

4. Cost-of-Living Adjustments (COLAs)

No future COLAs are assumed. Previously granted COLAs are included in the data.

5. Salary Increases

Salaries are assumed to increase by 2.95% per year through fiscal year 2025 and 3.95% per year for fiscal years 2026 and thereafter.

6. 401(a)(17) Pay Limit

$270,000 in 2017 increasing 3.00% per annum, compounded annually.

7. Social Security Wage Base

$127,200 in 2017 increasing 4.00% per annum, compounded annually.

8. Termination

Representative termination rates are as follows:

Age	Less Than 5 Years of Service	Between 5 and 19 Years of Service
25	0.375%	0.000%
30	0.375	0.200
35	0.825	0.140
40	0.000	0.075
45	0.000	0.100
50	0.000	0.000

No termination is assumed after attainment of retirement eligibility.

All members with 10 or more years of service at termination are assumed to elect a deferred retirement benefit.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

9. Disability

Representative disability rates are as follows:

Age	Ordinary Disability	Accidental Disability
25	0.041%	0.025%
30	0.061	0.053
35	0.169	0.194
40	0.172	0.208
45	0.218	0.214
50	0.375	0.220

No ordinary disability is assumed after attainment of special retirement eligibility at 25 years of service.

Accidental disability rates apply at all ages until the mandatory retirement age of 55.

Members retiring under the ordinary disability decrement with less than four years of service are assumed to receive a return of aggregate contributions.

Members retiring under the ordinary disability decrement with 20 or more years of service are assumed to receive the involuntary disability retirement benefit.

Members are assumed to receive the greater of the applicable disability benefit or the service or special retirement benefit, depending on eligibility.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

10. Mortality

Healthy Mortality: RP-2000 Combined Healthy Mortality Tables (unadjusted for females and set back 3 years for males) projected on a generational basis from the base year of 2000 to 2013 using Projection Scale BB and the Conduent Modified 2014 Projection scale thereafter. These tables are also used for purposes of the pre-retirement ordinary death benefit.

Disabled Mortality: RP-2000 Combined Healthy Mortality Tables (set forward 5 years for males and females) without projection.

Representative mortality rates for purposes of the pre-retirement accidental death benefit are as follows:

Age	Rates
25	0.040%
30	0.050
35	0.050
40	0.050
45	0.060
50	0.090

No mortality improvement is assumed for purposes of the pre-retirement accidental death benefit.

For purposes of pre-retirement accidental death benefits based on Adjusted Final Compensation, the benefit is assumed to increase at the same rate as active salaries.

11. Retirement

For those with 25 years of service or less:

Service	Rates
20	2.000%
21	0.500
22	0.000
23	0.000
24	0.000
25	50.000

For those with more than 25 years of service:

Age	Rates
42 or younger	5.000%
43-47	28.000
48-53	33.000
54	61.000

Mandatory retirement at age 55.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

12. Family Composition Assumptions

For members not currently in receipt, 83.3% of members are assumed married to spouses of the opposite sex. Males are assumed to be three years older than females.

For purposes of the post-retirement death benefit for members currently in receipt, beneficiary status is based on the beneficiary allowance reported. If no beneficiary date of birth is provided, the beneficiary is assumed to be the member's spouse of the opposite sex with males assumed to be three years older than females.

No additional dependent children or parents are assumed.

For current dependents receiving a pre-retirement accidental death benefit, those under age 24 are assumed to receive a benefit until age 24 while those over age 24 are assumed to receive a benefit for the remainder of their lifetime.

For current dependents receiving a benefit other than a pre-retirement accidental death benefit, those under age 18 are assumed to receive a benefit until age 18 while those over age 18 are assumed to receive a benefit for the remainder of their lifetime.

13. Data

Information provided by the prior actuary was relied upon for the purposes of setting the status of and valuing non-contributing active records.

Per information provided by the prior actuary, non-contributing active records with an enrollment date of June 10, 2017 were assumed to be contributing members with the same salary and maintenance amount as the lowest paid contributing active records.

For current beneficiaries with missing data, reasonable assumptions were made based on the information available in prior years.

