The Police and Fire Retirement System of the City of Detroit

GASB Statement Nos. 67 and 68 Accounting and Financial Reporting for Pensions

Component I

June 30, 2018

GRS Retirement Consulting
800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

October 19, 2018

Board of Trustees
The Police and Fire Retirement System of the City of Detroit

Dear Board Members:

This report provides information required for the Police and Fire Retirement System of the City of Detroit in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans" and No. 68 "Employer Reporting for Pension Plans". These calculations have been made on a basis that is consistent with our understanding of these Statements. This information is subject to review of the City's and the System's Auditor. Please let us know if the City's or the System's Auditor recommends any changes. This report covers the Police and Fire Retirement System Plan known as Component I (also known as the Hybrid Plan). Since Component II is a separate plan, it is detailed in a separate report.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB Statement Nos. 67 and 68. The calculation of the plan's liability for this report is not applicable for funding purposes of the plan. 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. In particular, this report is not a funding report and nothing in this report should be construed as a funding recommendation. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by the System staff, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This report is based on the valuation date of June 30, 2017. The total pension liability was rolled-forward from the valuation date to the plan year ending June 30, 2018 using generally accepted actuarial principles. The asset information as of June 30, 2018 was provided by the System. This information was checked for internal consistency, but it was not audited by GRS. GRS is not responsible for the accuracy of any information provided by the Retirement System or the plan sponsor.

At the direction of the System and with approval of the System's Auditor, the long term expected return on assets used to determine the discount rate is 7.19% net of investment expenses as of June 30, 2018, up from 7.17% net of investment expenses as of June 30, 2017. We have reviewed this assumption based on the System's asset allocation and have determined it to be not unreasonable for purposes of the measurement being taken.

The benefit provisions reflected in this valuation for the development of the end of year TPL are those in effect for Component I as of the end of the plan year on June 30, 2018. There were no changes in benefit provisions from the June 30, 2017 GASB Statement No. 67 valuation.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the System on the measurement date for purposes of GASB Statement Nos. 67 and 68 reporting. 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 signing individuals are independent of the plan sponsor.

David T. Kausch and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

David T. Kausch, FSA, EA, FCA, MAAA
Chief Actuary and Senior Consultant

Judith A. Kermans, EA, FCA, MAAA
President and Senior Consultant

Kenneth G. Alberts
Consultant

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2018

Actuarial Valuation Date		June 30, 2017
Measurement Date of the Net Pension Liability		June 30, 2018
Employer's Fiscal Year Ending Date (Reporting Date)		June 30, 2019
Membership		
Number of		
- Retirees and Beneficiaries		64
- DROP Members		81
- Inactive, Nonretired Members		465
- Active Members		2,523
- Total		3,133
Covered Payroll (excluding DROP)	$	141,225,328
Net Pension Liability		
Total Pension Liability	$	94,784,240
Plan Fiduciary Net Position		127,971,386
Net Pension Liability	$	(33,187,146)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		135.01%
Net Pension Liability as a Percentage of Covered Payroll		(23.50)%
Development of the Single Discount Rate		
Single Discount Rate		7.19%
Long-Term Expected Rate of Investment Return		7.19%
Long-Term Municipal Bond Rate*		3.62%
Last year ending June 30 in the 2019 to 2118 projection period for which projected benefit payments are fully funded		2118
Total Pension Expense	$	13,159,864

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 experience	$ -	$ 13,913,551
Changes in assumptions	1,562,998	995,333
Net difference between projected and actual earnings on pension plan investments	994,937	3,427,624
Total	$ 2,557,935	$ 18,336,508

**Source: 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 June 29, 2018. 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

Changes to the Actuarial Assumptions

The Single Discount Rate (SDR) changed to 7.19% at the end of the year from 7.17% at the beginning of the year. We believe that the assumption is not unreasonable. However, it is important to note that an upward movement of this assumption is not consistent with industry trend.

Other economic and demographic assumptions are the same as those used in the June 30, 2017 GASB Statement No. 67 valuation as approved by the Boards.

There was an administrative change involving the allocation of administrative expenses between Component I and Component II. Administrative expenses are now shared 70% with Component II and 30% with Component I. This change was reflected in our modeling, where appropriate.

Changes to the Plan Provisions

There were no changes in benefit provisions during the year affecting the Total Pension Liability.

Funding

Employee contributions are initially set to 6.0% of pay for members hired before June 30, 2014 and 8.0% of pay for members hired after June 30, 2014, but can be increased if necessary to maintain funding levels at 100%. Employer contributions are initially set at 12.25% of payroll. Employer contributions are actuarially determined beginning in fiscal year 2024 to be the amount necessary to fund the plan on an actuarial basis.

Post Retirement COLA

This plan has a post retirement COLA feature known as the Variable Pension Improvement Factor or VPIF of a 1% compound COLA. It can be granted (beginning July 1, 2015) only if a five-year projection shows the plan funded status as above 90% based upon a 6.75% future investment return. It is reasonable to assume that there will be years in which a 1% compound COLA will be granted, however, it is unlikely to be granted every year. For purposes of the TPL, we have therefore assumed a 0.50% compound COLA beginning July 1, 2018 to model the potential average COLA over time. In the notes section we indicate the TPL based on a 0% VPIF and a 1% compound VPIF.

DROP Plan

We understand that the System is working on bringing the management of all DROP plan balances in-house, but that all balances are currently (as of the measurement date) still managed by an outside vendor and the amount of the balances is currently unavailable. The balances were not included in the reported assets and, therefore, not included in the computed liabilities.

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 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 System subsequent to the measurement date of June 30, 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 and the net 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;
- annual money-weighted rate of return; and
- a description of the terms of the plan's deferred retirement option program (DROP) and the total DROP balance for those members currently participating in the DROP.

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.

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 June 30, 2017 and a measurement date of June 30, 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) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) 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 7.19%; the municipal bond rate is 3.62% (based on the daily rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting Single Discount Rate is 7.19% as of June 30, 2018.

For purposes of calculating the SDR, the following simplifications were made to the projections:

1) Voluntary employee contributions were excluded.
2) The VPIF was assumed to be 0.50% compound each year.
3) Mandatory employee contributions were assumed to be fixed at the current rate of 6% for members hired before June 30, 2014 and 8% for members hired after June 30, 2014.
4) The VPIF reduction under Section 9.5 of the plan was assumed not to occur.
5) Employer contributions were determined in a manner to fully fund the plan beginning in 2024, in accordance with the plan.

Discussion

Limitation of Assets as a Percent of Total Pension Liability Measurements

This report includes a measure of the plan fiduciary net position as a percent of total pension liability (135.01% as of June 30, 2018). Unless otherwise indicated, with regard to any such measurements in this report:

(1) This measurement is not intended to be a funded ratio or a measure of funded progress.
(2) This measurement is inappropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations.
(3) The measurement is inappropriate for assessing the need for or amount of future employer contribution.

Limitations of Project Scope

Actuarial Standards do not require the actuary to evaluate the ability of the Plan sponsor or other contributing entities to make required contributions when due. Such an evaluation was not within the scope of this project and is not within our area of expertise.

Plan

The Police and Fire Retirement System has two components. It is our understanding that Component I and Component II are separate plans and that the assets from one plan cannot be used to satisfy the liabilities of the other, even though assets may be pooled for investment purposes. Therefore, this report only includes the liabilities and reported assets of Component I. The liabilities and reported assets of Component II will be detailed in a separate report.

Comparisons to Funding Valuation

Because of a difference in the actuarial funding method used in the GASB valuations vs. funding valuation as well as differences in the investment return assumption, it is likely that the June 30, 2018 funding valuation will show a lower funded status than this report and possibly will be less than 100%.

Development of TPL, Service Cost and PE

The TPL is the entry age accrued liability of the Defined Benefit plan plus the current Voluntary Member Contribution Reserve Fund (VMCRF). The service cost is the normal cost for the defined benefit portion plus voluntary member contributions made during the year. The Pension Expense (PE) is the service cost plus interest on the TPL plus adjustments for deferred inflows and outflows and "other" changes in Plan Fiduciary Net Position, less expected income on the Plan Fiduciary Net Position less member contributions. In this way, contributions to the VMCRF should not have an effect on the PE.

Data

Please see the June 30, 2017 actuarial valuation, pages 18-19, for a discussion regarding data work, data assumptions, and data approximations used in the underlying valuation.

SECTION B

FINANCIAL STATEMENTS

This information is subject to the System's Auditor's review. Please let us know if the System's Auditor recommends any changes.

