

Policemen's Annuity and Benefit Fund of Chicago

GASB Statement Nos. 67 and 68
Accounting and Financial
Reporting for Pensions
December 31, 2018



May 8, 2019

The Retirement Board of the
Policemen's Annuity and Benefit Fund
221 North LaSalle Street, Suite 1626
Chicago, Illinois 60601-1404

Dear Members of the Board:

This report provides accounting and financial reporting information as of December 31, 2018, that is intended to comply with the Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 for the Policemen's Annuity and Benefit Fund of Chicago ("PABF" or "Fund"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

Our calculation of the liability associated with the PABF benefits (described in Section E) was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statement Nos. 67 and 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement Nos. 67 and 68 may produce significantly different results. This report may be provided to parties other than PABF only in its entirety and only with the permission of PABF.

This report is based upon information, furnished to us by PABF, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If the understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the funding actuarial valuation report that was provided to PABF and should be considered in conjunction with that report. Please see the funding actuarial valuation report as of December 31, 2018, for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

The funding objective is to provide employer and employee contributions sufficient to provide the benefits of the Fund when due. Pursuant to Public Act ("P.A.") 99-0506, effective May 30, 2016, the funding policy was amended and requires City contributions to be equal to \$420 million in payment year 2016, \$464 million in payment year 2017, \$500 million in payment year 2018, \$557 million in payment year 2019 and \$579 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years 2020 through 2055 that along with member contributions and investment earnings are expected to generate a projected funded ratio of 90% by plan year end 2055. The projections are based on an open group, level percent of pay financing and the Entry-Age Normal cost method.

This is a severely underfunded plan. Based on the results of the funding actuarial valuation report, the funded ratio is only 23.8% (using actuarial value of assets) and the unfunded liability is approximately \$10 billion as of December 31, 2018. The funded ratio based on the results of the funding actuarial valuation report is not projected to even reach 50% funded for another 25 years until 2043.

The funding policy defined in P.A. 99-0506 provides for fixed dollar City contributions for payment years 2016 to 2020, and level percent of pay contributions for years 2021 to 2055 that, along with member contributions and investment income, are projected to produce a funded ratio of 90% by 2055. This funding policy significantly defers contributions when compared to the provisions of the prior funding policy defined in P.A. 96-1495. The amount of annual contributions defined under P.A. 99-0506 does not even cover normal cost plus interest on the unfunded liability for the next 14 years. This means the unfunded liability is actually projected to increase to a high of \$12.0 billion in 2032, when contributions are finally sufficient to start reducing the unfunded liability.

We understand that P.A. 99-0506 defines the amount of City Contributions to the PABF. Nevertheless, we continue to recommend that the plan sponsor seriously consider making additional contributions (in excess of the statutory requirement) to ensure that there are sufficient assets available in the fund in all years to pay the promised benefits.

We also recommend that the Board perform projections which include pessimistic scenarios such as investment return lower than assumed, lower contributions received than expected, higher benefit payments than expected, etc., to more fully understand the impact of less than optimal future expectations.

This actuarial valuation assumes that the City will be able to make future contributions on a timely basis. We did not perform an analysis of the ability of the City to make future contributions. Such an analysis is not within the scope of our assignment or within our analytical skill set. Failure to receive City contributions on a timely basis could jeopardize the sustainability of the Fund.



The actuarial valuation results set forth in this report are based on the data and actuarial techniques described above, and upon the provisions of the Fund as of the actuarial valuation date. To the best of our knowledge, the information contained in this report is complete and accurate based on the statutes in effect as of December 31, 2018, and fairly presents the actuarial position of the Fund as of December 31, 2018, for purposes of complying with the financial reporting requirements under GASB Statement Nos. 67 and 68. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

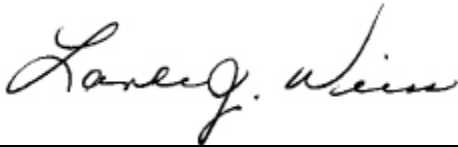
The actuarial assumptions used in this actuarial valuation are reasonable and appropriate for purposes of measuring the GASB Statement Nos. 67 and 68 pension liability as of December 31, 2018, under the current provisions.

This report should not be relied on for any purpose other than the purpose stated.

The signing actuaries are independent of the PABF and the plan sponsor.

Lance Weiss and Alex Rivera are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



By

Lance J. Weiss, EA, MAAA, FCA
Senior Consultant



By

Alex Rivera, FSA, EA, MAAA, FCA
Senior Consultant

Auditor's Note – This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.



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SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2018

	2018
Actuarial Valuation Date	December 31, 2018
Measurement Date of the Net Pension Liability	December 31, 2018
Employer's Fiscal Year Ending Date (Reporting Date)	December 31, 2018

Membership

Number of	
- Retirees and Beneficiaries	13,631
- Inactive, Nonretired Members	721
- Active Members	13,438
- Total	27,790
Covered Payroll	\$ 1,205,324,445

Net Pension Liability

Total Pension Liability	\$ 13,313,258,366
Plan Fiduciary Net Position	2,905,179,841
Net Pension Liability	\$ 10,408,078,525
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	21.82%
Net Pension Liability as a Percentage of Covered Payroll	863.51%

Development of the Single Discount Rate

Single Discount Rate Beginning of Year	7.00%
Single Discount Rate End of Year	7.18%
Long-Term Expected Rate of Investment Return	7.25%
Long-Term Municipal Bond Rate Beginning of Year*	3.31%
Long-Term Municipal Bond Rate End of Year*	3.71%
Last Year Trust Assets are Available to Pay Assets	2079

Total Pension Expense \$ 839,169,821

Deferred Outflows and Deferred Inflows of Resources by Source to be recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred (Inflows) of Resources
Difference Between Expected and Actual Non-Investment Experience	\$ 869,433	\$ (467,170,536)
Changes in Assumptions	212,000,349	(217,531,394)
Net Difference Between Projected and Actual Earnings on Pension Plan Investments	365,957,606	(126,001,243)
Total	\$ 578,827,388	\$ (810,703,173)

**Source: The rates at the beginning and end of the year are the rates for fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of December 29, 2017, and December 28, 2018, respectively. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax exempt securities.*

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (“GASB”) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain non-actuarial information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state or local governments to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan’s fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer’s contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, “Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer’s reporting period should be reported as a deferred outflow of resources related to pensions.” The information contained in this report does not incorporate any contributions made to the PABF subsequent to the measurement date of December 31, 2018.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the liability and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The *statement of fiduciary net position* presents the assets and liabilities of the pension plan at the end of the pension plan’s reporting period. The *statement of changes in fiduciary net position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Discussion

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The type of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

The tables may be built prospectively as the information becomes available.

Discussion

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2018, and a measurement date of December 31, 2018.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects: (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year mixed maturity general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this actuarial valuation, the expected rate of return on pension plan investments is 7.25%; the municipal bond rate is 3.71% (based on the most recent date available on or before the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting Single Discount Rate is 7.18%.

Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014, respectively; earlier application is encouraged by the GASB.

Recent Legislation

The following Public Act passed in 2018 by the 100th General Assembly, included changes to the Fund Provisions but did not impact the results of the actuarial valuation.

Public Act 100-1148 effective December 10, 2018

Technical correction related to filing copies of the report as required by Section 3.1 of the General Assembly Organizational Act and with the State Government Report Distribution Center for the General Assembly.

Discussion

Assumption Changes

Actuarial assumptions remained unchanged (with the exception of the single discount rate) from the prior actuarial valuation and reflect the results of the experience study performed for the period of January 1, 2009 through December 31, 2013, approved by the Board on March 16, 2015, and the investment return and inflation assumptions of 7.25% and 2.75%, respectively, first effective for the December 31, 2016, actuarial valuation.

At its regularly scheduled meeting on May 31, 2019, the Retirement Board of the Policemen's Annuity and Benefit Fund of Chicago authorized Gabriel, Roeder, Smith & Company to perform an experience study of the actuarial assumptions for the five year period January 1, 2014 through December 31, 2018. The primary purpose of the study is to determine the continued appropriateness of the current actuarial assumptions by comparing actual experience to expected experience. The study will be completed in the summer of 2019.