Inactives receiving benefits according to the 2016 data but omitted from the 2017 data are assumed to have died without a beneficiary.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

The actuarial methods used for determining State contributions are described as follows.

1. Actuarial Cost Method

The actuarial cost method for funding calculations is the Projected Unit Credit Cost Method.

The actuarial liability is calculated as the actuarial present value of the projected benefits linearly allocated to periods prior to the valuation year based on service. The unfunded actuarial liability is the actuarial liability on the valuation date less the actuarial value of assets.

In accordance with Chapter 78, P.L. 2011:

- Beginning with the July 1, 2010 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over an open 30 year period.
- Beginning with the July 1, 2019 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over a closed 30 year period (i.e., for each subsequent actuarial valuation the amortization period shall decrease by one year).
- Beginning with the July 1, 2029 actuarial valuation, when the remaining amortization period reaches 20 years, any increase or decrease in the unfunded accrued liability as a result of actuarial losses or gains for subsequent valuation years shall serve to increase or decrease, respectively, the amortization period for the unfunded accrued liability, unless an increase in the amortization period will cause it to exceed 20 years. If an increase in the amortization period as a result of actuarial losses for a valuation year would exceed 20 years, the accrued liability contribution shall be computed for the valuation year using a 20 year amortization period.

To the extent that the amortization period remains an open period in future years and depending upon the specific circumstances, it should be noted that in the absence of emerging actuarial gains or contributions made in excess of the actuarially determined contribution, any existing unfunded accrued liability may not be fully amortized in the future.

2. Asset Valuation Method

For the purposes of determining contribution rates, an actuarial value of assets is used that dampens the volatility in the market value of assets, resulting in a smoother pattern of contributions.

The actuarial value of assets is adjusted to reflect actual contributions and benefit payments, an assumed rate of return on the previous year's assets and current year's cash flow at the prior year's actuarial valuation interest rate, with a further adjustment to reflect 20% of the difference between the resulting value and the actual market value of Plan assets.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

3. State Contribution Payable Dates

Prior to FYE 2018, it is assumed the State would make pension contributions the June 30th following the valuation date. Effective with FYE 2018, Chapter 83, P.L. 2016 requires the State to make pension contributions on a quarterly basis: at least 25 percent by September 30, at least 50 percent by December 31, at least 75 percent by March 31, and at least 100 percent by June 30. As such, contributions are assumed to be made on a quarterly basis.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

This summary of Plan provisions provides an overview of the major provisions of the SPRS used in the actuarial valuation. It is not intended to replace the more precise language of the NJ State Statutes, Title 53, Chapter 5A, and if there is any difference between the description of the plan herein and the actual language in the NJ State Statutes, the NJ State Statutes will govern.

1. Eligibility of Membership

All members of the former State Police and Benevolent Fund and full-time commissioned officers, non-commissioned officers or troopers of the Division of State Police. Membership is a condition of employment.

2. Plan Year

The 12-month period beginning on July 1 and ending on June 30.

3. Service Credit

Service rendered while a member as described above.

4. Credited Service

A year is credited for each year of service as an officer or trooper in the State Police.

5. Compensation

Base salary in accordance with established salary policies of the state for all employees in the same position. Compensation does not include individual salary adjustments granted primarily in anticipation of the retirement or for temporary or extracurricular duties beyond the regular work day or shift. Effective June 30, 1996, Chapter 113, P. L. 1997 provided that the amount of compensation used for employer and member contributions and benefits under the program cannot exceed the compensation limitation of Section 401(a)(17) of the Internal Revenue Code. Chapter 1, P. L. 2010 provides that for members hired on or after May 22, 2010, the amount of compensation used for employer and member contributions and benefits under the System cannot exceed the annual maximum wage contribution base for Social Security, pursuant to the Federal Insurance Contributions Act.

6. Final Compensation

Average compensation received by the member in the last 12 months of credited service preceding retirement or death. Such term includes the value of the member’s maintenance allowance for the same period. Chapter 1, P. L. 2010 provides that for members hired on or after May 22, 2010, Final Compensation means the average annual compensation for service for which contributions are made during any three fiscal years of membership providing the largest possible benefit to the member or the member’s beneficiary.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

7. Aggregate Contributions

The sum of all amounts deducted from the compensation of a member or contributed by him or on his behalf.

