



Fiscal Year 2022
Actuarial Valuation Report
for the
New York City
Fire Pension Fund

JUNE 30, 2020 (LAG) ACTUARIAL VALUATION

prepared by the
New York City
Office of the Actuary

2022



OFFICE OF THE ACTUARY

255 GREENWICH STREET • 9TH FLOOR
NEW YORK, NY 10007
(212) 442-5775 • FAX: (212) 442-5777

MICHAEL J. SAMET
INTERIM CHIEF ACTUARY

September 2, 2022

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 2022 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2020 (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, 2020 (Lag) valuation, forms the basis for determining the statutorily required contribution (Statutory Contribution) of \$1,446,991,622 for Fiscal Year 2022 (i.e., for the period beginning July 1, 2021 and ending June 30, 2022). 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, 2019 (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, 2020 (Lag) and June 30, 2019 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll service providers. Financial information was provided by FIRE and the Office of the Comptroller as of June 30, 2020 and June 30, 2019.

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. There have been no changes since the prior year.

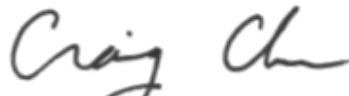
This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary will publish the Fiscal Year 2022 GASB67 and GASB68 results in September 2022, which will be available on the website of the Office of the Actuary (www.nyc.gov/actuary).

The undersigned actuaries are Fellows of the Society of Actuaries and Members of the American Academy of Actuaries. In addition, Craig T. Chu is an Enrolled Actuary under the Employee Retirement Income Security Act of 1974 and a Fellow of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of our 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,



Michael J. Samet, FSA, MAAA
Interim Chief Actuary



Craig T. Chu, FSA, EA, MAAA, FCA
Deputy Chief Actuary

MJS/eh

cc: Melissa Chacko, FSA, EA - New York City Office of the Actuary
Patrick Dunn - New York City Fire Pension Fund
Crag Lu, ASA - New York City Office of the Actuary
Keith Snow, Esq. - New York City Office of the Actuary
Lei Tian - New York City Fire Pension Fund
Marek Tyszkiewicz, ASA - New York City Office of the Actuary
Gregory Zelikovsky, ASA - New York City Office of the Actuary

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SECTION I - EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2020 (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 2022 (i.e., July 1, 2021 to June 30, 2022),
- 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 for Fiscal Year 2020 as determined by the Actuary in a letter dated August 28, 2020 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, 2020 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2019 (Lag) actuarial valuation.

NEW YORK CITY FIRE PENSION FUND		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2020 (Lag)	June 30, 2019 (Lag)
Fiscal Year	2022	2021
Funded Status		
1. Accrued Liability ¹	\$ 23,491,616,573	\$ 22,824,418,903
2. Actuarial Value of Assets (AVA) ²	16,745,000,411	15,719,878,166
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 6,746,616,162	\$ 7,104,540,737
4. Market Value of Assets (MVA)	15,086,575,000	14,337,618,000
5. Unfunded Accrued Liability (MVA Basis) (1. - 4.)	\$ 8,405,041,573	\$ 8,486,800,903
6. Funded Ratio (MVA Basis) (4. / 1.)	64.2%	62.8%
Contribution³		
1. Normal Cost	\$ 603,605,747	\$ 606,173,530
2. Amortization of Unfunded Accrued Liability	832,931,793	819,513,747
3. Administrative Expenses	10,454,082	11,289,859
4. Actuarial Contribution (1. + 2. + 3.)	\$ 1,446,991,622	\$ 1,436,977,136
5. Statutory Contribution (4.)	\$ 1,446,991,622	\$ 1,436,977,136
Participant Data		
1. Active Members		
a. Number	11,079	11,244
b. Annual Salary ⁴	\$ 1,348,006,398	\$ 1,336,843,002
c. Average Salary	\$ 121,672	\$ 118,894
2. Terminated Nonvested Members/Actives Off Payroll ⁵	0	28
3. Deferred Vested Members	64	67
4. Retirees and Beneficiaries		
a. Number	16,624	16,628
b. Total Annual Benefits	\$ 1,341,351,103	\$ 1,294,170,638
c. Average Annual Benefit	\$ 80,688	\$ 77,831

¹ Includes unfunded Accrued Liability for VSFs, if any.

² Includes adjustments for receivable contributions.

³ Includes results for VSFs.

⁴ Salaries shown are the base salary plus assumed overtime paid and reflect certain salary increases with retroactive dates, if any, that are not yet reflected in census data.

⁵ Actives Off Payroll as of June 30, 2019 (Lag) represents members no longer on payroll, but not otherwise classified.

