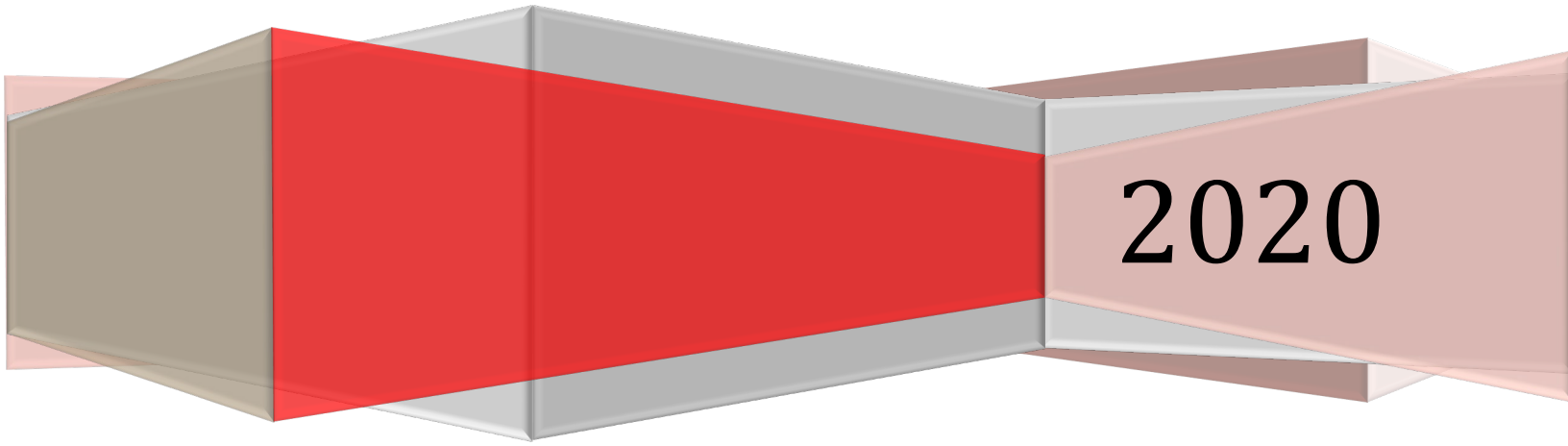
Fiscal Year 2020
Actuarial Valuation Report
for the
New York City
Fire Pension Fund

JUNE 30, 2018 (LAG) ACTUARIAL VALUATION

prepared by the

New York City

Office of the Actuary



OFFICE OF THE ACTUARY

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SHERRY S. CHAN
CHIEF ACTUARY

August 24, 2020

Board of Trustees
New York City Fire Pension Fund and Group Life Insurance Plan
One Battery Park Plaza, 9th Floor
New York, NY 10004

Re: Fiscal Year 2020 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2018 (Lag) actuarial valuation of the benefits under both the New York City Fire Pension Fund (FIRE) and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2018 (Lag) valuation, forms the basis for determining the statutorily-required contribution (Statutory Contribution) of $1,419,269,763 for Fiscal Year 2020 (i.e. for the period beginning July 1, 2019 and ending June 30, 2020). It is not intended, nor necessarily suitable, for other purposes. Calculations made for other purposes may differ significantly from those shown herein.

Results of the June 30, 2017 (Lag) actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2018 (Lag) and June 30, 2017 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by FIRE and the Office of the Comptroller as of June 30, 2018 and June 30, 2017.

Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations presented in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.

A summary of the benefits available under the terms of the Plan is shown in SECTION VIII – SUMMARY OF PLAN PROVISIONS. The benefits under the Plan are unchanged from the prior valuation.

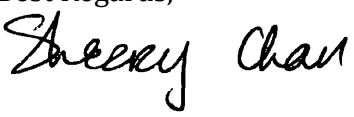
A summary of the actuarial assumptions and methods used in the valuation of the Plan is shown in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS. The assumptions and

methods used for the June 30, 2018 valuation were presented in the report titled "Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Fire Pension Fund" dated January 23, 2019 which was adopted by the Board of Trustees at the February 27, 2019 Board meeting. There have been no changes since the prior year.

This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary will publish Fiscal Year 2020 GASB67 and GASB68 results in a report later this year, which will be available on the website of the Office of the Actuary (www.nyc.gov/actuary).

I, Sherry S. Chan, am the Chief Actuary for, and independent of, the New York City Retirement Systems and Pension Funds. I am a Fellow of the Society of Actuaries, an Enrolled Actuary under the Employee Retirement Income and Security Act of 1974, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of my knowledge, the results contained herein have been prepared in accordance with generally accepted actuarial principles and procedures and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Best Regards,



Sherry S. Chan, FSA, EA, MAAA, FCA
Chief Actuary

SSC/eh

cc: Mr. Craig Chu - New York City Office of the Actuary
Mr. Patrick Dunn - New York City Fire Pension Fund
Mr. Anderson Huynh - New York City Office of the Actuary
Mr. Michael Samet - New York City Office of the Actuary
Keith Snow, Esq. - New York City Office of the Actuary
Ms. Lei Tian - New York City Fire Pension Fund

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SECTION I – EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2018 (Lag) actuarial valuation of the New York City Fire Pension Fund (FIRE) and Group Life Insurance Plan (collectively, the Plan).

The purposes of the valuation are:

- To determine the actuarially-required contribution (Actuarial Contribution) for Fiscal Year 2020 (i.e. July 1, 2019 to June 30, 2020),
- To measure the funding progress of the Plan,
- To disclose the census data and financial information used in the valuation, and
- To disclose the actuarial assumptions and actuarial methods used to determine the Actuarial Contribution.

The statutorily-required contribution (Statutory Contribution) is also shown and compared to the Actuarial Contribution in historical years.

This Report does not provide financial and accounting information required by current GASB standards. That information is provided in a separate report.

All results are based on preliminary SKIM amounts as determined by the Actuary in a letter dated September 7, 2018 to the Comptroller's Office. All results are without regard to the Variable Supplements Funds, unless specifically noted.

Future measurements of this information may differ from current measurements for many reasons including, but not limited to, experience differing from economic or demographic assumptions, changes in actuarial assumptions and methods, and changes in applicable statute and plan provisions. These and additional risks may be present for the Plan. A further discussion is presented in SECTION VII – RISK AND UNCERTAINTY for consideration.

Table I-1
Executive Summary

Presented in **Table I-1** are the principal results of the June 30, 2018 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2017 (Lag) actuarial valuation.

NEW YORK CITY FIRE PENSION FUND

SUMMARY OF VALUATION RESULTS

Valuation Date	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Fiscal Year	**2020**	**2019**
Funded Status		
1. Accrued Liability[1]	$ 21,787,887,650	$ 20,942,655,456
2. Actuarial Value of Assets (AVA)[2]	12,876,671,000	11,814,576,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 8,911,216,650	$ 9,128,079,456
4. Funded Ratio (AVA Basis) (2. / 1.)	59.1%	56.4%
5. Market Value of Assets (MVA)[2]	13,267,043,000	12,089,896,000
6. Unfunded Accrued Liability (MVA Basis) (1. - 5.)	$ 8,520,844,650	$ 8,852,759,456
7. Funded Ratio (MVA Basis) (5. / 1.)	60.9%	57.7%
Contribution[3]		
1. Normal Cost	$ 591,951,663	$ 577,125,956
2. Amortization of Unfunded Accrued Liability	819,977,001	821,439,443
3. Administrative Expenses[4]	7,341,099	NA
4. Actuarial Contribution (1. + 2. + 3.)	$ 1,419,269,763	$ 1,398,565,399
5. Statutory Contribution (4.)	$ 1,419,269,763	$ 1,398,565,399
Participant Data		
1. Active Members		
a. Number	11,237	11,091
b. Annual Salary[5]	$ 1,305,960,137	$ 1,256,001,332
c. Average Salary	$ 116,220	$ 113,245
2. Active Off Payroll Members[6]	35	15
3. Terminated Vested Members	68	58
4. Retirees and Beneficiaries		
a. Number	16,593	16,636
b. Total Annual Benefits	$ 1,240,810,210	$ 1,196,134,725
c. Average Annual Benefit	$ 74,779	$ 71,900

[1] Includes unfunded VSF Accrued Liability.

[2] Actuarial Value of Assets and Market Value of Assets are rounded to the nearest thousand.

[3] Including results for Variable Supplements Funds.

[4] Chapter 298/16 changed FIRE to a corpus funded entity. Beginning in FY18, administrative expenses are paid out of the FIRE Main Fund.

[5] Salaries shown are the base salary plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

[6] Represents members no longer on payroll, but not otherwise classified.

Table I-2
Actuarial Liabilities

NEW YORK CITY FIRE PENSION FUND ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	**June 30, 2018 (Lag)**	**June 30, 2017 (Lag)**
Fiscal Year	**2020**	**2019**
Accrued Liability		
1. Active Members	$ 7,926,734,196	$ 7,575,439,810
2. Active Off Payroll Members[1]	7,362,355	2,674,393
3. Terminated Vested Members	15,345,609	11,765,858
4. Retirees and Beneficiaries	13,822,620,016	13,384,339,259
5. Accrued Liability Pre-Adjustments (1. to 4.)	$ 21,772,062,176	$ 20,974,219,320
6. Actuarial Adjustments[2]	15,825,474	(31,563,864)
7. Total Accrued Liability (5. + 6.)	$ 21,787,887,650	$ 20,942,655,456
Present Value of Benefits		
1. Active Members	$ 13,727,061,882	$ 13,238,039,466
2. Active Off Payroll Members[1]	7,362,355	2,674,393
3. Terminated Vested Members	15,345,609	11,765,858
4. Retirees and Beneficiaries	13,822,620,016	13,384,339,259
5. Present Value of Benefits (1. to 4.)	$ 27,572,389,862	$ 26,636,818,976
6. Actuarial Adjustments[2]	161,270,823	110,106,250
7. Total Present Value of Benefits (5. + 6.)	$ 27,733,660,685	$ 26,746,925,226

[1] Represents members no longer on payroll, but not otherwise classified.

[2] Includes unfunded VSF liability and other actuarial loading adjustments.

Graph I-3
Historical Funded Status

SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS

Information on the Market Value of Assets (MVA) of the Plan is provided by the Office of the Comptroller. An Actuarial Asset Valuation Method (AAVM) is used to determine the Actuarial Value of Assets (AVA) of the Plan.

The Actuary reset the AVA to the market value as of June 30, 2011. Beginning with the June 30, 2012 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of six years. In accordance with this AAVM, the Unexpected Investment Returns (UIR) are phased into the AVA at rates of 15%, 15%, 15%, 15%, 20%, and 20% per year (i.e. UIR is recognized at cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100% over a period of six years).

UIR is defined as the excess of net investment return over the Expected Investment Return (EIR) based on the expected rate of return and the AVA, where EIR equals the sum of beginning-of-fiscal-year AVA plus one-half of net cash flow, multiplied by the expected rate of return.

Beginning with the June 30, 2014 (Lag) actuarial valuation, the AVA is further constrained to be within a corridor of 80% to 120% of the market value.

Table II-1
Statement of Plan Net Assets

($ Thousands)		
	June 30, 2018	**June 30, 2017**
ASSETS		
Cash	$ 2,883	$ 37,035
Receivables		
Investment Securities Sold	$ 143,921	$ 138,400
Member Loans	25,248	26,951
Accrued Interest and Dividends	25,777	23,004
Other Receivables	129	178
Total Receivables	$ 195,075	$ 188,533
INVESTMENTS AT FAIR VALUE		
Short-Term Investments		
Commercial Paper	$ 237,589	$ 136,416
Short-Term Investment Fund	105,484	91,493
U.S. Treasury Bills	0	0
Debt Securities	3,029,091	2,219,638
Equity Securities	3,848,728	1,878,641
Alternative Investments	2,607,718	2,391,376
Collective Trust Funds		
Fixed Income	1,206,636	575,442
Domestic Equity	88,801	2,149,785
International Equity	2,264,395	2,232,054
Mortgage Debt Security	99,102	89,229
Treasury Inflation Protected Securities	0	543,317
Collateral From Securities Lending	1,140,436	1,080,020
Total Investments	$ 14,627,980	$ 13,387,411
OTHER ASSETS	2,899	2,508
TOTAL ASSETS	$ 14,828,837	$ 13,615,487
LIABILITIES		
Accounts Payable	$ 177,540	$ 147,979
Payable for Investment Securities Purchased	203,986	147,296
Accrued Benefits Payable	10,832	15,680
Accrued Transfers to VSFs	29,000	134,616
Security Lending	1,140,436	1,080,020
TOTAL LIABILITIES	$ 1,561,794	$ 1,525,591
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	$ 13,267,043	$ 12,089,896

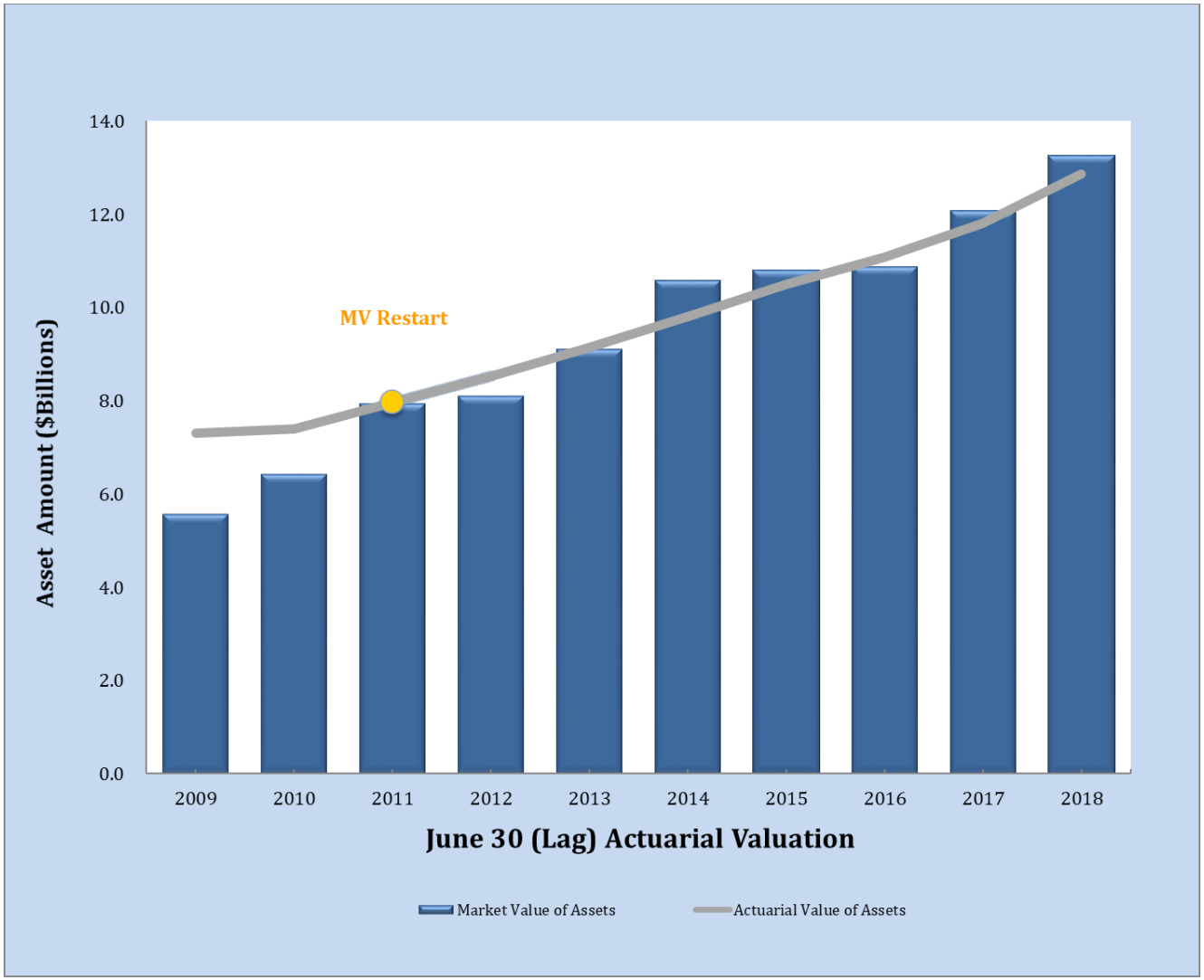
Table II-2
Statement of Changes in Plan Net Assets

($ Thousands)	June 30, 2018	June 30, 2017
ADDITIONS		
Contributions		
Member Contributions	$ 108,338	$ 108,368
Employer Contributions	1,200,417	1,061,170
Total Contributions	$ 1,308,755	$ 1,169,538
Investment Income (Loss)		
Interest Income	$ 168,451	$ 135,642
Dividend Income	159,918	159,972
Net Appreciation (Depreciation) in Fair Value	952,687	1,067,973
Total Investment Income (Loss)	$ 1,281,056	$ 1,363,587
Less Investment Expenses	96,936	84,438
Net Income (Loss)	$ 1,184,120	$ 1,279,149
Securities Lending Transactions		
Securities Lending Income	$ 5,267	$ 6,150
Securities Lending Fees	(527)	(428)
Net Securities Lending Income (Loss)	$ 4,740	$ 5,722
Net Investment Income (Loss)	$ 1,188,860	$ 1,284,871
Other		
Net Receipts from Other Retirement Systems	8,697	44,999
Litigation Income	714	2,285
TOTAL ADDITIONS	$ 2,507,026	$ 2,501,693
DEDUCTIONS		
Benefit Payments and Withdrawals	$ 1,308,467	$ 1,265,817
Accrued Transfers to VSFs	15,000	45,743
Administrative Expenses	6,412	0
TOTAL DEDUCTIONS	$ 1,329,879	$ 1,311,560
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ 1,177,147	$ 1,190,133
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	$ 12,089,896	$ 10,899,763
End of Year	$ 13,267,043	$ 12,089,896

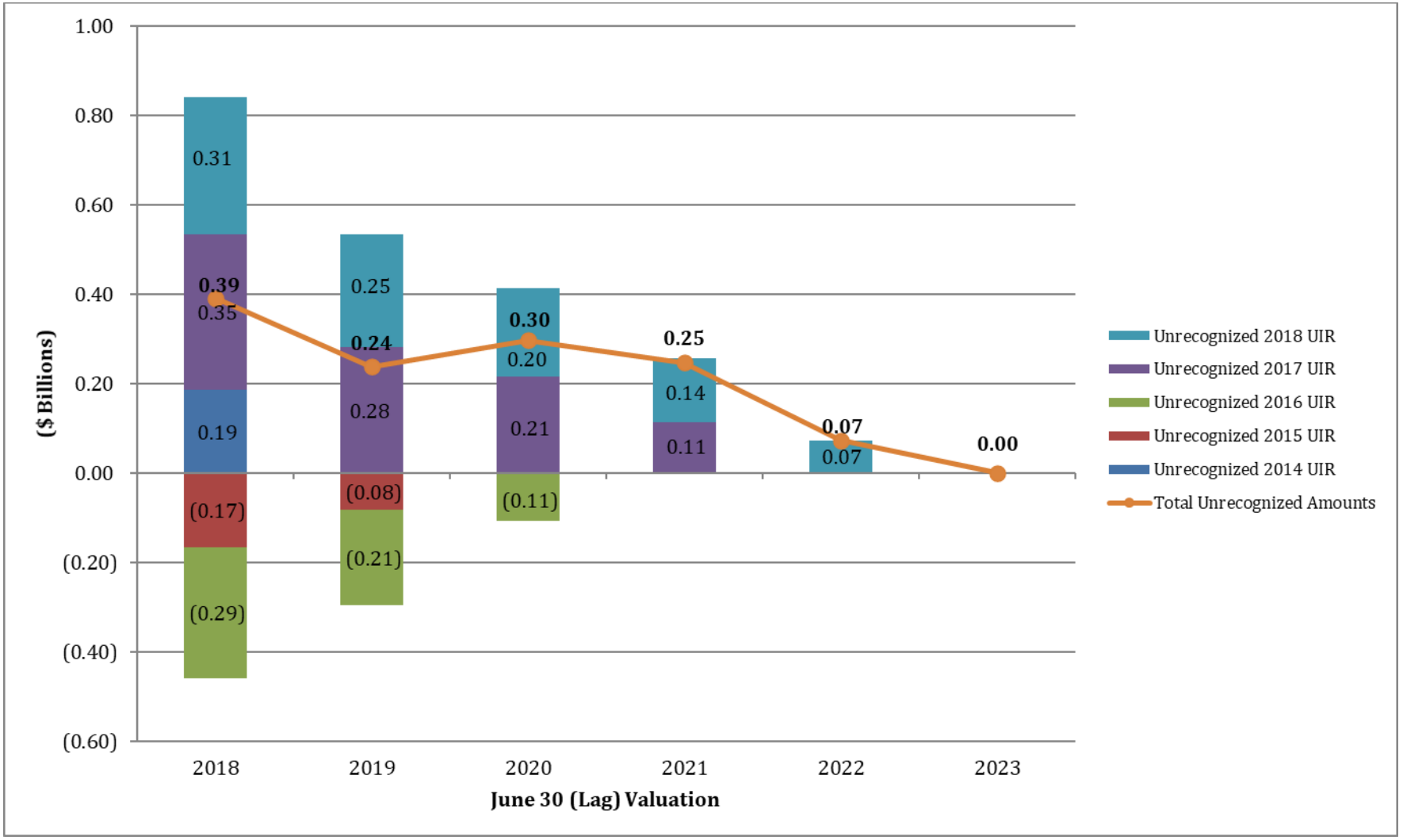
Table II-3
Development of Actuarial Value of Assets