8. Member Contributions

Each member contributes 9.0% of base salary. For contribution purposes, compensation does not include overtime, bonuses, maintenance or any adjustments before retirement.

9. Adjusted Final Compensation

For purposes of the pre-retirement accidental death benefit, the amount of compensation or compensation as adjusted, as the case may be, increased by the same percentage increase which is applied in any adjustments of the compensation schedule of active members after the member's death and before the date on which the deceased member of the retirement system would have accrued 25 years of service under an assumption of continuous service, at which time that amount will become fixed. Adjustments to compensation or adjusted compensation shall take effect at the same time as any adjustments in the compensation schedule of active members.

10. Benefits

a) Service and Special Retirement:
Mandatory retirement at age 55. Voluntary retirement prior to age 55.

(1) <u>Service Retirement</u>: 20 years of service credit, or members as of August 29, 1985 who would not have 20 years of service credit at age 55.

Benefit is an annual retirement allowance equal to 50% of final compensation.

(2) <u>Special Retirement</u>: 25 years of service credit.

Benefit is an annual retirement allowance equal to 65% of final compensation, plus 1% for each year of service credit in excess of 25 years, to a maximum of 70% of final compensation.

(3) Members as of August 29, 1985 who would have 20 years of service credit but not 25 years at age 55.

Benefit is an annual retirement allowance equal to 50% of final compensation, plus 3% for each year of service credit in excess of 20 years.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

b) Deferred Retirement:

Termination of service prior to age 55 with 10 years of service credit.

Benefit is either a refund of aggregate contributions, or a deferred life annuity beginning at age 55 equal to 2% of final compensation for each year of service credit up to 25 years.

For members who die during the deferral period, the benefit is a return of aggregate contributions.

c) Non-Vested Termination:

Termination of service prior to age 55 and less than 10 years of service credit.

Benefit is a return of aggregate contributions.

d) Death Benefits

(1) Ordinary Death Before Retirement: Death of an active member of the plan. Benefit is equal to:

a) Lump sum payment equal to 350% of final compensation, also known as the noncontributory group life insurance benefit, plus

b) Spousal life annuity of 50% of final compensation payable until spouse's death or remarriage. If there is no surviving spouse, or upon death or remarriage, a total of 20% (35%, 50%) of final compensation payable to one (two, three or more) dependent child(ren). If there is no surviving spouse or dependent child(ren), 25% (40%) of final compensation to one (two) dependent parent(s). If there is no surviving spouse, dependent child(ren) or parent(s), the benefit is a refund of accumulated contributions.

(2) Accidental Death Before Retirement: Death of an active member of the plan resulting during performance of duties. Benefit is equal to:

a) Lump sum payment equal to 350% of final compensation, also known as the noncontributory group life insurance benefit, plus

b) Spousal life annuity of 70% of final compensation or adjusted final compensation (if appropriate) payable until spouse's death. If there is no surviving spouse, or upon death of the surviving spouse, 70% of final compensation or adjusted final compensation (if appropriate) payable to surviving children in equal shares. If there is no surviving spouse or dependent children, 25% (40%) of final compensation or adjusted final compensation (if appropriate) to one (two) dependent parents. If there is no surviving spouse, dependent child(ren) or parent(s), the benefit is a refund of accumulated contributions.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

(3) Death After Retirement: Death of a retired member of the plan. Benefit is equal to:

a) Lump sum payment equal to 50% of final compensation for a member retired under service, special or deferred retirement. For a member receiving a disability benefit, lump sum payment of 350% of final compensation if death occurs prior to age 55 and 50% of final compensation if death occurs after age 55. This benefit is also known as the noncontributory group life insurance benefit, plus

b) Spousal life annuity of 50% of final compensation payable until spouse's death or remarriage. If there is no surviving spouse, or upon death or remarriage, a total of 20% (35%, 50%) of final compensation payable to one (two, three or more) dependent child(ren). Previously granted COLAs also apply.

e) Disability Retirement

(1) Ordinary Disability Retirement: Four years of service credit and mentally or physically incapacitated for the performance of his usual duty and of any other available duty in the Division of State Police and such incapacity is likely to be permanent.