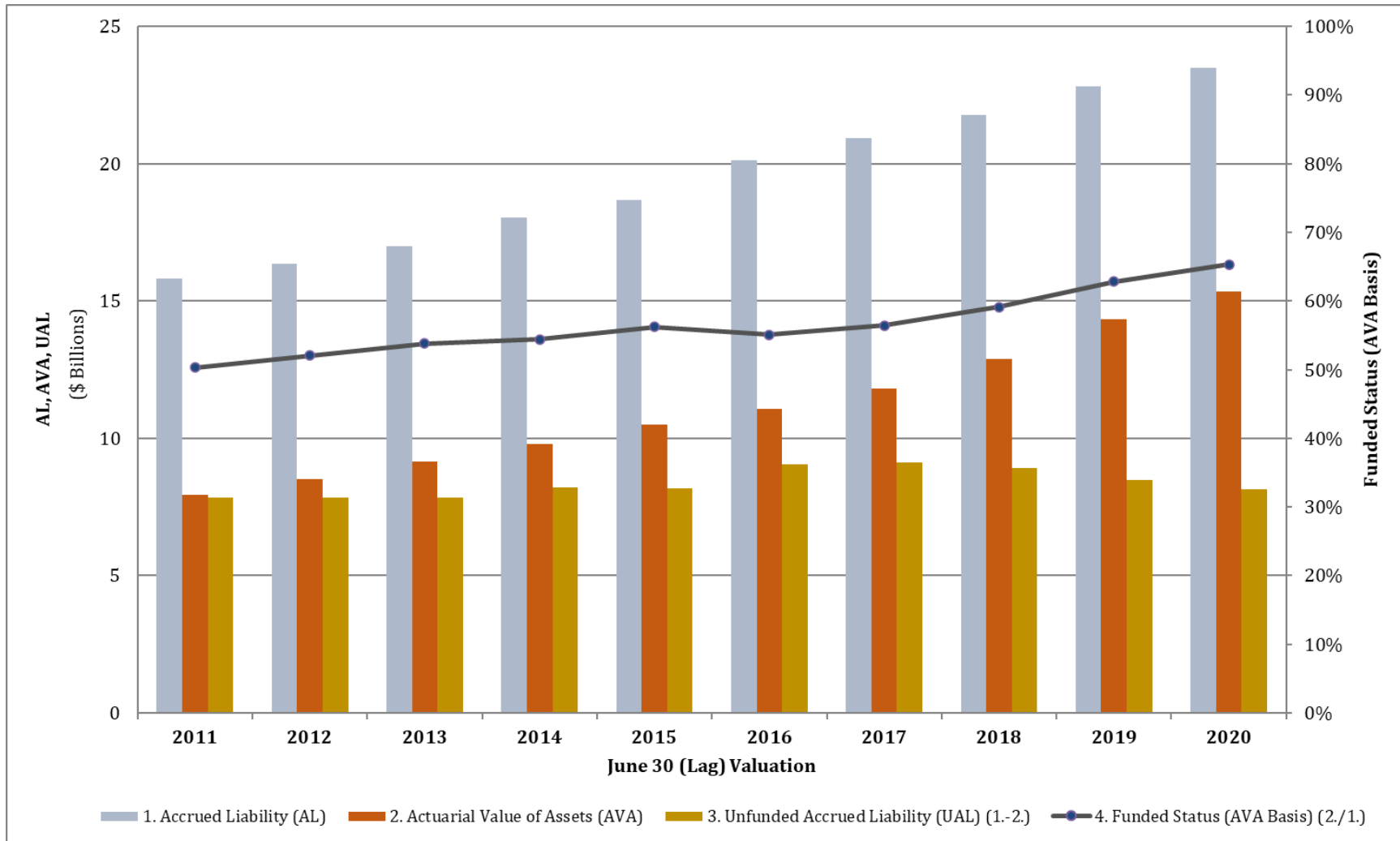
Table I-2
Actuarial Liabilities

NEW YORK CITY FIRE PENSION FUND		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2020 (Lag)	June 30, 2019 (Lag)
Fiscal Year	2022	2021
Accrued Liability		
1. Active Members	\$ 8,350,779,789	\$ 8,284,636,413
2. Terminated Nonvested Members/Actives Off Payroll ¹	0	5,354,344
3. Deferred Vested Members	15,986,181	16,130,101
4. Retirees and Beneficiaries	<u>14,915,140,282</u>	<u>14,351,915,056</u>
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 23,281,906,252	\$ 22,658,035,914
6. Actuarial Adjustments ²	<u>209,710,321</u>	<u>166,382,989</u>
7. Total Accrued Liability (5. + 6.)	\$ 23,491,616,573	\$ 22,824,418,903
Present Value of Benefits		
1. Active Members	\$ 14,109,006,950	\$ 14,158,529,182
2. Terminated Nonvested Members/Actives Off Payroll ¹	0	5,354,344
3. Deferred Vested Members	15,986,181	16,130,101
4. Retirees and Beneficiaries	<u>14,915,140,282</u>	<u>14,351,915,056</u>
5. Present Value of Benefits Pre-adjustments (1. to 4.)	\$ 29,040,133,413	\$ 28,531,928,683
6. Actuarial Adjustments ²	<u>288,383,888</u>	<u>240,372,685</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 29,328,517,301	\$ 28,772,301,368

¹ Actives Off Payroll as of June 30, 2019 (Lag) represents members no longer on payroll, but not otherwise classified.