Statement of Fiduciary Net Position
as of June 30, 2018

Assets		
Cash and Cash Equivalents	$	19,029,332
Receivables	$	7,723,351
Investments		
Investments at Fair Value	$	104,456,123
Cash and Investments held as Collateral for Securities Lending		8,982,003
Capital Assets - Net		300,441
Total Investments	$	113,738,567
Total Assets	$	140,491,250
Liabilities		
Payables		
Accounts Payable	$	12,519,864
Total Liabilities	$	12,519,864
Total Fund Balances	$	127,971,386

Reported Reserve Balances		
Accumulated Voluntary Employee Contribution	$	177,741
Accumulated Mandatory Employee Contribution		32,030,640
Pension Accumulation		95,763,005
Total Fund	$	127,971,386

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2018

Additions		
Contributions		
Employer	$	19,244,806
Mandatory Member Pension Fund Contributions		9,074,671
Transfer from Component II		-
Voluntary Member Contributions		96,205
Total Contributions	$	28,415,682
Investment Income		
Net Appreciation in Fair Value of Investments	$	8,634,498
Investment Income		-
Less Investment Expense		-
Net Investment Income	$	8,634,498
Other	$	55,353
Total Additions	$	37,105,533
Deductions		
Benefit Payments, including Refunds of Employee Contributions	$	561,561
Pension Plan Administrative Expense		1,928,606
Other		-
Total Deductions	$	2,490,167
Net Increase in Net Position	$	34,615,366
Total Fund Balances Beginning of Year	$	93,356,020
Total Fund Balances End of Year	$	127,971,386

Statement of Pension Expense Under GASB Statement No. 68 Fiscal Year Ended June 30, 2018

A. Expense		
1. Service Cost *	$	24,907,507
2. Interest on the Total Pension Liability		5,787,404
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)*		(9,170,876)
5. Projected Earnings on Plan Investments (made negative for addition here)		(7,625,041)
6. Pension Plan Administrative Expense		1,928,606
7. Other Changes in Plan Fiduciary Net Position		(55,353)
8. Recognition of Outflow (Inflow) of Resources due to Liabilities		(2,109,209)
9. Recognition of Outflow (Inflow) of Resources due to Assets		(503,174)
10. Total Pension Expense	**$**	**13,159,864**

* *Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total.*

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2018

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	(3,622,053)
2. Assumption Changes (gains) or losses	$	(305,021)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		8.4269
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	$	(429,820)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(36,196)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(466,016)
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	(3,192,233)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(268,825)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(3,461,058)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(1,009,457)
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	(201,891)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(807,566)

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2018

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Due to Liabilities	$ 287,020	$ 2,396,229	$ (2,109,209)
2. Due to Assets	572,070	1,075,244	(503,174)
3. Total	$ 859,090	$ 3,471,473	$ (2,612,383)

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ -	$ 2,220,716	$ (2,220,716)
2. Assumption Changes	287,020	175,513	111,507
3. Net Difference between projected and actual earnings on pension plan investments	572,070	1,075,244	(503,174)
4. Total	$ 859,090	$ 3,471,473	$ (2,612,383)

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows of Resources
1. Differences between expected and actual experience	$ -	$ 13,913,551	$ (13,913,551)
2. Assumption Changes	1,562,998	995,333	567,665
3. Net Difference between projected and actual earnings on pension plan investments	994,937	3,427,624	(2,432,687)
4. Total	$ 2,557,935	$ 18,336,508	$ (15,778,573)

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

Year Ending June 30	Net Deferred Outflows of Resources
2019	$ (2,612,385)
2020	(2,761,584)
2021	(3,184,452)
2022	(2,311,102)
2023	(2,107,033)
Thereafter	(2,802,017)
Total	$ (15,778,573)

Recognition of Deferred Outflows and Inflows of Resources
Fiscal Year Ended June 30, 2018

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
Deferred Outflow (Inflow) due to Differences Between Expected and Actual Experience on Liabilities					
2014	$ 0	0.0000	$ 0	$ 0	0.0000
2015	0	8.9806	0	0	4.9806
2016	(4,077,124)	8.4456	(482,751)	(2,628,871)	5.4456
2017	(10,708,737)	8.1862	(1,308,145)	(8,092,447)	6.1862
2018	(3,622,053)	8.4269	(429,820)	(3,192,233)	7.4269
Total			**(2,220,716)**	**(13,913,551)**	
Deferred Outflow (Inflow) due to Assumption Changes					
2014	$ 0	0.0000	$ 0	$ 0	0.0000
2015	(1,008,119)	8.9806	(112,255)	(559,099)	4.9806
2016	2,424,058	8.4456	287,020	1,562,998	5.4456
2017	(221,533)	8.1862	(27,062)	(167,409)	6.1862
2018	(305,021)	8.4269	(36,196)	(268,825)	7.4269
Total			**111,507**	**567,665**	
Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments					
2014	$ 0	5.0000	$ 0	$ 0	0.0000
2015	746,013	5.0000	149,203	149,201	1.0000
2016	2,114,337	5.0000	422,867	845,736	2.0000
2017	(4,366,764)	5.0000	(873,353)	(2,620,058)	3.0000
2018	(1,009,457)	5.0000	(201,891)	(807,566)	4.0000
Total			**(503,174)**	**(2,432,687)**	

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

This information is subject to the System's Auditor's review. Please let us know if the System's Auditor recommends any changes.

Schedule of Changes in Net Pension Liability (Asset) and Related Ratios Current Period Fiscal Year Ended June 30, 2018

A. Total Pension Liability		
1. Service cost *	$	24,907,507
2. Interest on the Total Pension Liability		5,787,404
3. Changes of benefit terms		0
4. Difference between expected and actual experience of the Total Pension Liability		(3,622,053)
5. Changes of assumptions		(305,021)
6. Benefit payments, including refunds of employee contributions		(561,561)
7. Net change in Total Pension Liability	$	26,206,276
8. Total Pension Liability – Beginning		68,577,964
9. Total Pension Liability – Ending	**$**	**94,784,240**
B. Plan Fiduciary Net Position		
1. Contributions – Employer	$	19,244,806
2. Contributions – Employee *		9,170,876
3. Net investment income		8,634,498
4. Benefit payments, including refunds of employee contributions		(561,561)
5. Pension plan administrative expense		(1,928,606)
6. Other		55,353
7. Net change in Plan Fiduciary Net Position	$	34,615,366
8. Plan Fiduciary Net Position – Beginning		93,356,020
9. Plan Fiduciary Net Position – Ending	**$**	**127,971,386**
C. Net Pension Liability	**$**	**(33,187,146)**
D. Plan Fiduciary Net Position as a percentage of the Total Pension Liability		**135.01%**
E. Covered-Employee Payroll	**$**	**141,225,328**
F. Net Pension Liability as a percentage of Covered-Employee Payroll		**(23.50)%**

A Special Funding Situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability (Asset) shown here has not been adjusted for any potential special funding situation.

* *Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total.*

Schedules of Required Supplementary Information
Schedule of Changes in Net Pension Liability (Asset) and Related Ratios Multiyear

Ultimately 10 Fiscal Years Will Be Displayed

Fiscal year ending June 30,	2018	2017	2016	2015
Total Pension Liability				
Service Cost#	$ 24,907,507	$ 25,448,316	$ 24,084,267	$ 24,850,184
Interest on the Total Pension Liability (and Service Cost)	5,787,404	4,474,574	2,743,066	894,089
Benefit Changes	-	-	-	-
Difference between Expected and Actual Experience	(3,622,053)	(10,708,737)	(4,077,124)	-
Assumption Changes	(305,021)	(221,533)	2,424,058	(1,008,119)
Benefit Payments	(345,297)	(137,325)	(63,883)	-
Refunds	(216,264)	(86,501)	(37,368)	-
Net Change in Total Pension Liability	26,206,276	18,768,794	25,073,016	24,736,154
Total Pension Liability - Beginning	68,577,964	49,809,170	24,736,154	-
Total Pension Liability - Ending (a)	$ 94,784,240	$ 68,577,964	$ 49,809,170	$ 24,736,154
Plan Fiduciary Net Position				
Employer Contributions	$ 19,244,806	$ 16,448,246	$ 15,955,915	$ 14,606,971
Employee Contributions	9,074,671	8,554,893	7,834,119	7,390,335
Voluntary Employee Contributions #	96,205	34,134	15,459	14,370
Pension Plan Net Investment Income	8,634,498	8,897,790	252,125	21,019
Benefit Payments	(345,297)	(137,325)	(63,883)	(19,554)
Refunds	(216,264)	(86,501)	(37,368)	-
Pension Plan Administrative Expense	(1,928,606)	(2,648,040)	(3,000,369)	(685,677)
Other	55,353	20,009,060	301	-
Net Change in Plan Fiduciary Net Position	34,615,366	51,072,257	20,956,299	21,327,464
Plan Fiduciary Net Position - Beginning	93,356,020	42,283,763	21,327,464	-
Plan Fiduciary Net Position - Ending (b)	$ 127,971,386	$ 93,356,020	$ 42,283,763	$ 21,327,464
Net Pension Liability (Asset) - Ending (a) - (b)	(33,187,146)	(24,778,056)	7,525,407	3,408,690
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	135.01 %	136.13 %	84.89 %	86.22 %
Covered-Employee Payroll (excluding DROP)	$ 141,225,328	$ 128,837,649	$ 131,695,469	$ 132,566,687
Net Pension Liability (Asset) as a Percentage of Covered-Employee Payroll	(23.50)%	(19.23)%	5.71 %	2.57 %

Notes to Schedule:

N/A

Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total.

A special funding situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability (Asset) shown here has not been adjusted for any potential special funding situation.