Benefit is an immediate life annuity equal to the greater of:

a) 40% of final compensation, or

b) 1.5% of final compensation for each year of service credit.

(2) Involuntary Ordinary Disability Retirement: Ordinary Disability Retirement applied for by the employer.

Benefit is an immediate life annuity equal to:

a) For members with 20 years of service credit but less than 25 years, 50% of final compensation plus 3% of final compensation for each year of service credit in excess of 20 years, to a maximum of 65% of final compensation.

b) For all other members, the Ordinary Disability benefit.

(3) Accidental Disability Retirement: Totally and permanently disabled as a direct result of a traumatic event occurring during and as a result of his regular or assigned duties and such member is mentally or physically incapacitated for the performance of his usual duties in the Division of State Police.

Benefit is an immediate life annuity equal to 2/3 of annual rate of compensation, including the maintenance allowance, at the time of the traumatic event or retirement, whichever is greater.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

11. Forms of Payment

No optional forms of payment available.

12. Changes in Plan Provisions Since Last Valuation

None.

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2018

Year	Projected Beginning Fiduciary Net Position (a)	Projected Member Contributions (b)	Projected Employer Contributions (c)	Projected Benefit Payments (d)	Projected Administrative Expenses (e)	Projected Investment Earnings (f)	Projected Ending Fiduciary Net Position (g) = (a) + (b) + (c) - (d) - (e) + (f)
1	$ 1,790,045	$ 21,968	$ 82,558	$ 226,931	$ 385	$ 120,400	$ 1,787,655
2	1,787,655	21,613	87,293	233,310	396	120,124	1,782,979
3	1,782,979	21,011	94,624	241,459	410	119,685	1,776,431
4	1,776,431	20,424	99,216	248,985	422	119,067	1,765,731
5	1,765,731	19,938	109,078	255,652	434	118,328	1,756,987
6	1,756,987	19,147	114,421	264,469	449	117,524	1,743,162
7	1,743,162	18,453	119,462	271,947	461	116,406	1,725,075
8	1,725,075	17,986	125,011	277,500	471	115,077	1,705,179
9	1,705,179	16,984	131,290	287,820	488	113,457	1,678,602
10	1,678,602	16,002	136,669	298,014	505	111,352	1,644,105
11	1,644,105	15,239	142,276	306,229	519	108,774	1,603,645
12	1,603,645	14,237	148,650	315,930	536	105,739	1,555,805
13	1,555,805	12,747	154,951	329,210	558	102,045	1,495,779
14	1,495,779	11,314	157,343	341,280	579	97,440	1,420,018
15	1,420,018	10,286	159,830	349,559	593	91,881	1,331,863
16	1,331,863	9,258	163,058	357,477	606	85,486	1,231,582
17	1,231,582	8,179	166,200	365,116	619	78,248	1,118,475
18	1,118,475	7,436	169,248	369,434	627	70,236	995,334
19	995,334	6,939	172,964	371,264	630	61,633	864,977
20	864,977	6,412	177,194	372,918	633	52,544	727,577
21	727,577	5,559	181,429	376,994	639	42,867	579,798
22	579,798	4,462	184,999	382,407	649	32,391	418,595
23	418,595	3,475	188,088	386,411	655	21,015	244,107
24	244,107	2,470	191,384	390,110	662	8,725	55,915
25	0	0	0	393,408	667	0	0
26	0	0	0	394,346	669	0	0
27	0	0	0	391,713	664	0	0
28	0	0	0	386,961	656	0	0
29	0	0	0	381,128	646	0	0
30	0	0	0	374,586	635	0	0
31	0	0	0	367,524	623	0	0
32	0	0	0	360,148	611	0	0
33	0	0	0	352,512	598	0	0
34	0	0	0	344,606	585	0	0
35	0	0	0	336,426	571	0	0
36	0	0	0	327,974	556	0	0
37	0	0	0	319,255	542	0	0
38	0	0	0	310,281	526	0	0
39	0	0	0	301,069	511	0	0
40	0	0	0	291,646	495	0	0
41	0	0	0	282,043	478	0	0
42	0	0	0	272,294	462	0	0
43	0	0	0	262,436	445	0	0
44	0	0	0	252,506	428	0	0
45	0	0	0	242,541	411	0	0
46	0	0	0	232,569	394	0	0
47	0	0	0	222,618	378	0	0
48	0	0	0	212,703	361	0	0
49	0	0	0	202,839	344	0	0
50	0	0	0	193,030	327	0	0