² Includes unfunded VSF liability, if any, 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 and as of June 30, 2019. Beginning with the June 30, 2020 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years. In accordance with this AAVM, the Unexpected Investment Returns (UIR) are phased into the AVA at rates of 20% per year.

UIR is defined as the excess of net investment return over the Expected Investment Return (EIR) based on the expected rate of return on the MVA, where EIR is based on beginning-of-fiscal-year MVA and assumes all net cash flow occurs midyear.

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, 2020	June 30, 2019
ASSETS		
Cash	\$ 3,118	\$ 6,770
Receivables		
Investment Securities Sold	\$ 372,313	\$ 269,966
Member Loans	20,559	23,052
Accrued Interest and Dividends	37,900	36,211
Other Receivables	<u>91</u>	<u>225</u>
Total Receivables	\$ 430,863	\$ 329,454
INVESTMENTS AT FAIR VALUE		
Short-Term Investments		
Commercial Paper	\$ 115,094	\$ 254,839
Short-Term Investment Fund	156,248	78,084
U.S. Treasury Bills	470,090	0
Discount Notes	0	108,843
Debt Securities		
U.S. Government and Agencies	1,383,806	1,513,791
Mortgage Debt Security	696,105	309,829
Corporate and Other	1,341,212	1,469,495
Treasury Inflation Protected Securities	667,049	462,901
Bank Loans	61,355	102,820
Equity Securities		
Equity Securities	4,895,777	4,256,999
International Equity	1,186,338	0
Alternative Investments	3,174,702	2,947,833
Collective Trust Funds		
Bank Loans	101,784	105,615
Corporate and Other	624	32,299
International Equity	877,623	2,368,346
Domestic Equity	80,603	156,999
Fixed Income	0	0
Mortgage Debt Security	52,601	107,129
Opportunistic Fixed Income	50,189	48,113
Treasury Inflation Protected Securities	0	158,200
Collateral From Securities Lending	<u>914,986</u>	<u>774,084</u>
Total Investments	\$ 16,226,186	\$ 15,256,219
OTHER ASSETS	<u>2,970</u>	<u>2,573</u>
TOTAL ASSETS	\$ 16,663,137	\$ 15,595,016
LIABILITIES		
Accounts Payable	\$ 65,828	\$ 167,302
Payable for Investment Securities Purchased	580,330	292,460
Accrued Benefits Payable	15,418	8,552
Accrued Transfers to VSFs	0	15,000
Security Lending	<u>914,986</u>	<u>774,084</u>
TOTAL LIABILITIES	\$ 1,576,562	\$ 1,257,398
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	\$ 15,086,575	\$ 14,337,618