SECTION B

FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Pension Expense under GASB Statement No. 68

Fiscal Year Ended December 31, 2018

A. Expense

1. Service Cost Including Pension Plan Administrative Expense	\$	242,998,341
2. Interest on the Total Pension Liability		931,731,201
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)		(107,186,492)
5. Projected Earnings on Plan Investments (made negative for addition here)		(223,539,393)
6. Other Changes in Plan Fiduciary Net Position		(1,600,348)
7. Recognition of Outflow/(Inflow) of Resources due to Liabilities		(113,967,711)
8. Recognition of Outflow/(Inflow) of Resources due to Assumption Changes		18,552,310
9. Recognition of Outflow/(Inflow) of Resources due to Assets		92,181,913
10. Total Pension Expense	\$	839,169,821

B. Reconciliation of Net Pension Liability

1. Net Pension Liability Beginning of Year	\$	10,332,396,270
2. Pension Expense		839,169,821
3. Employer Contributions (made negative for addition here)		(588,034,930)
4. Change in Liability Experience Outflows/(Inflows) Recognized in Current Liabilities		(167,183,275)
5. Change in Assumption Changes Experience Outflows/(Inflows) Recognized in Current Liabilities		(277,604,023)
6. Change in Investment Experience Outflows/(Inflows) Recognized in Current Assets		269,334,662
7. Net Pension Liability End of Year	\$	10,408,078,525

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods

Fiscal Year Ended December 31, 2018

A. Outflows and (Inflows) of Resources Recognized in Current and Future Pension Expenses as of Plan Year End December 31, 2018

Experience (Gain)/Loss			Original	Amount Recognized in Past Pension Expenses	Amount Recognized in Current Pension Expense	Deferred (Inflows)	Deferred Outflows
	Original Balance	Date Established	Recognition Period/ Amortization Factor			to be Recognized in Future Pension Expenses	to be Recognized in Future Pension Expenses
1. Differences Between Expected and Actual Non-Investment Experience	\$ (281,150,986)	December 31, 2018	6.2392	\$ -	\$ (45,062,349)	\$ (236,088,637)	\$ -
	(299,923,560)	December 31, 2017	5.8778	(51,026,728)	(51,026,728)	(197,870,104)	-
	1,801,353	December 31, 2016	5.7988	621,280	310,640	-	869,433
	(105,968,891)	December 31, 2015	5.8259	(54,567,822)	(18,189,274)	(33,211,795)	-
	<u>\$ (685,242,084)</u>		<u>5.9354</u>	<u>\$ (104,973,270)</u>	<u>\$ (113,967,711)</u>	<u>\$ (467,170,536)</u>	<u>\$ 869,433</u>
2. Assumption Changes	\$ (259,051,713)	December 31, 2018	6.2392	\$ -	\$ (41,520,319)	\$ (217,531,394)	\$ -
	238,975,508	December 31, 2017	5.8778	40,657,487	40,657,487	-	157,660,534
	112,585,241	December 31, 2016	5.7988	38,830,284	19,415,142	-	54,339,815
	-	December 31, 2015	5.8259	-	-	-	-
	<u>\$ 92,509,036</u>		<u>5.9354</u>	<u>\$ 79,487,771</u>	<u>\$ 18,552,310</u>	<u>\$ (217,531,394)</u>	<u>\$ 212,000,349</u>
3. Difference Between Expected and Actual Investment Earnings	\$ 361,516,575	December 31, 2018	5.0000	\$ -	\$ 72,303,315	\$ -	\$ 289,213,260
	(210,002,073)	December 31, 2017	5.0000	(42,000,415)	(42,000,415)	(126,001,243)	-
	74,326,665	December 31, 2016	5.0000	29,730,666	14,865,333	-	29,730,666
	235,068,400	December 31, 2015	5.0000	141,041,040	47,013,680	-	47,013,680
	<u>460,909,567</u>		<u>5.0000</u>	<u>\$ 128,771,291</u>	<u>\$ 92,181,913</u>	<u>\$ (126,001,243)</u>	<u>\$ 365,957,606</u>
4. Total	\$ (131,823,481)			\$ 103,285,792	\$ (3,233,488)	\$ (810,703,173)	\$ 578,827,388

B. Deferred Outflows and Deferred (Inflows) of Resources by Year to be Recognized in Future Pension Expenses

Year Ending December 31	Differences Between Expected and Actual Non-Investment Experience	Assumption Changes	Differences Between Expected and Actual Investment Experience	Year Ending December 31	Deferred Outflows of Resources	Deferred (Inflows) of Resources	Net Deferred Outflows/ (Inflows) of Resources
2019	\$ (113,967,711)	\$ 18,552,310	\$ 92,181,913	2019	\$ 194,565,597	\$ (197,799,085)	\$ (3,233,488)
2020	(110,800,958)	18,552,310	45,168,233	2020	147,551,917	(194,632,332)	(47,080,415)
2021	(95,840,924)	14,646,699	30,302,902	2021	128,718,486	(179,609,809)	(50,891,323)
2022	(89,852,269)	(5,832,246)	72,303,315	2022	107,991,388	(131,372,588)	(23,381,200)
2023	(45,062,349)	(41,520,319)	-	2023	-	(86,582,668)	(86,582,668)
2024	(10,776,892)	(9,929,799)	-	2024	-	(20,706,691)	(20,706,691)
Thereafter	-	-	-	Thereafter	-	-	-
Total	\$ (466,301,103)	\$ (5,531,045)	\$ 239,956,363	Total	\$ 578,827,388	\$ (810,703,173)	\$ (231,875,785)

Numbers may not add due to rounding.

Statement of Fiduciary Net Position

Years Ended December 31, 2018, and 2017

	2018	2017
Assets		
Receivables		
Employer	\$ 581,515,035	\$ 486,151,716
Plan member	5,209,349	5,019,464
Due from Broker - net	135,126,612	139,702,728
Interest and dividends	6,555,825	5,822,061
Other receivables	-	-
Total receivables	728,406,821	636,695,969
Investments - at fair value		
Cash and short-term investments	108,459,254	156,035,875
Equities	1,098,656,068	1,485,918,492
Fixed income	705,429,666	796,069,079
Private equity	84,919,513	36,607,996
Real estate	90,782,832	72,809,905
Hedge funds	188,406,726	100,082,750
Infrastructure	92,520,576	26,855,526
Subtotal	2,369,174,635	2,674,379,623
Forward currency contracts	22,194,095	27,924,125
Securities lending cash collateral	112,851,289	143,322,338
Total investments - fair value	2,504,220,019	2,845,626,086
Total assets	3,232,626,840	3,482,322,055
Liabilities and net position		
Liabilities		
Due to brokers - net	204,454,518	207,254,031
Refunds, professional fees payable and other liabilities	7,898,508	6,734,372
OPEB liability	2,242,684	2,945,021
Securities lending cash collateral	112,851,289	143,322,338
Total liabilities	327,446,999	360,255,762
Net Position - Restricted for Pension Benefits	\$ 2,905,179,841	\$ 3,122,066,293

Statement of Changes in Fiduciary Net Position Years Ended December 31, 2018, and 2017

	<u>2018</u>	<u>2017</u>
Additions		
Contributions		
Employer	\$ 588,034,930	\$ 494,483,191
Plan Member	107,186,492	103,011,250
Other	1,600,348	97,239
Total Contributions	<u>696,821,770</u>	<u>597,591,680</u>
Investment Income		
Net appreciation in fair value of investments	(183,034,696)	371,090,440
Interest	21,282,711	19,437,993
Dividends	29,667,486	29,272,410
Real estate operating income - net	2,973,090	1,749,558
	<u>(129,111,409)</u>	<u>421,550,401</u>
Less investment expenses	(9,615,537)	(10,129,378)
Investment income - net	<u>(138,726,946)</u>	<u>411,421,023</u>
Securities lending		
Income	3,134,411	2,150,479
Lender (borrower) rebates	(2,282,406)	(1,254,123)
Management fees	(102,241)	(126,975)
Securities lending income - net	<u>749,764</u>	<u>769,381</u>
Total additions	<u>558,844,588</u>	<u>1,009,782,084</u>
Deductions		
Benefits	764,367,368	737,873,928
Refund Payments	6,737,073	10,017,655
Administrative and OPEB expenses	4,626,599	4,843,012
Total deductions	<u>775,731,040</u>	<u>752,734,595</u>
Net increase	<u>(216,886,452)</u>	<u>257,047,489</u>
Net Position Restricted for Pension Benefits		
Beginning of year	3,122,066,293	2,865,018,804
End of year	<u>\$ 2,905,179,841</u>	<u>\$ 3,122,066,293</u>

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Schedule of Changes in Net Pension Liability and Related Ratios Current Period Fiscal Year Ended December 31, 2018

A. Total Pension Liability	
1. Service Cost Including Pension Plan Administrative Expense	\$ 242,998,341
2. Interest on the Total Pension Liability	931,731,201
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the Total Pension Liability	(281,150,986)
5. Changes of assumptions	(259,051,713)
6. Benefit payments, including refunds of employee contributions	(771,104,441)
7. Pension Plan Administrative Expenses	(4,626,599)
8. Net change in total pension liability	(141,204,197)
9. Total pension liability – beginning	13,454,462,563
10. Total pension liability – ending	<u><u>\$ 13,313,258,366</u></u>
B. Plan Fiduciary Net Position	
1. Contributions – employer	588,034,930
2. Contributions – employee	107,186,492
3. Net investment income	(137,977,182)
4. Benefit payments, including refunds of employee contributions	(771,104,441)
5. Pension Plan Administrative Expense	(4,626,599)
6. Other	1,600,348
7. Net change in plan fiduciary net position	(216,886,452)
8. Plan fiduciary net position – beginning	3,122,066,293
9. Plan fiduciary net position – ending	<u><u>\$ 2,905,179,841</u></u>
C. Net Pension Liability	<u><u>\$ 10,408,078,525</u></u>
D. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	21.82%
E. Covered-Employee Payroll	\$ 1,205,324,445
F. Net Pension Liability as a Percentage of Covered Employee Payroll	863.51%