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2018

Year	Projected Beginning Fiduciary Net Position (a)	Projected Member Contributions (b)	Projected Employer Contributions (c)	Projected Benefit Payments (d)	Projected Administrative Expenses (e)	Projected Investment Earnings (f)	Projected Ending Fiduciary Net Position (g) = (a) + (b) + (c) - (d) - (e) + (f)
51	0	0	0	183,276	311	0	0
52	0	0	0	173,578	294	0	0
53	0	0	0	163,939	278	0	0
54	0	0	0	154,360	262	0	0
55	0	0	0	144,853	246	0	0
56	0	0	0	135,428	230	0	0
57	0	0	0	126,102	214	0	0
58	0	0	0	116,896	198	0	0
59	0	0	0	107,843	183	0	0
60	0	0	0	98,971	168	0	0
61	0	0	0	90,322	153	0	0
62	0	0	0	81,932	139	0	0
63	0	0	0	73,842	125	0	0
64	0	0	0	66,093	112	0	0
65	0	0	0	58,723	100	0	0
66	0	0	0	51,763	88	0	0
67	0	0	0	45,246	77	0	0
68	0	0	0	39,198	66	0	0
69	0	0	0	33,637	57	0	0
70	0	0	0	28,577	48	0	0
71	0	0	0	24,026	41	0	0
72	0	0	0	19,982	34	0	0
73	0	0	0	16,432	28	0	0
74	0	0	0	13,358	23	0	0
75	0	0	0	10,730	18	0	0
76	0	0	0	8,515	14	0	0
77	0	0	0	6,671	11	0	0
78	0	0	0	5,158	9	0	0
79	0	0	0	3,933	7	0	0
80	0	0	0	2,955	5	0	0
81	0	0	0	2,186	4	0	0
82	0	0	0	1,591	3	0	0
83	0	0	0	1,139	2	0	0
84	0	0	0	800	1	0	0
85	0	0	0	552	1	0	0
86	0	0	0	373	1	0	0
87	0	0	0	247	0	0	0
88	0	0	0	160	0	0	0
89	0	0	0	102	0	0	0
90	0	0	0	63	0	0	0
91	0	0	0	38	0	0	0
92	0	0	0	23	0	0	0
93	0	0	0	13	0	0	0
94	0	0	0	7	0	0	0
95	0	0	0	4	0	0	0
96	0	0	0	2	0	0	0
97	0	0	0	1	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments
(In Thousands)
Projections Commence June 30, 2018
* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)
** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (d)