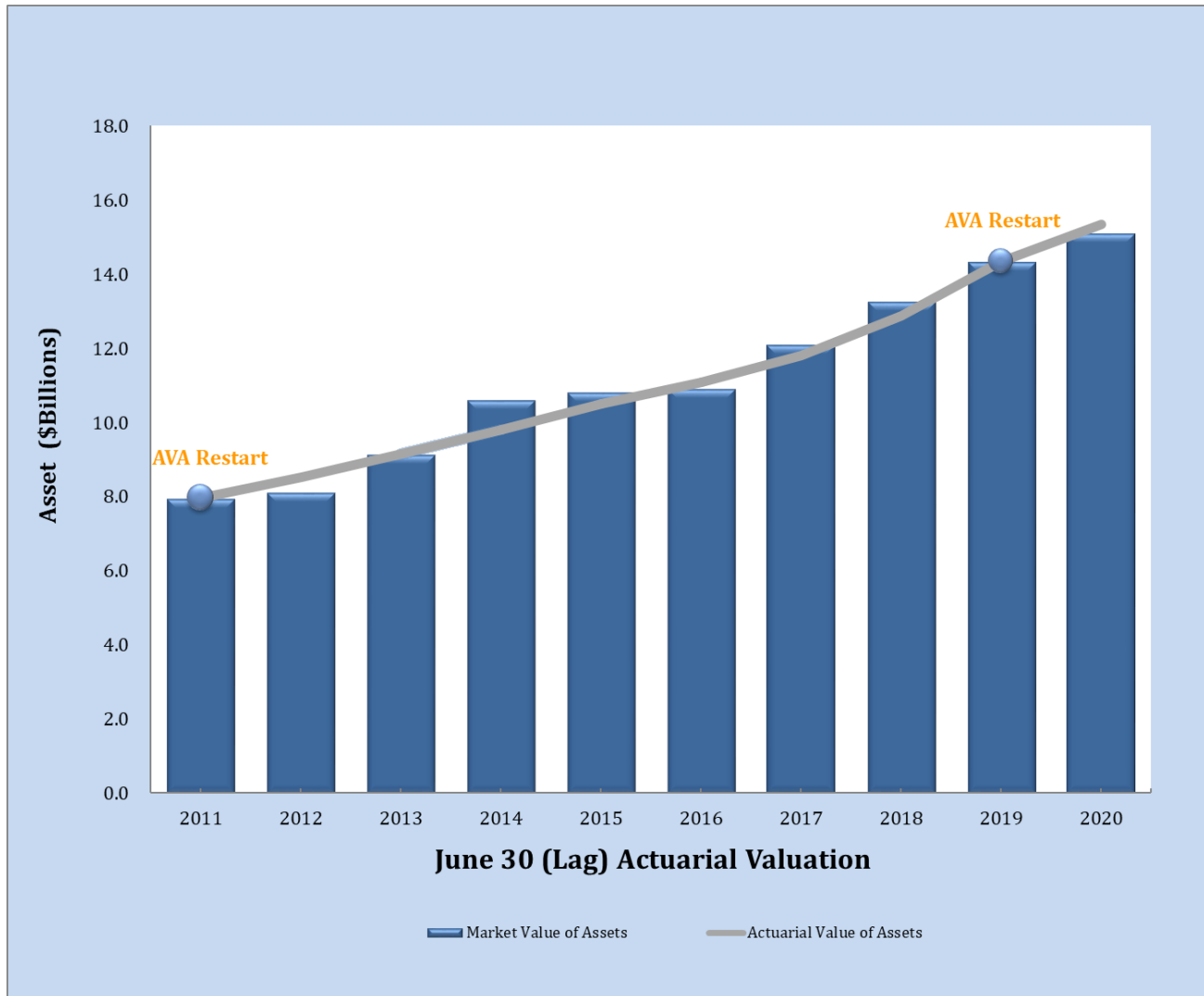
Table II-2
Statement of Changes in Plan Net Assets

(\$ Thousands)		
	June 30, 2020	June 30, 2019
ADDITIONS		
Contributions		
Member Contributions	\$ 106,821	\$ 108,015
Employer Contributions	<u>1,419,270</u>	<u>1,398,565</u>
Total Contributions	\$ 1,526,091	\$ 1,506,580
Investment Income (Loss)		
Interest Income	\$ 172,679	\$ 181,067
Dividend Income	174,436	170,140
Net Appreciation (Depreciation) in Fair Value	<u>411,582</u>	<u>667,697</u>
Total Investment Income (Loss)	\$ 758,697	\$ 1,018,904
Less Investment Expenses	80,078	89,976
Net Income (Loss)	\$ 678,619	\$ 928,928
Securities Lending Transactions		
Securities Lending Income	3,047	5,498
Securities Lending Fees	<u>(283)</u>	<u>(537)</u>
Net Securities Lending Income (Loss)	\$ 2,764	\$ 4,961
Net Investment Income (Loss)	\$ 681,383	\$ 933,889
Other		
Net Receipts from Other Retirement Systems	1,337	1,565
Litigation Income	<u>1,505</u>	<u>492</u>
Other Total	2,842	2,057
Transferable Earnings due from VSFs to QPP	15,000	14,000
TOTAL ADDITIONS	\$ 2,225,316	\$ 2,456,526
DEDUCTIONS		
Benefit Payments and Withdrawals	\$ 1,447,071	\$ 1,376,090
Accrued Transfers to VSFs	0	0
Administrative Expenses	9,131	9,861
Payment to VSFs - Interest on SKIM	<u>20,157</u>	<u>0</u>
TOTAL DEDUCTIONS	\$ 1,476,359	\$ 1,385,951
NET INCREASE (DECREASE) IN PLAN NET ASSETS	\$ 748,957	\$ 1,070,575
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	\$ 14,337,618	\$ 13,267,043
End of Year	\$ 15,086,575	\$ 14,337,618