Schedules of Required Supplementary Information
Schedule of the Net Pension Liability (Asset) Multiyear

Ultimately 10 Fiscal Years Will Be Displayed

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability (Asset)	Plan Net Position as a % of Total Pension Liability	Covered Payroll*	Net Pension Liability (Asset) as a % of Covered Payroll
2015	$ 24,736,154	$ 21,327,464	$ 3,408,690	86.22%	$ 132,566,687	2.57%
2016	49,809,170	42,283,763	7,525,407	84.89%	131,695,469	5.71%
2017	68,577,964	93,356,020	(24,778,056)	136.13%	128,837,649	(19.23)%
2018	94,784,240	127,971,386	(33,187,146)	135.01%	141,225,328	(23.50)%

* *Covered payroll shown is the reported payroll from the actuarial valuation date (census date). For 2015, covered payroll was based on payroll reported for Component II. Beginning in 2016, covered payroll was based on payroll reported for Component I.*

Schedule of Contributions Multiyear

FY Ending June 30,	Actuarially Determined Contribution#	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll*	Actual Contribution as a % of Covered Payroll
2015	N/A	$ 14,606,971	N/A	$ 132,566,687	11.02%
2016	N/A	15,831,763	N/A	131,695,469	12.02%
2017	N/A	16,448,246	N/A	128,837,649	12.77%
2018	N/A	19,244,806	N/A	141,225,328	13.63%

* *Covered payroll shown is the reported payroll from the actuarial valuation date (census date). For 2015, covered payroll was based on payroll reported for Component II. Beginning in 2016, covered payroll was based on payroll reported for Component I.*

\# *Employer contribution amounts are set in the plan until Fiscal Year 2024.*

Notes to Schedule of Contributions

Employer Contribution: 12.25% until FY 2024. Actuarially determined beginning in FY 2024.

Schedule of Investment Returns

This information was not provided to Gabriel, Roeder, Smith & Company for this report.

Rate Stabilization Fund (RSF)

The RSF, as defined in Section 9.2(4) of the Combined PFRS Plan, is currently $0.

SECTION D

NOTES TO FINANCIAL STATEMENTS

This information is subject to the System's Auditor's review. Please let us know if the System's Auditor recommends any changes.

Single Discount Rate

A Single Discount Rate of 7.19% was used to measure the total pension liability as of June 30, 2018. This Single Discount Rate was based on the expected rate of return on pension plan investments of 7.19% as directed by the System and the System's Auditor. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will be made at 6% of compensation for members hired before June 30, 2014 and 8% for members hired after June 30, 2014 and that employer contributions will be made at 12.25% of compensation through June 30, 2023. Beyond 2023, the employer contributions will be actuarially determined, however, the Board does not have a funding policy at this time. For purposes of the GASB projections only, the employer contribution shown in this report is the rate which, when applied to the closed group payroll, is sufficient to fund the benefits. The rate as determined is 5.61% of the closed group payroll. The actual contributions to this plan will be on open group payroll under different assumptions and methods and are expected to be at a lower rate. The contributions that result from applying the current funding approach to the methods required under GASB Statement Nos. 67 and 68 should not be interpreted as a funding recommendation or requirement. Different contributions will result when applying the same funding approach to the methods and assumptions used in the funding valuation. 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. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the Net Pension Liability (Asset) (NPL(A)) to changes in the Single Discount Rate, the following presents the plan's NPL(A), calculated using a Single Discount Rate of 7.19%, as well as what the plan's NPL(A) 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 (Asset) to the Single Discount Rate Assumption

	1% Decrease 6.19%	**Current Single Discount Rate Assumption 7.19%**	**1% Increase 8.19%**
Total Pension Liability	$112,169,736	$94,784,240	$80,950,783
Net Position Restricted for Pensions	127,971,386	127,971,386	127,971,386
Net Pension Liability (Asset)	$(15,801,650)	$(33,187,146)	$(47,020,603)

Expected Real Returns by Asset Class

This information was not available to Gabriel, Roeder, Smith & Company for this report.

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	64
DROP Members	81
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	465
Active Plan Members	2,523
Total Plan Members	3,133

Additional information regarding the plan population may be found in the June 30, 2017 actuarial valuation of the System.

Additional Note

Liabilities and reported assets for Component II are not included in this report and will be detailed in a separate report.

The Total Pension Liability is sensitive to the assumption regarding the VPIF. The sensitivity may increase as the plan matures. To illustrate the sensitivity, we are showing the Total Pension Liability below based on two alternate VPIF assumptions: 0% and 1% (the maximum amount payable). All scenarios are based on a 7.19% discount rate.

VPIF Assumption

	Minimum 0%	Current Assumption 0.5%	Maximum 1%
Total Pension Liability	$90,019,140	$94,784,240	$99,982,783
Net Position Restricted for Pensions	127,971,386	127,971,386	127,971,386
Net Pension Liability (Asset)	$(37,952,246)	$(33,187,146)	$(27,988,603)

SECTION E

SUMMARY OF BENEFITS

Summary of Benefit Provisions
(July 1, 2018)

Plan Year

The Plan Year is the 12-month period commencing on July 1, and ending on June 30. The first plan year starts July 1, 2014.

Plan Membership

Employee means an employee of the City's Police Department who has taken an oath of office or a Firefighter providing services to the City, excluding individuals who are compensated on a contractual or fee basis, any person who is classified as a non-common law employee or an independent contractor for federal income tax and withholding, and also excluding the Medical Director of the Retirement System.

The membership of the Retirement System shall consist of all employees of the Fire Department of the City of Detroit and of the Police Department of the City of Detroit who are employed as Firefighters or Police Officers according to the rules and regulations of the respective departments.

Appointed Officials of the Police Department or the Fire Department who are appointed from the membership are permitted to remain members. A Police Officer or Firefighter who is **killed or totally disabled prior to being confirmed**, shall be deemed to have been a member as of the date of his or her death. Any Member who is **transferred to a civilian position** in his or her department shall continue as a member.

Service Credit

Credited Service: A member is credited with one month of Credited Service for each calendar month in which the individual performs 140 hours or more of service for the employer as a member. Credited Service is recorded from the later of July 1, 2014, or the date of employment with the City as a Police Officer or Firefighter. A member also receives 1 month of Credited Service for each month the member is eligible to receive duty disability benefits, until such time as the member has 25 years of credited service.

Prior Service: refers to service credit awarded to a member prior to July 1, 2014 under the terms of the Retirement System in effect on June 30, 2014.

Vesting Service: A member is credited with a year of vesting service for each Plan Year commencing on or after July 1, 2014 during which the member performs 1,000 or more hours of work for the employer. Prior Service, as defined above, is also Vesting Service.

Military Service: A member who enters the military while employed by the City and returns to employment with the City following military service receives service credit in the Retirement System for the military service time as though there had been no interruption of employment. In order to receive such service credit, the individual must pay contributions to the Retirement System for the military service time upon return to employment.

Summary of Benefit Provisions
(Continued)

Average Final Compensation

Compensation: Compensation is base salary, excluding bonuses, overtime, sick leave, longevity pay, unused vacation time, etc. Compensation includes deferred compensation and "picked up" employee contributions to the Retirement System. Compensation is limited by IRC Section 401(a)(17).

Average Final Compensation: The average of the compensation received during the 5 consecutive years of Credited Service (including Prior Service) immediately preceding the date of the member's last termination of City employment as a Police Officer or Firefighter. If the member has less than 5 years of Credited Service (including Prior Service), the Average Final Compensation is the average of the compensation received during all years of Credited Service.

Final Compensation means the annual compensation of a member at the time of last termination of employment.

Normal Retirement

Normal Retirement Age: The Normal Retirement Age is 50 with 25 or more years of Credited Service (including prior service), with the following transition period.

Fiscal Year	Age and Elgibility Service
2015	43 and 20
2016	43 and 20
2017	44 and 21
2018	45 and 22
2019	46 and 23
2020	47 and 24
2021 and later	50 and 25

Normal Retirement Amount: The retirement allowance payable to a member who retires on or after the normal retirement age is 2.0% times average final compensation times Credited Service (after June 30, 2014) measured to the nearest month.

Deferred Retirement (Vested Benefit)

Eligibility: 10 years of Vesting Service.

Benefit Commencement: Age 55.

Annual Amount: Same as Normal Retirement but based on Average Final Compensation and Credited Service at the time of termination. An actuarial reduction from age 62 is applicable if benefits are taken prior to age 62 (*waived for DPLSA and DPCOA members*).

Summary of Benefit Provisions
(Continued)

Duty Disability Retirement

Eligibility: The individual must be totally disabled for duty by reason of illness, injury, or disease resulting from performance of duty.

Amount: For the first 24 months, the member shall receive a basic benefit equal to 50% of his or her final compensation plus a supplemental benefit equal to 16-2/3 % of final compensation. After 24 months, if the Board finds that the member is disabled from any occupation, the member shall continue to receive both the 50% and the 16-2/3% benefit until the member would have achieved 25 years of service. The 16-2/3% benefit ceases at the time the member would have had 25 years of service, or if the member is found not to be disabled from any occupation after the 24 month review. Duty disability benefits continue to be paid until age 65, unless the member is found not to be disabled prior to that date. Upon termination of disability, or the attainment of age 65, the member's benefit is reduced to the 50% basic benefit. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit exceeds the compensation at the time of disability (after adjustment for the Variable Improvement factor). Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

Non-Duty Disability Retirement

Eligibility: Total and permanent disability that is not duty related but that occurred while in the employ of the City.

Amount: If the member has less than 5 years of Credited service, accumulated contributions are refunded or, at the members option, may be payable in the form of a cash refund annuity. No other benefits are payable. Members with 5 or more years of credited service at the time of disability may receive a benefit computed as a Normal Retirement benefit, but not less than 20% of Average Final Compensation. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit (after adjustment for the Variable Improvement factor) exceeds the compensation at the time of disability. Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

Summary of Benefit Provisions (Continued)

Accidental (Line of Duty) Death Before Retirement

Eligibility: Death resulting directly from performance of Duty in the service of the employer or as a result of illness contracted or injuries received while in the service of the employer.