($ Thousands)		
Valuation Date	**June 30, 2018**	**June 30, 2017**
1. Market Value of Assets (MVA)		
Beginning of Year (BOY)	$ 12,089,896	$ 10,899,763
End of Year (EOY)	$ 13,267,043	$ 12,089,896
2. Contributions		
a. Employee	$ 108,338	$ 108,368
b. Employer	1,200,417	1,061,170
c. Total Contributions	$ 1,308,755	$ 1,169,538
3. Net Investment Income		
a. Investment Income	$ 1,285,796	$ 1,369,309
b. Investment Expenses	(96,936)	(84,438)
c. Total Net Investment Income	$ 1,188,860	$ 1,284,871
4. Cash Flow (Other)	$ (1,305,468)	$ (1,218,533)
5. Preliminary SKIM from FIRE to VSFs - EOY	$ (15,000)	$ (45,743)
6. Net Cash Flow (2.c. + 4. + 5.)	$ (11,713)	$ (94,738)
7. Average invested assets		
a. AVA @ BOY	$ 11,814,576	$ 11,082,451
b. 1/2 Net Cash Flow ((2.c. + 4.) / 2)	1,644	(24,498)
c. Total	$ 11,816,220	$ 11,057,953
8. Expected Rate of Return (AIR)	7.00%	7.00%
9. Expected Investment Return (EIR) (7.c. x 8.)	$ 827,135	$ 774,057
10. Unexpected Investment Return (UIR) (3.c. - 9.)	$ 361,725	$ 510,814
11. AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	$ 11,814,576	$ 11,082,451
b. Net Cash Flow (6.)	(11,713)	(94,738)
c. Expected Investment Return (9.)	827,135	774,057
d. Phase in of UIR		
15% * UIR for prior year	54,259	76,622
15% * UIR for second prior year	76,622	(80,291)
15% * UIR for third prior year	(80,291)	(62,216)
15% * UIR for fourth prior year	(62,216)	139,231
20% * UIR for fifth prior year	185,641	72,658
20% * UIR for sixth prior year	72,658	(93,198)
Total	$ 246,673	$ 52,806
e. Preliminary AVA (11.a. + 11.b. + 11.c. + 11.d.)	$ 12,876,671	$ 11,814,576
12. Corridor		
a. 80% of MVA	$ 10,613,634	$ 9,671,917
b. 120% of MVA	$ 15,920,452	$ 14,507,875
13. Total AVA of EOY (11e. bounded by 12)	**$ 12,876,671**	**$ 11,814,576**

Graph II-4
Historical Market and Actuarial Value of Assets



Graph II-5
Future Recognition of UIR as of June 30, 2018



SECTION III – CONTRIBUTION DEVELOPMENT AND HISTORY

Table III-1
Statutory Contributions

Table III-1 shows the components of the Fiscal Year 2020 and the Fiscal Year 2019 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	**June 30, 2018 (Lag)**	**June 30, 2017 (Lag)**
Fiscal Year	**2020**	**2019**
Normal Cost[1]	$ 591,951,663	$ 577,125,956
Amortization of Unfunded Accrued Liability		
- Initial UAL	675,349,289	655,678,921
- 2011 (Gain)/Loss	(19,908,798)	(19,908,798)
- 2012 (Gain)/Loss	3,110,478	3,110,478
- 2013 (Gain)/Loss	7,251,935	7,251,935
- 2014 (Gain)/Loss	9,980,736	9,980,736
- 2014 Assumption Change[2]	32,784,417	32,784,417
- 2015 (Gain)/Loss	506,537	506,537
- 2016 (Gain)/Loss	18,745,299	18,745,299
- 2016 SADB	96,997,069	96,997,069
- 2016 Enhanced ADR	249,358	249,358
- 2017 (Gain)/Loss	7,078,925	7,078,925
- 2017 No VSF Escalation Offset	45,144	45,144
- 2017 Non-uniformed Service	264,728	264,728
- 2017 Assumption Changes[3]	40,764,306	40,764,307
- 2017 Method Changes[3]	(32,109,613)	(32,109,613)
- 2018 (Gain)/Loss	(21,132,809)	NA
Total	819,977,001	821,439,443
Administrative Expenses	7,341,099	N/A
Interest on Late Employer Contributions	N/A	N/A
Total Contribution to the New York City Fire Pension Fund	**$ 1,419,269,763**	**$ 1,398,565,399**

[1] Includes amounts necessary, if any, to provide for financing of the Excess Benefit Plan established by Chapter 623/04.

[2] Change in post retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

[3] 2019 A&M.

Table III-2
Schedule of Unfunded Accrued Liability Bases

The Initial Unfunded Accrued Liability (UAL) is being amortized over a closed 22-year period using Increasing Dollar Payments (IDP). Under IDP, amortization payments increase by 3.0% per year, consistent with the assumed rate of General Wage Increases. Increments to the UAL established after June 30, 2010 are generally amortized using Level Dollar Payments (LDP) as follows:

- Benefit Changes – Over the remaining working lifetimes of those impacted, unless the amortization period is determined by statute.
- Assumption and Method Changes – Over a closed 20-year period.
- Actuarial Gains and Losses – Over a closed 15-year period.

Under the One-Year Lag methodology (OYLM), the number of payments is one fewer than the number of years in the amortization period (e.g. 14 payments over a closed 15-year amortization period).

Table III-2
Schedule of Unfunded Accrued Liability Bases (cont'd)

Table III-2 shows the Schedule of UAL Bases as of June 30, 2018.

NEW YORK CITY FIRE PENSION FUND SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES						
Amortization Base	**Date Established**	**Original Amount**	**Amortization Years**	**Amortization Payment**	**Payments Remaining**	**OYLM UAL June 30, 2018**
Initial UAL	6/30/10	$ 7,095,864,159	22	$ 675,349,289	13	$ 6,375,595,024
(Gain)/Loss	6/30/11	$ (168,320,189)	15	$ (19,908,798)	7	$ (103,725,291)
(Gain)/Loss	6/30/12	$ 26,297,732	15	$ 3,110,478	8	$ 17,955,770
(Gain)/Loss	6/30/13	$ 61,311,940	15	$ 7,251,935	9	$ 45,676,404
(Gain)/Loss	6/30/14	$ 84,382,762	15	$ 9,980,736	10	$ 67,768,724
Assumption Change[1]	6/30/14	$ 327,575,238	20	$ 32,784,417	15	$ 288,665,242
(Gain)/Loss	6/30/15	$ 4,282,552	15	$ 506,537	11	$ 3,672,012
(Gain)/Loss	6/30/16	$ 158,483,315	15	$ 18,745,299	12	$ 143,935,494
SADB	6/30/16	$ 820,067,832	15	$ 96,997,069	12	$ 744,790,507
Enhanced ADR	6/30/16	$ 2,612,048	22	$ 249,358	19	$ 2,491,533
(Gain)/Loss	6/30/17	$ 59,849,221	15	$ 7,078,925	13	$ 57,195,211
No VSF Escalation Offset	6/30/17	$ 462,349	21	$ 45,144	19	$ 451,071
Non-Uniformed Service	6/30/17	$ 2,645,107	20	$ 264,728	18	$ 2,574,342
Assumption Changes[2]	6/30/17	$ 407,308,674	20	$ 40,764,306	18	$ 396,411,940
Method Changes[2]	6/30/17	$ (320,832,740)	20	$ (32,109,613)	18	$ (312,249,497)
(Gain)/Loss	6/30/18	$ (178,668,664)	15	$ (21,132,809)	14	$ (178,668,664)

[1] Change in post retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

[2] 2019 A&M.

Graph III-3
Remaining UAL Amortizations as of June 30, 2018

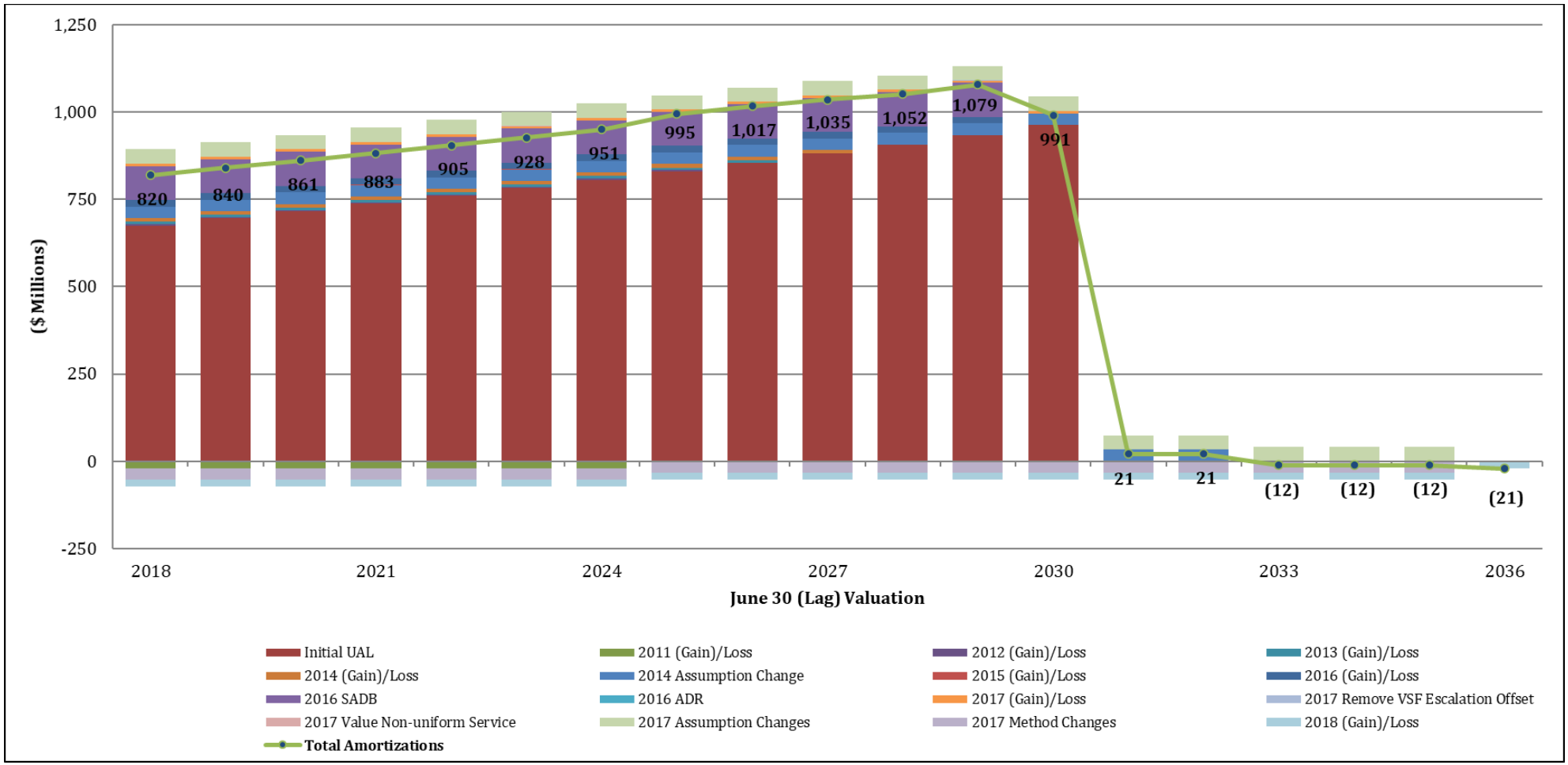


Table III-4
Reconciliation of Outstanding UAL Bases

	Amounts (in $ Thousands) Remaining to be Amortized, as of								
June 30 (Lag) Valuation Date	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017 [1]**	**2018**
Unfunded Accrued Liability, June 30, 2010	$ 7,095,864	$ 7,592,575	$ 7,572,584	$ 7,534,650	$ 7,477,020	$ 7,397,804	$ 7,294,965	$ 6,550,901	$ 6,375,595
2011 (Gain)/Loss		(168,320)	(180,103)	(172,116)	(163,570)	(154,426)	(144,642)	(114,927)	(103,725)
2012 (Gain)/Loss			26,298	28,139	26,891	25,556	24,127	19,591	17,956
2013 (Gain)/Loss				61,312	65,604	62,695	59,582	49,240	45,676
2014 (Gain)/Loss					84,383	90,290	86,286	72,353	67,769
2014 Assumption Change					327,575	350,506	341,128	299,401	288,665
2015 (Gain)/Loss						4,283	4,582	3,889	3,672
2016 (Gain)/Loss							158,483	151,455	143,935
2016 SADB							820,068	783,702	744,791
2016 Enhanced ADR							2,612	2,554	2,492
2017 (Gain)/Loss								59,849	57,195
2017 Removal of VSF Escalation Offset								462	451
2017 Non-uniformed Service								2,645	2,574
2017 Assumption Changes								407,309	396,412
2017 Method Changes								(320,833)	(312,249)
2018 (Gain)/Loss									(178,669)
Sum of Outstanding Amortization Amounts	**$ 7,095,864**	**$ 7,424,255**	**$ 7,418,779**	**$ 7,451,985**	**$ 7,817,903**	**$ 7,776,708**	**$ 8,647,191**	**$ 7,967,591**	**$ 7,552,540**

June 30 (Lag) Valuation Date	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
1. Accrued Liability (AL)	$ 15,349,598	$ 15,808,930	$ 16,358,108	$ 17,003,722	$ 18,028,696	$ 18,688,642	$ 20,125,429	$ 20,942,655	$ 21,787,888
2. Actuarial Value of Assets (AVA)	7,392,656	7,955,668	8,520,769	9,144,587	9,808,854	10,504,728	11,082,451	11,814,576	12,876,671
3. Unfunded Accrued Liability (UAL) (1. - 2.)	7,956,942	7,853,262	7,837,339	7,859,135	8,219,842	8,183,914	9,042,978	9,128,079	8,911,217
4. PV 1-year Adjusted Employer Contribution[2]	861,078	429,007	418,560	407,150	401,939	407,206	395,787	1,160,488	1,352,044
5. PV Future Administrative Expense Reimbursement	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6,633
6. Adjusted UAL (3. - 4. - 5.)	**$ 7,095,864**	**$ 7,424,255**	**$ 7,418,779**	**$ 7,451,985**	**$ 7,817,903**	**$ 7,776,708**	**$ 8,647,191**	**$ 7,967,591**	**$ 7,552,540**

[1] Beginning at June 30, 2017, amounts remaining to be amortized have been reduced by the prior valuation year's amortization payments. When considered with (2) below, this change has no effect.

[2] Beginning at June 30, 2017, the PV 1-year Adjusted Employer Contribution includes amounts used to pay UAL bases and one year of administrative expenses. When considered with (1) above, this change has no effect.

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2011 through 2020.

($ Thousands)			
Fiscal Year Ended June 30	**Actuarial Contribution Certified**	**Statutory Contribution Contributed**	**Percentage of Actuarial Contribution Contributed**
2011	$ 890,706	$ 890,706	100.0%
2012	976,895	976,895	100.0%
2013	962,173	962,173	100.0%
2014	969,956	969,956	100.0%
2015	988,784	988,784	100.0%
2016	1,054,478	1,054,478	100.0%
2017	1,061,170	1,061,170	100.0%
2018	1,200,417	1,200,417	100.0%
2019	1,398,565	1,398,565	100.0%
2020	1,419,270	1,419,270	100.0%

Table III-6
City Rates: Contributions as a Percentage of Salary

Table III-6 shows the City Rates defined to be the contributions as a percentage of salary for the Fiscal Years 2011 through 2020.

CITY RATES ($ Thousands)			
Fiscal Year Ended June 30	**Actuarial Contribution**	**Salary[1] at Beginning of Fiscal Year**	**City Rate**
2011	$ 890,706	$ 1,082,953	82.2%
2012	976,895	1,149,426	85.0%
2013	962,173	1,129,926	85.2%
2014	969,956	1,102,396	88.0%
2015	988,784	1,111,744	88.9%
2016	1,054,478	1,129,470	93.4%
2017	1,061,170	1,145,919	92.6%
2018	1,200,417	1,164,528	103.1%
2019	1,398,565	1,272,490	109.9%
2020	1,419,270	1,326,177	107.0%

[1]Includes assumed overtime paid, the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

SECTION IV – (GAIN)/LOSS ANALYSIS

Table IV-1
Development of Experience (Gain)/Loss

Table IV-1 develops the asset and liability (Gain)/Loss between the June 30, 2017 (Lag) actuarial valuation and the June 30, 2018 (Lag) actuarial valuation[1].

DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS June 30, 2018 ($ Thousands)	
1. Expected Accrued Liability (AL)	
a. AL at June 30, 2017	$ 21,829,248
b. Total Normal Cost and Administrative Expenses at June 30, 2017	632,362
c. Interest on 1.a. and 1.b. to June 30, 2018	1,572,313
d. Fiscal Year 2018 Benefit Payments	(1,379,087)
e. Interest on 1.d. to June 30, 2018	(47,452)
f. Expected AL at June 30, 2018	$ 22,607,384
2. Actual AL at June 30, 2018	$ 22,693,479
3. Expected Total Actuarial Value of Assets (AVA)	
a. Total AVA at June 30, 2017	$ 12,701,169
b. Interest on 3.a. to June 30, 2018	889,082
c. Total Contributions Paid in Fiscal Year 2018	1,308,755
d. Interest on 3.c. to June 30, 2018	45,032
e. Fiscal Year 2018 Benefit Payments	(1,379,087)
f. Interest on 3.e. to June 30, 2018	(47,452)
g. Expected Total AVA at June 30, 2018	$ 13,517,499
4. Actual Total AVA at June 30, 2018	$ 13,782,262
5. Liability (Gain) / Loss (2. - 1.f.)	$ 86,095
6. Actuarial Asset (Gain) / Loss (3.g. - 4.)	$ (264,763)
7. Total Actuarial (Gain) / Loss (5. + 6.)	$ (178,668)

[1]Includes results for the Variable Supplements Funds.

SECTION V – SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB25, which has been superseded by GASB67, and is provided for historical context. These liability and asset measures are used to develop the Actuarial Contribution and are not suitable for other purposes including, but not limited to, settlement of plan obligations. For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

Table V-1
Schedule of Funding Progress

NEW YORK CITY FIRE PENSION FUND ($ Thousands)						
June 30 (Lag) Valuation Date	**(1) Actuarial Value of Assets (AVA)**	**(2) Accrued Liability (AL)**	**(3) Unfunded AL (UAL) (2) - (1)**	**(4) Funded Ratio (1) / (2)**	**(5) Covered Payroll**	**(6) UAL as a % of Covered Payroll (3) / (5)**
2009	$7,304,758	$7,327,560	$22,802	99.7%	$1,079,682	2.1%
2010	7,392,656	15,349,598	7,956,942	48.2%	1,138,188	699.1%
2011	7,955,668	15,808,930	7,853,262	50.3%	1,125,460	697.8%
2012	8,520,769	16,358,108	7,837,339	52.1%	1,106,113	708.5%
2013	9,144,587	17,003,722	7,859,135	53.8%	1,129,706	695.7%
2014	9,808,854	18,028,695	8,219,841	54.4%	1,150,390	714.5%
2015	10,504,728	18,688,642	8,183,914	56.2%	1,164,994	702.5%
2016	11,082,451	20,125,429	9,042,978	55.1%	1,180,226	766.2%
2017	11,814,576	20,942,655	9,128,079	56.4%	1,256,001	726.8%
2018	12,876,671	21,787,888	8,911,217	59.1%	1,305,960	682.3%

Effective June 30, 2010, AL is based on the Entry Age Normal cost method. Previously, the Frozen Initial Liability cost method was used.
Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

SECTION VI – VARIABLE SUPPLEMENTS FUNDS (VSF)

The New York City Fire Pension Fund administers both the Firefighters' Variable Supplements Fund (FFVSF) and the Fire Officers' Variable Supplements Fund (FOVSF). The FFVSF and FOVSF (the Funds) operate pursuant to the provisions of Title 13, Chapter 3 of the Administrative Code of the City of New York (ACCNY) and provide supplemental benefits to retirees who were Firefighters and Fire Officers, respectively, of the New York City Fire Department, Subchapter One Pension Fund or New York City Fire Department, Subchapter Two Pension Fund and who retired for service with 20 or more years of service on or after October 1, 1968.