Year (a)	Projected Beginning Fiduciary Net Position* (b)	Projected Benefit Payments for current Plan participants** (c)	"Funded" Portion of Benefit Payments (d) = (c) if (b) >= (c)	"Unfunded" Portion of Benefit Payments (e) = (c) - (d)	Present Value of "Funded" Benefit Payments (f) = (d) / (1+7.00%)^[(a) - .5]	Present Value of "Unfunded" Benefit Payments (g) = (e) / (1+3.87%)^[(a) - .5]	Present Value of Benefit Payments Using the Single Discount Rate (h) = (c) / (1+4.97%)^[(a) - .5]
1	$ 1,790,045	$ 226,931	$ 226,931	$ 0	$ 219,382	$ 0	$ 221,497
2	1,787,655	233,310	233,310	0	210,794	0	216,950
3	1,782,979	241,459	241,459	0	203,884	0	213,904
4	1,776,431	248,985	248,985	0	196,486	0	210,136
5	1,765,731	255,652	255,652	0	188,548	0	205,554
6	1,756,987	264,469	264,469	0	182,290	0	202,582
7	1,743,162	271,947	271,947	0	175,182	0	198,455
8	1,725,075	277,500	277,500	0	167,064	0	192,926
9	1,705,179	287,820	287,820	0	161,942	0	190,633
10	1,678,602	298,014	298,014	0	156,708	0	188,046
11	1,644,105	306,229	306,229	0	150,493	0	184,088
12	1,603,645	315,930	315,930	0	145,103	0	180,933
13	1,555,805	329,210	329,210	0	141,311	0	179,619
14	1,495,779	341,280	341,280	0	136,908	0	177,394
15	1,420,018	349,559	349,559	0	131,056	0	173,101
16	1,331,863	357,477	357,477	0	125,256	0	168,647
17	1,231,582	365,116	365,116	0	119,563	0	164,101
18	1,118,475	369,434	369,434	0	113,063	0	158,186
19	995,334	371,264	371,264	0	106,190	0	151,448
20	864,977	372,918	372,918	0	99,685	0	144,925
21	727,577	376,994	376,994	0	94,182	0	139,578
22	579,798	382,407	382,407	0	89,284	0	134,883
23	418,595	386,411	386,411	0	84,317	0	129,847
24	244,107	390,110	244,107	146,003	49,781	59,819	124,888
25	0	393,408	0	393,408	0	155,180	119,985
26	0	394,346	0	394,346	0	149,754	114,580
27	0	391,713	0	391,713	0	143,212	108,430
28	0	386,961	0	386,961	0	136,204	102,047
29	0	381,128	0	381,128	0	129,152	95,754
30	0	374,586	0	374,586	0	122,206	89,657
31	0	367,524	0	367,524	0	115,435	83,805
32	0	360,148	0	360,148	0	108,903	78,238
33	0	352,512	0	352,512	0	102,623	72,956
34	0	344,606	0	344,606	0	96,583	67,945
35	0	336,426	0	336,426	0	90,778	63,194
36	0	327,974	0	327,974	0	85,200	58,692
37	0	319,255	0	319,255	0	79,845	54,428
38	0	310,281	0	310,281	0	74,709	50,396
39	0	301,069	0	301,069	0	69,791	46,586
40	0	291,646	0	291,646	0	65,087	42,993
41	0	282,043	0	282,043	0	60,599	39,610
42	0	272,294	0	272,294	0	56,324	36,431
43	0	262,436	0	262,436	0	52,263	33,451
44	0	252,506	0	252,506	0	48,412	30,663
45	0	242,541	0	242,541	0	44,769	28,059
46	0	232,569	0	232,569	0	41,329	25,633
47	0	222,618	0	222,618	0	38,086	23,375
48	0	212,703	0	212,703	0	35,034	21,277
49	0	202,839	0	202,839	0	32,165	19,330
50	0	193,030	0	193,030	0	29,469	17,525

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments
(In Thousands)
Projections Commence June 30, 2018
* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)
** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (d)