Amount: Accumulated Mandatory Employee Contributions are refunded. If there is a surviving spouse, the surviving spouse receives a lifetime pension of 5/11ths of the member's final compensation. Each surviving child under age 18 receives a pension of 1/10th of final compensation payable until age 18. If there are more than two surviving children, each receives an equal share of 7/33rds of final compensation, payable to age 18 and redistributed to the remaining children upon attainment of age 18. The sum of all benefits payable shall not exceed 2/3rds of the member's Final Compensation. If there is no surviving spouse, each surviving child under age 18 receives a pension of 1/4th of the member's final compensation, subject to a maximum total of ½ of final compensation. If there is neither surviving spouse nor surviving children under the age of 18, each dependent parent, if any, shall receive a pension of 1/6th of the member's Final Compensation.

Ordinary (Other than Line of Duty) Death Before Retirement

Eligibility: 10 or more years of Vesting Service. The individual must be employed by the employer at time of death.

Amount: The Surviving Spouse shall receive a retirement allowance computed as though the member had retired the day before death, notwithstanding that the death was prior to the Normal Retirement Date, elected the Joint and 100% Option in favor of the spouse, and then died.

Refund of Mandatory Contributions

A member who ceases to be an employee for reasons other than retirement, death, or disability, may elect to receive a refund of mandatory Accumulated Contributions (without interest) in lieu of any other Component I benefit payable. In the case of a member who dies while employed by the City, or following termination of employment with the City, if no Surviving Spouse benefit is payable, the accumulated mandatory Employee Contributions (without interest) are paid to the member's estate.

Variable Pension Improvement Factor (VPIF Escalator)

Eligibility: In receipt of a retirement allowance for at least 12 months as of the first day of the plan year.

Amount: Beginning July 1, 2015 and effective the first date of each Plan year thereafter, the Board may determine that the Component I Retirement Allowance shall be increased by 1% of the then current (i.e., compounded to include prior VPIF's) retirement allowance. The VPIF Escalator may not be awarded in the event that the funding level of Component I of the Retirement System projected over a 5-year period falls below 90%.

Summary of Benefit Provisions
(Continued)

Deferred Retirement Option Program "DROP"

Eligibility: Eligible for immediate retirement under Component I and either a non-union executive or covered by a collective bargaining agreement permitting participation in the DROP.

Amount: Upon entry into the DROP, the member ceases to accrue additional retirement benefits and must elect the optional form under which the retirement allowance will ultimately be paid. 75% of that amount, including VPIF, is paid into the DROP account.

Investment: ING is currently responsible for the administration and investment of the DROP accounts. As soon as possible after July 1, 2014, the Board shall determine whether or not it is feasible for the Board to administer and invest the DROP accounts, in which case DROP assets would be commingled with Retirement System assets for investment purposes.

Earnings Credits: If the Board administers and invests the accounts, earnings credits shall be 75% of actual net Retirement System earnings rates, but neither less than 0% nor more than 7.75%.

Fees: Fees associated with maintenance of the DROP accounts outside the Retirement System shall be charged directly to DROP participants by means of deductions from their accounts.

Distribution: Upon termination of employment for any reason (including disability), the member's DROP account may be distributed in the form of a lump sum or an annuity. Any such annuity shall be subject to market rates of interest and other market related assumptions. At the same time, the member's monthly retirement allowance shall commence in the amount that would have been paid at the time the member entered the DROP, together with any applicable VPIF increases.

Death While in DROP: In the case of a member who dies during DROP participation, the DROP account balance is paid either to the named beneficiary or to the estate. Further, the DROP election is then rescinded and 100% of the retirement allowance that would have been paid but for participation in the DROP is restored. Survivor benefits are then payable in accordance with the payment option elected by the deceased member at the time the member elected to participate in the DROP.

Termination of DROP: The DROP can be terminated if it is determined that it is not cost neutral and cannot be amended to make it so.

Contributions

Members: Members who were active as of June 30, 2014 contribute 6% of Compensation. Members who are hired or rehired after that date contribute 8% of compensation. DROP participants do not make employee contributions. Member contributions are "picked up" in accordance with IRC 414(h).

Employers: 11.2% of compensation for members of the DPOA until October 3, 2014; 11.2% of Compensation of active employees who are members of the DFFA until November 6, 2014; 12.25% of Compensation of Active employees who are members of the DPCOA, DPLSA, and DPOA from and after October 3, 2014 until June 30, 2023; 12.25% of Compensation of DFFA members from and after November 6, 2014 until June 30, 2023, to be split between the Pension Accumulation Fund and the Rate Stabilization reserve. For Plan years 2024 and later, contributions shall be determined by an Actuary using reasonable and appropriate assumptions approved by the Board and the Investment Committee.

Summary of Benefit Provisions
(Continued)

Voluntary Employee Contributions

Eligibility: Coverage by a collective bargaining agreement that permits the Member to make Voluntary Employee Contributions to Component I cannot be a current participant in the DROP.

Amount: Not less than 1% of Compensation nor more than 10% of Compensation. DPOA members can elect to have a whole % of the amount the City pays him or her for accumulated sick leave in excess of 400 hours paid to the voluntary employee account. All voluntary employee contributions are made on an after tax basis.

Earnings Crediting: Each Plan year, accounts are credited with earnings at a rate equal to the net investment rate of return on Retirement System Assets for the second fiscal year immediately preceding the fiscal year in which earnings are to be credited. The earnings rate may not be less than 0% and may not exceed 5.25%.

Distribution: Upon termination of employment, accounts may be distributed in a lump sum, in equal monthly installments for a period not exceeding three years, or, at the option of the member, in the form of an actuarially equivalent life annuity payable in the same form as and added to the member's Retirement Allowance. The determination of actuarial equivalent for this purpose is based upon market rates of investment return and other market related assumptions. In case of a member who dies before receiving a distribution of his or her voluntary account, the value of the account is payable to the nominated beneficiary, or to the estate.

Forms of Payment

Normal Form of Payment: The normal form of payment is a straight life allowance with no death benefit, and, in particular, no residual refund of mandatory employee contributions. Until the date the first Retirement Allowance payment check is issued, any Member may elect to receive payment in either the Normal Form or in the Actuarial Equivalent of the Normal Form computed as of the effective date of retirement and payable in one of the forms described below.

Option One. Modified Cash Refund Annuity: If a Retiree who elected a Modified Cash Refund Annuity dies before payment has been received in an aggregate amount equal to, but not exceeding the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between said Accumulated Mandatory Employee Contributions and the aggregate amount of annuity payments already received, shall be paid in a single lump sum to a Beneficiary nominated by written designation duly executed by the Member and filed with the Board. If there are no such designated Beneficiaries surviving said Retiree, any such difference shall be paid to the Retiree's estate.

Option Two. Joint and One Hundred Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and One Hundred Percent Survivor Allowance, one hundred percent of the reduced Retirement Allowance shall be paid to and continued throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Summary of Benefit Provisions (Continued)

Option "A". Joint and Seventy-Five Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Seventy-Five Percent Survivor Allowance, seventy-five percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Option Three. Joint and Fifty Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Fifty Percent Survivor Allowance, fifty percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Option "B". Joint and Twenty-Five Percent Survivor Allowance: Upon the death of a Retiree who elected a Joint and Twenty-Five Percent Survivor Allowance, twenty-five percent of the reduced Retirement Allowance shall be paid throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

Joint and Survivor Optional Forms of Payment: The Joint and Survivor Optional Forms of Payment provided under the Retirement System shall be made available in either the standard form or the pop-up form, as follows:

> ***Standard Form:*** Under the Standard Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree.
>
> ***Pop-up Form:*** Under the Pop-up Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree and the designated Beneficiary. In the event of the death of the designated Beneficiary during the lifetime of the Retiree, the amount of the Retirement Allowance shall be changed to the amount that would have been payable had the Retiree elected the Straight Life Retirement Allowance Form of Payment.

Disposition of Residue: If under a Joint and One Hundred Percent Survivor allowance, a Joint and Seventy-Five Percent Survivor allowance, a Joint and Fifty Percent Survivor allowance, or a Joint and Twenty-Five Percent Survivor allowance as provided above, both the Retiree and the Beneficiary die before they have received, in Retirement Allowance payments, an aggregate amount equal to the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between the said Accumulated Mandatory Employee Contributions and the aggregate amount of Retirement Allowances paid to the Retiree and Beneficiary, shall be paid in a single lump sum to such person or persons nominated by written designation of the Retiree duly executed and filed with the Board. If there are no such person or persons surviving the Retiree and the Beneficiary, any such difference shall be paid to the estate of the second to die of the Retiree or Beneficiary.

Summary of Benefit Provisions
(Concluded)

Rehire Before or After Retirement

A former member who is vested and is not a DROP participant and who later becomes a Police Officer or Firefighter (but not a Police Assistant) shall have his or her benefit pertaining to total Credited Service earned on and after July 1, 2014 calculated in accordance with the terms of Component I of the Retirement System in effect at the time of the last separation from service. If the former member has previously withdrawn mandatory accumulated contributions, and such withdrawn contributions are not repaid within two years of the rehire date, only the Credited Service earned on and after the rehire date shall be taken into consideration in determining the retirement allowance.