Table VI-1
VSF Accrued Liability

($ Thousands)		
Valuation Date	**June 30, 2018**	**June 30, 2017**
FFVSF		
Active	$ 142,048	$ 133,811
Retiree	354,715	366,673
Total	$ 496,763	$ 500,484
FOVSF		
Active	$ 138,081	$ 138,444
Retiree	157,411	158,302
Total	$ 295,492	$ 296,746
Total VSF AL	$ 792,255	$ 797,230

Table VI-2
VSF Member Data

VARIABLE SUPPLEMENTS FUNDS MEMBERS INCLUDED IN THE JUNE 30, 2018 (LAG) AND JUNE 30, 2017 (LAG) ACTUARIAL VALUATIONS				
	June 30, 2018		**June 30, 2017**	
	FFVSF	**FOVSF**	**FFVSF**	**FOVSF**
Actives				
Number	8,627	2,610	8,431	2,660
Average Age	38.4	47.9	38.5	47.6
Retirees				
Number	3,386	1,532	3,474	1,536
Average Age	72.6	73.4	72.2	73.2

Table VI-3
VSF Statement of Assets

($ Thousands)				
Valuation Date	**June 30, 2018[1]**		**June 30, 2017[2]**	
	MVA[3]	**AVA**	**MVA[4]**	**AVA**
FFVSF	$ 550,507	$ 558,731	$ 547,077	$ 547,690
FOVSF	355,712	346,860	354,337	338,903
Total	$ 906,219	$ 905,591	$ 901,414	$ 886,593

[1] Includes preliminary SKIM amounts as determined by the Actuary in a letter dated September 7, 2018 to the Comptroller's Office.

[2] Includes preliminary SKIM amounts as determined by the Actuary in a letter dated September 15, 2017 to the Comptroller's Office.

[3] Includes Accrued Benefits Payable of $20,427,000 for FFVSF and $9,079,000 for FOVSF.

[4] Includes Accrued Benefits Payable of $20,831,000 for FFVSF and $9,121,000 for FOVSF.

Table VI-4
Development of VSF Actuarial Value of Assets

($ Thousands)	June 30, 2018		June 30, 2017	
	FFVSF	FOVSF	FFVSF	FOVSF
1. Market Value of Assets (MVA)				
a. Beginning of Year (BOY)[1]	$ 547,077	$ 354,337	$ 524,075	$ 314,272
b. End of Year (EOY)[2]	$ 550,507	$ 355,712	$ 547,077	$ 354,337
2. Contributions				
a. Employee	$ 0	$ 0	$ 0	$ 0
b. Employer	0	0	0	0
c. Total Contributions	$ 0	$ 0	$ 0	$ 0
3. Benefit Payments and Other Cash Flow	$ (46,976)	$ (24,090)	$ (47,667)	$ (21,859)
4. Preliminary SKIM from FIRE to VSFs - EOY[3]	$ 15,000	$ 0	$ 23,914	$ 21,829
5. Net Cash Flow (2.c. + 3. + 4.)	$ (31,976)	$ (24,090)	$ (23,753)	$ (30)
6. Net Investment Income				
a. Investment Income	$ 35,810	$ 25,713	$ 47,194	$ 40,342
b. Investment Expenses	(404)	(248)	(439)	(247)
c. Total Net Investment Income	$ 35,406	$ 25,465	$ 46,755	$ 40,095
7. Average invested assets				
a. AVA @ BOY	$ 547,690	$ 338,903	$ 535,824	$ 313,451
b. 1/2 Net Cash Flow before SKIM ((2.c. + 3.) / 2)	(23,488)	(12,045)	(23,834)	(10,930)
c. Total	$ 524,202	$ 326,858	$ 511,990	$ 302,521
8. Expected Rate of Return (AIR)	7.00%	7.00%	7.00%	7.00%
9. Expected Investment Return (EIR) (7.c. x 8.)	$ 36,694	$ 22,880	$ 35,839	$ 21,176
10. Unexpected Investment Return (UIR) (6.c. - 9.)	$ (1,288)	$ 2,585	$ 10,916	$ 18,919
11. AVA @ EOY				
a. AVA @ BOY	$ 547,690	$ 338,903	$ 535,824	$ 313,451
b. Net Cash Flow (5.)	(31,976)	(24,090)	(23,753)	(30)
c. Expected Investment Return (9.)	36,694	22,880	35,839	21,176
d. Phase in of UIR				
15% * UIR for prior year	(193)	388	1,637	2,838
15% * UIR for second prior year	1,637	2,838	(4,628)	(2,843)
15% * UIR for third prior year	(4,628)	(2,843)	(2,285)	(1,041)
15% * UIR for fourth prior year	(2,285)	(1,041)	6,219	4,960
20% * UIR for fifth prior year	8,292	6,613	3,500	3,212
20% * UIR for sixth prior year	3,500	3,212	(4,663)	(2,820)
Total	$ 6,323	$ 9,167	$ (220)	$ 4,306
e. AVA (11.a. + 11.b. + 11.c. + 11.d.)	$ 558,731	$ 346,860	$ 547,690	$ 338,903
12. Final AVA at EOY (11.e)	**$ 558,731**	**$ 346,860**	**$ 547,690**	**$ 338,903**

[1] Includes Accrued Benefits Payable for 6/30/2017 of $20,831,000 for FFVSF and $9,121,000 for FOVSF and Accrued Benefits Payable for 6/30/2016 of $21,225,000 for FFVSF and $9,263,000 for FOVSF

[2] Includes Accrued Benefits Payable for 6/30/2018 of $20,427,000 for FFVSF and $9,079,000 for FOVSF and Accrued Benefits Payable for 6/30/2017 of $20,831,000 for FFVSF and $9,121,000 for FOVSF

[3] Reflects preliminary SKIM amounts as determined by the Actuary in a letter dated September 7, 2018 for 6/30/2018 and a letter dated September 15, 2017 for 6/30/2017 to the Comptroller's Office

Table VI-5
Preliminary SKIM Calculation as of June 30, 2018

For details, see Summary of VSF Actuarial Assumptions and Methods.

($ Thousands)	Preliminary	
Total FIRE Pension Fund		
1. FY2018 Equity Earnings	$	1,044,087
2. FY2018 Hypothetical Earnings		255,605
3. FY2018 Excess Earnings (1. - 2.)		788,482
4. Deficit at June 30, 2017		0
5. Hypothetical Interest Rate (HIR)		2.959%
6. Deficit with interest (4. x (1+HIR))		0
7. Potential SKIM (3. - 6.), not less than zero	$	788,482

	FFVSF	FOVSF
Allocations to VSF		
8. Allocation Percentage	67.447%	32.553%
9. Potential SKIM (7. x 8.)	$ 531,808	$ 256,675
10. APV of Accumulated Plan Benefits	551,440	332,765
11. MVA Prior to SKIM	535,507	355,712
12. Unfunded APV of Accumulated Plan Benefits (10. - 11.), not less than zero	15,933	0
13. SKIM Payable (Lesser of 9. and 12., not less than zero)	15,933	0
14. Rounded Estimate, for FY18 Financial Statements[1]	$ 15,000	$ 0

[1] Included in MVA at June 30, 2018.

Summary of VSF Plan Provisions

A. Eligibility

Service Retirement with at least 20 years of allowable service on or after October 1, 1968. This benefit is not payable to disability retirees, vested retirees, or beneficiaries of members who die while eligible for service retirement.

B. Benefits

The benefit is currently $12,000 per year, prorated in the first year and in the year of death based on the number of full months of retirement. The month of retirement and the month of death are not included in these two prorations.

C. Cost-of-Living Benefits

Any Auto COLA payable to a retiree reduces VSF benefits by an amount equal to such Auto COLA until the attainment of age 62.

D. Form of Payment

Firefighters: Life annuity payable annually on or about December 15 for the current calendar year.

Fire Officers: Life annuity payable annually on or about January 31 for the prior calendar year.

E. VSF DROP

Firefighters who retire on and after January 1, 2002 with 20 or more years of service are entitled to an additional one-time special lump sum payment (VSF DROP) payable on or about December 15 succeeding the date of retirement equal to the cumulative Fund benefits that would have been paid after January 1, 2002 had the member retired at the completion of the 20th year of service.

Fire officers who retire on and after January 1, 2002 with 20 or more years of service are entitled to an additional one-time special lump sum payment (VSF DROP) payable on or about January 31 of the calendar year succeeding the date of retirement equal to the cumulative Fund benefits that would have been paid after January 1, 2002 had the member retired at the completion of the 20th year of service.

Summary of VSF Actuarial Assumptions and Methods

Assumptions not detailed below are as described in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS.

1. **FFVSF vs. FOVSF Membership**: Amongst current active members, 70% of members who become eligible for VSF benefits are assumed to retire as Firefighters, while the remaining 30% are assumed to retire as Fire Officers.

2. **COLA**: 1.5% per year for Auto COLA, used to estimate future COLA on the first $18,000 of FIRE benefits which, in general, reduces benefits payable by the Fund until age 62.

3. **Actuarial Asset Valuation Method**: Information on the Market Value of Assets (MVA) of the Variable Supplements Funds (VSF) is provided by the Office of the Comptroller. The same Actuarial Asset Valuation Method (AAVM) is used to determine the Actuarial Value of Assets (AVA) of the FFVSF and the FOVSF as is used to determine the AVA of the Plan, except there is no corridor of 80% to 120% of the MVA for the VSFs. For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

4. **Liability Method**: The obligations of FIRE to the FFVSF and the FOVSF are recognized through a methodology where the PV of future VSF transfers from FIRE to the FFVSF and FOVSF is included directly as an actuarial liability of FIRE. This amount is computed as the excess, if any, of the PV of benefits of the FFVSF and FOVSF over the AVA of the FFVSF and FOVSF, respectively. Under EAN, a portion of the PV of future VSF transfers is reflected in the PV of future normal costs and a portion is reflected in the UAL.

5. **SKIM Calculation**: The ACCNY provides that FIRE transfer to the Funds a portion of the amount by which earnings on equity investments of FIRE exceed what the earnings would have been had such funds been invested at the Hypothetical Interest Rate, less any negative Cumulative Earnings Differentials and other limitations, determined as follows:

    a. *Hypothetical Interest Rate*: 115% of the 12-month average of monthly 10-year U.S. Treasury Note yields

    b. *Hypothetical Fixed Income Securities Earnings*: Investment earnings had equities been invested in fixed income securities earning the Hypothetical Interest Rate

    c. *Earnings Differential*: Difference between actual equity investment earnings and Hypothetical Fixed Income Securities Earnings

d. *Cumulative Earnings Differential*: The current year's Earnings Differential, offset by any negative Earnings Differentials from prior years, accumulated with interest at the corresponding year's Hypothetical Interest Rate

e. *Proportionate Transferable Earnings*: The portion of the Cumulative Earnings Differential allocable to the VSFs based on the ratio of total contributions between Firefighters and Fire Officers, limited to not allow assets to exceed the actuarial present value of accumulated plan benefits of the VSFs

SECTION VII – RISK AND UNCERTAINTY

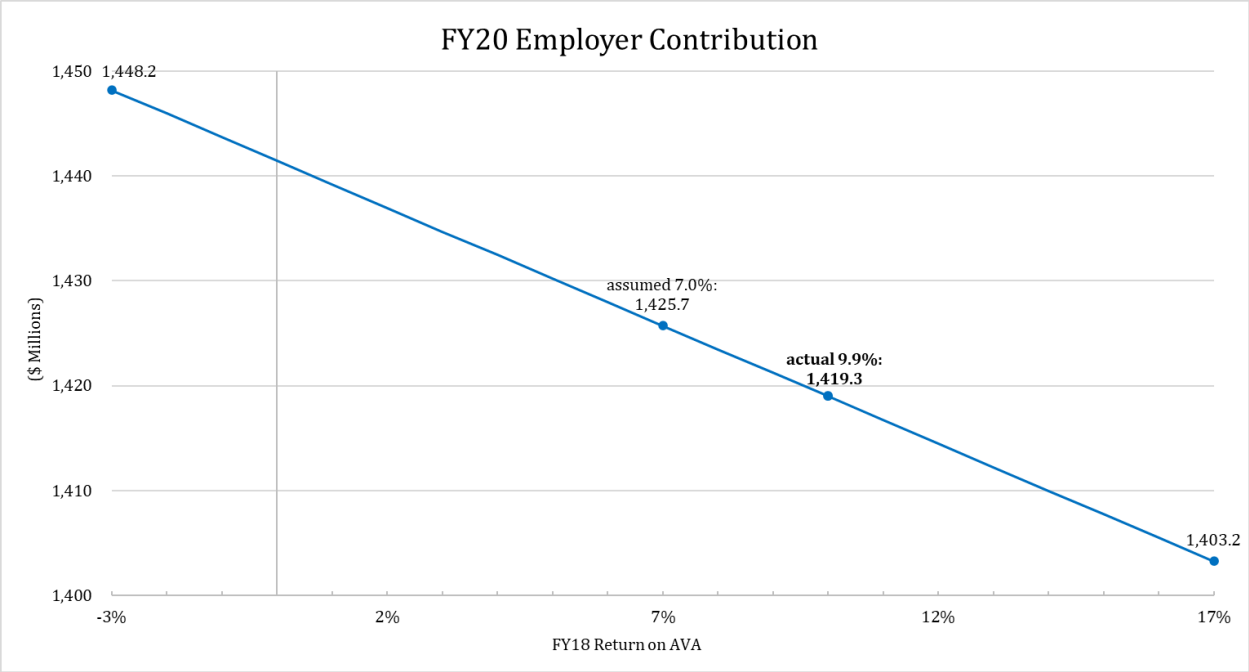
The funded status of FIRE depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Risks faced by the Plan are described in this Section. These risks have been separated, based on the Actuary's professional judgement, into high, medium, and other risks.

High Risk Types

Investment Risk: The Risk of Not Realizing Expected Returns

The most substantial risk for most pension systems, FIRE included, is the risk of investment returns being less than assumed. Generally speaking, as risk-free investment return rates have fallen in recent decades, more aggressive asset allocations have been taken to achieve long-term rates of return commensurate with the actuarial assumption of 7.0%.

The graph below illustrates the potential FY20 employer contributions if the FY18 investment return had differed from the actual rate, by up to 10%.[1]

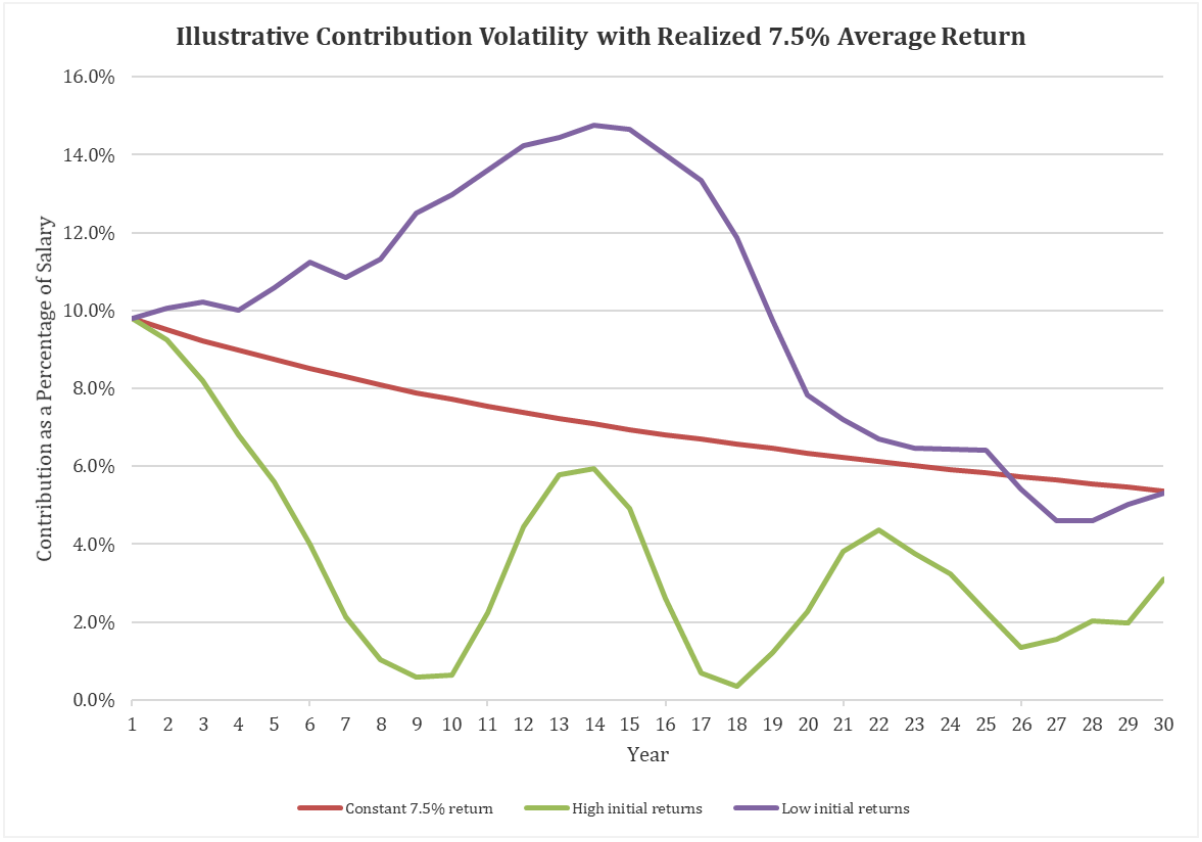


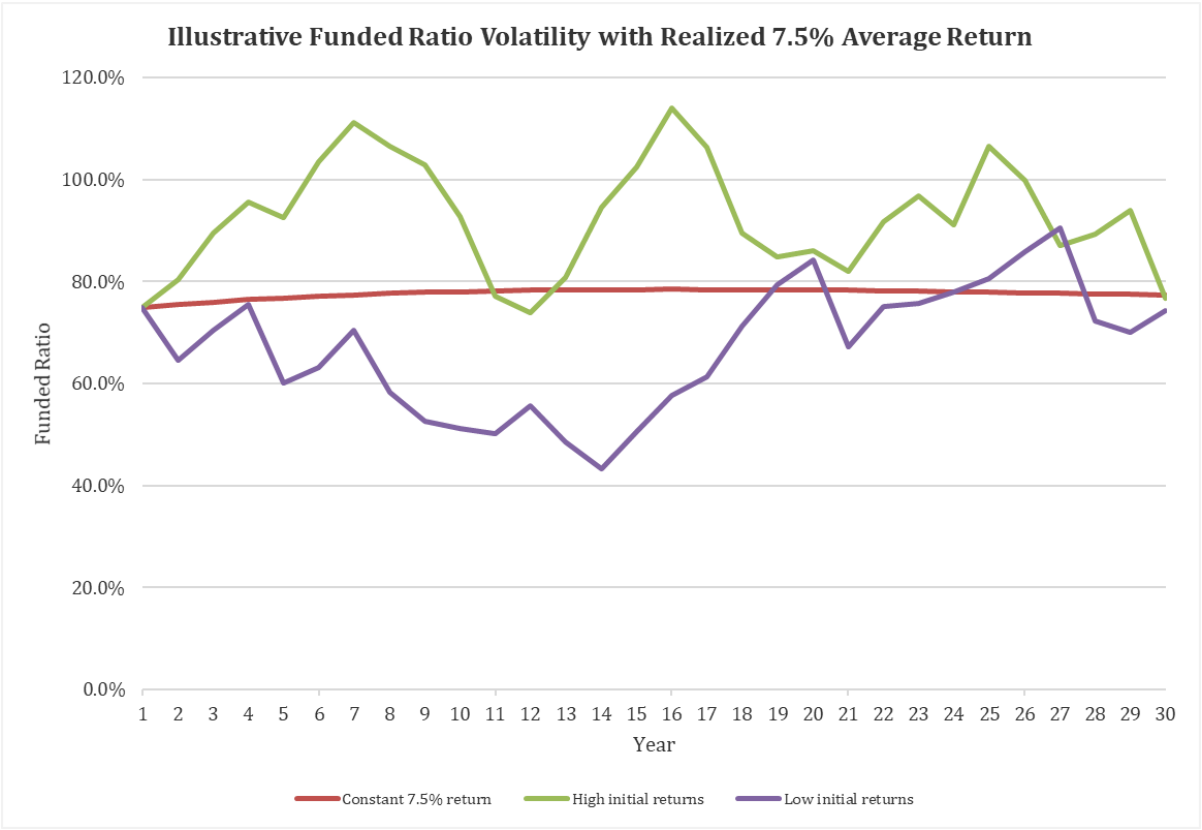
Investment Risk: The Risk of Volatile Realized Returns

Even when long-term investment returns meet actuarial assumptions, investment return volatility can contribute substantially to contribution and funded status volatility. While not yet available specifically for the Plan at this time, recent research demonstrates this volatility based on a sample public plan with typical characteristics, a typical contribution policy, and a long-term return assumption of 7.5%, which can be realized in different patterns.[2]

[1] The actual rate of return displayed in this graph is calculated as the overall rate of return for FIRE when combining the Plan and the VSFs together.