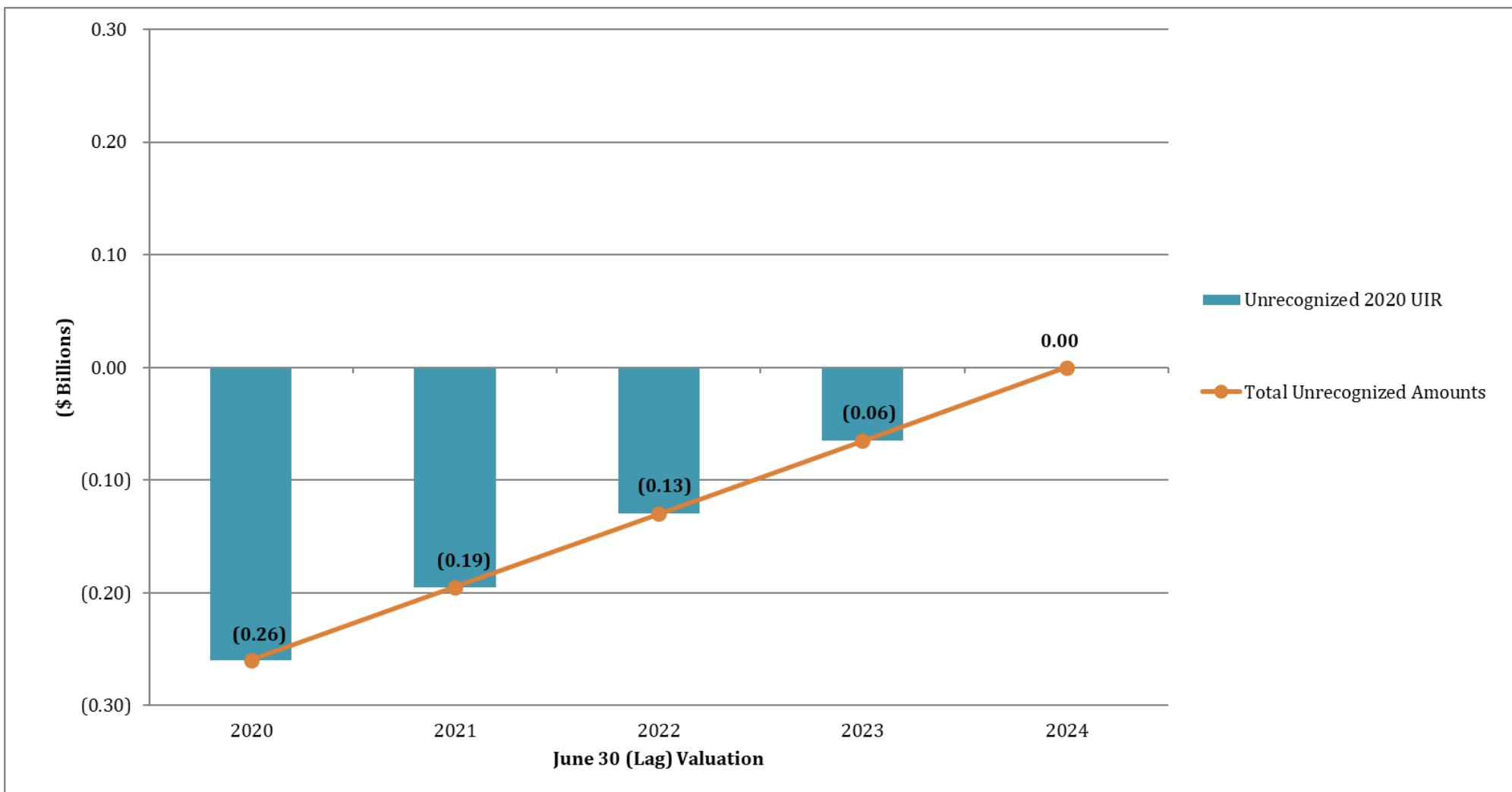
Table II-3
Development of Actuarial Value of Assets