Retirement benefits for a Retiree who returns to active full time employment other than as a Police Assistant shall be subject to the following provisions:

- A Retiree who returns to work will have the Retirement Allowance suspended upon re-employment. The variable pension improvement factor (escalator) shall not be added to the amount of the original Retirement Allowance during the Retiree's re-employment period.
- A Retiree who returns to work will be entitled to receive a second Retirement Allowance in accordance with the provisions of the Retirement System in effect during the re-employment period.
- A Retiree's Average Final Compensation for purposes of determining the second Retirement Allowance will be based upon the Compensation earned by the Retiree after the return to work.
- An individual who retires for a second time will not be allowed to change the payment option selected with respect to the original Retirement Allowance. However, the individual may select a separate payment option with respect to the second Retirement Allowance.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Funding Methods

The entry age actuarial cost method was used in determining liabilities and normal cost as prescribed by GASB Statement Nos. 67 and 68. Under this method, each individual's service cost is determined as a level percent of pay from plan inception to DROP or termination of active service. This method is used in this report to comply with the GASB Standards and differs from the method used for funding the plan.

Projection of Employer Contributions. Actual employer contributions through June 30, 2023 are set at 12.25% of pay. The amortization period and method after 2023 has not yet been established by the Board. Additional funding for Transition Costs may occur as a result of Component II ASF transfers. For the purposes of the GASB projections only, the employer contribution shown in this report is the rate which, when applied to the closed group projected payroll, is sufficient to fund the benefits.

Present assets are set equal to the Market Value.

The data about persons now covered and about present assets was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary. Please see the June 30, 2017 actuarial valuation report dated May 31, 2018 (Section E) for a description of any data adjustments that were made by the actuary.

Summary of Assumptions and Methods Used for GASB Valuation

All demographic assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on the 2002-2007 experience study of the Component II plan unless noted otherwise.

Economic Assumptions

For the Determination of the June 30, 2018 TPL:

The investment return rate used in the valuation was 7.19% per year, compounded annually (net after expenses). This is a prescribed assumption set by the Retirement System.

Pay increase assumptions for individual active members are shown on page 30. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation (as of June 30, 2014 assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter). The rationale for this assumption is that it is consistent with expectations by the employer used during the plan design.

Price Inflation is not directly used in the valuation. For purposes of assessing the reasonableness of the assumed rate of return, we assumed price inflation of 2.50% per year.

Non-Economic Assumptions

The mortality table used to measure retired life mortality is the RP-2014 Blue Collar Annuitant Table for males and females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is the RP-2014 Blue Collar Employee Tables for males and females. The tables are projected to be fully generational, based on the 2-dimensional, sex distinct mortality improvement scale MP-2014 (which was published and intended to be used with RP-2014). The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 13, 2015.

The probabilities of age/service retirement for members eligible to retire are shown on pages 31 through 33. The rationale is based on the 2002-2007 Experience Study modified as necessary to account for the difference in eligibility of the Component I plan.

The probabilities of separation from service are shown for sample ages on page 34.

Sample Salary Adjustment Rates

	Salary Increase Assumptions for an Individual Member		
Service	Merit & Seniority	Base (Economic)*	Increase Next Year
5	5.20%	3.00%	8.20%
10	1.70%	3.00%	4.70%
15	1.00%	3.00%	4.00%
20	1.00%	3.00%	4.00%
25	1.00%	3.00%	4.00%
30	1.00%	3.00%	4.00%
35	1.00%	3.00%	4.00%

** Ultimate rate shown. Base (Economic) salary increase rates as of June 30, 2014 are assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter.*

Single Life Retirement Values Based on RP-2014 Blue Collar for Males and Females

Sample Attained Ages	Future Life Expectancy (years)	
in 2017	Men	Women
45	39.48	42.84
50	34.50	37.77
55	29.71	32.85
60	25.14	28.08
65	20.80	23.48
70	16.75	19.11
75	13.05	15.08
80	9.77	11.48

Probabilities of Service Retirement for Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service) as of June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year			
	Police		Fire	
Service	20 & Out	25 & Out	20 & Out	25 & Out
19	40%		40%	
20	40%		40%	
21	40%		40%	
22	40%		40%	
23	40%		40%	
24	100%	40%	100%	40%
25	100%	40%	100%	40%
26	100%	40%	100%	40%
27	100%	40%	100%	40%
28	100%	40%	100%	40%
29	100%	100%	100%	100%
30	100%	100%	100%	100%
31	100%	100%	100%	100%
32	100%	100%	100%	100%
33	100%	100%	100%	100%
34	100%	100%	100%	100%
35	100%	100%	100%	100%
36	100%	100%	100%	100%
37	100%	100%	100%	100%
38	100%	100%	100%	100%
39	100%	100%	100%	100%
40	100%	100%	100%	100%

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Probabilities of Service Retirement for Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service) as of June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year	
Age	Police	Fire
60	40%	100%
61	40%	100%
62	40%	100%
63	40%	100%
64	40%	100%
65	100%	100%
66	100%	100%
67	100%	100%
68	100%	100%
69	100%	100%
70	100%	100%

Members eligible for 20 & Out are assumed to be first eligible for normal retirement after 19 years of service due to their ability to purchase service. Members eligible for 25 & Out are assumed to be eligible for normal retirement after 24 years of service due to their ability to purchase service. Members are also eligible to retire at age 60 with no service requirement.

Probabilities of Service Retirement for Members Age 43 or Younger and with Less Than 17 Years of Service on June 30, 2014

	Percent of Eligible Active Members Retiring or Entering DROP Within Next Year	
Age	**Police**	**Fire**
50	30%	20%
51	30%	20%
52	30%	20%
53	30%	20%
54	30%	20%
55	30%	20%
56	30%	20%
57	30%	20%
58	30%	20%
59	30%	20%
60	100%	100%

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Probabilities of Separation

Sample Ages	Years of Service	% of Active Members Withdrawing within Next Year	
		Police	Fire
ALL	0	8.50%	5.00%
	1	7.50%	4.00%
	2	6.00%	3.00%
	3	5.00%	2.00%
	4	4.50%	2.00%
25	5 & Over	4.50%	1.96%
30		3.30%	1.62%
35		2.30%	1.11%
40		1.70%	0.77%
45		1.50%	0.60%
50		1.10%	0.51%
55		0.80%	0.51%
60		0.80%	0.51%

Sample Ages	% of Active Members Becoming Disabled within Next Year			
	Police		Fire	
	Ordinary	Duty	Ordinary	Duty
25	0.06%	0.13%	0.07%	0.34%
30	0.07%	0.19%	0.08%	0.52%
35	0.08%	0.34%	0.09%	0.90%
40	0.11%	0.49%	0.12%	1.30%
45	0.16%	0.73%	0.18%	1.92%
50	0.47%	1.16%	0.53%	3.06%
55	0.73%	1.96%	0.82%	5.18%
60	0.83%	2.82%	0.94%	7.47%

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. This assumption accounts for potential dependent children/dependent parent death benefits. No other assumption is made for surviving children/dependent parents. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	End of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year beginning on the valuation date.
Decrement Timing:	Decrements are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date of decrement.
Decrement Operation:	Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.
Longevity in AFC:	None
Unused Sick Leave Payout:	None
Administrative Expense:	3.0% of payroll. 30% of administrative expenses were allocated to Component I and 70% to Component II based on actual administrative expenses paid.
Post-Retirement COLA:	A 0.5% COLA was used to determine the SDR and TPL.
Disability Change Age:	The duty disability benefit is assumed to change at the earlier of age 65 or the time the member would have had 25 years of credited service (including prior service). The benefit at change age was assumed to be 2.0% times final compensation times projected benefit service.
DROP Assumption:	Members are assumed to retire or DROP based on assumed rates. 60% of members leaving active service in accordance with the Ret/DROP rates are assumed to DROP/40% and are assumed to retire. Members entering the DROP are assumed to retire 5 years after entering the DROP. Employer contributions are assumed not to be made on DROP payroll. DROP account balances are assumed to grow at 6.75% per year.
Service Credit Accruals:	Service accruals for calculating benefits begin as of June 30, 2014 for Component I liabilities. However, service prior to June 30, 2014 is used to satisfy benefit eligibility requirements.

Miscellaneous and Technical Assumptions (Concluded)

Workers Compensation Offset:	No Workers compensation offsets are assumed for duty disability benefits.
DROP Account:	Members in the Component II DROP as of June 30, 2014 were excluded from this valuation.
Class Codes/Bargaining Unit:	For valuation purposes, members are categorized as DPOA, DFFA or LSA based on class codes and bargaining units provided by the Retirement System and are primarily used in the valuation to determine deferred retirement commencement.
Form of Payment:	No adjustment has been made for alternate forms of payment elections.
Disability Load:	Duty Disability benefits were increased by 2.0% to account for the Death While Disabled provision based on an analysis of the estimated impact for a sample set of individuals.
IRC Section 415 Limit:	We assumed that no benefits will be limited by IRC Section 415. The limit is assumed to grow with wage inflation.
IRC Section 401(a)(17) Limit:	All of the member salary provided falls below the current 401(a)(17) limit. The limit is assumed to grow with wage inflation.
IRC Section 401(h) Limit:	We did not test for the 401(h) limit on employer contributions for medical benefits. No employer contributions are anticipated in this valuation.
COLA (VPIF):	Unless stated otherwise, liabilities in this report are based on an assumed average 0.5% future VPIF.
New Entrant Assumption:	None.

The rationale for the miscellaneous and technical assumptions is the 2002-2007 Experience Study, modified as necessary for changes in data, administration, or plan provisions.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate at End of Year

GASB Statement No. 67 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) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) 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 7.19%; the municipal bond rate is 3.62%; and the resulting Single Discount Rate is 7.19% as of June 30, 2018.