[2] Yin, Yimeng; Boyd, Don. Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government*.


Illustrative Contribution Volatility with Realized 7.5% Average Return
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Contribution as a Percentage of Salary
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Year
Constant 7.5% return
High initial returns
Low initial returns

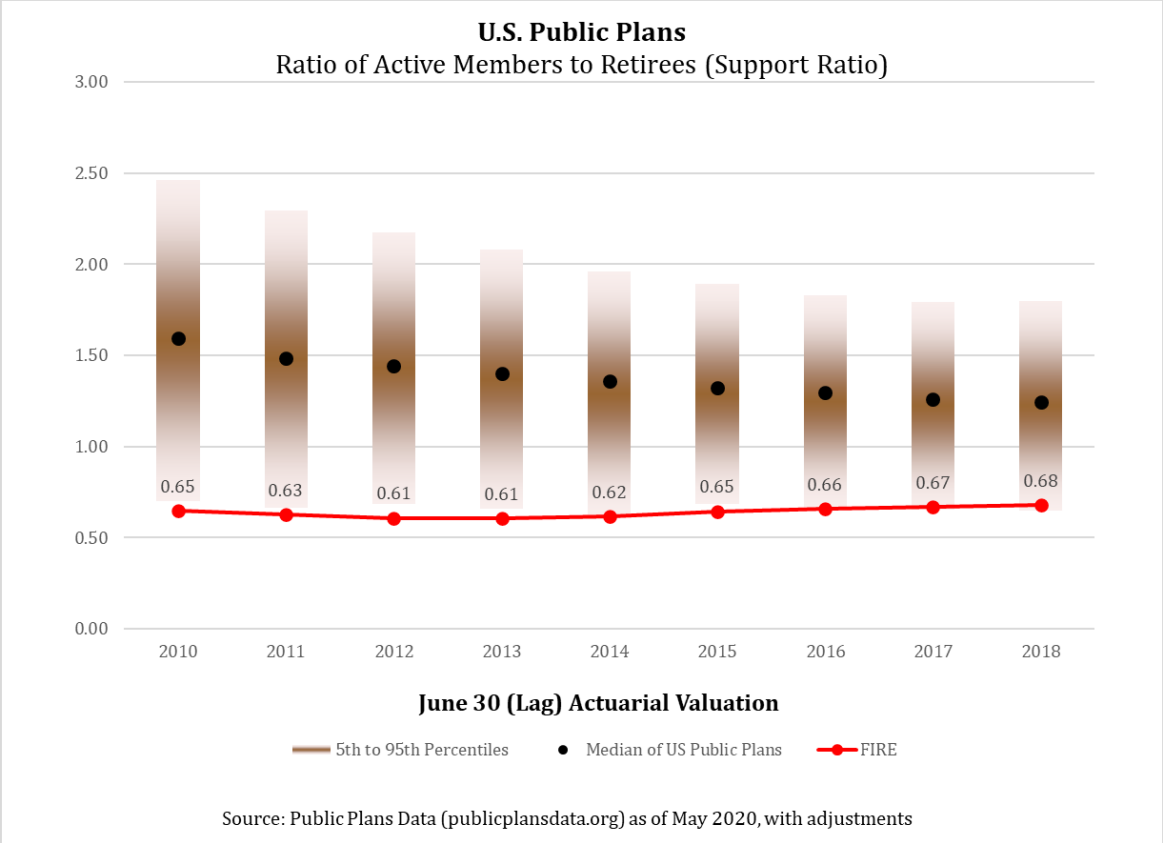

Illustrative Funded Ratio Volatility with Realized 7.5% Average Return
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Funded Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Year
Constant 7.5% return
High initial returns
Low initial returns

Maturity Risk: The Risk of Demographic Imbalance

In this subsection, the maturity of the Plan is examined with several metrics.

Ratio of Active Members to Retirees (Support Ratio)

A plan's Support Ratio (i.e. the ratio of active members to retirees) is an indicator of the Plan's maturity level. In a plan's early years, the ratio is very high as the plan contains mostly active members. As it matures, more active members transition to retirement, leading to a decrease in the Support Ratio over time that can result in a ratio near or below one. For FIRE, this ratio has been below one, meaning fewer active workers exist to support pensioner payments.

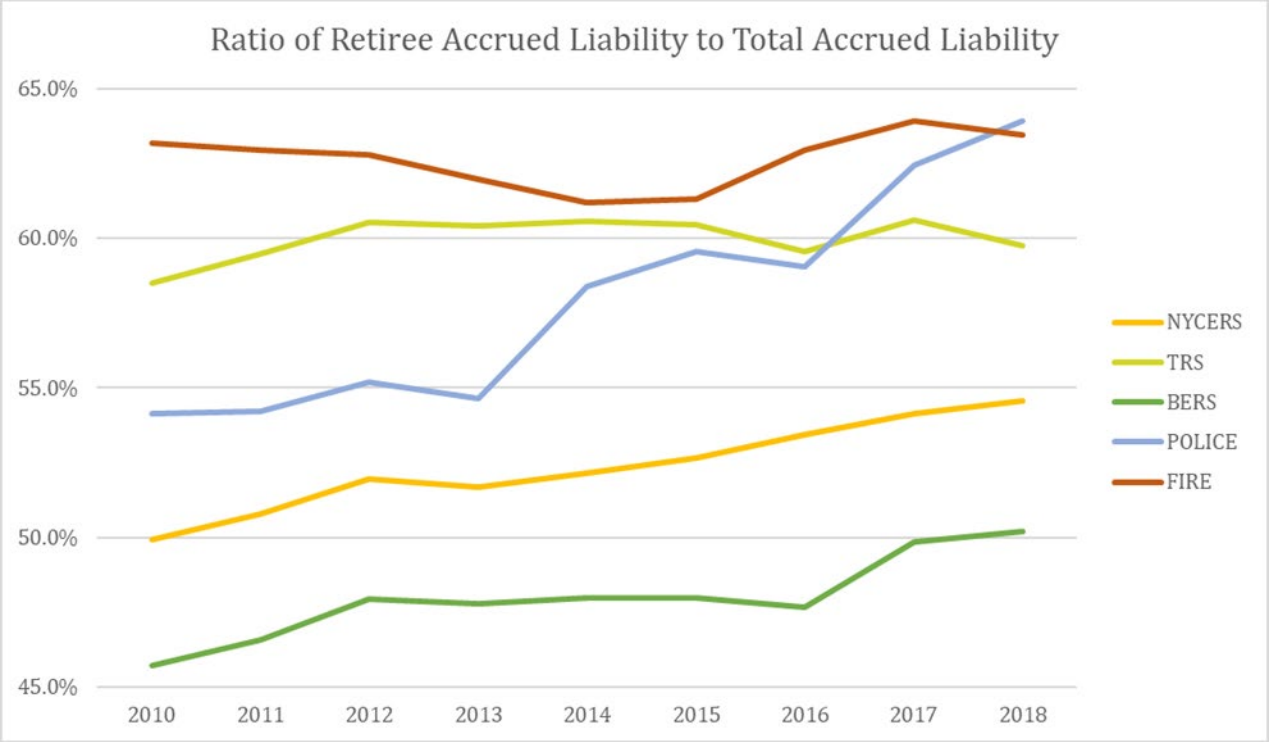


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst U.S. public pensions has declined from 1.59 in the 2010 valuation year to 1.24 in the 2018 valuation year. Over that same period, the Plan's Support Ratio increased from 0.65 to 0.68, but remains significantly lower than the U.S. public pension plan median Support Ratio meaning that fewer active workers exist to support guaranteed pensioner payments.

Because the Plan's Support Ratio is below the median, FIRE's contributions for active members form a smaller proportion of the total actuarial contribution than other pension funds in the U.S. with average maturity.

Ratio of Retiree Accrued Liability to Total Accrued Liability

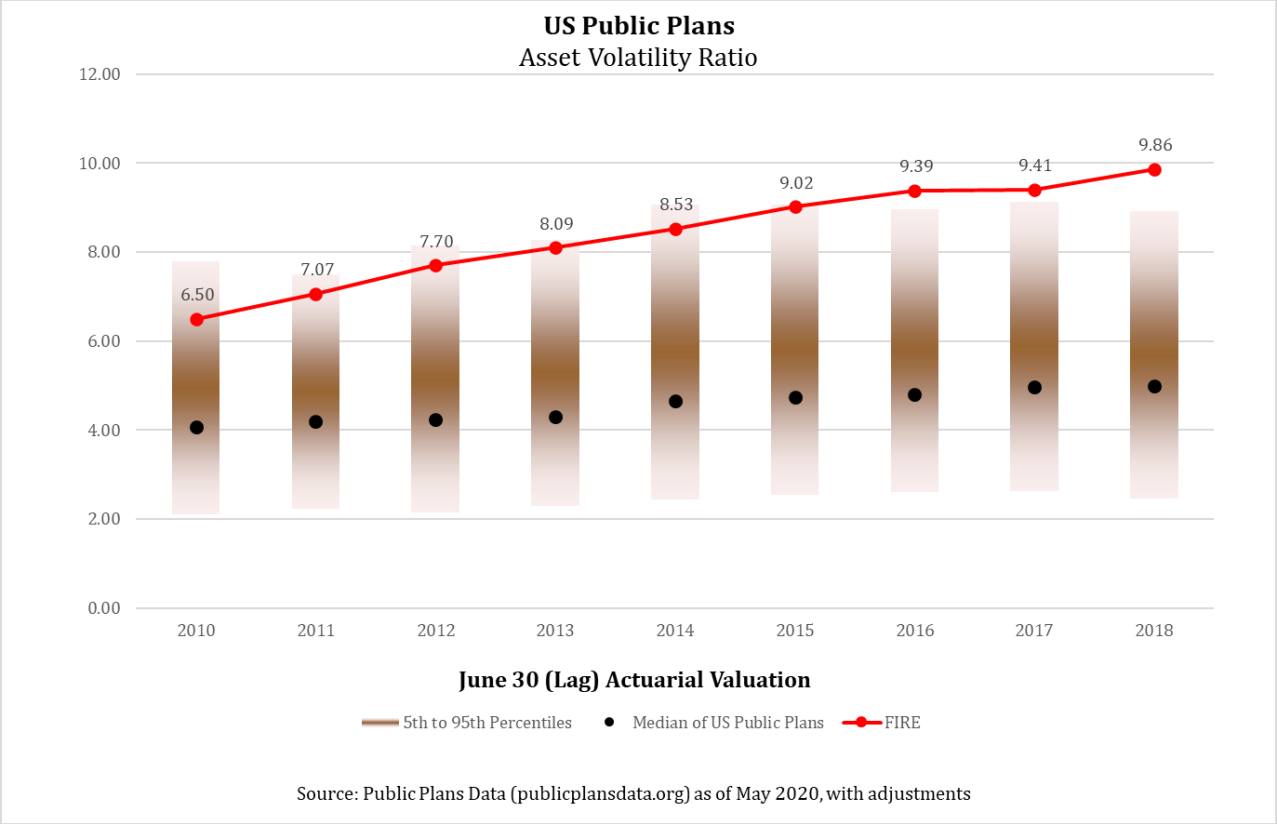
We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for FIRE; the other New York City Retirement Systems[1] are included for comparison purposes. The ratio for FIRE has been between 60-65% for the past few years, indicating that FIRE is a mature retirement system.



Asset Volatility Ratio

Another way to look at plan maturity is the Asset Volatility Ratio (AVR), or ratio of assets to payroll. This ratio tends to rise as plans mature because assets generally need to accumulate to provide for benefit payments. The chart below compares the AVR (on an AVA basis) for FIRE to the population of public pension systems.

[1] New York City Employees' Retirement System (NYCERS); Teachers' Retirement System (TRS); Board of Education Retirement System (BERS); New York City Police Pension Fund (POLICE)



Source: Public Plans Data (publicplansdata.org) as of May 2020, with adjustments

As a plan approaches maturity, AVRs tend to increase, and the plan's actuarially-determined contribution becomes more sensitive to investment losses. For example, the same percentage of investment losses in more mature plans with a larger asset base can increase contributions as a percentage of payroll more than in less mature plans, leading to additional volatility. Therefore, mature plans may wish to consider more conservative investment strategies. Typical AVRs for a mature retirement system are between 5 and 6. As shown in the tables above, for FIRE, since ratios are greater than the average, FIRE is considered a mature plan under this measure.

Medium Risk Types

Interest Rate Risk: The Risk of Reduction in the Long-Term Rate of Return

The Accrued Liability for the Plan depends heavily on the actuarial assumption used for future investment returns. While the returns themselves can produce substantial volatility, as detailed in the Investment Risk subsection above, the long-term rate of return assumption of 7.0% is highly dependent on the allocation of Plan assets.

If market conditions or the allocation of Plan assets no longer support a long-term rate of return assumption of 7.0%, the Actuarial Interest Rate (AIR) may have to be reduced, which can significantly increase the Accrued Liability, Unfunded Accrued Liability, Normal Cost, and resulting contribution of the Plan. The sensitivity of the Accrued Liability, the Unfunded Accrued Liability, Funded Ratio, and Normal Cost of the Plan are shown below:

NEW YORK CITY FIRE PENSION FUND

SENSITIVITY ANALYSIS AS OF JUNE 30, 2018

Valuation Date	**June 30, 2018**
Results at 7.0%	
1. Accrued Liability (AL)	$ 21,787,887,650
2. Actuarial Value of Assets (AVA)	12,876,671,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 8,911,216,650
4. Funded Ratio (AVA Basis) (2. / 1.)	59.1%
5. Normal Cost	591,951,663
Results at 6.0%	
1. Accrued Liability (AL)	$ 24,308,478,868
2. Actuarial Value of Assets (AVA)	12,876,671,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 11,431,807,868
4. Funded Ratio (AVA Basis) (2. / 1.)	53.0%
5. Normal Cost	732,884,483
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	11.6%
2. Increase in Unfunded Accrued Liability	28.3%
3. Decrease in Funded Ratio	6.1%
4. Increase in Normal Cost	23.8%

Longevity Risk: The Risk of Higher than Assumed Mortality Improvement

FIRE faces risk in its assumption of future mortality rates. Actuarial experience studies were used to develop the base mortality rates assumed in the valuation; Society of Actuaries mortality improvement scale MP-2018 was subsequently applied to these base rates.[1]

This scale MP-2018 is an assumption regarding the *improvement* of future mortality rates as compared to mortality when the experience studies were completed. The scale was developed using large amounts of historical data from the Social Security Administration. Risk therefore exists such that the mortality improvement inherent in the Plan population is higher than the improvement seen in the population provided by the Social Security Administration. When mortality improvement is higher than assumed, plan participants will live longer than expected, and the plan will pay more pension benefits than had been previously funded.

Furthermore, while the scale uses recent experience to develop short-term mortality improvement rates, an actuarial assumption is applied to long-term mortality improvement rates based on expert opinion. A rate of 1.0% is assumed, which the Society of Actuaries characterizes as "neither overly optimistic nor too pessimistic with respect to future longevity improvements."[2] Risk to the Plan exists, however, if Plan mortality experience shows higher levels of long-term mortality improvement; expert opinion can in some cases be flawed, particularly when past experience is not indicative or predictive of future experience.

In a letter dated June 28, 2019, Buck analyzed historical Plan experience and noted "it appears that historical mortality improvement in NYC pensioners has kept pace with, and in some cases may have exceeded slightly, the mortality improvement trends in historical Social Security Administration graduated rates that are based on a broad US population" and that "continued use of MP-20xx mortality improvement scales seems reasonable." It may be prudent in future years, after longer trends can be observed, to quantify the effect of changing the ultimate mortality improvement rate to be higher than 1.0%.

Litigation Risk: The Risk of Legal Claims and Lawsuits

It is not uncommon for New York City to be a defendant in legal claims and lawsuits.[3] In its most recent claims report, the Comptroller reports that in FY2018, NYC settled 14,094 claims and lawsuits for $1.0 billion. On occasion, these settlements involve NYCRS. The 1996 case *Gulino v. Board of Education* awards damages to plaintiffs that in some cases include counterfactual service and salary in NYCRS. It remains a continuing risk that litigation may expand the scope of pension benefits beyond what is intended or codified in statute.

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[1] Retirement Plans Experience Committee. "Mortality Improvement Scale MP-2018 Report" and "Mortality Improvement Scale MP-2014 report." *Society of Actuaries.*

[2] Retirement Plans Experience Committee. "Mortality Improvement Scale BB Report" 5.5 Selection of 1.0% Long-Term Rate of Mortality Improvement. *Society of Actuaries*.

[3] https://comptroller.nyc.gov/wp-content/uploads/documents/Claims-Report-FY-2018.pdf

Other Risk Types

Credit/Solvency Risk: The Risk of Potential Insolvency of Contributing Entities

All public pension systems face credit risk in the event their sponsoring entities become unable to pay their debts and obligations. Credit rating agencies currently consider New York City bonds to be of high quality, and the Actuary believes the City faces low credit risk as the main contributing entity to FIRE.

Inflation Risk: The Risk of Higher than Assumed Inflation

FIRE faces risk if inflation is higher than expected. Inflation is a key driver of the salary increase assumptions (affecting active members) and COLA assumptions (affecting both active members and pensioners/beneficiaries). A quantitative analysis is not available at this time. Notably, however, the pensioner COLA is limited to half of CPI on the first $18,000 of annual benefits, which limits the risk exposure to inflation.

Contribution Risk: The Risk that Future Contributions Are Less than the Actuarially-Determined Contributions

Public pension systems can suffer from contribution risk when sponsoring governmental entities fail to make contributions as determined by the actuary under their funding policies. A 2018 study[1] which used data from 50 states and 230 retirement systems, found that since 2007 the shortfall between actual contributions to state pension plans and minimum actuarial funding standards was $200 billion.[2]

The New York City Retirement Systems and Pension Funds face low contribution risk. City benefits are constitutionally protected, and participating employers have historically contributed to the actuarial contribution as certified by the Actuary. The Actuary believes the City will continue to do so in future years. See Table III-5 ACTUARIAL AND STATUTORY CONTRIBUTION HISTORY.

Contribution risk may also increase in future years if the actuarial contribution determined for the Plan grows to be a larger part of the City budget. The five New York City Retirement Systems and Pension Funds currently require contributions of over 10% of the City's annual budget, and contribution risk may increase if this contribution rate becomes untenable.

Agency/Political Risk: The Risk of Stakeholder Influences

With assumed long-term asset returns and gradual amortization of unfunded liabilities, the funded status of the Plan is expected to improve over time. Many public pension systems suffer from agency risk, wherein different stakeholders or agents want to influence the cost calculations in directions favorable to their interests. Agents may also downplay other risks (e.g. investment risk) to advance specific agendas. These situations create cases where

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[1] The Pew Charitable Trusts. *"The State Pension Funding Gap: 2018."*

[2] Accounting standards changed in 2014. From 2007 to 2013, the shortfall is calculated between the actuarial recommended contribution and actual employer contributions. From 2014 to 2018, the shortfall represents the gap between the net amortization benchmark and employer contributions.

promises for future funding can be disregarded for political expediency or other priorities. In other cases, certain plan provisions or administrative practices intended to provide occasional clarity or relief become commonplace or intentionally sought for the benefit of members at the expense of taxpayers.

Intergenerational Equity Risk: The Risk of Inequity in the Actuarially-Determined Contributions

Intergenerational inequity could exist for certain stakeholders (e.g. public taxpayers). If, for example, liabilities are valued using overly conservative assumptions, aggressive funding patterns may occur, thus causing current taxpayers to shoulder a disproportionately high share of the funding burden, as compared to past and future taxpayers. The reverse can also be true if aggressive or unrealistic assumptions are used. As the Plan is ongoing, taxpayers across all generations should be expected to offer similar funding contributions over the lifetime of the Plan.

Additionally, in future years of higher or lower funded status, changes in the statute may take place that can improve or diminish plan provisions. If so, intergenerational equity risk could increase as taxpayers and plan members at that time may receive preferential or less preferential treatment over the taxpayers and plan members prior to and subsequent to them.

SECTION VIII – SUMMARY OF PLAN PROVISIONS

A. Effective Date

July 15, 1941.

B. Tier Membership

Tier 1: Prior to July 1, 1973

Tier 2: July 1, 1973 to June 30, 2009

Tier 3: July 1, 2009 to March 31, 2012 and did not elect to join Tier 3 Enhanced

Tier 3 Modified: April 1, 2012 to June 14, 2016 and did not elect to join Tier 3 Enhanced

Tier 3 Enhanced: On or after June 15, 2016 and those in Tier 3 and Tier 3 Modified who elected to join

Eligible service includes City service in positions in the competitive class of the civil service for probationary periods or permanent appointments in the Fire Department.