Schedules of Required Supplementary Information

Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Fiscal year ending December 31,	2018	2017	2016	2015	2014
Total Pension Liability					
Service Cost Including Pension Plan Administrative Expense	\$ 242,998,341	\$237,333,255	\$ 220,569,553	\$ 213,584,647	\$ 199,435,084
Interest on the Total Pension Liability	931,731,201	917,720,267	851,098,457	832,972,131	791,693,017
Benefit Changes	-	-	606,249,791	-	-
Difference between Expected and Actual Experience	(281,150,986)	(299,923,560)	1,801,353	(105,968,891)	-
Assumption Changes	(259,051,713)	238,975,508	112,585,241	-	845,070,287
Benefit Payments	(764,367,368)	(737,873,928)	(696,491,103)	(668,950,080)	(645,688,934)
Refunds	(6,737,073)	(10,017,655)	(10,704,842)	(7,826,847)	(8,991,636)
Pension Plan Administrative Expense	(4,626,599)	(4,843,012)	(4,749,762)	(4,508,519)	(4,240,625)
Net Change in Total Pension Liability	(141,204,197)	341,370,875	1,080,358,688	259,302,441	1,177,277,193
Total Pension Liability - Beginning	13,454,462,563	13,113,091,688	12,032,733,000	11,773,430,559	10,596,153,366
Total Pension Liability - Ending (a)	\$ 13,313,258,366	\$ 13,454,462,563	\$ 13,113,091,688	\$ 12,032,733,000	\$ 11,773,430,559
Plan Fiduciary Net Position					
Employer Contributions	588,034,930	494,483,191	272,427,716	\$ 572,836,100	\$ 177,417,827
Employee Contributions	107,186,492	103,011,250	101,475,864	107,626,311	95,675,538
Pension Plan Net Investment Income	(137,977,182)	412,190,404	142,699,124	(5,333,795)	181,901,293
Benefit Payments	(764,367,368)	(737,873,928)	(696,491,103)	(668,950,080)	(645,688,934)
Refunds	(6,737,073)	(10,017,655)	(10,704,842)	(7,826,847)	(8,991,636)
Pension Plan Administrative Expense	(4,626,599)	(4,843,012)	(4,749,762)	(4,508,519)	(4,240,625)
Other	1,600,348	97,239	1,412,770	3,091,545	740,305
Net Change in Plan Fiduciary Net Position	(216,886,452)	257,047,489	(193,930,233)	(3,065,285)	(203,186,232)
Plan Fiduciary Net Position - Beginning	3,122,066,293	2,865,018,804	3,058,949,037	3,062,014,322	3,265,200,554
Plan Fiduciary Net Position - Ending (b)	\$ 2,905,179,841	\$ 3,122,066,293	\$ 2,865,018,804	\$ 3,058,949,037	\$ 3,062,014,322
Net Pension Liability - Ending (a) - (b)	10,408,078,525	10,332,396,270	10,248,072,884	8,973,783,963	8,711,416,237
Plan Fiduciary Net Position as a Percentage					
of Total Pension Liability	21.82%	23.20%	21.85%	25.42%	26.01%
Covered Employee Payroll	\$ 1,205,324,445	\$ 1,150,406,094	\$ 1,119,526,987	\$ 1,086,607,979	\$ 1,074,333,319
Net Pension Liability as a Percentage					
of Covered Employee Payroll	863.51%	898.15%	915.39%	825.85%	810.87%

Ten fiscal years will be built prospectively.

Please see the following page for additional notes relating to the Schedule of Changes in Net Pension Liability and Related Ratios.

Schedules of Required Supplementary Information

Additional Notes to the Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Beginning of year total pension liability for fiscal year 2018 used a Single Discount Rate of 7.00% and the benefit provisions, actuarial assumptions and funding policy in effect as of the December 31, 2017, funding actuarial valuation. The Single Discount Rate of 7.00% was based on a long-term expected rate of return on pension plan investments of 7.25% used in the December 31, 2017, funding actuarial valuation for the years 2017 through 2070 and a long-term municipal bond rate as of December 29, 2017, of 3.31% for subsequent years.

End of year total pension liability for fiscal year 2018 uses a Single Discount Rate of 7.18% and the benefit provisions, actuarial assumptions and funding policy in effect as of the December 31, 2018, funding actuarial valuation. The Single Discount Rate of 7.18% was based on a long-term expected rate of return on pension plan investments of 7.25% used in the December 31, 2018, funding actuarial valuation for the years 2018 through 2079 and a long-term municipal bond rate as of December 28, 2018, of 3.71% for subsequent years.

The decrease in the total pension liability for fiscal year 2018 due to assumption changes and methods includes the impact of the change in the municipal bond rate from December 29, 2017 to December 28, 2018. Changes in actuarial assumptions and methods led to the change in the Single Discount Rate from 7.00% to 7.18% (based on the long-term expected rate of return on pension plan investments of 7.25% used in the December 31, 2017, funding actuarial valuation and 7.25% used in the December 31, 2018, funding actuarial valuation and the long-term municipal bond rate of 3.31% as of December 29, 2017, and 3.71% as of December 28, 2018, respectively). This change was measured at the end of the year using the benefit provisions in effect as of December 31, 2018.

Schedules of Required Supplementary Information

Schedule of the Net Pension Liability Multiyear

FY Ending December 31,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll ¹	Net Pension Liability as a % of Covered Payroll
2014	\$ 11,773,430,559	\$ 3,062,014,322	\$ 8,711,416,237	26.01%	\$ 1,074,333,318	810.87%
2015	12,032,733,000	3,058,949,037	8,973,783,963	25.42%	1,086,607,979	825.85%
2016	13,113,091,688	2,865,018,804	10,248,072,884	21.85%	1,119,526,987	915.39%
2017	13,454,462,563	3,122,066,293	10,332,396,270	23.20%	1,150,406,094	898.15%
2018	13,313,258,366	2,905,179,841	10,408,078,525	21.82%	1,205,324,445	863.51%

¹ Covered payroll is the amount in force as of the actuarial valuation date and likely differs from actual payroll paid during the fiscal year.

Ten fiscal years will be built prospectively.

Schedule of Contributions Multiyear Last 10 Fiscal Years

FY Ending December 31,	Actuarial Determined Contribution ¹	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll ²	Actual Contribution as a % of Covered Payroll	Statutory Contribution ³
2009	\$ 339,488,187	\$ 172,043,784	\$ 167,444,403	\$ 1,011,205,359	17.01%	\$177,333,569
2010	363,624,570	174,500,507	189,124,063	1,048,084,301	16.65%	177,060,837
2011	402,751,961	174,034,600	228,717,361	1,034,403,526	16.82%	176,068,606
2012	431,010,173	197,885,552	233,124,621	1,015,170,686	19.49%	204,329,314
2013	474,177,604	179,521,259	294,656,345	1,015,426,128	17.68%	182,716,690
2014	491,651,208	178,158,132	313,493,076	1,074,333,318	16.58%	178,773,877
2015	785,500,836	575,927,645	209,573,191	1,086,607,979	53.00%	410,558,466
2016	785,695,084	273,840,486	511,854,598	1,119,526,987	24.46%	454,844,486
2017	910,938,497	494,580,430	416,358,067	1,150,406,094	42.99%	500,000,000
2018	924,653,899	589,635,278	335,018,621	1,205,324,445	48.92%	557,000,000

¹ The PABF Statutory Funding Policy does not conform to Actuarial Standards of Practice; therefore, for fiscal years 2015 and after, the actuarially determined contribution is equal to the normal cost plus a 30-year level dollar amortization of the unfunded actuarial liability. Prior to 2015 the actuarially determined contribution was equal to the "ARC" which was equal to the normal cost plus a 30-year open level percent amortization of the unfunded actuarial liability.

² Covered payroll shown is the amount in force as of the actuarial valuation date and likely differs from actual payroll paid during the fiscal year.

³ Excludes amounts paid for health insurance supplement.