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

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their benefits). For purposes of determining the discount rate as of June 30, 2018, the employer contributions for the 10-year period ending June 30, 2023 are set at 12.25% of payroll. Subsequent employer contributions were set at 5.61% of the closed group payroll including contributions for expenses. The actual employer rate will be determined by future funding valuations and is expected to be different when based on open group payroll. The estimated employer contribution rate of 5.61% is less than the estimated rate from the 2017 GASB report. The primary factors decreasing this estimate were the liability gains as of June 30, 2017 and gains on the market value of assets as of June 30, 2018. Member contributions were set at 6% for members hired before June 30, 2014 and at 8% for members hired after June 30, 2014. The voluntary member contributions were excluded for the projections (and assets). The VPIF was assumed to be 0.50% compound each year. The VPIF reduction under Section 9.5 of the plan was assumed not to occur.

Note that these projections are specifically used to determine the GASB discount rate and should not be interpreted as a funding projection or recommendation.

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR. For purposes of determining the discount rate as of June 30, 2018, the benefit payments reflect the plan provisions in force as of June 30, 2018.

Single Discount Rate Development
Projection of Contributions
End of Year

Fiscal Year Ending June 30,	Payroll for Current Employees	Projected Contributions from Current Employees	Projected Employer Service Cost Contribution	Employer Administrative Expense Contributions #	Projected Employer UAL Contributions	Projected Total Contributions
2019	$ 123,111,886	$ 7,869,129	$ 14,700,449	$ 1,108,007	$ (727,250)	$ 22,950,335
2020	115,248,347	7,411,554	13,694,916	1,037,235	(614,229)	21,529,477
2021	109,536,977	7,086,725	12,968,831	985,833	(536,385)	20,505,004
2022	105,342,572	6,853,208	12,370,916	948,083	(414,533)	19,757,673
2023	102,267,226	6,686,320	11,857,408	920,405	(250,077)	19,214,055
2024	99,250,555	6,521,212	11,337,355	893,255	(6,664,390)	12,087,432
2025	95,903,854	6,333,717	10,784,551	863,135	(6,269,158)	11,712,245
2026	92,534,627	6,144,767	10,222,046	832,812	(5,865,285)	11,334,340
2027	88,821,091	5,932,624	9,616,311	799,390	(5,434,391)	10,913,934
2028	84,900,459	5,705,822	8,999,944	764,104	(5,002,617)	10,467,252
2029	81,045,860	5,482,234	8,413,138	729,413	(4,597,296)	10,027,489
2030	77,523,230	5,278,851	7,891,357	697,709	(4,241,369)	9,626,548
2031	74,045,009	5,077,973	7,382,762	666,405	(3,896,538)	9,230,602
2032	70,255,242	4,857,520	6,823,382	632,297	(3,515,589)	8,797,610
2033	66,422,305	4,634,748	6,258,263	597,801	(3,130,935)	8,359,877
2034	62,832,870	4,426,949	5,750,660	565,496	(2,792,332)	7,950,774
2035	59,545,919	4,235,702	5,296,597	535,913	(2,493,026)	7,575,187
2036	56,801,962	4,076,582	4,926,170	511,218	(2,251,791)	7,262,178
2037	54,312,499	3,932,153	4,599,958	488,812	(2,042,789)	6,978,134
2038	52,009,109	3,796,623	4,307,109	468,082	(1,858,390)	6,713,424
2039	49,453,218	3,645,042	3,997,197	445,079	(1,668,816)	6,418,502
2040	46,207,740	3,443,439	3,629,134	415,870	(1,453,558)	6,034,885
2041	42,344,736	3,184,583	3,228,366	381,103	(1,234,670)	5,559,381
2042	36,844,235	2,788,199	2,724,475	331,598	(989,756)	4,854,516
2043	30,460,348	2,313,531	2,187,086	274,143	(752,937)	4,021,824
2044	24,907,351	1,896,333	1,748,801	224,166	(576,100)	3,293,199
2045	19,847,785	1,515,298	1,360,442	178,630	(425,958)	2,628,412
2046	15,369,360	1,176,600	1,026,033	138,324	(302,405)	2,038,552
2047	11,617,217	890,424	760,871	104,555	(213,903)	1,541,946
2048	8,537,670	654,760	552,989	76,839	(151,014)	1,133,574
2049	6,062,948	465,040	387,427	54,567	(101,968)	805,066
2050	4,222,096	324,084	264,924	37,999	(66,137)	560,869
2051	2,924,981	224,744	180,947	26,325	(43,231)	388,784
2052	1,962,604	151,031	118,683	17,663	(26,278)	261,099
2053	1,266,343	97,877	73,723	11,397	(14,100)	168,897
2054	783,976	60,851	43,970	7,056	(7,058)	104,818
2055	444,793	34,859	23,476	4,003	(2,534)	59,805
2056	225,500	17,885	11,059	2,030	(442)	30,531
2057	92,957	7,437	4,146	837	230	12,650
2058	28,217	2,257	1,235	254	94	3,840
2059	2,284	183	83	21	24	311
2060	-	-	-	-	-	-
2061	-	-	-	-	-	-
2062	-	-	-	-	-	-
2063	-	-	-	-	-	-
2064	-	-	-	-	-	-
2065	-	-	-	-	-	-
2066	-	-	-	-	-	-
2067	-	-	-	-	-	-
2068	-	-	-	-	-	-

Expenses assumed to be paid by employer.

Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Projection of Plan Fiduciary Net Position
End of Year
(Net of Voluntary Employee Contribution)

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.19%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2019	$ 127,793,645	$ 22,950,335	$ 2,024,513	$ 1,108,007	$ 9,888,448	$ 157,499,908
2020	157,499,908	21,529,477	2,926,538	1,037,235	11,944,770	187,010,382
2021	187,010,382	20,505,004	3,717,680	985,833	14,004,250	216,816,124
2022	216,816,124	19,757,673	4,480,226	948,083	16,095,279	247,240,767
2023	247,240,767	19,214,055	5,353,752	920,405	18,233,726	278,414,392
2024	278,414,392	12,087,432	6,269,100	893,255	20,191,978	303,531,447
2025	303,531,447	11,712,245	7,236,584	863,135	21,951,527	329,095,501
2026	329,095,501	11,334,340	8,305,473	832,812	23,739,544	355,031,100
2027	355,031,100	10,913,934	9,469,940	799,390	25,549,507	381,225,211
2028	381,225,211	10,467,252	11,043,497	764,104	27,362,743	407,247,605
2029	407,247,605	10,027,489	12,811,424	729,413	29,156,990	432,891,247
2030	432,891,247	9,626,548	14,692,815	697,709	30,921,262	458,048,533
2031	458,048,533	9,230,602	16,672,260	666,405	32,647,264	482,587,735
2032	482,587,735	8,797,610	18,917,101	632,297	34,318,240	506,154,187
2033	506,154,187	8,359,877	21,303,655	597,801	35,914,116	528,526,724
2034	528,526,724	7,950,774	23,492,397	565,496	37,432,071	549,851,676
2035	549,851,676	7,575,187	25,473,727	535,913	38,883,119	570,300,342
2036	570,300,342	7,262,178	27,354,511	511,218	40,276,753	589,973,544
2037	589,973,544	6,978,134	29,189,545	488,812	41,617,189	608,890,510
2038	608,890,510	6,713,424	30,992,652	468,082	42,905,003	627,048,203
2039	627,048,203	6,418,502	32,793,310	445,079	44,137,326	644,365,642
2040	644,365,642	6,034,885	34,666,815	415,870	45,303,746	660,621,587
2041	660,621,587	5,559,381	36,778,753	381,103	46,382,373	675,403,486
2042	675,403,486	4,854,516	39,479,568	331,598	47,326,631	687,773,467
2043	687,773,467	4,021,824	42,499,988	274,143	48,081,947	697,103,106
2044	697,103,106	3,293,199	45,359,489	224,166	48,627,759	703,440,410
2045	703,440,410	2,628,412	48,070,017	178,630	48,965,783	706,785,958
2046	706,785,958	2,038,552	50,541,323	138,324	49,099,613	707,244,476
2047	707,244,476	1,541,946	52,794,895	104,555	49,036,621	704,923,593
2048	704,923,593	1,133,574	54,774,326	76,839	48,786,377	699,992,379
2049	699,992,379	805,066	56,381,061	54,567	48,364,245	692,726,062
2050	692,726,062	560,869	57,600,070	37,999	47,790,693	683,439,555
2051	683,439,555	388,784	58,450,282	26,325	47,087,292	672,439,024
2052	672,439,024	261,099	59,076,620	17,663	46,270,023	659,875,863
2053	659,875,863	168,897	59,495,580	11,397	45,348,895	645,886,679
2054	645,886,679	104,818	59,681,158	7,056	44,334,407	630,637,691
2055	630,637,691	59,805	59,661,475	4,003	43,237,218	614,269,235
2056	614,269,235	30,531	59,459,039	2,030	42,066,513	596,905,209
2057	596,905,209	12,650	59,057,689	837	40,831,628	578,690,961
2058	578,690,961	3,840	58,478,049	254	39,542,209	559,758,708
2059	559,758,708	311	57,752,921	21	38,206,480	540,212,556
2060	540,212,556	-	56,872,914	-	36,832,188	520,171,831
2061	520,171,831	-	55,844,271	-	35,427,598	499,755,157
2062	499,755,157	-	54,687,934	-	34,000,488	479,067,711
2063	479,067,711	-	53,447,600	-	32,556,877	458,176,988
2064	458,176,988	-	52,132,291	-	31,101,298	437,145,996
2065	437,145,996	-	50,745,753	-	29,638,151	416,038,393
2066	416,038,393	-	49,292,597	-	28,171,848	394,917,645
2067	394,917,645	-	47,776,541	-	26,706,823	373,847,927
2068	373,847,927	-	46,201,486	-	25,247,551	352,893,993

Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Projection of Plan Fiduciary Net Position
End of Year (Concluded)

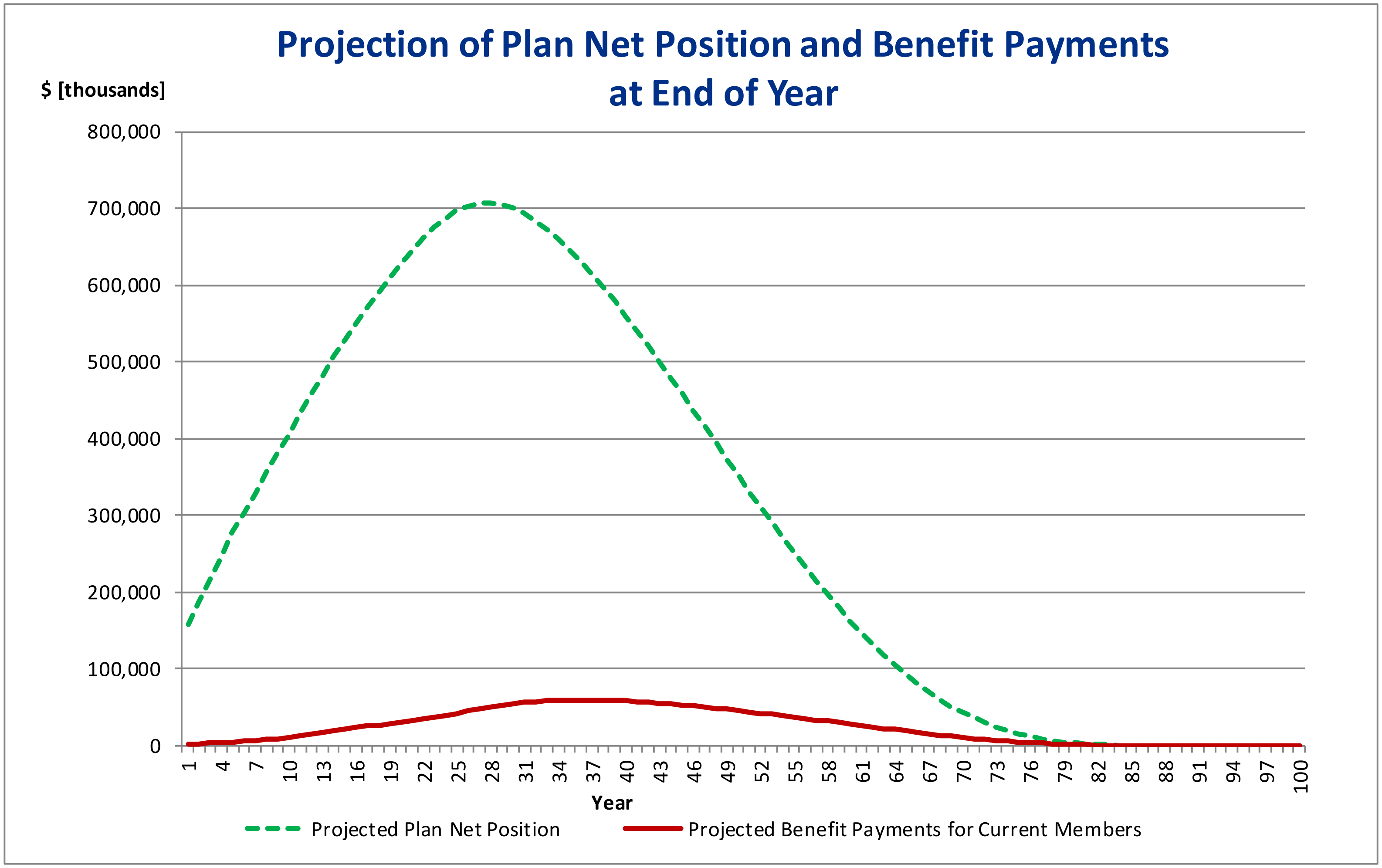
Fiscal Year Ending June 30,	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.19%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2069	$ 352,893,993	$ -	$ 44,571,792	$ -	$ 23,798,533	$ 332,120,734
2070	332,120,734	-	42,892,509	-	22,364,258	311,592,483
2071	311,592,483	-	41,169,336	-	20,949,150	291,372,297
2072	291,372,297	-	39,408,360	-	19,557,527	271,521,464
2073	271,521,464	-	37,615,946	-	18,193,571	252,099,088
2074	252,099,088	-	35,798,598	-	16,861,302	233,161,793
2075	233,161,793	-	33,962,763	-	15,564,563	214,763,592
2076	214,763,592	-	32,114,751	-	14,307,015	196,955,857
2077	196,955,857	-	30,260,641	-	13,092,138	179,787,354
2078	179,787,354	-	28,406,271	-	11,923,230	163,304,312
2079	163,304,312	-	26,557,534	-	10,803,408	147,550,185
2080	147,550,185	-	24,720,731	-	9,735,573	132,565,028
2081	132,565,028	-	22,902,450	-	8,722,373	118,384,950
2082	118,384,950	-	21,109,672	-	7,766,157	105,041,435
2083	105,041,435	-	19,349,913	-	6,868,923	92,560,446
2084	92,560,446	-	17,631,112	-	6,032,259	80,961,592
2085	80,961,592	-	15,961,580	-	5,257,279	70,257,292
2086	70,257,292	-	14,349,697	-	4,544,581	60,452,176
2087	60,452,176	-	12,803,531	-	3,894,213	51,542,858
2088	51,542,858	-	11,330,770	-	3,305,660	43,517,748
2089	43,517,748	-	9,938,736	-	2,777,830	36,356,842
2090	36,356,842	-	8,634,011	-	2,309,052	30,031,883
2091	30,031,883	-	7,422,211	-	1,897,095	24,506,767
2092	24,506,767	-	6,307,952	-	1,539,202	19,738,016
2093	19,738,016	-	5,294,671	-	1,232,124	15,675,469
2094	15,675,469	-	4,384,446	-	972,181	12,263,205
2095	12,263,205	-	3,577,829	-	755,334	9,440,710
2096	9,440,710	-	2,873,725	-	577,270	7,144,255
2097	7,144,255	-	2,269,224	-	433,509	5,308,540
2098	5,308,540	-	1,759,491	-	319,528	3,868,578
2099	3,868,578	-	1,337,860	-	230,889	2,761,607
2100	2,761,607	-	996,223	-	163,367	1,928,751
2101	1,928,751	-	725,501	-	113,048	1,316,299
2102	1,316,299	-	516,035	-	76,412	876,676
2103	876,676	-	357,988	-	50,387	569,075
2104	569,075	-	241,852	-	32,373	359,596
2105	359,596	-	158,880	-	20,242	220,958
2106	220,958	-	101,364	-	12,306	131,900
2107	131,900	-	62,735	-	7,267	76,432
2108	76,432	-	37,624	-	4,166	42,975
2109	42,975	-	21,853	-	2,318	23,440
2110	23,440	-	12,299	-	1,251	12,392
2111	12,392	-	6,710	-	654	6,336
2112	6,336	-	3,546	-	330	3,121
2113	3,121	-	1,811	-	160	1,470
2114	1,470	-	890	-	74	654
2115	654	-	420	-	32	266
2116	266	-	186	-	13	93
2117	93	-	96	-	3	-
2118	-	-	-	-	-	-

Single Discount Rate Development
Present Values of Projected Benefits
End of Year