C. Member Contributions

Tier 1 and Tier 2: Required Member Contributions - Based upon age at entry and elected retirement age, credited with regular and special interest. Contributions are required for the first 20 years.

Voluntary Member Contributions - Additional contributions to the Annuity Savings Fund credited with regular and special interest.

Tier 3, Tier 3 Modified, and Tier 3 Enhanced: Basic Member Contributions - Members contribute 3.0% of salary for a maximum of 25 years.

Additional Member Contributions - Enhanced Plan Members are required to contribute an additional 2.0% of salary for a maximum of 25 years.

D. Increased-Take-Home-Pay (ITHP) Contributions

Tier 1 and Tier 2: The City of New York pays a portion of member contributions. Effective October 1, 2000, the rate of ITHP contributions is 5.0% of salary, accumulated with regular and additional interest. The member may elect to waive the ITHP reduction from the full member rate and contribute at the full member rate, which results in additional benefits attributable to the ITHP contributions.

Tier 3, Tier 3 Modified, and Tier 3 Enhanced: The City of New York does not pay any portion of member contributions.

E. Credited Service

Credited Service is classified as Allowable Fire Service or certain other Credited Service:

- Members are credited with one year of service for two hundred fifty or more days of service and not more than one year for all service in any calendar year.
- **Tier 1 and Tier 2**: Allowable Fire Service includes service in the Uniformed Force of the New York Police Department, Uniformed Transit Police Force, Uniformed Housing Police Force, Uniformed Correction Force, Uniformed Sanitation Force, and as an Emergency Medical Technician, provided all such service immediately precedes the Uniformed Fire Force service.
- **Tier 3, Tier 3 Modified, and Tier 3 Enhanced**: Fire Service includes service in the Uniformed Force of the New York Police Department and the New York State and Local Fire and Police Retirement System.
- Members may purchase, subject to limitations in the law, years of certain wartime military service, combined military service, and service as police officers in a foreign country for the United States Government, and authorized Child Care Leave.

F. Salary Base

Tier 1: Final Salary (FS): The contract rate of base pay and holiday pay on the last day paid, plus any overtime, night differential, and worked vacation earned in the previous 12 months, plus applicable longevity pay.

For members appointed on or after June 17, 1971, the pensionable compensation for the final year of service is limited by the Kingston Law to 120% of the pensionable compensation for the year immediately preceding the final year.

Tier 2: Final Average Salary (FAS): Total pensionable compensation (i.e. wages, overtime, night differential, worked vacation, etc.) a member earned during the 12 months preceding the date of retirement, not in excess of 120% of the immediate previous 12 months' pensionable compensation.

For members hired prior to July 1, 2000 (original Tier 2 members), if greater, FAS will equal the greatest average three consecutive years' pensionable compensation, where each year's salary cannot exceed 120% of the average of the two previous years.

Tier 3: FAS: The average total pensionable compensation earned by a member during any three consecutive year period based on the month and day of retirement that provides the highest average wages. If the wages earned during any year included in the period exceed the average of the prior two years by more than 10%, the amount in excess of 10% shall be excluded. Additionally, if the member was on a leave of absence without pay (e.g. suspension) at any time during the three-year period, that time, not in excess of 12 months, will be excluded from the calculation and the same period of time immediately preceding the three-year period will be included for the final average salary.

Tier 3 Modified and Tier 3 Enhanced: FAS: The average total pensionable compensation earned by a member during any five consecutive years based on the month and day of retirement that provides the highest average wages. If the wages earned during any year included in the period exceed the average of the prior four years by more than 10%, the amount in excess of 10% shall be excluded. Additionally, if the member was on a leave of absence without pay (e.g. suspension) at any time during the five-year period, that time, not in excess of 12 months, will be excluded from the calculation and the same period of time immediately preceding the five-year period will be included for the final average salary.

G. Service Retirement

1. Eligibility

   The eligibility requirements for normal service retirement and early service retirement are summarized in the table below:

Tier	Minimum Service for Normal Retirement	Minimum Service for Early Retirement
1	20	NA
2	20	NA
3	22	20
3 Modified	22	20
3 Enhanced	22	20

2. Benefits

   a. Tier 1 and Tier 2

      i. 50% of [FS (Tier 1) or FAS (Tier 2)] plus $1/60^{th}$ of the sum of all salary after 20 or 25 years, as applicable, of Credited Service.

      ii. The benefit is adjusted by the annuitized value of the net excess or deficit of accumulated member contributions and ITHP over or under required amounts.

   b. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

i. 2.1% of FAS times number of years of Credited Service for first 20 years plus 4.0% of FAS times number of years of Credited Service in excess of 20 years (total benefit limited to 50% of FAS), less 50% of the Primary Social Security Retirement benefit at age 62.

H. Disability Retirement

1. Accidental Disability (ADR)

    a. Eligibility for all Tiers: Immediate. Must be found by the Medical Board and the Board of Trustees to be physically or mentally unable to perform regular job duties as a result of an injury received in the performance of duty and such disability was not the result of willful negligence on the part of the member.

    b. Benefits

        i. Tier 1 and Tier 2

        75% of [FS (Tier 1) or FAS (Tier 2)] plus 1/60th of the sum of all salary after 20 or 25 years in accordance with the Member's selection of the minimum period of Credited Service, plus annuitized value of actual member accumulated contributions and ITHP.

        ii. Tier 3 and Tier 3 Modified

        50% of FAS less 50% of the Primary Social Security Disability Benefits.

        iii. Tier 3 Enhanced Plan

        75% of FAS.

2. Ordinary Disability (ODR)

    a. Eligibility

        i. Tier 1 and Tier 2

        Immediate. Must be found by the Medical Board and the Board of Trustees to be physically or mentally unable to perform regular job duties as a result of an injury not received in the performance of duty.

ii. Tier 3, Tier 3 Modified and Tier 3 Enhanced

Five years of Credited Service and eligibility for Social Security disability benefit.

b. Benefits

i. Tier 1 and Tier 2

(a) For members choosing 20 years as their minimum period of Membership service: 2.5% times [FS (Tier 1) or FAS (Tier 2)] times Credited Service.

(b) For members choosing 25 years as their minimum period of Membership service: 2.0% times [FS (Tier 1) or FAS (Tier 2)] times Credited Service.

Minimum Benefit:

Less than 10 years of service: ⅓ of [FS (Tier 1) or FAS (Tier 2)]

10 or more years of service: ½ of [FS (Tier 1) or FAS (Tier 2)],

plus (regardless of service) the annuitized value of the net excess or deficit of member accumulated contributions and ITHP over or under the required amounts.

ii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

The greater of:

(a) 33-1/3% of FAS

(b) 2.0% of FAS times number of years of Credited Service (not in excess of 22 years),

less 50% of the Primary Social Security Disability Benefit (non-Enhanced Plan only).

I. Death Benefits:

1. Accidental Death Benefits

    a. Eligibility for all Tiers: Immediate.

    b. Benefits

        i. Tier 1 and Tier 2

        50% of the average of the final salary as defined as the last 12 months of earnings, payable annually to surviving spouse or other eligible dependents for life.

        In addition, a lump sum of accumulated member contributions and ITHP.

        ii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

        50% of FAS, payable annually to surviving spouse or other eligible dependents for life.

    In addition there may be a benefit payable in accordance with General Municipal Law Section 208(f).

2. Ordinary Death Benefit

    a. Eligibility

        i. Tier 1: Immediate

        ii. Tier 2, Tier 3, Tier 3 Modified, and Tier 3 Enhanced: 90 days of service

    b. Benefits

        i. Tier 1

        <u>Less than 10 years of Credited Service</u>: 50% of FS plus accumulated member contributions and ITHP with interest.

        <u>At least 10 years of Credited Service</u>: 100% of FS plus accumulated member contributions and ITHP with interest.

        However, if a member would have been eligible for a service retirement benefit at the date of death, the beneficiary may elect to receive the pension reserve had the member retired on the day

before his or her death plus the accumulated member contributions. The beneficiary can also elect to receive the death benefit in the form of an annuity.

ii. Tier 2

Three times final year's salary raised to the next highest multiple of $1,000 plus accumulated member contributions.

However, if a member would have been eligible for a service retirement benefit at the date of death, the beneficiary may elect to receive the pension reserve had the member retired on the day before his or her death plus the accumulated member contributions. The beneficiary can also elect to receive any death benefit and ITHP, if applicable, in the form of an annuity. The accumulated member contributions would still be paid as a lump sum.

iii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

Three times final year's salary raised to the next highest multiple of $1,000 plus accumulated member contributions.

c. Form of Payment: Lump sum. The first $50,000 of benefit on account of death in active service will be paid from the Group Life Insurance Plan.

J. Vested Benefit After Termination

1. Eligibility: Five years of Credited Service for all Tiers

2. Benefits: A vestee may elect a refund of accumulated member contributions, but would then lose entitlement to a vested benefit. The Benefit at Service Retirement Date:

a. Tier 1 and Tier 2

2.5% for members choosing 20 years as their minimum period of Membership service, or 2.0% for members choosing 25 years as their minimum period of Membership service, times [FS (Tier 1) or FAS (Tier 2)] times number of years of Credited Service plus annuitized value of the net excess or deficit of accumulated member contributions and ITHP over or under the required amounts with interest to normal retirement date.

b. Tier 3

2.1% of FAS times number of years of Credited Service payable at the Early Retirement Age (i.e. the earlier of the date when 20 years of Credited Service would have been completed or age 62) or at age 55. If the benefit

commences before the Early Retirement Age, there are reductions.

In addition, the benefit is reduced by 50% of the Primary Social Security Retirement benefit at age 62.

c. Tier 3 Modified and Tier 3 Enhanced

2.1% of FAS times number of years of Credited Service payable at the Early Retirement Age (i.e. the date when 20 years of Credited Service would have been completed) or at age 55. If the benefit commences before the Early Retirement Age, there are reductions.

In addition, the benefit is reduced by 50% of the Primary Social Security Retirement benefit at age 62 (non-Enhanced Plan only).

K. Forms of Payment

1. Normal Form of Payment: Single Life Annuity.

2. Optional Forms of Payment: Joint and Survivor Annuities, Certain and Life Annuities.

L. Loans

Applicable to Tier 1 and Tier 2 only.

1. Eligibility: After three years of membership and up to the day of retirement.

2. Amount: Up to 90% of accumulated member contributions with a limit of $50,000 for tax-free treatment under IRC Section 72(p).

M. Cost-of-Living Adjustments (COLA)

Annuity payments are increased annually on September 1st, but only after a pensioner has attained the applicable eligibility threshold. Some beneficiaries are not eligible for COLA increases. The COLA increase is equal to a base benefit times a COLA percentage. The COLA increase for a spouse receiving a joint & survivor annuity is one half of the COLA increase that would have been applicable to the member had he or she survived.

1. Eligibility Thresholds:

    a. Service Retirement and Vested Retirement: The earlier of (i) and (ii):

        i. Attainment of age 62 and 5 years since commencement

        ii. Attainment of age 55 and 10 years since commencement

    b. Disability Retirement: 5 years since commencement

c. Beneficiaries of an Accidental Death benefit: 5 years since commencement

2. Eligible beneficiaries: Spouses receiving a joint & survivor annuity. All others are non-eligible.

3. Base Benefit: The lesser of $18,000 and the maximum retirement allowance plus the sum of prior years' COLA increases.

4. COLA percentage: 50% of the Consumer Price Index (CPI-U) based upon the 12 months ending March 31 prior to each September 1 effective date, rounded to the next higher 0.1%. Such percentage shall not be less than 1.0% nor greater than 3.0%.

N. Escalation

Applicable to (1) all Tier 3 and Tier 3 Modified and (2) Tier 3 Enhanced Plan members receiving vested or service retirement benefits. Members in both (1) and (2) receive COLA, if greater.

1. Eligibility: Service, vesting, disability retirement, and survivor benefits.

2. Full Escalation Date

   a. Vested and Service Pensions: The first day of the month following the day which a member completes or would have completed 25 years of service.

   b. Disability Pensions: The first day of the month following the day which a non-Enhanced Plan disability retiree first becomes eligible for ODR/ADR.

   c. Death Benefits: The first day of the month following the day which a beneficiary first becomes eligible for a death benefit paid other than in a lump sum.

3. Amount

   If a member first begins receiving benefits on the same date as the Full Escalation Date, the member will receive Full Escalation which is the lesser of 3.0% or the Cost-of-Living Index increase, as computed on the December 31 of each prior year for benefits being escalated the following April.

   In the event of a decrease in the Cost-of-Living Index, the current benefit will be decreased by the lesser of 3% or the Cost-of-Living Index. However, the benefit will not be reduced below the benefit payable at the initial commencement date.

   In addition, Cost-of-Living Index changes are computed on a cumulative basis so that any increases or decreases not affected in an adjustment are carried forward and applied in subsequent years.

4. Partial Escalation

   Partial Escalation is calculated on benefits that commence prior to the member's Full Escalation Date. For each month that the benefit commencement date succeeds the date when a member completes or would have completed 22 years of service, a member will receive 1/36th of the Full Escalation, to a maximum of Full Escalation at 25 years of service.

O. WTC Disability Benefits

Certain active, vested, and retired members of the Plan, who participated in the rescue, recovery, or clean-up operations at the WTC site, and who become disabled due to certain diseases (e.g. diseases in the respiratory tract, gastroesophageal tract, psychological axis, and skin), are presumed to have become disabled in the performance of duty and therefore may be entitled to be reclassified with an Accidental Disability Retirement.

P. WTC Death Benefits

Certain active, vested, and retired members of the Plan, who participated in the rescue, recovery, or clean-up operations at the WTC site, and who die due to certain diseases (e.g. diseases in the respiratory tract, gastroesophageal tract, psychological axis, and skin) are presumed to have died in the performance of duty potentially entitling eligible beneficiaries to receive Accidental Death Benefits.

Q. Changes Since the Prior Valuation

None.

SECTION IX – CHAPTER AMENDMENTS

The Chapter amendments enacted during the past five years that had a significant impact on the June 30, 2018 (Lag) actuarial valuation results include:

- **Chapter 179 of the Laws of 2018** (Chapter 179/18) grants a 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits pursuant to GML 208-f. (Similar legislation was enacted in each of the previous years.)

- **Chapter 298 of the Laws of 2016** (Chapter 298/16), signed into law on September 8, 2016, changes the Accidental Disability Retirement and Ordinary Disability Retirement benefits for current Tier 3 and Tier 3 Modified members who elect to participate in the Enhanced Disability Benefits Plan. Members as of June 15, 2016 and later are mandated into the Enhanced Disability Benefits Plan. Additionally, Chapter 298/16 changes FIRE into a corpus funded entity.

- **Chapter 326 of the Laws of 2016** (Chapter 326/16) extends the deadline to file a Notice of Participation in the World Trade Center Rescue, Recovery, and Cleanup Operations to September 11, 2018.

- **Chapter 41 of the Laws of 2016** (Chapter 41/16) provides up to three years of service credit to members of public retirement systems of the State of New York for military service. Chapter 41/16 removes the requirement that such military service occur during specified periods of hostilities.

SECTION X – SUBSEQUENT EVENTS

The Board of Trustees, based on recommendations of the Actuary, adopted new factors that provide the adjustment necessary for a retiree to choose an alternative form of benefit payment that is actuarially equivalent to the benefit payable for only the retiree's lifetime (i.e. Maximum Retirement Allowance). The new Option Factors are effective for retirements on and after April 1, 2019 and produce, in almost all cases, a benefit that is greater than the benefit provided under the prior set of Option Factors.

For virtually all retirees who would have elected an Optional Retirement Allowance prior to these new Option Factors and were to elect an Optional Retirement Allowance under the new Option Factors, there will be a reduction in the actuarial gains. For those retirees who would have declined an Optional Retirement Allowance, but would now elect an Optional Retirement Allowance in light of more favorable new factors, no additional cost is expected.

Chapter 298/16 states that the AMC rate for Tier 3 Enhanced Plan members is required to be reviewed every 3 years. Effective September 8, 2019, the AMC rate was revised to 2.1% of salary. This revised AMC rate will be reflected in the June 30, 2019 valuation.

SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The Actuary issued a Report entitled, "Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Fire Pension Fund," dated January 23, 2019. The actuarial assumptions and methods described in that report were adopted by the Board of Trustees at the February 27, 2019 Board meeting and are referred to as the "2019 A&M."

The actuarial assumptions and a description of the actuarial methods follow.

Table XI-1a
Service Retirement, Unreduced with Full COLA/Escalation

NEW YORK CITY FIRE PENSION FUND

PROBABILITIES OF SERVICE RETIREMENT
RETIREMENT WITH FULL COLA/ESCALATION
FOR THOSE ELIGIBLE FOR UNREDUCED

	Years of Service Since First Eligible	
Age	**Year 1**	**Ultimate**
19	0.00%	0.00%
20	0.00%	0.00%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%
26	0.00%	0.00%
27	0.00%	0.00%
28	0.00%	0.00%
29	0.00%	0.00%
30	0.00%	0.00%
31	0.00%	0.00%
32	0.00%	0.00%
33	0.00%	0.00%
34	0.00%	0.00%
35	0.00%	0.00%
36	5.00%	0.00%
37	5.00%	0.00%
38	5.00%	1.50%
39	5.00%	1.50%
40	5.00%	1.50%
41	5.00%	1.50%
42	5.00%	1.50%
43	5.00%	1.50%
44	5.00%	1.50%
45	5.00%	1.50%
46	5.50%	1.50%
47	6.00%	1.50%
48	6.50%	1.50%
49	7.00%	1.50%
50	7.50%	1.50%
51	8.00%	1.50%
52	8.50%	2.25%
53	9.00%	3.00%
54	9.50%	3.75%
55	10.00%	4.50%
56	10.00%	5.25%
57	10.00%	6.00%
58	10.00%	6.75%
59	10.00%	7.50%
60	10.00%	9.00%
61	15.00%	11.25%
62	20.00%[1]	15.00%[1]
63	25.00%[1]	25.00%[1]
64	25.00%[1]	25.00%[1]
65	100.00%	100.00%

[1]100% for Tier 3, Tier 3 Modified, and Tier 3 Enhanced members.

Table XI-1b
Early Service Retirement

NEW YORK CITY FIRE PENSION FUND PROBABILITIES OF EARLY SERVICE RETIREMENT FOR TIER 3, TIER 3 MODIFIED, AND TIER 3 ENHANCED MEMBERS		
Years of Service	**Reduced Service Retirement**	**Unreduced Before Full Escalation**
20	5.00%	N/A
21	2.00%	N/A
22	N/A	5.00%
23	N/A	2.00%
24	N/A	2.00%

Table XI-2
Active Termination Rates

NEW YORK CITY FIRE PENSION FUND PROBABILITIES OF TERMINATION	
Years Of Service	**Probability of Termination**
0	2.00%
1	0.80%
2	0.40%
3	0.40%
4	0.40%
5	0.40%
6	0.36%
7	0.32%
8	0.28%
9	0.24%
10	0.20%
11	0.18%
12	0.16%
13	0.14%
14	0.12%
15	0.10%
16	0.10%
17	0.10%
18	0.10%
19	0.10%
20	N/A

Table XI-3
Active Disability Rates

NEW YORK CITY FIRE PENSION FUND PROBABILITIES OF DISABILITY RETIREMENT				
		Accidental Disability		
Age	Ordinary Disability	Tier 1 & Tier 2 Eligible for WTC Benefits	Tier 1 & Tier 2 Not Eligible for WTC AND Tier 3 Enhanced Plan	Tier 3 & Tier 3 Modified Non-Enhanced Plan
15	0.0025%	0.050%	0.035%	0.030%
16	0.0025%	0.050%	0.035%	0.030%
17	0.0025%	0.050%	0.035%	0.030%
18	0.0025%	0.050%	0.035%	0.030%
19	0.0025%	0.050%	0.035%	0.030%
20	0.0025%	0.050%	0.035%	0.030%
21	0.0025%	0.050%	0.035%	0.030%
22	0.0025%	0.050%	0.035%	0.030%
23	0.0025%	0.050%	0.035%	0.030%
24	0.0025%	0.050%	0.035%	0.030%
25	0.0025%	0.050%	0.035%	0.030%
26	0.0025%	0.090%	0.045%	0.040%
27	0.0050%	0.130%	0.055%	0.050%
28	0.0075%	0.170%	0.075%	0.070%
29	0.0100%	0.210%	0.115%	0.100%
30	0.0125%	0.250%	0.175%	0.150%
31	0.0150%	0.400%	0.275%	0.240%
32	0.0175%	0.550%	0.375%	0.330%
33	0.0200%	0.700%	0.475%	0.420%
34	0.0225%	0.850%	0.575%	0.510%
35	0.0250%	1.000%	0.700%	0.600%
36	0.0275%	1.200%	0.850%	0.720%
37	0.0300%	1.400%	1.000%	0.840%
38	0.0325%	1.600%	1.150%	0.960%
39	0.0350%	1.800%	1.300%	1.080%
40	0.0375%	2.000%	1.500%	1.200%
41	0.0400%	2.200%	1.650%	1.320%
42	0.0425%	2.400%	1.800%	1.440%
43	0.0450%	2.600%	1.950%	1.560%
44	0.0475%	2.800%	2.100%	1.680%
45	0.0500%	3.000%	2.300%	1.800%
46	0.0550%	3.400%	2.650%	1.920%
47	0.0600%	3.800%	3.000%	2.040%
48	0.0650%	4.200%	3.350%	2.160%
49	0.0700%	4.600%	3.700%	2.280%
50	0.0750%	5.000%	4.050%	2.400%
51	0.1100%	5.600%	4.400%	2.520%
52	0.1450%	6.200%	4.750%	2.640%
53	0.1800%	6.800%	5.100%	2.760%
54	0.2150%	7.400%	5.450%	2.880%
55	0.2500%	8.000%	5.800%	3.000%
56	0.5000%	10.000%	8.000%	4.000%
57	0.7500%	12.000%	10.000%	5.000%
58	1.0000%	15.000%	12.500%	6.000%
59	1.2500%	18.000%	15.000%	7.000%
60	1.5000%	21.000%	17.500%	8.000%
61	2.0000%	25.000%	20.000%	9.000%
62	2.5000%[1]	30.000%	22.000%[1]	N/A
63	2.5000%[1]	30.000%	22.000%[1]	N/A
64	2.5000%[1]	30.000%	22.000%[1]	N/A
65	N/A	N/A	N/A	N/A

[1]N/A for Tier 3, Tier 3 Modified, and Tier 3 Enhanced members.