Notes to Schedule of Contributions

Valuation Date:	December 31, 2018
Methods and Assumptions Used to Determine Contribution Rates as of the Valuation Date:	
Actuarial Cost Method	Entry-Age Normal
Amortization Method	Prior to 2015, the total City contribution was generated by a tax equal to 2.00 times the contributions made by the policemen to the Fund two years prior to the year of the tax levy. For tax levy years 2015-2019, the statutory contributions are equal to \$420 million, \$464 million, \$500 million, \$557 million and \$579 million respectively. For tax levy years on and after 2020, the statutory contributions are equal to a level percentage of pay contribution determined so that the Plan attains a 90 percent funded ratio by the end of 2055 on an open group basis.
Remaining Amortization Period	Not Applicable. An amortization payment is not directly calculated. The amortization payment is the difference between the total statutory contribution and the employer normal cost contribution.
Asset Valuation Method	5-year smoothed market
Inflation	2.75 percent as of the December 31, 2018, actuarial valuation.
Salary Increases	Salary increase rates based on wage inflation rate of 3.75% plus service based increases consistent with bargaining contracts.
Postretirement Benefit Increases	A retiree born before January 1, 1966, with at least 20 years of service or receiving a mandatory retirement minimum annuity, receives an increase of 3 percent of the original annuity, starting on the first of the month following the first anniversary of his retirement or the first of the month following attainment of age 55, whichever is later, and shall not be subject to a 30 percent maximum increase. For retirees born on and after January 1, 1966, automatic increases are 1.5 percent of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30 percent. For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00 percent and 50 percent of CPI-U of the original benefit, commencing at age 60.
Investment Rate of Return	7.25 percent as of the December 31, 2018, actuarial valuation.
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the December 31, 2014, actuarial valuation pursuant to an experience study of the period January 1, 2009 through December 31, 2013.
Mortality	Post-Retirement Healthy mortality rates: Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 108% for males and 97% for females. Pre-Retirement mortality rates: Sex distinct Retirement Plans 2014 Total Employee mortality table weighted 85% for males and 115% for females. Disabled Mortality: Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 115% for males and 115% for females.
Other Information:	
Notes	The actuarial valuation is based on the statutes in effect as of December 31, 2018.
Methods and Assumptions Used for Accounting Purposes as of the Valuation Date:	
Actuarial Cost Method	Entry-Age Normal
Asset Valuation Method	Market value
Discount Rate	7.00 percent as of the December 31, 2017, actuarial valuation. 7.18 percent as of the December 31, 2018, actuarial valuation.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumptions

Single Discount Rate

A Single Discount Rate of 7.18% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 7.25% and a municipal bond rate of 3.71%. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made under the statutory funding policy. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments only through the year 2079. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year 2079, and the municipal bond rate was applied to all benefit payments after that date.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 7.18%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher:

SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

1% Decrease	Current Single Discount	1% Increase
6.18%	Rate Assumption	8.18%
7.18%		
\$ 11,955,692,258	\$ 10,408,078,525	\$ 9,104,012,404

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	13,631
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	721
Active Plan Members	<u>13,438</u>
Total Plan Members	27,790

Additional information about the member data used is included in the December 31, 2018, funding actuarial valuation report.

SECTION E

SUMMARY OF BENEFITS

Summary of Benefits

Plan Descriptions (as of December 31, 2018)

PARTICIPANTS

An employee in the police department of the City of Chicago appointed and sworn or designated by law as a peace officer with the title of policeman, policewoman, chief surgeon, police surgeon, police dog catcher, police kennelman, police matron and members of the police force of the police department.

SERVICE

In computing service rendered by a police officer, the following periods shall be counted, in addition to all periods during which he performed the duties of his position, as periods of service for annuity purposes only: All periods of (a) vacation; (b) leave of absence with pay; (c) military service; (d) disability for which the police officer receives disability benefit. The calculation of service is based on a day-to-day basis for most purposes. For the purpose of calculating benefits under the Dominant Formula, one year of Service is credited for a year in any portion of which a police officer is compensated.

RETIREMENT

Eligibility

Attainment of age 50 with at least 10 years of service.

For participants who first became members on or after January 1, 2011, attainment of age 55 with at least 10 years of service. Participants may retire at attainment of age 50 with 10 years of service with a reduced benefit.

Mandatory

Effective in plan year 2003, retirement is mandatory for a participant who has attained age 63.

Accumulation Annuity

At age 50 or more, with 10 or more years of service, the employee is entitled to an annuity based on the sums accumulated for age and service annuity plus 1/10 of the sum accumulated from the contributions by the City for the age and service annuity for each completed year of service after the first 10 years. At age 50 or more with 20 or more years, the employee is entitled to an annuity based on all sums accumulated.

Summary of Benefits

Formula Minimum Annuity

While there are several alternative formulas available with 20 or more years of service, the Dominant Formula is 50% of highest average salary (including duty availability pay) in 48 consecutive months within the last 10 years of service plus 2.5% for each year or fraction of service over 20 years, limited to 75% of average salary.

Mandatory Retirement Minimum Annuity

A police officer who is required to withdraw from service due to attainment of mandatory retirement age who has less than 20 years of service credit may elect to receive an annuity equal to 30% of average salary for the first 10 years of service, plus 2% of average salary for each completed year of service in excess of 10, to a maximum of 48% of average salary. This benefit qualifies for post retirement increases.

Post-Retirement Increase

A retiree born before January 1, 1966, with at least 20 years of service or receiving a mandatory retirement minimum annuity, receives an increase of 3% of the original annuity, starting on the first of the month following the first anniversary of his retirement or the first of the month following attainment of age 55, whichever is later, and shall not be subject to a 30% maximum increase. For retirees born on and after January 1, 1966, automatic increases are 1.5% of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30%.

For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00% and 50% of CPI-U of the original benefit, commencing at age 60.

Summary of Benefits

Minimum Annuity

Beginning with the monthly annuity payment due on January 1, 2016, the fixed and granted monthly annuity payment for any policeman who retired from the service before January 1, 2016, at age 50 or over with 20 or more years of service, and for any policeman who retired from service due to termination of disability and who is entitled to an annuity on January 1, 2016, shall be no less than 125% of the Federal Poverty Level.

For participants who first became members on or after January 1, 2011, the member is entitled to an annuity based on an accrual rate of 2.5% of the final average salary for each fraction of service. Maximum is 75% of the final average salary. Final average salary is calculated using salary from the eight highest consecutive years within the last 10 years of service prior to retirement. Pensionable salary is limited to \$106,800 in 2011, increased by the lesser of 3% and one-half of the annual unadjusted percentage increase in the Consumer Price Index-U (but not less than zero) as measured in the preceding 12-month period ending with the September preceding the November 1, which is the date that the new amount will be calculated and made available to the pension funds.

For participants who first became members on or after January 1, 2011, who retire after age 50 but before age 55 is attained, the member is entitled to an annuity based on an accrual rate of 2.5% of the final average salary for each fraction of service, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum benefit of 75%.

Reversionary Annuity

A member, prior to retirement, may elect to reduce his own annuity, and provide a reversionary annuity, to begin upon the officer's death, for the officer's spouse.

Summary of Benefits

SURVIVOR INCOME BENEFITS PAYABLE ON DEATH

Death in Service (Non-Duty): Generally, a money-purchase benefit is provided, based on total salary deductions and City contributions. However, if a policeman dies in service after December 31, 1985, with at least 1.5 years of service, the widow's annuity is the greater of (a) 30% of the annual maximum salary attached to the classified civil service position of a first class patrolman at the time of his death (without dollar limit) or (b) 50% of the benefit accrued by the policeman at date of death.

The lifetime benefit is payable until death.

Death in Service (Duty Related)

Compensation Annuity

75% of the member's salary attached to the civil service position that would ordinarily have been paid to such member as though in active discharge of his duties at the time of death payable until the date the policeman would have attained age 63.

Supplemental Annuity

Payable for life and is equal to the difference between the money purchase annuity for the spouse and an amount equal to 75% of the annual salary (including all salary increases and longevity raises) the police officer would have been receiving when he attained age 63 if the police officer had continued in service at the same rank last held in the department.

Death after Retirement

If a police officer retires on or after January 1, 1986, and subsequently dies, the widow's annuity is 40% before 1988 and 50% on and after January 1, 1988, of the retired policeman's annuity at the time of death (without dollar limit).

Maximum Annuity

\$500 a month (after discount for age difference) under both the accumulation method and the old formula method. There is no dollar limit on the 30%, 40% or 50% benefit.

Summary of Benefits

Minimum Annuity

The minimum widow's annuity shall be no less than 125% of the Federal Poverty Level.

For participants who first became members on or after January 1, 2011, widow benefits are equal to 66-2/3% of the officer's earned annuity at the date of death. Automatic increases to the annuity are equal to the lesser of 3.00% and 50% of CPI-U, commencing when the survivor reaches age 60, and applied to the original granted retirement annuity.

CHILDREN'S ANNUITIES

Eligibility

Payable at death of the policeman to all unmarried children less than 18 years of age.

Benefit

10% of the annual maximum salary of a first class patrolman during widow (widower) life, 15% otherwise.

Payable Until

Age 18. If the child is disabled, benefit is payable for life or as long as such disablement exists.

Family Maximum

60% (non-duty death) or 100% (duty death) of the salary that would ordinarily been paid to the policeman, if he had been in the active discharge of his duties.

Parent's Annuities Eligibility

Payable to a dependent parent at the death of a policeman who is in either active service, or receiving a disability benefit, or on leave of absence, or in receipt of an annuity granted after 20 years of service, or waiting to start receiving an annuity granted for 20 years of service. The benefit is only payable if there are no surviving spouses or children eligible for benefits.

Benefit

18% of the current salary attached to the rank at separation from service.

Payable until

Death of the dependent parent.