(\$ Thousands)		
Valuation Date	June 30, 2020	June 30, 2019
1. Market Value of Assets (MVA)		
a. Beginning of Year (BOY)	\$ 14,337,618	\$ 13,267,043
b. End of Year (EOY)	\$ 15,086,575	\$ 14,337,618
2. Contributions		
a. Employee	\$ 106,821	\$ 108,015
b. Employer	<u>1,419,270</u>	<u>1,398,565</u>
c. Total Contributions	\$ 1,526,091	\$ 1,506,580
3. Net Investment Income		
a. Investment Income	\$ 761,461	\$ 1,023,865
b. Investment Expenses	<u>(80,078)</u>	<u>(89,976)</u>
c. Total Net Investment Income	\$ 681,383	\$ 933,889
4. Benefit Payments and Other Cash Flow	\$ (1,453,360)	\$ (1,383,894)
5. Preliminary Transferable Earnings from FIRE to VSFs - EOY	\$ (5,157)	\$ 14,000
6. Net Cash Flow (2.c. + 4. + 5.)	\$ 67,574	\$ 136,686
7. Expected Investment Return (EIR)	\$ 1,006,136	\$ 933,889
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ (324,753)	\$ 0
9. Preliminary AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 14,337,618	\$ 13,267,043
b. Net Cash Flow (6.)	\$ 67,574	\$ 136,686
c. Expected Investment Return (7.)	\$ 1,006,136	\$ 933,889
d. Phase in of UIR		
20% of UIR for prior year	\$ (64,951)	N/A
20% of UIR for second prior year	N/A	N/A
20% of UIR for third prior year	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A
Total	\$ (64,951)	N/A
e. Lower Corridor Bound (80% of 1.b.)	\$ 12,069,260	\$ 11,470,094
f. Upper Corridor Bound (120% of 1.b.)	\$ 18,103,890	\$ 17,205,142
g. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d., bounded by e. and f.)	\$ 15,346,377	\$ 14,337,618
10. Receivable Amounts		
a. PV 1-year Adjusted Employer Contribution	\$ 1,389,178	\$ 1,372,060
b. PV Future Administrative Expense Reimbursement	<u>9,445</u>	<u>10,200</u>
c. Total Receivable Contributions	\$ 1,398,623	\$ 1,382,260
11. Final AVA @EOY (9g. + 10.c.)	\$ 16,745,000	\$ 15,719,878

Graph II-4
Historical Market and Actuarial Value of Assets



Graph II-5
Future Recognition of UIR as of June 30, 2020



SECTION III – CONTRIBUTION DEVELOPMENT AND HISTORY

Table III-1
Statutory Contributions

Table III-1 shows the components of the Fiscal Year 2022 and the Fiscal Year 2021 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2020 (Lag)	June 30, 2019 (Lag)
Fiscal Year	2022	2021
Normal Cost ¹	\$ 603,605,747	\$ 606,173,530
Amortization of Unfunded Accrued Liability		
- Initial UAL	716,478,061	695,609,768
- 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	40,764,306
- 2017 Method Changes ³	(32,109,613)	(32,109,613)
- 2018 (Gain)/Loss	(21,132,809)	(21,132,809)
- 2019 (Gain)/Loss	(15,021,890)	(15,021,890)
- 2019 Assumption Changes ⁴	9,925,679	9,925,679
- 2019 Method Changes ⁴	(15,627,522)	(15,627,522)
- 2020 (Gain)/Loss	(7,450,247)	N/A
Total	832,931,793	819,513,747
Administrative Expenses	10,454,082	11,289,859
Total Contribution to the New York City Fire Pension Fund	\$ 1,446,991,622	\$ 1,436,977,136

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.

⁴ Revised 2021 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 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, 2020.

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, 2020
Initial UAL	6/30/10	\$ 7,095,864,159	22	\$ 716,478,061	11	\$ 5,928,360,662
(Gain)/Loss	6/30/11	\$ (168,320,189)	15	\$ (19,908,798)	5	\$ (78,914,703)
(Gain)/Loss	6/30/12	\$ 26,297,732	15	\$ 3,110,478	6	\$ 14,333,044
(Gain)/Loss	6/30/13	\$ 61,311,940	15	\$ 7,251,935	7	\$ 37,782,745
(Gain)/Loss	6/30/14	\$ 84,382,762	15	\$ 9,980,736	8	\$ 57,615,517
Assumption Change ¹	6/30/14	\$ 327,575,238	20	\$ 32,784,417	13	\$ 264,886,478
(Gain)/Loss	6/30/15	\$ 4,282,552	15	\$ 506,537	9	\$ 3,190,432
(Gain)/Loss	6/30/16	\$ 158,483,315	15	\$ 18,745,299	10	\$ 127,279,694
SADB	6/30/16	\$ 820,067,832	15	\$ 96,997,069	10	\$ 658,605,497
Enhanced ADR	6/30/16	\$ 2,612,048	22	\$ 249,358	17	\$ 2,353,555
(Gain)/Loss	6/30/17	\$ 59,849,221	15	\$ 7,078,925	11	\$ 51,316,844
No VSF Escalation Offset	6/30/17	\$ 462,349	21	\$ 45,144	17	\$ 426,091
Non-Uniformed Service	6/30/17	\$ 2,645,107	20	\$ 264,728	16	\$ 2,417,606
Assumption Changes ²	6/30/17	\$ 407,308,674	20	\$ 40,764,306	16	\$ 372,276,762
Method Changes ²	6/30/17	\$ (320,832,740)	20	\$ (32,109,613)	16	\$ (293,238,472)
(Gain)/Loss	6/30/18	\$ (178,668,664)	15	\$ (21,132,809)	12	\$ (162,267,948)
(Gain)/Loss	6/30/19	\$ (127,003,510)	15	\$ (15,021,890)	13	\$ (121,371,547)
Assumption Changes ³	6/30/19	\$ 99,175,360	20	\$ 9,925,679	18	\$ 96,522,120
Method Changes ³	6/30/19	\$ (156,147,033)	20	\$ (15,627,522)	18	\$ (151,969,629)
(Gain)/Loss	6/30/20	\$ (62,988,586)	15	\$ (7,450,247)	14	\$ (62,988,586)

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

² 2019 A&M.