Table XI-4
Active Mortality Rates

NEW YORK CITY FIRE PENSION FUND PROBABILITIES OF ACTIVE MEMBER MORTALITY			
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.020%	0.015%	0.010%
16	0.020%	0.015%	0.010%
17	0.020%	0.015%	0.010%
18	0.020%	0.015%	0.010%
19	0.020%	0.015%	0.010%
20	0.020%	0.015%	0.010%
21	0.020%	0.015%	0.010%
22	0.020%	0.015%	0.010%
23	0.020%	0.015%	0.010%
24	0.020%	0.015%	0.010%
25	0.020%	0.015%	0.010%
26	0.020%	0.015%	0.010%
27	0.020%	0.015%	0.010%
28	0.020%	0.015%	0.010%
29	0.020%	0.015%	0.010%
30	0.020%	0.015%	0.010%
31	0.020%	0.015%	0.010%
32	0.020%	0.015%	0.010%
33	0.020%	0.015%	0.010%
34	0.020%	0.015%	0.010%
35	0.020%	0.015%	0.010%
36	0.021%	0.016%	0.010%
37	0.022%	0.017%	0.010%
38	0.023%	0.018%	0.010%
39	0.024%	0.019%	0.010%
40	0.025%	0.020%	0.010%
41	0.030%	0.023%	0.013%
42	0.035%	0.026%	0.016%
43	0.040%	0.029%	0.019%
44	0.045%	0.032%	0.022%
45	0.050%	0.035%	0.025%
46	0.055%	0.038%	0.030%
47	0.060%	0.041%	0.035%
48	0.065%	0.044%	0.040%
49	0.070%	0.047%	0.045%
50	0.075%	0.050%	0.050%
51	0.080%	0.055%	0.060%
52	0.085%	0.060%	0.070%
53	0.090%	0.065%	0.080%
54	0.095%	0.070%	0.090%
55	0.100%	0.075%	0.100%
56	0.110%	0.080%	0.110%
57	0.120%	0.085%	0.120%
58	0.130%	0.090%	0.130%
59	0.140%	0.095%	0.140%
60	0.150%	0.100%	0.150%
61	0.160%	0.110%	0.200%
62	0.170%[1]	0.120%[1]	0.250%[1]
63	0.180%[1]	0.130%[1]	0.300%[1]
64	0.190%[1]	0.140%[1]	0.350%[1]
65	N/A	N/A	N/A

[1]Probabilities are N/A for Tier 3 and Tier 3 Modified members.

Table XI-5
Service Retiree Mortality

NEW YORK CITY FIRE PENSION FUND

PROBABILITIES OF MORTALITY FOR SERVICE RETIREES
BASE TABLE

Age	Males	Females	Age	Males	Females
15	0.0100%	0.0084%	68	1.2063%	0.7604%
16	0.0135%	0.0103%	69	1.2653%	0.8243%
17	0.0181%	0.0112%	70	1.4084%	0.9061%
18	0.0217%	0.0131%	71	1.5806%	0.9954%
19	0.0240%	0.0140%	72	1.7538%	1.0940%
20	0.0251%	0.0142%	73	1.9842%	1.2060%
21	0.0268%	0.0150%	74	2.2163%	1.3283%
22	0.0284%	0.0158%	75	2.4510%	1.4362%
23	0.0301%	0.0168%	76	2.6879%	1.6455%
24	0.0315%	0.0179%	77	2.9280%	1.8563%
25	0.0327%	0.0191%	78	3.3690%	2.0670%
26	0.0342%	0.0204%	79	3.8155%	2.3446%
27	0.0354%	0.0217%	80	4.2660%	2.6218%
28	0.0371%	0.0231%	81	4.7728%	2.8997%
29	0.0394%	0.0247%	82	5.2958%	3.1772%
30	0.0427%	0.0265%	83	6.2483%	3.4554%
31	0.0503%	0.0323%	84	7.2266%	3.9664%
32	0.0581%	0.0372%	85	8.2335%	4.4805%
33	0.0655%	0.0415%	86	9.2715%	4.9967%
34	0.0725%	0.0448%	87	10.3365%	5.5147%
35	0.0799%	0.0478%	88	11.2397%	6.0388%
36	0.0851%	0.0505%	89	12.1663%	7.0317%
37	0.0901%	0.0532%	90	13.1242%	8.0312%
38	0.0961%	0.0561%	91	14.6163%	9.4265%
39	0.1037%	0.0595%	92	16.2757%	10.8698%
40	0.1138%	0.0634%	93	18.9667%	12.3822%
41	0.1230%	0.0688%	94	21.5036%	13.7895%
42	0.1327%	0.0725%	95	23.9289%	15.2575%
43	0.1430%	0.0775%	96	25.8261%	16.7330%
44	0.1542%	0.0843%	97	27.5777%	18.2626%
45	0.1666%	0.0931%	98	29.2887%	19.6947%
46	0.1798%	0.1041%	99	30.8020%	21.1460%
47	0.1941%	0.1166%	100	32.1584%	22.1859%
48	0.2093%	0.1295%	101	33.7521%	23.0680%
49	0.2250%	0.1425%	102	35.1259%	24.0803%
50	0.2412%	0.1555%	103	36.3671%	25.2770%
51	0.2975%	0.1681%	104	37.3834%	26.6309%
52	0.3514%	0.1797%	105	38.1051%	28.0912%
53	0.4018%	0.1902%	106	38.4698%	29.6244%
54	0.4483%	0.1996%	107	38.6325%	31.1943%
55	0.4895%	0.2075%	108	38.8076%	32.7579%
56	0.5352%	0.2144%	109	38.9794%	34.2712%
57	0.5757%	0.2629%	110	50.0000%	50.0000%
58	0.6104%	0.3090%	111	50.0000%	50.0000%
59	0.6391%	0.3530%	112	50.0000%	50.0000%
60	0.6625%	0.3957%	113	50.0000%	50.0000%
61	0.7126%	0.4377%	114	50.0000%	50.0000%
62	0.7621%	0.4800%	115	50.0000%	50.0000%
63	0.8255%	0.5231%	116	50.0000%	50.0000%
64	0.9079%	0.5675%	117	50.0000%	50.0000%
65	0.9997%	0.6138%	118	50.0000%	50.0000%
66	1.0607%	0.6613%	119	50.0000%	50.0000%
67	1.1308%	0.7103%	120	100.0000%	100.0000%

Table XI-6
Disabled Retiree Mortality

NEW YORK CITY FIRE PENSION FUND

PROBABILITIES OF MORTALITY FOR DISABLED RETIREES
BASE TABLE

Age	Males	Females	Age	Males	Females
15	0.0238%	0.0098%	68	1.5909%	1.2517%
16	0.0321%	0.0120%	69	1.7622%	1.4342%
17	0.0433%	0.0131%	70	1.9120%	1.6327%
18	0.0517%	0.0153%	71	2.1153%	1.8400%
19	0.0573%	0.0164%	72	2.3101%	2.0561%
20	0.0608%	0.0173%	73	2.4968%	2.2946%
21	0.0660%	0.0191%	74	2.6752%	2.5649%
22	0.0716%	0.0211%	75	2.8786%	2.8625%
23	0.0772%	0.0234%	76	3.2717%	3.1737%
24	0.0831%	0.0259%	77	3.6597%	3.4562%
25	0.0886%	0.0282%	78	4.0420%	3.7889%
26	0.0936%	0.0307%	79	4.4200%	4.3087%
27	0.1008%	0.0332%	80	4.8490%	4.8485%
28	0.1089%	0.0359%	81	5.6563%	5.4107%
29	0.1170%	0.0386%	82	6.4729%	5.8954%
30	0.1254%	0.0412%	83	7.2988%	6.3864%
31	0.1342%	0.0438%	84	8.1300%	7.2278%
32	0.1426%	0.0464%	85	8.9696%	8.0743%
33	0.1544%	0.0491%	86	9.7646%	8.8707%
34	0.1602%	0.0506%	87	10.5803%	9.6600%
35	0.1670%	0.0528%	88	11.4245%	10.5768%
36	0.1696%	0.0551%	89	12.3269%	11.9527%
37	0.1721%	0.0580%	90	13.2834%	13.2782%
38	0.1754%	0.0608%	91	15.7515%	14.7506%
39	0.1792%	0.0648%	92	18.1410%	15.8458%
40	0.1836%	0.0709%	93	20.4240%	16.9974%
41	0.1891%	0.0790%	94	22.5700%	18.2075%
42	0.1957%	0.0892%	95	24.6643%	19.3408%
43	0.2038%	0.1023%	96	26.5127%	20.3502%
44	0.2134%	0.1184%	97	28.2029%	21.2709%
45	0.2247%	0.1371%	98	29.5441%	21.9254%
46	0.2374%	0.1586%	99	30.9728%	22.3227%
47	0.2518%	0.1824%	100	32.1584%	22.4341%
48	0.2672%	0.2079%	101	33.7521%	23.0680%
49	0.2837%	0.2388%	102	35.1259%	24.0803%
50	0.3022%	0.2719%	103	36.3671%	25.2770%
51	0.3597%	0.2959%	104	37.3834%	26.6309%
52	0.4188%	0.3426%	105	38.1051%	28.0912%
53	0.4788%	0.3791%	106	38.4698%	29.6244%
54	0.5392%	0.4326%	107	38.6325%	31.1943%
55	0.5986%	0.4868%	108	38.8076%	32.7579%
56	0.6556%	0.5294%	109	38.9794%	34.2712%
57	0.7090%	0.5421%	110	50.0000%	50.0000%
58	0.7577%	0.5621%	111	50.0000%	50.0000%
59	0.8017%	0.6003%	112	50.0000%	50.0000%
60	0.8498%	0.6343%	113	50.0000%	50.0000%
61	0.9095%	0.6687%	114	50.0000%	50.0000%
62	0.9862%	0.7391%	115	50.0000%	50.0000%
63	1.0698%	0.8094%	116	50.0000%	50.0000%
64	1.1631%	0.8897%	117	50.0000%	50.0000%
65	1.2477%	0.9710%	118	50.0000%	50.0000%
66	1.3403%	1.0569%	119	50.0000%	50.0000%
67	1.4168%	1.1551%	120	100.0000%	100.0000%

Table XI-7
Beneficiary Mortality

NEW YORK CITY FIRE PENSION FUND

PROBABILITIES OF BENEFICIARY MORTALITY
BASE TABLE

Age	Males	Females	Age	Males	Females
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

Table XI-8
Salary Scale

NEW YORK CITY FIRE PENSION FUND ANNUAL RATES OF MERIT AND SALARY INCREASE		
Years of Service	**Merit Increase**	**Salary Increase[1]**
0	20.00%	23.00%
1	12.00%	15.00%
2	12.00%	15.00%
3	12.00%	15.00%
4	27.00%	30.00%
5	16.00%	19.00%
6	1.65%	4.65%
7	1.80%	4.80%
8	1.95%	4.95%
9	4.05%	7.05%
10	2.25%	5.25%
11	2.40%	5.40%
12	2.55%	5.55%
13	2.70%	5.70%
14	4.65%	7.65%
15	3.00%	6.00%
16	2.85%	5.85%
17	2.70%	5.70%
18	2.55%	5.55%
19	4.20%	7.20%
20	2.25%	5.25%
21	2.10%	5.10%
22	1.95%	4.95%
23	1.80%	4.80%
24	1.65%	4.65%
25	1.50%	4.50%
26	1.35%	4.35%
27	1.20%	4.20%
28	1.05%	4.05%
29	0.90%	3.90%
30+	0.75%	3.75%

[1]Salary Increase is the General Wage Increase of 3.00% plus the Merit Increase.

Table XI-9
Overtime Assumptions

NEW YORK CITY FIRE PENSION FUND OVERTIME ASSUMPTION				
Years of Service	**All Tiers Baseline**	**Tier 1 & Tier 2 Dual Service**	**Tier 3, Tier 3 Modified, & Tier 3 Enhanced Dual Service**	**All Tiers Dual Disability**
0-13	20.00%	21.00%	21.00%	20.00%
14	20.00%	22.00%	21.00%	20.00%
15	20.00%	24.00%	21.00%	20.00%
16	20.00%	25.00%	22.00%	21.00%
17	20.00%	26.00%	24.00%	22.00%
18	21.00%	28.00%	25.00%	24.00%
19	22.00%	29.00%	26.00%	25.00%
20	24.00%	30.00%	28.00%	26.00%
21	22.00%	29.00%	26.00%	25.00%
22	21.00%	28.00%	25.00%	24.00%
23	20.00%	26.00%	24.00%	22.00%
24	19.00%	25.00%	22.00%	21.00%
25	17.00%	24.00%	21.00%	20.00%
26	16.00%	21.00%	19.00%	17.00%
27	15.00%	19.00%	18.00%	15.00%
28	13.00%	16.00%	15.00%	13.00%
29	12.00%	15.00%	13.00%	12.00%
30	11.00%	13.00%	12.00%	11.00%
31	9.00%	12.00%	11.00%	10.00%
32	8.00%	11.00%	9.00%	8.00%
33	7.00%	9.00%	8.00%	7.00%
34+	7.00%	8.00%	8.00%	7.00%

Additional Assumptions and Methods

1. **Post-commencement Mortality Assumption:** The service retiree mortality, disabled retiree mortality, and beneficiary mortality base tables are projected from 2012 using mortality improvement scale MP-2018. The base tables are also multiplied by adjustment factors to convert them from lives-weighted to amounts-weighted tables to account for socioeconomic effects on mortality. The adjustment factors used are as follows:

	Adjustment Factor	
	Male	**Female**
Service Retiree	0.910	0.910
Disabled Retiree	0.830	0.830
Beneficiary	0.890	0.951

   These post-adjusted probabilities were then smoothed at certain ages to reflect internal consistency between service and disability post-commencement mortality.

2. **Marital Assumption**: All active members are assumed to be married and females are assumed to be three years younger than their male spouses.

3. **Credited Service**: Calculated in whole year increments for valuation purposes.

4. **Loans**: Except for Death Benefits, it is assumed that eligible members take the maximum allowable loan at retirement.

5. **Actuarial Interest Rate (AIR)**: 7.0% per annum, net of investment expenses.

6. **COLA**: Based on an assumed long-term Consumer Price Index inflation rate of 2.5% per year. 1.5% per year for Auto COLA, 2.5% per year for Escalation.

7. **Actuarial Asset Valuation Method (AAVM):**

   The Actuary reset the Actuarial Value of Assets to market value as of June 30, 2011.

   Beginning with the June 30, 2012 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of six years.

   In accordance with this AAVM, the Unexpected Investment Returns (UIR) are phased into the Actuarial Value of Assets (AVA) at rates of 15%, 15%, 15%, 15%, 20%, and 20% per year (i.e. cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100% over a period of six years).

   The AVA is further constrained to be within a corridor of 80% to 120% of the MVA.

For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

8. **Actuarial Cost Method:** The Entry Age Normal (EAN) cost method of funding is used by the Actuary to calculate the Employer Contribution.

   Under this method, the Present Value (PV) of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the earnings (or service) of the individual between entry age and the assumed exit age(s). The employer portion of this PVFB allocated to a valuation year is the Normal Cost. The portion of this PVFB not provided for at a valuation date by the PV of Future Normal Costs or future member contributions is the Accrued Liability (AL).

   The excess, if any, of the AL over the Actuarial Value of Assets (AVA) is the Unfunded Accrued Liability (UAL).

   Under this method, actuarial gains and losses, as they occur, reduce and increase the UAL, respectively, and are explicitly identified and amortized.

   Increases or decreases in obligations due to benefit changes, actuarial assumption changes, and actuarial method changes are also explicitly identified and amortized.

   Under EAN, the explicit UALs that are developed each year are generally financed over fixed periods. Ideally, these periods are reasonably consistent with the expected future working lifetimes of all active participants. For more information see Page 12.

   Under EAN, the Normal Cost as a percentage of pay remains constant by individual and changes gradually over time for the entire plan as the characteristics of the group changes (e.g. more Tier 3 Enhanced active members decrease the average Normal Cost as a percentage of pay).

9. **Allowances for Administrative Expenses**: The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from FIRE during the second prior fiscal year.

10. **WTC Disability and Death Benefits**: Obligations attributable to the WTC Disability Benefits Law and to the WTC Death Benefits Law are determined through the use of explicit assumptions in the 2019 A&M, and through estimation techniques for post-retirement reclassifications.

11. **One-Year Lag Methodology (OYLM)**: One-Year Lag methodology uses a June 30, XX-2 valuation date to determine Fiscal Year XX employer contributions.

This methodology requires adjustments to certain components used to determine Fiscal Year XX employer contributions as follows:

a. Normal Cost

   The normal cost as of June 30, XX-2 is rolled forward with the assumed AIR of 7.0% to derive the normal cost as of December 31, XX-1.

b. UAL Payments

   For determining the UAL payments for Fiscal Year XX, and to be consistent with the OYLM, the UAL as of June 30, XX-2 is adjusted by the discounted value of employer normal cost and UAL payments paid during Fiscal Year XX-1 and the discounted value of Administrative Expenses reimbursed during Fiscal Years XX-1 and XX.

SECTION XII – SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2018 (Lag) and June 30, 2017 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by the Office of the Comptroller as of June 30, 2018 and June 30, 2017.

Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations contained in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.