DUTY DISABILITY BENEFIT

Eligibility

Disabling condition incurred in the performance of duty.

Summary of Benefits

Benefit 75% of salary at the time the disability is allowed plus \$100.00 per month for each unmarried child less than age 18, (total amount of child's benefits shall not exceed 25% of salary). Beginning January 1, 2000, after seven years of payment, the benefit shall not be less than 60% of the current salary attached to the rank held by the policemen at the time of disability. Payable to employee's age 63 or by operation of law, whichever is later. Salary deductions are contributed by the City.

OCCUPATIONAL DISEASE DISABILITY BENEFIT

Eligibility Heart attack or any disability heart disease after 10 years of service.

Benefit 65% of salary attached to the rank held by the police officer at the time of his or her removal from the police department payroll with a minimum after 10 years of 50% of the current salary attached to the rank. Each natural or legally adopted unmarried child of the officer under the age of 18 is entitled to a benefit of \$100 per month. This benefit is not terminated at age 18 if the child is then dependent by reason of physical or mental disability. Salary deductions are contributed by the City.

ORDINARY DISABILITY BENEFIT

Eligibility Disabling condition other than duty or occupational related.

Benefit 50% of salary at the time of injury, payable for a period not more than 25% of service (excluding any previous disability time) rendered prior to injury, nor more than five years. Disability shall cease at age 63. Salary deductions are contributed by the City.

DEATH BENEFIT

Eligibility Payable upon the death of a police officer whose death occurs while in active service; on authorized leave of absence; within 60 days of receipt of salary; while receiving duty or ordinary disability benefit; occurring within 60 days of termination of such benefit; or occurring on retirement while in receipt of annuity and separation was effective after 20 years of service. This benefit is payable to beneficiaries or, if none, to estate.

Summary of Benefits

Benefit

Death in Service:	Age at Death	Benefit
	49 and under	\$12,000
	50-62	\$12,000 less \$400 for each year by which age at death exceeds 49

Death after Retirement:	Age at Death	Benefit
	50 and over	\$6,000

If death results from injury incurred in performance of duty before retirement on annuity, the benefit payable is \$12,000 regardless of the attained age.

REFUNDS

Policemen Without regard to service and under age 50, or with less than 10 years of service and under age 57 at withdrawal: a refund of all salary deductions together with 1.5% simple interest until the date of withdrawal.

For Spouse's Annuity Upon retirement an unmarried policeman will receive a refund of contributions for spouse's annuity, accumulated at 3% compounded annually.

Of Remaining Amounts If at death of a retired policeman the total member contributions paid while active exceed the total retirement benefits paid to date of death, the difference is payable.

CONTRIBUTIONS

Salary Deductions	Employee	7 %	
	Spouse	1½%	
	Annuity Increase	½%	
		9 %	
City Contributions ¹	Employee	9-5/7%	
	Spouse	2%	
	Annuity Increase	½%	Unallocated
		12-3/14%	

¹ Credited to Participant's Accumulation Annuity and Widow's Annuity Account

Summary of Benefits

In addition to the above contributions, a contribution is made to support the Death Benefit. Policemen contribute \$2.50 per month. City contributes a total of \$224,000 for all policemen.

Prior to 2015, the total City contribution is generated by a tax equal to double the contributions by the policemen to the Fund two years prior to the year of the tax levy.

Under P.A. 99-0506, City contributions are equal to \$420 million in payment year 2016, \$464 million in payment year 2017, \$500 million in payment year 2018, \$557 million in payment year 2019 and \$579 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years 2020 through 2055 that along with member contributions and investment earnings are expected to generate a projected funded ratio of 90% by plan year end 2055.

**"PICK UP" OF EMPLOYEE
SALARY DEDUCTIONS**

Beginning January 1, 1982, the employee contributions were "picked up" by the employer. The W-2 salary is therefore reduced by the amount of contribution. For pension purposes the salary remains unchanged. Income tax will be paid when a refund or annuity is received. For the purpose of benefits, refunds or contributions, these contributions will be treated as employee contributions.

SALARY CAP AND COLA DEVELOPMENT FOR MEMBERS HIRED ON OR AFTER JANUARY 1, 2011

Year Ending	CPI-U	½ CPI-U	COLA	Maximum Annual Pensionable Earnings
2011			3.00%	\$106,800.00
2012	3.90%	1.95%	1.95%	\$108,882.60
2013	2.00%	1.00%	1.00%	\$109,971.43
2014	1.20%	0.60%	0.60%	\$110,631.26
2015	1.70%	0.85%	0.85%	\$111,571.63
2016	0.00%	0.00%	0.00%	\$111,571.63
2017	1.50%	0.75%	0.75%	\$112,408.42
2018	2.20%	1.10%	1.10%	\$113,644.91
2019	2.30%	1.15%	1.15%	\$114,951.83

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial Cost Method and Actuarial Assumptions

I. ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this valuation for statutory funding and State reporting purposes and GASB accounting purposes is the Entry Age Normal cost method.

Under the Entry Age Normal Cost Method, each participant's projected benefit is allocated on a level percent of pay basis from entry age to assumed exit age. The Actuarial Accrued Liability is the portion of the present value associated with pay prior to the valuation date. The Normal Cost is the portion of the present value associated with pay during the current plan year.

To the extent that current assets and future Normal Costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is generally amortized over a fixed period of time (e.g., 30 years) from the date incurred. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

II. CURRENT ACTUARIAL ASSUMPTIONS

The current actuarial assumptions except for the investment return and general inflation assumptions were adopted and became effective December 31, 2014, and were based on an experience study for the period January 1, 2009 to December 31, 2013. The investment return and general inflation assumptions were adopted and became effective December 31, 2016.

A. Demographic Assumptions

Mortality:	<p>Pre-Retirement mortality rates: Sex distinct Retirement Plans 2014 Total Employee mortality table weighted 85% for males and 115% for females.</p> <p>Post-Retirement Healthy mortality rates: Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 108% for males and 97% for females. When compared to observed experience, the recommended rates include a 23% margin for future mortality improvements when the experience study was performed.</p>
Disabled Mortality:	Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 115% for males and 115% for females.

Actuarial Cost Method and Actuarial Assumptions

Rate of Disability: Rates at which members are assumed to become disabled under the provisions of the Fund. Sample rates assumed are as follows:

Attained Age	Rate
22	.0003
27	.0007
32	.0007
37	.0020
42	.0030
47	.0040
52	.0050
57	.0060
62	.0060

The assumed distribution of disability types is assumed to be as follows:

Duty Disability	55%
Occupational Disease Disability	10%
Ordinary Disability	35%

Rate of Retirement: Rates at which members are assumed to retire under the provisions of the Fund. The rates assumed are as follows:
For members hired before January 1, 2011:

Attained Age	Rate ¹
50	.05
51	.05
52	.05
53	.05
54	.05
55	.19
56	.19
57	.19
58	.25
59	.25
60	.25
61	.30
62	.30
63	1.00

¹ Only for members eligible for a formula annuity.

Actuarial Cost Method and Actuarial Assumptions

For members hired on or after January 1, 2011:

<u>Attained Age</u>	<u>Rate ¹</u>
50	.02
51	.02
52	.02
53	.02
54	.03
55	.21
56	.21
57	.21
58	.27
59	.27
60	.25
61	.30
62	.30
63	1.00

¹ Only for members eligible for a formula annuity.

Turnover Rates:

The following sample rates exemplify the table:

<u>Years of Service</u>	<u>Rate</u>
0	0.030
1	0.028
2	0.020
3	0.015
4-5	0.010
6-10	0.009
11	0.008
12	0.007
13-24	0.006

B. Economic Assumptions

Investment Return Rate: 7.25% per annum effective as of December 31, 2016.

General Inflation: The 7.25% Investment Return Rate assumption is comprised of a 2.75% inflation assumption and a 4.50% real rate of return assumption for pension.

Actuarial Cost Method and Actuarial Assumptions

Future Salary Increases: Assumed rates of individual salary increase at 3.75% per year, plus an additional percentage based on the following service scale:

Completed Years of Service *	Scale
1	0.3625
2	0.0325
3	0.0325
4	0.0325
5	0.0225
6-9	0.0000
10	0.0225
11-14	0.0000
15	0.0225
16-19	0.0000
20	0.0225
21-24	0.0000
25	0.0225
26-29	0.0000
30	0.0225
Over 30	0.0000

* Includes increases at 12 and 18 months of service.

Asset Value: For Book value of Assets, bonds are at amortized value and stocks are at cost.

For statutory funding, the actuarial value of assets is smoothed by recognizing each year's difference between actual and expected investment return at the rate of 20% per year over a five-year period.

The actuarial value of assets was marked to the market value as of January 1, 2012, and is smoothed by using a five-year phase-in of each year's unexpected investment gains and losses.

Actuarial Cost Method and Actuarial Assumptions

C. Other Assumptions

Marital Status: It is assumed that 85% of members have an eligible spouse. The male spouse is assumed to be three years older than the female spouse. No assumption is made about other dependents.