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (v_f)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=(c)/(1+sdr)^(a-.5)
2019	$ 127,793,645	$ 2,024,513	$ 2,024,513	$ -	$ 1,955,436	$ -	$ 1,955,436
2020	157,499,908	2,926,538	2,926,538	-	2,637,077	-	2,637,077
2021	187,010,382	3,717,680	3,717,680	-	3,125,261	-	3,125,261
2022	216,816,124	4,480,226	4,480,226	-	3,513,662	-	3,513,662
2023	247,240,767	5,353,752	5,353,752	-	3,917,095	-	3,917,095
2024	278,414,392	6,269,100	6,269,100	-	4,279,142	-	4,279,142
2025	303,531,447	7,236,584	7,236,584	-	4,608,195	-	4,608,195
2026	329,095,501	8,305,473	8,305,473	-	4,934,093	-	4,934,093
2027	355,031,100	9,469,940	9,469,940	-	5,248,509	-	5,248,509
2028	381,225,211	11,043,497	11,043,497	-	5,710,065	-	5,710,065
2029	407,247,605	12,811,424	12,811,424	-	6,179,845	-	6,179,845
2030	432,891,247	14,692,815	14,692,815	-	6,611,970	-	6,611,970
2031	458,048,533	16,672,260	16,672,260	-	6,999,485	-	6,999,485
2032	482,587,735	18,917,101	18,917,101	-	7,409,210	-	7,409,210
2033	506,154,187	21,303,655	21,303,655	-	7,784,257	-	7,784,257
2034	528,526,724	23,492,397	23,492,397	-	8,008,222	-	8,008,222
2035	549,851,676	25,473,727	25,473,727	-	8,101,156	-	8,101,156
2036	570,300,342	27,354,511	27,354,511	-	8,115,760	-	8,115,760
2037	589,973,544	29,189,545	29,189,545	-	8,079,292	-	8,079,292
2038	608,890,510	30,992,652	30,992,652	-	8,002,957	-	8,002,957
2039	627,048,203	32,793,310	32,793,310	-	7,899,920	-	7,899,920
2040	644,365,642	34,666,815	34,666,815	-	7,791,070	-	7,791,070
2041	660,621,587	36,778,753	36,778,753	-	7,711,270	-	7,711,270
2042	675,403,486	39,479,568	39,479,568	-	7,722,306	-	7,722,306
2043	687,773,467	42,499,988	42,499,988	-	7,755,489	-	7,755,489
2044	697,103,106	45,359,489	45,359,489	-	7,722,079	-	7,722,079
2045	703,440,410	48,070,017	48,070,017	-	7,634,597	-	7,634,597
2046	706,785,958	50,541,323	50,541,323	-	7,488,661	-	7,488,661
2047	707,244,476	52,794,895	52,794,895	-	7,297,855	-	7,297,855
2048	704,923,593	54,774,326	54,774,326	-	7,063,599	-	7,063,599
2049	699,992,379	56,381,061	56,381,061	-	6,783,096	-	6,783,096
2050	692,726,062	57,600,070	57,600,070	-	6,464,925	-	6,464,925
2051	683,439,555	58,450,282	58,450,282	-	6,120,301	-	6,120,301
2052	672,439,024	59,076,620	59,076,620	-	5,770,953	-	5,770,953
2053	659,875,863	59,495,580	59,495,580	-	5,422,035	-	5,422,035
2054	645,886,679	59,681,158	59,681,158	-	5,074,119	-	5,074,119
2055	630,637,691	59,661,475	59,661,475	-	4,732,200	-	4,732,200
2056	614,269,235	59,459,039	59,459,039	-	4,399,798	-	4,399,798
2057	596,905,209	59,057,689	59,057,689	-	4,076,965	-	4,076,965
2058	578,690,961	58,478,049	58,478,049	-	3,766,164	-	3,766,164
2059	559,758,708	57,752,921	57,752,921	-	3,469,972	-	3,469,972
2060	540,212,556	56,872,914	56,872,914	-	3,187,889	-	3,187,889
2061	520,171,831	55,844,271	55,844,271	-	2,920,264	-	2,920,264
2062	499,755,157	54,687,934	54,687,934	-	2,667,969	-	2,667,969
2063	479,067,711	53,447,600	53,447,600	-	2,432,558	-	2,432,558
2064	458,176,988	52,132,291	52,132,291	-	2,213,541	-	2,213,541
2065	437,145,996	50,745,753	50,745,753	-	2,010,139	-	2,010,139
2066	416,038,393	49,292,597	49,292,597	-	1,821,603	-	1,821,603
2067	394,917,645	47,776,541	47,776,541	-	1,647,148	-	1,647,148
2068	373,847,927	46,201,486	46,201,486	-	1,486,002	-	1,486,002

Single Discount Rate Development
Present Values of Projected Benefits
End of Year (Concluded)

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=(c)/(1+sdr)^(a-.5)
2069	$ 352,893,993	$ 44,571,792	$ 44,571,792	$ -	$ 1,337,425	$ -	$ 1,337,425
2070	332,120,734	42,892,509	42,892,509	-	1,200,706	-	1,200,706
2071	311,592,483	41,169,336	41,169,336	-	1,075,164	-	1,075,164
2072	291,372,297	39,408,360	39,408,360	-	960,141	-	960,141
2073	271,521,464	37,615,946	37,615,946	-	854,996	-	854,996
2074	252,099,088	35,798,598	35,798,598	-	759,109	-	759,109
2075	233,161,793	33,962,763	33,962,763	-	671,872	-	671,872
2076	214,763,592	32,114,751	32,114,751	-	592,699	-	592,699
2077	196,955,857	30,260,641	30,260,641	-	521,019	-	521,019
2078	179,787,354	28,406,271	28,406,271	-	456,284	-	456,284
2079	163,304,312	26,557,534	26,557,534	-	397,974	-	397,974
2080	147,550,185	24,720,731	24,720,731	-	345,600	-	345,600
2081	132,565,028	22,902,450	22,902,450	-	298,703	-	298,703
2082	118,384,950	21,109,672	21,109,672	-	256,853	-	256,853
2083	105,041,435	19,349,913	19,349,913	-	219,649	-	219,649
2084	92,560,446	17,631,112	17,631,112	-	186,713	-	186,713
2085	80,961,592	15,961,580	15,961,580	-	157,695	-	157,695
2086	70,257,292	14,349,697	14,349,697	-	132,260	-	132,260
2087	60,452,176	12,803,531	12,803,531	-	110,094	-	110,094
2088	51,542,858	11,330,770	11,330,770	-	90,895	-	90,895
2089	43,517,748	9,938,736	9,938,736	-	74,380	-	74,380
2090	36,356,842	8,634,011	8,634,011	-	60,281	-	60,281
2091	30,031,883	7,422,211	7,422,211	-	48,345	-	48,345
2092	24,506,767	6,307,952	6,307,952	-	38,331	-	38,331
2093	19,738,016	5,294,671	5,294,671	-	30,016	-	30,016
2094	15,675,469	4,384,446	4,384,446	-	23,188	-	23,188
2095	12,263,205	3,577,829	3,577,829	-	17,653	-	17,653
2096	9,440,710	2,873,725	2,873,725	-	13,228	-	13,228
2097	7,144,255	2,269,224	2,269,224	-	9,745	-	9,745
2098	5,308,540	1,759,491	1,759,491	-	7,049	-	7,049
2099	3,868,578	1,337,860	1,337,860	-	5,000	-	5,000
2100	2,761,607	996,223	996,223	-	3,474	-	3,474
2101	1,928,751	725,501	725,501	-	2,360	-	2,360
2102	1,316,299	516,035	516,035	-	1,566	-	1,566
2103	876,676	357,988	357,988	-	1,014	-	1,014
2104	569,075	241,852	241,852	-	639	-	639
2105	359,596	158,880	158,880	-	391	-	391
2106	220,958	101,364	101,364	-	233	-	233
2107	131,900	62,735	62,735	-	135	-	135
2108	76,432	37,624	37,624	-	75	-	75
2109	42,975	21,853	21,853	-	41	-	41
2110	23,440	12,299	12,299	-	21	-	21
2111	12,392	6,710	6,710	-	11	-	11
2112	6,336	3,546	3,546	-	5	-	5
2113	3,121	1,811	1,811	-	3	-	3
2114	1,470	890	890	-	1	-	1
2115	654	420	420	-	1	-	1
2116	266	186	186	-	0	-	0
2117	93	96	96	-	0	-	0
2118	-	-	-	-	-	-	-
				Totals	$ 278,738,209	$ -	$ 278,738,209



Projection of Plan Net Position and Benefit Payments
at End of Year
$ [thousands]
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94
97
100
Year
Projected Plan Net Position
Projected Benefit Payments for Current Members

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

Actuarial Accrued Liability (AAL)	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."
Actuarial Assumptions	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.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	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.
Actuarial Cost Method	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.
Actuarial Gain (Loss)	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.
Actuarial Present Value (APV)	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.
Actuarial Valuation	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.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC)	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

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Amortization Method	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).
Cost-of-Living Adjustments (COLA)	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	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.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
Deferred Retirement Option Program (DROP)	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.
Deferred Inflows and Outflows	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.
Discount Rate	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: 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; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

Entry Age Actuarial Cost Method (EAN)	The EAN is a funding 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.
GASB	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the assets of the trust.
Long-Term Expected Rate of Return	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.
Money-Weighted Rate of Return	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.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	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.
Net Pension Liability (Asset) (NPL(A))	The NPL(A) is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contribution Entities	Non-employer contribution 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 statement plan members are not considered non-employer contribution entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method. Also known as service cost.

Glossary of Terms

Other Postemployment Benefits (OPEB)	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 post-employment benefits do not include termination benefits.
PERSIA	Public Employees Retirement System Investment Act.
POA	The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year. Also known as normal cost.
Single Discount Rate (SDR)	The discount rate used in determining the Total Pension Liability.
Total Pension Expense	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: 1. Service Cost 2. Interest on the Total Pension Liability 3. Current-Period Benefit Changes 4. Employee Contributions (made negative for addition here) 5. Projected Earnings on Plan Investments (made negative for addition here) 6. Pension Plan Administrative Expense 7. Other Changes in Plan Fiduciary Net Position 8. Recognition of Outflow (Inflow) of Resources due to Liabilities 9. Recognition of Outflow (Inflow) of Resources due to Assets
Total Pension Liability (TPL)	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
Unfunded Actuarial Accrued Liability (UAAL)	The UAAL is the difference between actuarial accrued liability and valuation assets.
Valuation Assets	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.
Variable Pension Improvement Factor (VPIF)	An increase on the Component I Retirement Allowance of 1% compound subject to plan restrictions.

GRS Retirement Consulting
800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

October 19, 2018

Mr. David Cetlinski
Executive Director
The Police and Fire Retirement System of the
City of Detroit
One Detroit Center
500 Woodward Avenue, Suite 3000
Detroit, MI 48226-3534

Dear Dave:

Please find enclosed 20 copies of the Component I GASB Statement Nos. 67 and 68 report of the Police and Fire Retirement System of the City of Detroit.

Sincerely,

Kenneth G. Alberts

KGA:ah
Enclosure

cc: Gail Oxedine, City of Detroit Retirement Systems
Kelly Tapper, City of Detroit Retirement Systems
David T. Kausch, GRS
Judith A. Kermans, GRS

CELEBRATING 80 YEARS OF EXCELLENCE 1938–2018