Table XII-1
Status Reconciliation

CHANGES IN THE NUMBER OF ACTIVES AND PENSIONERS DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	**(1) Active Members**	**(2) Active Off Payroll**	**(3) Deferred Vested**	**(4) Service Pension**	**(5) Ordinary Disability**	**(6) Accidental Disability**	**(7) Accidental Death**	**(8) Other Beneficiary**	**(9) Pensioners Subtotal (4) to (8)**	**(10) Grand Total (1) + (2) + (3) + (9)**
Number at June 30, 2017	**11,091**	**15**	**58**	**5,086**	**787**	**9,738**	**643**	**382**	**16,636**	**27,800**
New Entrants	**612**	**1**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**625**
Rehires	**8**	**(6)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
Leaving Active Payroll	**(27)**	**27**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Vested Termination	**(10)**	**(1)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(11)**
Non-Vested Termination / Cashout	**(28)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(28)**
Accidental Death (from Active)	**(4)**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**(1)**
Ordinary Death (from Active)	**(3)**	**(1)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(4)**
Service Retirement	**(103)**	**0**	**(1)**	**105**	**0**	**0**	**0**	**0**	**105**	**1**
Ordinary Disability Retirement	**(6)**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**0**
Accidental Disability Retirement	**(293)**	**0**	**(1)**	**0**	**0**	**292**	**0**	**0**	**292**	**(2)**
Reclassifications	**0**	**0**	**0**	**(20)**	**(1)**	**20**	**8**	**2**	**9**	**9**
Death with Beneficiary	**0**	**0**	**0**	**(4)**	**0**	**(16)**	**4**	**15**	**(1)**	**(1)**
Death without Beneficiary	**0**	**0**	**0**	**(174)**	**(61)**	**(164)**	**(11)**	**(45)**	**(455)**	**(455)**
Off Pension Payroll	**0**	**0**	**0**	**0**	**0**	**0**	**(2)**	**0**	**(2)**	**(2)**
Net Change	**146**	**20**	**10**	**(93)**	**(56)**	**132**	**2**	**(28)**	**(43)**	**133**
Number at June 30, 2018	**11,237**	**35**	**68**	**4,993**	**731**	**9,870**	**645**	**354**	**16,593**	**27,933**

Graph XII-2
Headcount Summary by Status

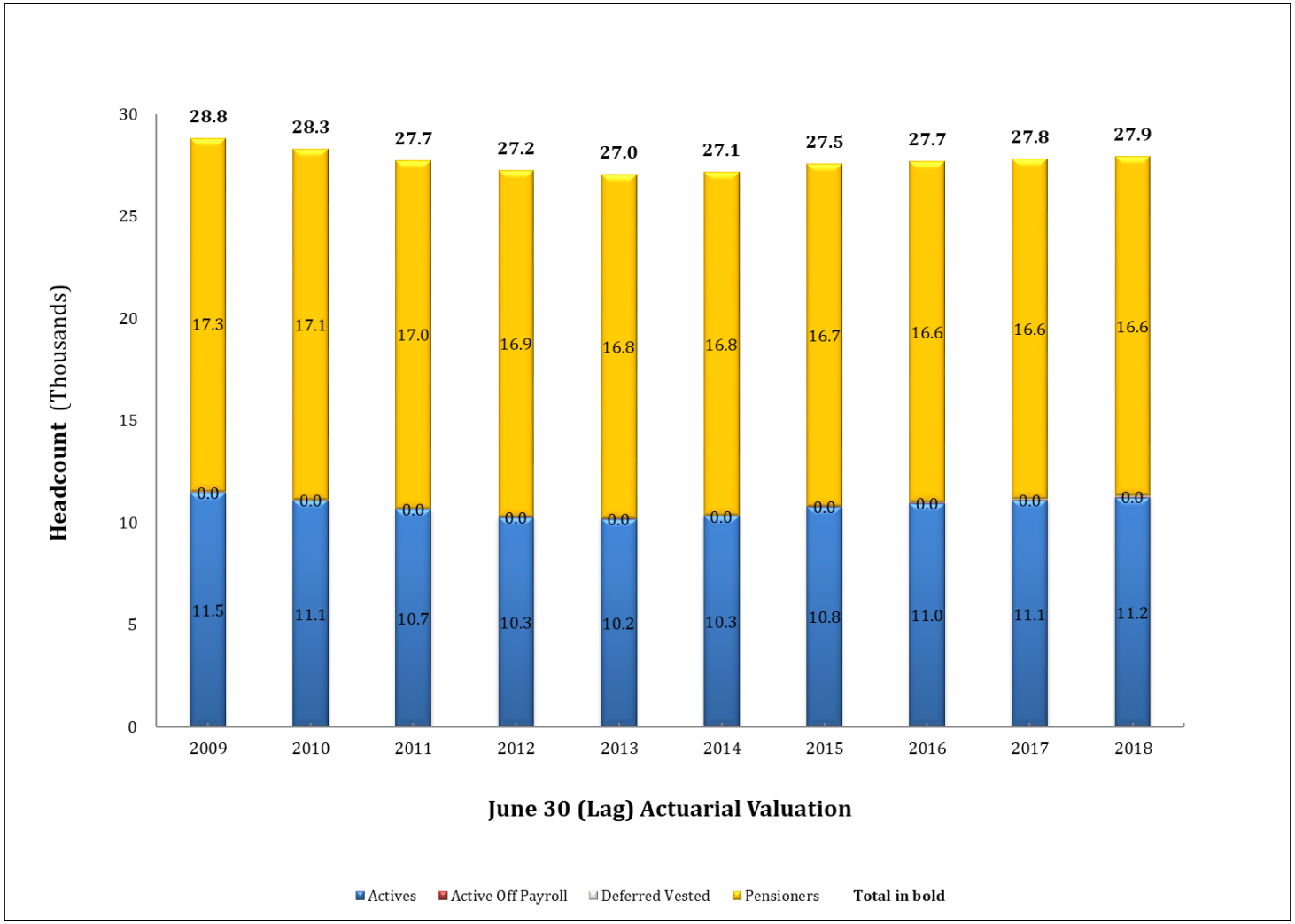

Table XII-3
Summary of Active Membership

NEW YORK CITY FIRE PENSION FUND

ACTIVE MEMBERS INCLUDED IN THE
JUNE 30, 2018 (LAG) AND THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATIONS

	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Number		
Males	11,129	11,004
Females	108	87
Total	11,237	11,091
Annual Salary[1]		
Males	$ 1,295,685,394	$ 1,247,538,831
Females	10,274,743	8,462,501
Total	$ 1,305,960,137	$ 1,256,001,332
Average Salary[1]		
Males	$ 116,424	$ 113,371
Females	95,137	97,270
Total Average	$ 116,220	$ 113,245
Average Age		
Males	40.7	40.7
Females	36.4	37.7
Total Average	40.6	40.7
Average Past Service		
Males	13.9	14.0
Females	7.1	8.9
Total Average	13.9	14.0

[1]Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Graph XII-4
Active Membership by Tier

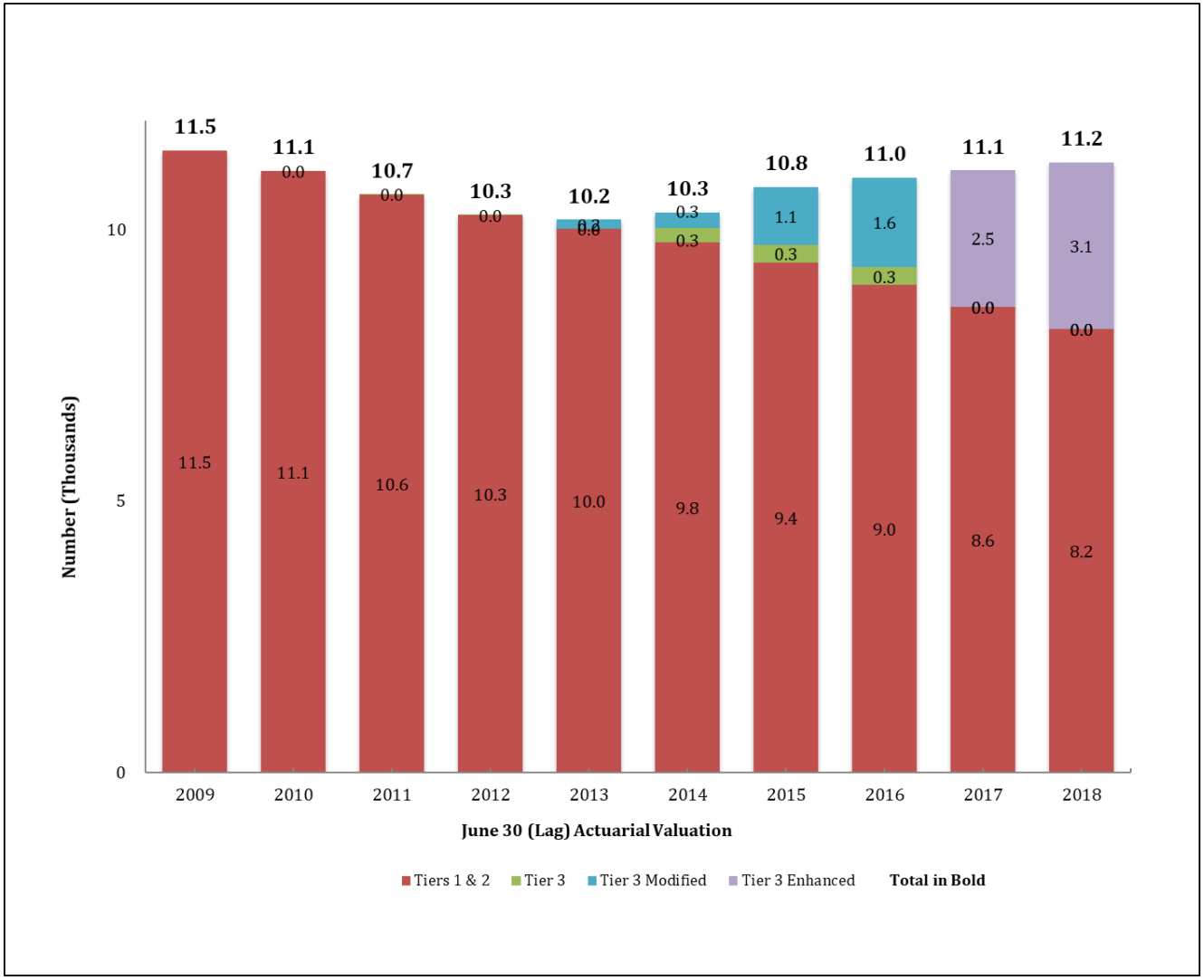

Table XII-5
Schedule of Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2009	11,460	$1,079,682,340	$94,213	3.7%
2010	11,080	1,138,187,795	102,725	9.0%
2011	10,650	1,125,459,668	105,677	2.9%
2012	10,267	1,106,113,386	107,735	1.9%
2013	10,182	1,129,706,314	110,951	3.0%
2014	10,319	1,150,389,645	111,483	0.5%
2015	10,780	1,164,994,036	108,070	(3.1%)
2016	10,951	1,180,226,281	107,773	(0.3%)
2017	11,091	1,256,001,332	113,245	5.1%
2018	11,237	1,305,960,137	116,220	2.6%

Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2018

ALL TIERS: MALE

AGE \ SVC	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	56	0	0	0	0	0	0	0	0	**56**
25 TO 29	1,162	76	4	0	0	0	0	0	0	**1,242**
30 TO 34	1,146	299	366	5	0	0	0	0	0	**1,816**
35 TO 39	283	59	1,385	447	3	0	0	0	0	**2,177**
40 TO 44	27	6	741	1,190	201	0	0	0	0	**2,165**
45 TO 49	1	1	114	810	606	156	0	0	0	**1,688**
50 TO 54	0	0	4	201	455	344	97	1	0	**1,102**
55 TO 59	0	0	0	20	101	219	215	56	0	**611**
60 TO 64	1	0	0	2	3	29	54	151	17	**257**
65 TO 69	0	0	1	1	1	1	1	5	4	**14**
70 & UP	0	0	0	0	0	0	0	1	0	**1**
TOTAL	**2,676**	**441**	**2,615**	**2,676**	**1,370**	**749**	**367**	**214**	**21**	**11,129**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	3,135	0	0	0	0	0	0	0	0	**3,135**
25 TO 29	72,320	6,862	419	0	0	0	0	0	0	**79,601**
30 TO 34	75,590	28,305	43,542	667	0	0	0	0	0	**148,105**
35 TO 39	19,160	5,435	171,369	58,791	383	0	0	0	0	**255,137**
40 TO 44	1,871	597	92,398	156,997	28,477	0	0	0	0	**280,342**
45 TO 49	185	165	14,124	107,006	89,680	23,105	0	0	0	**234,265**
50 TO 54	0	0	530	27,012	65,640	52,108	15,105	111	0	**160,505**
55 TO 59	0	0	0	2,686	14,038	32,514	33,674	9,246	0	**92,157**
60 TO 64	123	0	0	346	384	3,929	7,894	24,291	2,866	**39,833**
65 TO 69	0	0	165	165	167	167	229	928	644	**2,466**
70 & UP	0	0	0	0	0	0	0	140	0	**140**
TOTAL *	**172,384**	**41,364**	**322,548**	**353,671**	**198,769**	**111,823**	**56,902**	**34,715**	**3,511**	**1,295,685**
*AVERAGE SALARIES: ***										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	55,976	0	0	0	0	0	0	0	0	**55,976**
25 TO 29	62,237	90,290	104,724	0	0	0	0	0	0	**64,091**
30 TO 34	65,960	94,666	118,968	133,438	0	0	0	0	0	**81,555**
35 TO 39	67,702	92,120	123,732	131,523	127,566	0	0	0	0	**117,197**
40 TO 44	69,314	99,525	124,694	131,930	141,679	0	0	0	0	**129,488**
45 TO 49	184,918	164,747	123,897	132,107	147,987	148,106	0	0	0	**138,782**
50 TO 54	0	0	132,569	134,387	144,265	151,476	155,717	110,561	0	**145,649**
55 TO 59	0	0	0	134,280	138,988	148,464	156,625	165,101	0	**150,830**
60 TO 64	123,368	0	0	173,178	127,867	135,493	146,184	160,865	168,600	**154,994**
65 TO 69	0	0	165,145	165,227	167,285	167,285	228,945	185,618	161,080	**176,164**
70 & UP	0	0	0	0	0	0	0	139,786	0	**139,786**
TOTAL	**64,418**	**93,796**	**123,345**	**132,164**	**145,087**	**149,296**	**155,046**	**162,218**	**167,168**	**116,424**

Note: Age is nearest birthday. Service is nearest year.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6

Detailed Active Membership and Salaries as of June 30, 2018 (cont'd)

	ALL TIERS: FEMALE									
AGE \ SVC	**UNDER 5**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 & UP**	**ALL YEARS**
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	1	0	0	0	0	0	0	0	0	**1**
25 TO 29	27	1	0	0	0	0	0	0	0	**28**
30 TO 34	20	2	2	0	0	0	0	0	0	**24**
35 TO 39	9	1	6	2	0	0	0	0	0	**18**
40 TO 44	0	0	10	8	2	0	0	0	0	**20**
45 TO 49	0	2	1	7	1	0	0	0	0	**11**
50 TO 54	2	0	0	0	2	0	0	0	0	**4**
55 TO 59	0	1	0	0	0	0	0	0	0	**1**
60 TO 64	0	0	0	0	0	0	0	0	0	**0**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	1	0	0	0	0	0	**1**
TOTAL	**59**	**7**	**19**	**18**	**5**	**0**	**0**	**0**	**0**	**108**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	59	0	0	0	0	0	0	0	0	**59**
25 TO 29	1,627	78	0	0	0	0	0	0	0	**1,705**
30 TO 34	1,331	192	228	0	0	0	0	0	0	**1,751**
35 TO 39	679	114	663	241	0	0	0	0	0	**1,697**
40 TO 44	0	0	1,271	990	251	0	0	0	0	**2,512**
45 TO 49	0	329	121	994	138	0	0	0	0	**1,582**
50 TO 54	303	0	0	0	335	0	0	0	0	**638**
55 TO 59	0	164	0	0	0	0	0	0	0	**164**
60 TO 64	0	0	0	0	0	0	0	0	0	**0**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	166	0	0	0	0	0	**166**
TOTAL *	**4,000**	**877**	**2,283**	**2,391**	**724**	**0**	**0**	**0**	**0**	**10,275**
*AVERAGE SALARIES: ***										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	59,184	0	0	0	0	0	0	0	0	**59,184**
25 TO 29	60,256	78,407	0	0	0	0	0	0	0	**60,905**
30 TO 34	66,561	95,874	113,770	0	0	0	0	0	0	**72,938**
35 TO 39	75,491	113,557	110,536	120,411	0	0	0	0	0	**94,278**
40 TO 44	0	0	127,091	123,778	125,528	0	0	0	0	**125,609**
45 TO 49	0	164,641	120,990	141,938	138,017	0	0	0	0	**143,805**
50 TO 54	151,576	0	0	0	167,615	0	0	0	0	**159,595**
55 TO 59	0	164,075	0	0	0	0	0	0	0	**164,075**
60 TO 64	0	0	0	0	0	0	0	0	0	**0**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	166,216	0	0	0	0	0	**166,216**
TOTAL	**67,795**	**125,295**	**120,140**	**132,824**	**144,860**	**0**	**0**	**0**	**0**	**95,137**

Note: Age is nearest birthday. Service is nearest year.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6

Detailed Active Membership and Salaries as of June 30, 2018 (cont'd)

	ALL TIERS: ALL MEMBERS									
AGE \ SVC	**UNDER 5**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 & UP**	**ALL YEARS**
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	57	0	0	0	0	0	0	0	0	**57**
25 TO 29	1,189	77	4	0	0	0	0	0	0	**1,270**
30 TO 34	1,166	301	368	5	0	0	0	0	0	**1,840**
35 TO 39	292	60	1,391	449	3	0	0	0	0	**2,195**
40 TO 44	27	6	751	1,198	203	0	0	0	0	**2,185**
45 TO 49	1	3	115	817	607	156	0	0	0	**1,699**
50 TO 54	2	0	4	201	457	344	97	1	0	**1,106**
55 TO 59	0	1	0	20	101	219	215	56	0	**612**
60 TO 64	1	0	0	2	3	29	54	151	17	**257**
65 TO 69	0	0	1	1	1	1	1	5	4	**14**
70 & UP	0	0	0	1	0	0	0	1	0	**2**
TOTAL	**2,735**	**448**	**2,634**	**2,694**	**1,375**	**749**	**367**	**214**	**21**	**11,237**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	3,194	0	0	0	0	0	0	0	0	**3,194**
25 TO 29	73,947	6,940	419	0	0	0	0	0	0	**81,306**
30 TO 34	76,921	28,497	43,770	667	0	0	0	0	0	**149,855**
35 TO 39	19,839	5,549	172,032	59,032	383	0	0	0	0	**256,834**
40 TO 44	1,871	597	93,669	157,987	28,729	0	0	0	0	**282,854**
45 TO 49	185	494	14,245	108,000	89,818	23,105	0	0	0	**235,847**
50 TO 54	303	0	530	27,012	65,976	52,108	15,105	111	0	**161,144**
55 TO 59	0	164	0	2,686	14,038	32,514	33,674	9,246	0	**92,321**
60 TO 64	123	0	0	346	384	3,929	7,894	24,291	2,866	**39,833**
65 TO 69	0	0	165	165	167	167	229	928	644	**2,466**
70 & UP	0	0	0	166	0	0	0	140	0	**306**
TOTAL *	**176,384**	**42,241**	**324,831**	**356,061**	**199,494**	**111,823**	**56,902**	**34,715**	**3,511**	**1,305,960**
*AVERAGE SALARIES: ***										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	56,032	0	0	0	0	0	0	0	0	**56,032**
25 TO 29	62,192	90,136	104,724	0	0	0	0	0	0	**64,021**
30 TO 34	65,970	94,674	118,940	133,438	0	0	0	0	0	**81,443**
35 TO 39	67,942	92,477	123,675	131,474	127,566	0	0	0	0	**117,009**
40 TO 44	69,314	99,525	124,726	131,876	141,520	0	0	0	0	**129,453**
45 TO 49	184,918	164,676	123,871	132,191	147,970	148,106	0	0	0	**138,815**
50 TO 54	151,576	0	132,569	134,387	144,367	151,476	155,717	110,561	0	**145,700**
55 TO 59	0	164,075	0	134,280	138,988	148,464	156,625	165,101	0	**150,851**
60 TO 64	123,368	0	0	173,178	127,867	135,493	146,184	160,865	168,600	**154,994**
65 TO 69	0	0	165,145	165,227	167,285	167,285	228,945	185,618	161,080	**176,164**
70 & UP	0	0	0	166,216	0	0	0	139,786	0	**153,001**
TOTAL	**64,491**	**94,288**	**123,322**	**132,168**	**145,086**	**149,296**	**155,046**	**162,218**	**167,168**	**116,220**

Note: Age is nearest birthday. Service is nearest year.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-7
Summary of Non-Pensioner Membership

		TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2018					TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2017				
TIER	**GENDER**	**NUMBER**	**SALARY**	**AVG SAL**	**AVG AGE**	**AVG SVC**	**NUMBER**	**SALARY**	**AVG SAL**	**AVG AGE**	**AVG SVC**
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	8,118	1,091,886,792	134,502	44.5	18.1	8,532	1,096,254,213	128,487	43.8	17.5
II	F	45	5,741,282	127,584	42.5	14.5	49	5,948,333	121,395	42.1	14.2
		8,163	1,097,628,074	134,464	44.5	18.1	8,581	1,102,202,546	128,447	43.8	17.4
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Modified	M	2	148,875	74,438	32.5	3.5	2	132,188	66,094	31.5	3.0
III Modified	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	148,875	74,438	32.5	3.5	2	132,188	66,094	31.5	3.0
III Enhanced	M	3,009	203,649,727	67,680	30.3	2.6	2,470	151,152,430	61,195	30.0	2.2
III Enhanced	F	63	4,533,461	71,960	32.0	1.9	38	2,514,168	66,162	32.0	2.1
		3,072	208,183,188	67,768	30.4	2.6	2,508	153,666,598	61,271	30.0	2.2
ALL TIERS		**11,237**	**1,305,960,137**	**116,220**	**40.6**	**13.9**	**11,091**	**1,256,001,332**	**113,245**	**40.7**	**14.0**

		JUNE 30, 2018 MEMBERS ALSO PRESENT AS OF JUNE 30, 2017					JUNE 30, 2017 MEMBERS ALSO PRESENT AS OF JUNE 30, 2018				
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	8,105	1,090,872,660	134,593	44.5	18.2	8,105	1,039,519,563	128,257	43.5	17.2
II	F	45	5,741,282	127,584	42.5	14.5	45	5,372,825	119,396	41.5	13.5
		8,150	1,096,613,942	134,554	44.5	18.1	8,150	1,044,892,388	128,208	43.5	17.1
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Modified	M	2	148,875	74,438	32.5	3.5	2	132,188	66,094	31.5	3.0
III Modified	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	148,875	74,438	32.5	3.5	2	132,188	66,094	31.5	3.0
III Enhanced	M	2,422	170,942,097	70,579	31.0	3.1	2,422	148,423,142	61,281	30.0	2.2
III Enhanced	F	36	2,757,753	76,604	33.0	3.1	36	2,398,578	66,627	32.0	2.1
		2,458	173,699,850	70,667	31.0	3.1	2,458	150,821,720	61,360	30.0	2.2
ALL TIERS		**10,610**	**1,270,462,667**	**119,742**	**41.4**	**14.7**	**10,610**	**1,195,846,296**	**112,709**	**40.4**	**13.7**

		ADDITIONS DURING THE YEAR [1]					SEPARATIONS FROM MEMBERSHIP DURING THE YEAR [1]				
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	13	1,014,132	78,010	34.8	7.8	427	56,734,650	132,868	50.0	23.2
II	F	0	0	0	0.0	0.0	4	575,508	143,877	49.0	23.0
		13	1,014,132	78,010	34.8	7.8	431	57,310,158	132,970	50.0	23.2
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Modified	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Modified	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Enhanced	M	587	32,707,630	55,720	27.6	0.5	48	2,729,288	56,860	31.0	0.9
III Enhanced	F	27	1,775,708	65,767	30.6	0.3	2	115,590	57,795	31.5	1.0
		614	34,483,338	56,162	27.8	0.5	50	2,844,878	56,898	31.0	0.9
ALL TIERS		**627**	**35,497,470**	**56,615**	**27.9**	**0.7**	**481**	**60,155,036**	**125,062**	**48.0**	**20.8**

Note: Age is nearest birthday. Service is nearest year. The member is considered also present if active with the same tier and gender as of both valuation dates.