Beneficiary COLA Approximation: For current retirees with eligible reversionary annuitants, liabilities are calculated for the beneficiary's benefit by using 50 percent of the retiree's benefit as of the valuation date plus 35 percent of the retiree's future increase in benefit from the COLA each year after the valuation date.

D. Projection Assumptions

The projections under the provisions of P.A. 99-0506 were based on the following assumptions and methods:

Active Population: Active members who terminate, retire, become disabled or die during the year are replaced by new entrants such that the number of active members remains level during the projection period based on the most recent actuarial valuation. The number of active members as of the actuarial valuation at December 31, 2018, is 13,438.

New Entrant Profile: The entry age of future new entrants, which is summarized below, is based on the profile of current active members hired over the last five years with one or more years of service as of December 31, 2018. These members were hired from January 1, 2014, through December 31, 2017.

Entry Age	Number
20 to 25	624
25 to 30	986
30 to 35	505
35 to 40	234
40 to 45	6

Approximately 75% of the new entrants are assumed to be male.

New Entrant Pay: Based on the most recent employment contract, new entrants were assumed to earn \$48,078 for the plan year ending December 31, 2018. This amount does not include duty availability pay. The new entrant pay for members hired after 2018 is assumed to increase by the wage inflation assumption of 3.75% plus duty availability pay after three years, increased by CPI compounded.

Actuarial Cost Method and Actuarial Assumptions

New Entrant Pay Increases: Pay for a specific new entrant is assumed to increase in the future by the wage inflation and the service based increases disclosed in this actuarial valuation.

The projections assume a pay cap of \$114,951.83 for plan year 2019, increasing by 1.375% per year after plan year 2019. The annual increase of 1.375% per year is based on 50% of the CPI-U increase which is assumed to be 2.75% per year.

Administrative Expenses: Statutory funding projections include an explicit administrative expense assumption of \$4,627,000 for plan year end December 31, 2018, increased by 2.75% per year.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement Nos. 67 and 68 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (“SDR”) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.25%; the municipal bond rate is 3.71%; and the resulting Single Discount Rate is 7.18%.

The sponsor finances benefits using a funding policy defined in state statutes. Sponsor contributions are equal to a fixed payment schedule for payment years 2016 through 2020 and a level percentage of pay contribution determined so that the Fund attains a 90% funded ratio by the end of 2055 on an open group basis for payment years on and after 2021. The statutory contribution does not explicitly separate projected employer contributions between current plan members and future plan members.

For purposes of developing the Single Discount Rate, we have projected actuarial liabilities on an Entry Age Normal basis, and compared against projected market value of assets. We have assumed the actuarial liability for future members will be fully financed, to the extent that assets are available, and any remaining asset will be assigned to current plan members. Based on this assignment of assets and employer contributions, plan assets assigned to current members are projected to be depleted by 2079.

The tables in this section provide background for the development of the Single Discount Rate.

The following tables show the assignment of assets and employer contributions and the projection of assets for current members as of the actuarial valuation date. Our projections assume the sponsor will make the required statutory contributions. The projections are based on the statutory funding projections performed during the December 31, 2018, actuarial valuation.

Total administrative expenses are assumed to increase at the assumed rate of inflation, or 2.75%. Total administrative expenses are allocated between current and future hires by total payroll.

Projection of Funded Status and Assignment of Assets

PYE 12/31	Open Group Actuarial Liability	Closed Group Actuarial Liability	Future Member Actuarial Liability	Open Group Assets	Future Member Assigned Assets	Closed Group Assigned Assets	Funded Ratio Current Members	Funded Ratio Future Members
(a)	(b)	(c)=(a)-(b)	(d)	(e)=min[(c),(d)]	(f)=(d)-(e)	(g)=(f)/(b)	(h)=(e)/(c)	
2018	\$13,214,658,111	\$13,214,658,111	\$ -	\$2,905,179,841	\$ -	\$2,905,179,841	21.98%	0.00%
2019	13,595,697,436	13,595,697,436	-	2,968,312,298	-	2,968,312,298	21.83%	0.00%
2020	13,979,164,578	13,972,555,409	6,609,169	3,178,548,296	6,609,169	3,171,939,128	22.70%	100.00%
2021	14,362,559,979	14,342,035,530	20,524,449	3,399,343,083	20,524,449	3,378,818,634	23.56%	100.00%
2022	14,743,601,629	14,700,560,677	43,040,952	3,627,415,339	43,040,952	3,584,374,388	24.38%	100.00%
2023	15,120,207,024	15,045,050,703	75,156,321	3,860,247,252	75,156,321	3,785,090,931	25.16%	100.00%
2024	15,490,779,230	15,372,610,453	118,168,778	4,096,603,729	118,168,778	3,978,434,951	25.88%	100.00%
2025	15,852,986,665	15,679,688,934	173,297,731	4,334,338,790	173,297,731	4,161,041,059	26.54%	100.00%
2026	16,204,737,423	15,962,653,698	242,083,724	4,572,782,696	242,083,724	4,330,698,972	27.13%	100.00%
2027	16,544,479,220	16,218,518,899	325,960,322	4,812,436,232	325,960,322	4,486,475,911	27.66%	100.00%
2028	16,871,724,136	16,445,334,991	426,389,146	5,054,396,752	426,389,146	4,628,007,606	28.14%	100.00%
2029	17,186,715,600	16,641,395,925	545,319,675	5,300,343,733	545,319,675	4,755,024,058	28.57%	100.00%
2030	17,490,080,639	16,805,840,593	684,240,046	5,551,913,966	684,240,046	4,867,673,920	28.96%	100.00%
2031	17,782,714,378	16,937,926,033	844,788,344	5,811,958,649	844,788,344	4,967,170,305	29.33%	100.00%
2032	18,065,614,314	17,037,015,321	1,028,598,993	6,083,257,183	1,028,598,993	5,054,658,190	29.67%	100.00%
2033	18,339,748,366	17,102,118,421	1,237,629,945	6,369,750,352	1,237,629,945	5,132,120,407	30.01%	100.00%
2034	18,606,813,767	17,132,672,544	1,474,141,223	6,676,417,016	1,474,141,223	5,202,275,793	30.36%	100.00%
2035	18,869,349,200	17,129,110,019	1,740,239,181	7,007,869,699	1,740,239,181	5,267,630,518	30.75%	100.00%
2036	19,129,458,204	17,092,048,919	2,037,409,285	7,367,738,343	2,037,409,285	5,330,329,058	31.19%	100.00%
2037	19,387,968,110	17,021,984,383	2,365,983,727	7,754,671,810	2,365,983,727	5,388,688,083	31.66%	100.00%
2038	19,645,211,554	16,919,128,991	2,726,082,563	8,165,861,932	2,726,082,563	5,439,779,369	32.15%	100.00%
2039	19,902,327,186	16,783,443,512	3,118,883,675	8,604,005,401	3,118,883,675	5,485,121,726	32.68%	100.00%
2040	20,160,334,513	16,614,979,696	3,545,354,817	9,071,457,992	3,545,354,817	5,526,103,176	33.26%	100.00%
2041	20,420,529,234	16,414,012,657	4,006,516,577	9,572,426,457	4,006,516,577	5,565,909,880	33.91%	100.00%
2042	20,684,284,990	16,181,229,645	4,503,055,345	10,110,790,204	4,503,055,345	5,607,734,858	34.66%	100.00%
2043	20,952,275,538	15,916,852,805	5,035,422,733	10,689,840,299	5,035,422,733	5,654,417,565	35.52%	100.00%
2044	21,224,853,253	15,621,223,043	5,603,630,210	11,312,432,572	5,603,630,210	5,708,802,361	36.55%	100.00%
2045	21,501,625,365	15,294,319,014	6,207,306,351	11,980,836,593	6,207,306,351	5,773,530,241	37.75%	100.00%
2046	21,782,429,091	14,936,751,286	6,845,677,805	12,698,500,585	6,845,677,805	5,852,822,779	39.18%	100.00%
2047	22,067,112,239	14,549,693,951	7,517,418,288	13,468,882,785	7,517,418,288	5,951,464,498	40.90%	100.00%
2048	22,354,988,329	14,134,453,670	8,220,534,658	14,295,201,076	8,220,534,658	6,074,666,417	42.98%	100.00%
2049	22,644,617,626	13,692,204,944	8,952,412,682	15,179,961,081	8,952,412,682	6,227,548,399	45.48%	100.00%
2050	22,934,577,530	13,224,635,339	9,709,942,190	16,126,047,172	9,709,942,190	6,416,104,982	48.52%	100.00%
2051	23,224,287,758	12,734,827,282	10,489,460,476	17,137,533,900	10,489,460,476	6,648,073,424	52.20%	100.00%
2052	23,514,061,616	12,227,017,980	11,287,043,636	18,219,690,164	11,287,043,636	6,932,646,528	56.70%	100.00%
2053	23,804,912,836	11,706,209,550	12,098,703,286	19,378,819,344	12,098,703,286	7,280,116,058	62.19%	100.00%
2054	24,097,708,752	11,176,981,484	12,920,727,268	20,621,399,704	12,920,727,268	7,700,672,437	68.90%	100.00%
2055	24,393,267,873	10,643,341,070	13,749,926,804	21,954,316,415	13,749,926,804	8,204,389,612	77.08%	100.00%
2056	24,692,434,393	10,108,868,248	14,583,566,145	22,223,190,954	14,583,566,145	7,639,624,808	75.57%	100.00%
2057	24,995,934,533	9,576,564,370	15,419,370,163	22,496,341,079	15,419,370,163	7,076,970,916	73.90%	100.00%
2058	25,304,909,258	9,049,418,169	16,255,491,089	22,774,418,332	16,255,491,089	6,518,927,243	72.04%	100.00%
2059	25,620,624,807	8,530,210,273	17,090,414,533	23,058,562,326	17,090,414,533	5,968,147,793	69.96%	100.00%
2060	25,944,395,175	8,021,282,146	17,923,113,029	23,349,955,657	17,923,113,029	5,426,842,628	67.66%	100.00%
2061	26,277,277,063	7,524,417,605	18,752,859,458	23,649,549,356	18,752,859,458	4,896,689,899	65.08%	100.00%
2062	26,620,225,821	7,040,962,025	19,579,263,796	23,958,203,239	19,579,263,796	4,378,939,443	62.19%	100.00%
2063	26,974,073,163	6,571,935,306	20,402,137,858	24,276,665,847	20,402,137,858	3,874,527,989	58.96%	100.00%
2064	27,339,508,662	6,118,156,314	21,221,352,348	24,605,557,796	21,221,352,348	3,384,205,448	55.31%	100.00%
2065	27,716,948,894	5,680,219,295	22,036,729,599	24,945,254,005	22,036,729,599	2,908,524,406	51.20%	100.00%
2066	28,106,741,141	5,258,613,015	22,848,128,126	25,296,067,027	22,848,128,126	2,447,938,901	46.55%	100.00%
2067	28,509,030,169	4,853,699,593	23,655,330,576	25,658,127,153	23,655,330,576	2,002,796,577	41.26%	100.00%
2068	28,923,776,226	4,465,716,514	24,458,059,711	26,031,398,603	24,458,059,711	1,573,338,892	35.23%	100.00%
2069	29,350,829,680	4,094,879,859	25,255,949,822	26,415,746,712	25,255,949,822	1,159,796,891	28.32%	100.00%
2070	29,789,815,724	3,741,307,943	26,048,507,781	26,810,834,152	26,048,507,781	762,326,371	20.38%	100.00%
2071	30,240,310,524	3,405,103,294	26,835,207,230	27,216,279,471	26,835,207,230	381,072,241	11.19%	100.00%
2072	30,701,716,224	3,086,341,063	27,615,375,161	27,631,544,602	27,615,375,161	16,169,441	0.52%	100.00%
2073	31,173,343,138	2,785,054,773	28,388,288,365	28,056,008,825	28,056,008,825	-	0.00%	98.83%
2074	31,654,450,323	2,501,243,765	29,153,206,558	28,489,005,290	28,489,005,290	-	0.00%	97.72%
2075	32,144,178,614	2,234,870,849	29,909,307,765	28,929,760,753	28,929,760,753	-	0.00%	96.72%
2076	32,641,719,317	1,985,865,886	30,655,853,431	29,377,547,385	29,377,547,385	-	0.00%	95.83%
2077	33,146,222,261	1,754,115,083	31,392,107,178	29,831,600,035	29,831,600,035	-	0.00%	95.03%
2078	33,656,928,754	1,539,467,148	32,117,461,606	30,291,235,879	30,291,235,879	-	0.00%	94.31%
2079	34,173,194,399	1,341,731,256	32,831,463,143	30,755,874,960	30,755,874,960	-	0.00%	93.68%