Year (a)	Projected Beginning Fiduciary Net Position* (b)	Projected Benefit Payments for current Plan participants** (c)	"Funded" Portion of Benefit Payments (d) = (c) if (b) >= (c)	"Unfunded" Portion of Benefit Payments (e) = (c) - (d)	Present Value of "Funded" Benefit Payments (f) = (d) / (1+7.00%)^[(a) - .5]	Present Value of "Unfunded" Benefit Payments (g) = (e) / (1+3.87%)^[(a) - .5]	Present Value of Benefit Payments Using the Single Discount Rate (h) = (c) / (1+4.97%)^[(a) - .5]
51	0	183,276	0	183,276	0	26,937	15,852
52	0	173,578	0	173,578	0	24,561	14,303
53	0	163,939	0	163,939	0	22,333	12,870
54	0	154,360	0	154,360	0	20,245	11,545
55	0	144,853	0	144,853	0	18,290	10,321
56	0	135,428	0	135,428	0	16,463	9,193
57	0	126,102	0	126,102	0	14,758	8,155
58	0	116,896	0	116,896	0	13,171	7,202
59	0	107,843	0	107,843	0	11,698	6,330
60	0	98,971	0	98,971	0	10,336	5,534
61	0	90,322	0	90,322	0	9,081	4,812
62	0	81,932	0	81,932	0	7,931	4,158
63	0	73,842	0	73,842	0	6,881	3,570
64	0	66,093	0	66,093	0	5,930	3,044
65	0	58,723	0	58,723	0	5,072	2,577
66	0	51,763	0	51,763	0	4,304	2,164
67	0	45,246	0	45,246	0	3,622	1,802
68	0	39,198	0	39,198	0	3,021	1,487
69	0	33,637	0	33,637	0	2,496	1,216
70	0	28,577	0	28,577	0	2,042	984
71	0	24,026	0	24,026	0	1,652	788
72	0	19,982	0	19,982	0	1,323	625
73	0	16,432	0	16,432	0	1,048	489
74	0	13,358	0	13,358	0	820	379
75	0	10,730	0	10,730	0	634	290
76	0	8,515	0	8,515	0	484	219
77	0	6,671	0	6,671	0	365	164
78	0	5,158	0	5,158	0	272	121
79	0	3,933	0	3,933	0	200	88
80	0	2,955	0	2,955	0	144	63
81	0	2,186	0	2,186	0	103	44
82	0	1,591	0	1,591	0	72	31
83	0	1,139	0	1,139	0	50	21
84	0	800	0	800	0	34	14
85	0	552	0	552	0	22	9
86	0	373	0	373	0	15	6
87	0	247	0	247	0	9	4
88	0	160	0	160	0	6	2
89	0	102	0	102	0	4	1
90	0	63	0	63	0	2	1
91	0	38	0	38	0	1	0
92	0	23	0	23	0	1	0
93	0	13	0	13	0	0	0
94	0	7	0	7	0	0	0
95	0	4	0	4	0	0	0
96	0	2	0	2	0	0	0
97	0	1	0	1	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
					$ 3,448,473 +	**$ 2,459,366 =**	**$ 5,907,839**

APPENDIX E – GLOSSARY OF TERMS

1. **Actuarially Determined Contribution**

   A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

2. **Actuarial Valuation Date**

   The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

3. **Deferred Inflow of Resources**

   An acquisition of net assets by a government employer that is applicable to a future reporting period. In the context of GASB 68, these are experience gains on the Total Pension Liability, assumption changes reducing the Total Pension Liability, or investment gains that are recognized in future reporting periods.

4. **Deferred Outflow of Resources**

   A consumption of net assets by a government employer that is applicable to a future reporting period. In the context of GASB 68, these are experience losses on the Total Pension Liability, assumption changes increasing the Total Pension Liability, or investment losses that are recognized in future reporting periods.

5. **Entry Age Actuarial Cost Method**

   The actuarial cost method required for GASB 68 calculations. Under this method, the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Service Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future service costs is called the Total Pension Liability.

6. **Measurement Date**

   The date as of which the Total Pension Liability and Plan Fiduciary Net Position are measured. The Total Pension Liability may be projected from the Actuarial Valuation Date to the Measurement Date. The Measurement Date must be the same as the Reporting Date for the plan.

APPENDIX E – GLOSSARY OF TERMS

7. Net Pension Liability

The liability of employers and nonemployer contributing entities for employees for benefits provided through a defined benefit pension plan. It is calculated as the Total Pension Liability less the Plan Fiduciary Net Position.

8. Plan Fiduciary Net Position

The fair or market value of assets.

9. Reporting Date

The last day of the plan or employer's fiscal year.

10. Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to the current period of employee service in conformity with the requirements of GASB 68. The Service Cost is the normal cost calculated under the entry age actuarial cost method.

11. Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of GASB 68. The Total Pension Liability is the actuarial liability calculated under the entry age actuarial cost method. This measurement generally is not appropriate for estimating the cost to settle the Plan's liabilities.