³ Revised 2021 A&M.

Graph III-3
Remaining UAL Amortizations as of June 30, 2020

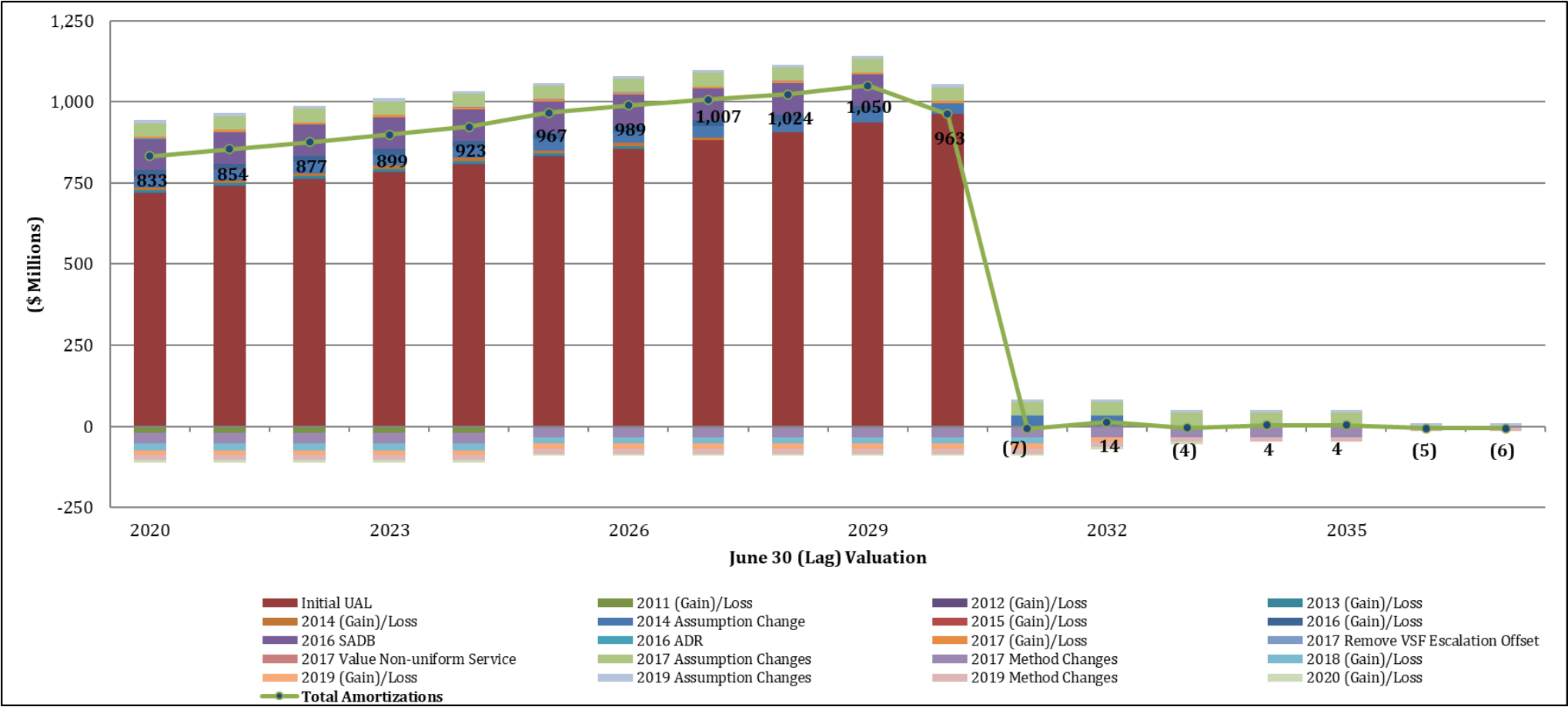


Table III-4
Reconciliation of Outstanding UAL Bases

Amounts Remaining to be Amortized, as of		
June 30 (Lag) Valuation Date	2020	2019
Unfunded Accrued Liability, June 30, 2010	\$ 5,928,360,662	\$ 6,169,001,875
2011 (Gain)/Loss	(78,914,703)	(91,739,500)
2012 (Gain)/Loss	14,333,044	16,205,661
2013 (Gain)/Loss	37,782,745	41,863,042
2014 (Gain)/Loss	57,615,517	62,863,793
2014 Assumption Change	264,886,478	277,177,917
2015 (Gain)/Loss	3,190,432	3,439,365
2016 (Gain)/Loss	127,279,694	135,889,214
2016 SADB	658,605,497	703,155,236
2016 Enhanced ADR	2,353,555	2,424,877
2017 (Gain)/Loss	51,316,844	54,355,420
2017 Removal of VSF Escalation Offset	426,091	439,003
2017 Non-uniformed Service	2,417,606	2,498,624
2017 Assumption Changes	372,276,762	384,752,433
2017 Method Changes	(293,238,472)	(303,065,427)
2018 (Gain)/Loss	(162,267,948)	(170,745,613)
2019 (Gain)/Loss	(121,371,547)	(127,003,510)
2019 Assumption Changes	96,522,120	99,175,360
2019 Method Changes	(151,969,629)	(156,147,033)
2020 (Gain)/Loss	(62,988,586)	
Sum of Outstanding Amortization Amounts	\$ 6,746,616,162	\$ 7,104,540,737

June 30 (Lag) Valuation Date	2020	2019
1. Accrued Liability (AL)	\$ 23,491,616,573	\$ 22,824,418,903
2. Actuarial Value of Assets (AVA) ¹	16,745,000,411	15,719,878,166
3. Unfunded Accrued Liability (UAL) (1. - 2.)	\$ 6,746,616,162	\$ 7,104,540,737

¹ Includes adjustment for receivable contributions.

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2013 through 2022.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
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%
2021	1,436,977	1,436,977	100.0%
2022	1,446,992	1,446,992	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 2013 through 2022.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution	Salary ¹ at Beginning of Fiscal Year	City Rate
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%
2021	1,436,977	1,362,579	105.5%
2022	1,446,992	1,372,178	105.5%

¹Includes 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

NEW YORK CITY FIRE PENSION FUND DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS JUNE 30, 2020							