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

Current Member Projection of Assets and Assignment of Employer Contributions

PYE 12/31	Assets (boy)	Member Contributions	Administrative Expenses	Benefit Payments	Assigned Sponsor Contribution	Income on Assets and Cash Flow	Assets (eoy)
2019	\$ 2,905,179,841	\$ 110,897,606	\$ 4,753,830	\$ 797,205,956	\$ 579,000,000	\$ 175,194,638	\$ 2,968,312,298
2020	2,968,312,298	120,418,497	4,768,346	825,942,891	734,785,950	179,133,619	3,171,939,128
2021	3,171,939,128	120,722,825	4,744,363	857,306,940	758,314,941	189,893,044	3,378,818,634
2022	3,378,818,634	119,675,229	4,715,128	889,514,234	776,839,156	203,270,730	3,584,374,388
2023	3,584,374,388	118,200,246	4,667,015	923,424,699	794,037,670	216,570,342	3,785,090,931
2024	3,785,090,931	116,284,302	4,604,940	958,471,302	810,647,860	229,488,101	3,978,434,951
2025	3,978,434,951	113,995,380	4,526,463	995,173,259	826,499,809	241,810,641	4,161,041,059
2026	4,161,041,059	111,119,383	4,430,203	1,032,863,750	842,519,178	253,313,304	4,330,698,972
2027	4,330,698,972	107,928,220	4,318,335	1,071,098,516	859,421,515	263,844,056	4,466,475,911
2028	4,486,475,911	104,365,982	4,195,083	1,108,705,354	876,704,586	273,361,563	4,628,007,606
2029	4,628,007,606	100,461,201	4,063,165	1,145,468,668	894,229,724	281,857,360	4,755,024,058
2030	4,755,024,058	96,383,642	3,919,843	1,180,800,325	911,644,849	289,341,539	4,867,673,920
2031	4,867,673,920	92,108,400	3,767,421	1,214,337,815	929,649,848	295,843,372	4,967,170,305
2032	4,967,170,305	87,840,972	3,609,699	1,246,353,889	948,175,243	301,435,258	5,054,658,190
2033	5,054,658,190	83,483,545	3,443,341	1,276,879,021	968,103,985	306,197,049	5,132,120,407
2034	5,132,120,407	78,893,052	3,270,904	1,305,211,956	989,469,328	310,275,865	5,202,275,793
2035	5,202,275,793	74,072,848	3,089,816	1,330,450,320	1,010,921,462	313,900,551	5,267,630,518
2036	5,267,630,518	69,317,472	2,899,993	1,352,926,025	1,031,930,496	317,276,590	5,330,329,058
2037	5,330,329,058	64,531,024	2,711,519	1,372,612,517	1,048,585,553	320,566,484	5,388,688,083
2038	5,388,688,083	59,791,037	2,536,536	1,389,961,863	1,060,091,473	323,707,175	5,439,779,369
2039	5,439,779,369	55,009,021	2,368,821	1,405,083,846	1,071,291,683	326,494,320	5,485,121,726
2040	5,485,121,726	50,391,107	2,202,671	1,418,334,391	1,082,184,607	328,942,797	5,526,103,176
2041	5,526,103,176	45,822,273	2,034,856	1,429,249,754	1,094,103,239	331,165,802	5,565,909,880
2042	5,565,909,880	41,511,608	1,871,492	1,437,885,222	1,106,695,293	333,374,792	5,607,734,858
2043	5,607,734,858	37,326,715	1,707,612	1,444,510,595	1,119,780,531	335,793,668	5,654,417,565
2044	5,654,417,565	33,334,178	1,547,046	1,449,143,835	1,133,108,261	338,633,238	5,708,802,931
2045	5,708,802,931	29,462,470	1,387,227	1,452,024,453	1,146,583,693	342,093,397	5,773,530,241
2046	5,773,530,241	25,742,897	1,229,818	1,452,575,205	1,160,965,670	346,388,994	5,852,822,779
2047	5,852,822,779	22,213,361	1,076,075	1,450,372,468	1,176,048,531	351,828,369	5,951,464,498
2048	5,951,464,498	18,875,131	926,811	1,445,341,265	1,191,829,951	358,764,913	6,074,666,417
2049	6,074,666,417	15,706,422	781,396	1,437,647,132	1,208,034,270	367,569,818	6,227,548,399
2050	6,227,548,399	12,645,686	637,327	1,426,767,822	1,224,680,144	378,635,901	6,416,104,982
2051	6,416,104,982	9,811,519	500,854	1,411,577,977	1,241,794,254	392,441,500	6,648,073,424
2052	6,648,073,424	7,318,095	378,331	1,391,296,725	1,259,351,344	409,578,721	6,932,646,528
2053	6,932,646,528	5,262,146	275,480	1,365,565,469	1,277,317,808	430,730,525	7,280,116,058
2054	7,280,116,058	3,681,877	195,176	1,335,162,671	1,295,615,124	456,617,224	7,700,672,437
2055	7,700,672,437	2,469,266	132,542	1,300,805,357	1,314,235,936	487,949,872	8,204,389,612
2056	8,204,389,612	1,581,848	85,975	1,263,123,914	1,314,235,936	525,435,061	8,739,624,808
2057	7,639,624,808	934,101	51,407	1,222,802,234	1,222,802,234	507,164,048	7,076,970,916
2058	7,076,970,916	461,006	25,698	1,179,979,186	1,179,979,186	468,240,424	6,518,927,243
2059	6,518,927,243	185,141	10,461	1,135,083,176	1,135,083,176	429,350,434	5,968,147,793
2060	5,968,147,793	40,341	2,310	1,088,641,859	1,088,641,859	391,039,845	5,426,842,628
2061	5,426,842,628	-	-	1,041,320,091	1,041,320,091	353,451,729	4,896,689,899
2062	4,896,689,899	-	-	993,588,450	993,588,450	316,688,553	4,378,939,443
2063	4,378,939,443	-	-	945,810,701	945,810,701	280,826,612	3,874,527,989
2064	3,874,527,989	-	-	898,252,362	898,252,362	245,924,132	3,384,205,448
2065	3,384,205,448	-	-	851,187,658	851,187,658	212,025,333	2,908,524,406
2066	2,908,524,406	-	-	804,760,039	804,760,039	179,164,561	2,447,938,901
2067	2,447,938,901	-	-	759,126,016	759,126,016	147,368,964	2,002,796,577
2068	2,002,796,577	-	-	714,431,287	714,431,287	119,757,739	1,573,338,892
2069	1,573,338,892	-	-	670,713,146	670,713,146	90,179,112	1,159,796,891
2070	1,159,796,891	-	-	628,081,120	628,081,120	61,715,689	762,326,371
2071	762,326,371	-	-	586,558,740	586,558,740	34,377,927	381,072,241
2072	381,072,241	-	-	546,179,618	546,179,618	8,175,136	16,169,441
2073	16,169,441	-	-	506,989,212	506,989,212	(16,884,521)	-
2074	-	-	-	469,022,875	469,022,875	(16,704,606)	-
2075	-	-	-	432,315,831	432,315,831	(15,397,256)	-
2076	-	-	-	396,897,301	396,897,301	(14,135,799)	-
2077	-	-	-	362,804,522	362,804,522	(12,921,558)	-
2078	-	-	-	330,065,736	330,065,736	(11,755,542)	-
2079	-	-	-	298,708,530	298,708,530	(10,638,731)	-