[1] Separations and additions do not include members who joined after June 30, 2017 and are no longer members on June 30, 2018. Members are included as separations and additions if the tier or gender has changed.

Table XII-8
Summary of Non-Pensioner Membership as of June 30, 2018

	TIER 1		TIER 2		TIER 3		TIER 3 MODIFIED		TIER 3 ENHANCED		ALL TIERS	
STATUS	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**
MALES:												
ACTIVES	0	0	8,118	1,091,886,792	0	0	2	148,875	3,009	203,649,727	11,129	1,295,685,394
ACTIVE OFF PAYROLL	0	0	17	2,058,312	0	0	0	0	16	928,433	33	2,986,745
VESTED	0	0	66	6,048,079	0	0	0	0	0	0	66	6,048,079
ALL STATUS	**0**	**0**	**8,201**	**1,099,993,183**	**0**	**0**	**2**	**148,875**	**3,025**	**204,578,160**	**11,228**	**1,304,720,218**
FEMALES:												
ACTIVES	0	0	45	5,741,282	0	0	0	0	63	4,533,461	108	10,274,743
ACTIVE OFF PAYROLL	0	0	1	73,465	0	0	0	0	1	74,260	2	147,725
VESTED	0	0	2	206,327	0	0	0	0	0	0	2	206,327
ALL STATUS	**0**	**0**	**48**	**6,021,074**	**0**	**0**	**0**	**0**	**64**	**4,607,721**	**112**	**10,628,795**
TOTAL:												
ACTIVES	0	0	8,163	1,097,628,074	0	0	2	148,875	3,072	208,183,188	11,237	1,305,960,137
ACTIVE OFF PAYROLL	0	0	18	2,131,777	0	0	0	0	17	1,002,693	35	3,134,470
VESTED	0	0	68	6,254,406	0	0	0	0	0	0	68	6,254,406
ALL STATUS	**0**	**0**	**8,249**	**1,106,014,257**	**0**	**0**	**2**	**148,875**	**3,089**	**209,185,881**	**11,340**	**1,315,349,013**

[1]Salary shown for Active Off Payroll and Vested members is the salary when last on payroll.

Table XII-9
Summary of Pensioner Membership

Group	June 30, 2018 (Lag)				June 30, 2017 (Lag)			
	Number	Annual Amounts Payable			Number	Annual Amounts Payable		
		Plan Benefit	Supplementation	Total		Plan Benefit	Supplementation	Total
Service Pensioners	**4,993**	$ 234,865,273	$ 22,591,698	**$ 257,456,971**	**5,086**	$ 228,733,390	$ 23,242,239	**$ 251,975,629**
Ordinary Disability Pensioners	**731**	34,985,459	4,590,381	**$ 39,575,840**	**787**	36,591,358	5,040,510	**$ 41,631,868**
Accidental Disability Pensioners	**9,870**	824,576,147	37,861,826	**$ 862,437,973**	**9,738**	787,024,157	37,909,168	**$ 824,933,325**
Beneficiaries of Members Killed in the Line-of-Duty	**645**	69,618,491	2,635,199	**$ 72,253,690**	**643**	66,876,559	2,558,895	**$ 69,435,454**
Other Beneficiaries	**354**	8,177,254	908,482	**$ 9,085,736**	**382**	7,118,822	1,039,627	**$ 8,158,449**
Total	**16,593**	**$ 1,172,222,624**	**$ 68,587,586**	**$ 1,240,810,210**	**16,636**	**$ 1,126,344,286**	**$ 69,790,439**	**$ 1,196,134,725**

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2018

	MALE			FEMALE			TOTAL		
AGE	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**
SERVICE RETIREMENT:									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	7	451,657	64,522	0	0	0	7	451,657	64,522
45 TO 49	45	3,290,366	73,119	1	83,543	83,543	46	3,373,909	73,346
50 TO 54	163	12,470,172	76,504	0	0	0	163	12,470,172	76,504
55 TO 59	380	28,899,865	76,052	1	109,056	109056	381	29,008,921	76,139
60 TO 64	722	47,366,364	65,604	4	185,638	46,410	726	47,552,002	65,499
65 TO 69	596	36,181,716	60,708	3	257,863	85,954	599	36,439,579	60,834
70 TO 74	672	33,850,583	50,373	0	0	0	672	33,850,583	50,373
75 TO 79	872	37,952,232	43,523	0	0	0	872	37,952,232	43,523
80 TO 84	810	31,205,720	38,526	1	35,156	35156	811	31,240,876	38,521
85 TO 89	461	16,529,353	35,855	0	0	0	461	16,529,353	35,855
90 & UP	255	8,587,687	33,677	0	0	0	255	8,587,687	33,677
TOTAL	**4,983**	**256,785,715**	**51,532**	**10**	**671,256**	**67,126**	**4,993**	**257,456,971**	**51,564**
ORDINARY DISABILITY:									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	1	61,466	61466	0	0	0	1	61,466	61466
35 TO 39	1	55,089	55089	0	0	0	1	55,089	55089
40 TO 44	7	287,976	41,139	0	0	0	7	287,976	41,139
45 TO 49	6	237,938	39,656	0	0	0	6	237,938	39,656
50 TO 54	14	548,731	39,195	0	0	0	14	548,731	39,195
55 TO 59	15	434,535	28,969	0	0	0	15	434,535	28,969
60 TO 64	49	1,267,447	25,866	1	29,364	29,364	50	1,296,811	25,936
65 TO 69	33	978,882	29,663	0	0	0	33	978,882	29,663
70 TO 74	60	3,948,748	65,812	0	0	0	60	3,948,748	65,812
75 TO 79	147	9,019,051	61,354	0	0	0	147	9,019,051	61,354
80 TO 84	188	11,471,960	61,021	0	0	0	188	11,471,960	61,021
85 TO 89	138	7,600,750	55,078	0	0	0	138	7,600,750	55,078
90 & UP	71	3,633,903	51,182	0	0	0	71	3,633,903	51,182
TOTAL	**730**	**39,546,476**	**54,173**	**1**	**29,364**	**29,364**	**731**	**39,575,840**	**54,139**
ACCIDENTAL DISABILITY:									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	3	231,048	77,016	0	0	0	3	231,048	77,016
35 TO 39	99	9,473,558	95,693	2	204,950	102,475	101	9,678,508	95,827
40 TO 44	318	31,062,143	97,680	0	0	0	318	31,062,143	97,680
45 TO 49	660	65,249,079	98,862	2	166,287	83,144	662	65,415,366	98,815
50 TO 54	1,135	116,592,687	102,725	0	0	0	1,135	116,592,687	102,725
55 TO 59	1,635	168,800,061	103,242	3	228,297	76,099	1,638	169,028,358	103,192
60 TO 64	2,016	197,040,563	97,738	6	596,646	99,441	2,022	197,637,209	97,743
65 TO 69	1,065	95,876,544	90,025	8	694,192	86,774	1,073	96,570,736	90,001
70 TO 74	810	60,405,565	74,575	0	0	0	810	60,405,565	74,575
75 TO 79	852	52,834,777	62,013	0	0	0	852	52,834,777	62,013
80 TO 84	787	40,645,029	51,646	1	66,910	66,910	788	40,711,939	51,665
85 TO 89	328	15,713,075	47,906	0	0	0	328	15,713,075	47,906
90 & UP	140	6,556,562	46,833	0	0	0	140	6,556,562	46,833
TOTAL	**9,848**	**860,480,691**	**87,376**	**22**	**1,957,282**	**88,967**	**9,870**	**862,437,973**	**87,380**

Table XII-10

Distribution of Pension Benefits by Cause and Age as of June 30, 2018 (cont'd)

	MALE			FEMALE			TOTAL		
AGE	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**
ACCIDENTAL DEATH:									
UNDER 30	0	0	0	5	570,094	114,019	5	570,094	114,019
30 TO 34	0	0	0	1	191,206	191206	1	191,206	191206
35 TO 39	0	0	0	2	275,974	137,987	2	275,974	137,987
40 TO 44	0	0	0	12	1,360,040	113,337	12	1,360,040	113,337
45 TO 49	0	0	0	49	5,702,413	116,376	49	5,702,413	116,376
50 TO 54	0	0	0	82	9,581,190	116,844	82	9,581,190	116,844
55 TO 59	0	0	0	112	14,252,112	127,251	112	14,252,112	127,251
60 TO 64	0	0	0	89	11,512,939	129,359	89	11,512,939	129,359
65 TO 69	3	194,322	64,774	63	7,543,165	119,733	66	7,737,487	117,235
70 TO 74	0	0	0	65	7,099,566	109,224	65	7,099,566	109,224
75 TO 79	0	0	0	67	6,668,716	99,533	67	6,668,716	99,533
80 TO 84	1	73,531	73,531	47	4,142,237	88,133	48	4,215,768	87,829
85 TO 89	0	0	0	28	2,092,874	74,746	28	2,092,874	74,746
90 & UP	0	0	0	19	993,311	52,280	19	993,311	52,280
TOTAL	**4**	**267,853**	**66,963**	**641**	**71,985,837**	**112,302**	**645**	**72,253,690**	**112,021**
OTHER BENEFICIARIES:									
UNDER 30	0	0	0	4	252,863	63,216	4	252,863	63,216
30 TO 34	0	0	0	2	108,755	54,378	2	108,755	54,378
35 TO 39	0	0	0	3	163,932	54,644	3	163,932	54,644
40 TO 44	0	0	0	1	101,543	101543	1	101,543	101543
45 TO 49	1	122,869	122869	0	0	0	1	122,869	122,869
50 TO 54	1	93,217	93217	7	396,705	56,672	8	489,922	61,240
55 TO 59	1	23,535	23,535	14	745,485	53,249	15	769,020	51,268
60 TO 64	0	0	0	23	1,060,862	46,124	23	1,060,862	46,124
65 TO 69	0	0	0	23	920,418	40,018	23	920,418	40,018
70 TO 74	0	0	0	32	1,196,082	37,378	32	1,196,082	37,378
75 TO 79	0	0	0	38	1,066,396	28,063	38	1,066,396	28,063
80 TO 84	0	0	0	50	1,216,742	24,335	50	1,216,742	24,335
85 TO 89	0	0	0	37	672,483	18,175	37	672,483	18,175
90 & UP	0	0	0	117	943,849	8,067	117	943,849	8,067
TOTAL	**3**	**239,621**	**79,874**	**351**	**8,846,115**	**25,203**	**354**	**9,085,736**	**25,666**
ALL PENSIONERS AND BENEFICIARIES:									
UNDER 30	0	0	0	9	822,957	91,440	9	822,957	91,440
30 TO 34	4	292,514	73,129	3	299,961	99,987	7	592,475	84,639
35 TO 39	100	9,528,647	95,286	7	644,856	92,122	107	10,173,503	95,079
40 TO 44	332	31,801,776	95,788	13	1,461,583	112,429	345	33,263,359	96,416
45 TO 49	712	68,900,252	96,770	52	5,952,243	114,466	764	74,852,495	97,974
50 TO 54	1,313	129,704,807	98,785	89	9,977,895	112,111	1,402	139,682,702	99,631
55 TO 59	2,031	198,157,996	97,567	130	15,334,950	117,961	2,161	213,492,946	98,794
60 TO 64	2,787	245,674,374	88,150	123	13,385,449	108,825	2,910	259,059,823	89,024
65 TO 69	1,697	133,231,464	78,510	97	9,415,638	97,068	1,794	142,647,102	79,513
70 TO 74	1,542	98,204,896	63,687	97	8,295,648	85,522	1,639	106,500,544	64,979
75 TO 79	1,871	99,806,060	53,344	105	7,735,112	73,668	1,976	107,541,172	54,424
80 TO 84	1,786	83,396,240	46,694	99	5,461,045	55,162	1,885	88,857,285	47,139
85 TO 89	927	39,843,178	42,981	65	2,765,357	42,544	992	42,608,535	42,952
90 & UP	466	18,778,152	40,296	136	1,937,160	14,244	602	20,715,312	34,411
TOTAL	**15,568**	**1,157,320,356**	**74,340**	**1,025**	**83,489,854**	**81,454**	**16,593**	**1,240,810,210**	**74,779**

Graph XII-11
Pensioner Average Benefits

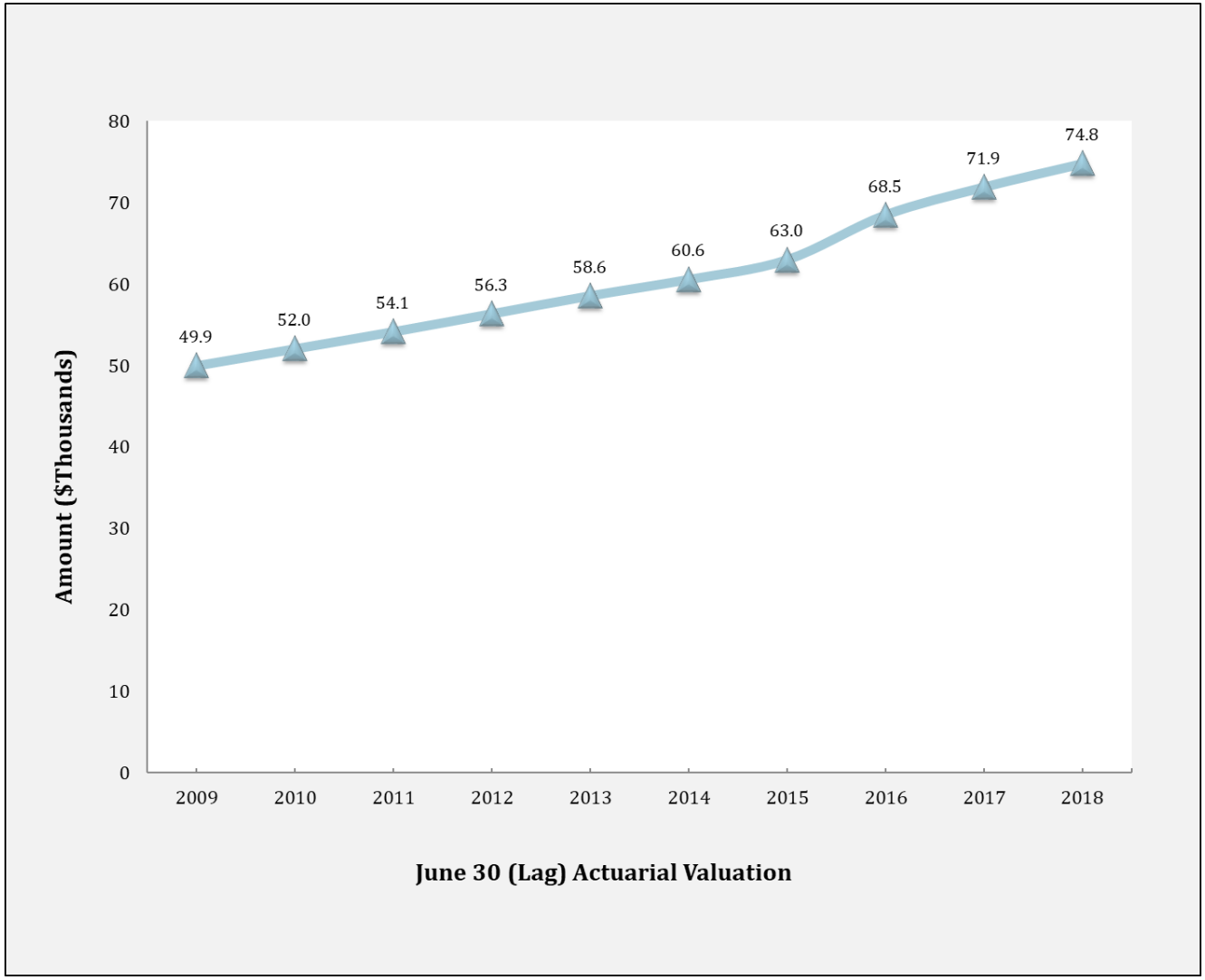

Table XII-12
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
	Added to Rolls		Removed from Rolls		End of Year Rolls			
June 30 (Lag) Actuarial Valuation	Number	Annual Allowances[1]	Number	Annual Allowances	Number	Annual Allowances[2]	% Increase In Annual Allowances	Average Annual Allowances
2009	476	49,098,185	617	20,247,862	17,263	862,197,482	3.5%	49,945
2010	556	54,883,701	679	25,161,316	17,140	891,919,867	3.4%	52,037
2011	653	64,843,804	776	35,553,289	17,017	921,210,382	3.3%	54,135
2012	538	58,288,645	638	26,379,782	16,917	953,119,245	3.5%	56,341
2013	453	54,522,199	563	23,448,369	16,807	984,193,075	3.3%	58,559
2014	490	54,256,974	534	23,299,539	16,763	1,015,150,510	3.1%	60,559
2015	500	59,578,951	553	22,526,507	16,710	1,052,202,954	3.6%	62,968
2016[3]	498	110,481,515	561	22,667,718	16,647	1,140,016,751	8.3%	68,482
2017	497	77,245,492	508	21,127,518	16,636	1,196,134,725	4.9%	71,900
2018	456	65,902,484	499	21,226,999	16,593	1,240,810,210	3.7%	74,779

[1] Amounts shown include changes due to benefit finalization, changes in benefit type (e.g. Service to Accident Disability), COLA increases and other changes.

[2] Allowances shown are those used in the actuarial valuation as of the Year End date and are not adjusted for anticipated changes due to finalization of benefit calculations or contract settlements.

[3] Beginning in 2016, SADB payments to beneficiaries are included.

APPENDIX: ACRONYMS AND ABBREVIATIONS

2019 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by Board of Trustees during Fiscal Year 2019
AAVM	Actuarial Asset Valuation Method
ACCNY	Administrative Code of the City of New York
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contributions
AVA	Actuarial Value of Assets
CAFR	Comprehensive Annual Financial Report
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
EIR	Expected Investment Return
FAS	Final Average Salary
FIRE	New York City Fire Pension Fund
FFVSF	Firefighters Variable Supplements Fund
FOVSF	Fire Officers Variable Supplements Fund
FS	Final Salary
GASB	Governmental Accounting Standards Board
GASB25	Governmental Accounting Standards Board Statement No. 25
GASB67	Governmental Accounting Standards Board Statement No. 67
GASB68	Governmental Accounting Standards Board Statement No. 68
IRC	Internal Revenue Code
ITHP	Increased-Take-Home-Pay
MVA	Market Value of Assets
OYLM	One-Year Lag Methodology
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
PVFS	Present Value of Future Salary
UAL	Unfunded Accrued Liability
UIR	Unexpected Investment Return
VSF	Variable Supplements Fund
WTC	World Trade Center