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

Development of Single Discount Rate

PYE 12/31	Benefit Payments	Discount Rate	Discounted Benefit Payment	Single Discount Rate	Discounted Benefit Payment
2019	\$ 797,205,956	7.25%	\$ 769,789,325	7.18%	\$ 770,041,393
2020	825,942,891	7.25%	743,625,148	7.18%	744,355,889
2021	857,306,940	7.25%	719,686,055	7.18%	720,865,135
2022	889,514,234	7.25%	696,245,416	7.18%	697,842,887
2023	923,424,699	7.25%	673,928,205	7.18%	675,916,913
2024	958,471,302	7.25%	652,219,771	7.18%	654,572,889
2025	995,173,259	7.25%	631,416,959	7.18%	634,110,099
2026	1,032,863,750	7.25%	611,031,049	7.18%	614,039,176
2027	1,071,098,516	7.25%	590,816,153	7.18%	594,113,656
2028	1,108,705,354	7.25%	570,219,135	7.18%	573,777,263
2029	1,145,468,668	7.25%	549,302,474	7.18%	553,092,127
2030	1,180,800,325	7.25%	527,967,882	7.18%	531,958,557
2031	1,214,337,815	7.25%	506,259,585	7.18%	510,420,287
2032	1,246,353,889	7.25%	484,482,185	7.18%	488,783,857
2033	1,276,879,021	7.25%	462,795,246	7.18%	467,210,188
2034	1,305,211,956	7.25%	441,085,600	7.18%	445,585,109
2035	1,330,450,320	7.25%	419,221,163	7.18%	423,775,027
2036	1,352,926,025	7.25%	397,485,496	7.18%	402,066,437
2037	1,372,612,517	7.25%	376,008,696	7.18%	380,591,249
2038	1,389,961,863	7.25%	355,022,206	7.18%	359,584,366
2039	1,405,083,846	7.25%	334,624,375	7.18%	339,146,414
2040	1,418,334,391	7.25%	314,946,412	7.18%	319,411,608
2041	1,429,249,754	7.25%	295,916,279	7.18%	300,308,248
2042	1,437,885,222	7.25%	277,579,667	7.18%	281,884,001
2043	1,444,510,595	7.25%	260,008,090	7.18%	264,212,896
2044	1,449,143,835	7.25%	243,209,381	7.18%	247,304,401
2045	1,452,024,453	7.25%	227,219,425	7.18%	231,196,553
2046	1,452,575,205	7.25%	211,939,962	7.18%	215,790,899
2047	1,450,372,468	7.25%	197,313,351	7.18%	201,030,113
2048	1,445,341,265	7.25%	183,336,960	7.18%	186,912,800
2049	1,437,647,132	7.25%	170,033,551	7.18%	173,463,465
2050	1,426,767,822	7.25%	157,339,704	7.18%	160,618,695
2051	1,411,577,977	7.25%	145,141,831	7.18%	148,263,666
2052	1,391,296,725	7.25%	133,385,980	7.18%	136,344,209
2053	1,365,565,469	7.25%	122,069,073	7.18%	124,858,045
2054	1,335,162,671	7.25%	111,283,301	7.18%	113,900,403
2055	1,300,805,357	7.25%	101,090,614	7.18%	103,535,782
2056	1,263,123,914	7.25%	91,526,568	7.18%	93,801,802
2057	1,222,802,234	7.25%	82,615,235	7.18%	84,724,403
2058	1,179,979,186	7.25%	74,332,881	7.18%	76,280,532
2059	1,135,083,176	7.25%	66,671,005	7.18%	68,462,717
2060	1,088,641,859	7.25%	59,620,696	7.18%	61,263,040
2061	1,041,320,091	7.25%	53,173,955	7.18%	54,674,502
2062	993,588,450	7.25%	47,306,841	7.18%	48,673,681
2063	945,810,701	7.25%	41,987,917	7.18%	43,229,375
2064	898,252,362	7.25%	37,181,010	7.18%	38,305,415
2065	851,187,658	7.25%	32,851,169	7.18%	33,866,802
2066	804,760,039	7.25%	28,959,737	7.18%	29,874,617
2067	759,126,016	7.25%	25,470,929	7.18%	26,292,804
2068	714,431,287	7.25%	22,350,851	7.18%	23,087,163
2069	670,713,146	7.25%	19,564,697	7.18%	20,222,460
2070	628,081,120	7.25%	17,082,630	7.18%	17,668,512
2071	586,558,740	7.25%	14,874,871	7.18%	15,395,111
2072	546,179,618	7.25%	12,914,568	7.18%	13,375,003
2073	506,989,212	7.25%	11,177,529	7.18%	11,583,617
2074	469,022,875	7.25%	9,641,483	7.18%	9,998,309
2075	432,315,831	7.25%	8,286,166	7.18%	8,598,461
2076	396,897,301	7.25%	7,093,055	7.18%	7,365,205
2077	362,804,522	7.25%	6,045,477	7.18%	6,281,544
2078	330,065,736	7.25%	5,128,154	7.18%	5,331,891
2079	298,708,530	7.25%	4,327,239	7.18%	4,502,104
2080	268,773,984	3.71%	28,603,437	7.18%	3,779,568
2081	240,294,386	3.71%	24,657,781	7.18%	3,152,722
2082	213,324,498	3.71%	21,107,192	7.18%	2,611,379
2090	58,237,272	3.71%	4,305,521	7.18%	409,380
2100	3,116,096	3.71%	160,040	7.18%	10,950
2110	19,949	3.71%	712	7.18%	35
2117	156	3.71%	4	7.18%	0
Total Present Value			\$ 15,613,329,618		\$ 15,613,329,618

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Accrued Liability ("AAL")</i>	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Equivalent</i>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value ("APV")</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution ("ADC") or Annual Required Contribution ("ARC")</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Glossary of Terms

<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of employees that are provided with pensions through the pension plan.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Deferred Retirement Option Program (“DROP”)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<i>Discount Rate</i>	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

<i>Entry Age Actuarial Cost Method (“EAN”)</i>	The EAN is a cost method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.
<i>Fiduciary Net Position</i>	The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<i>Long-Term Expected Rate of Return</i>	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
<i>Money-Weighted Rate of Return</i>	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
<i>Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<i>Municipal Bond Rate</i>	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
<i>Net Pension Liability (“NPL”)</i>	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
<i>Non-Employer Contributing Entities</i>	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contributing entities.
<i>Normal Cost</i>	The portion of the actuarial present value allocated to a valuation year is called the normal cost. For purposes of application to the requirements of this Statement, the term normal cost is the equivalent of service cost.

Glossary of Terms

<i>Other Postemployment Benefits (“OPEB”)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	The total pension expense is the sum of the following items that are recognized at the end of the employer’s fiscal year: <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (“TPL”)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (“UAAL”)</i>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.