	AL		AVA		UAL = AL - AVA		
	QPP	VSF	QPP	VSF	QPP	VSF	Total
AL, AVA, and UAL at June 30, 2019	\$ 22,824,418,903	\$ 778,866,231	\$ 15,719,878,166	\$ 870,654,000	\$ 7,104,540,737	\$ (91,787,769)	\$ 7,104,540,737
Normal Cost, Administrative Expenses, and Actuarial Adjustments ¹	646,300,997	13,467,225	(1,382,260,166)	(91,787,769)	2,028,561,163	105,254,994	2,042,028,388
Contributions Made (Employer and Employee) in Fiscal Year 2020 ²	0	0	1,521,105,540	4,985,460	(1,521,105,540)	(4,985,460)	(1,526,091,000)
Benefit Payments in Fiscal Year 2020	(1,447,071,000)	(70,074,000)	(1,447,071,000)	(70,074,000)	0	0	0
Interest and Expected Return on Assets	1,593,159,511	53,052,233	1,006,180,644	52,281,067	586,978,868	771,166	587,750,034
Actuarial Adjustments ³ at June 30, 2020	0	0	1,398,623,411	93,051,661	(1,398,623,411)	(93,051,661)	(1,398,623,411)
Expected AL and AVA at June 30, 2020	\$ 23,616,808,411	\$ 775,311,689	\$ 16,816,456,595	\$ 859,110,419	\$ 6,800,351,817	\$ (83,798,730)	\$ 6,809,604,748
Actual AL, AVA, and UAL at June 30, 2020	\$ 23,491,616,573	\$ 766,390,339	\$ 16,745,000,411	\$ 859,442,000	\$ 6,746,616,162	\$ (93,051,661)	\$ 6,746,616,162
AL and UAL (Gain)/Loss; AVA Gain/(Loss)	\$ (125,191,838)	\$ (8,921,350)	\$ (71,456,184)	\$ 331,581	\$ (53,735,655)	\$ (9,252,931)	\$ (62,988,586)

¹Actuarial Adjustments include those for receivable contributions, VSF assets in excess of liabilities, and accumulated member contributions in excess of accumulated member normal costs.

²Contributions include SKIM amounts transferred from QPP to VSF.

³Actuarial Adjustments include those for liability changes other than experience, receivable contributions, and VSF assets in excess of liabilities.

Table IV-2
Development of Actuarial Asset (Gain)/Loss

DEVELOPMENT OF ACTUARIAL ASSET (GAIN)/LOSS JUNE 30, 2020 (\$ Thousands)		
	QPP	VSF
1. Phase-in of Unexpected Investment Return (UIR)		
20% of UIR for prior year	\$ 64,951	\$ 4,232
20% of UIR for second prior year	N/A	N/A
20% of UIR for third prior year	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A
Total	\$ 64,951	\$ 4,232
2. Non-Benefit Payment Cash Flow		
a. Administrative Expenses paid in Fiscal Year 2020	\$ 9,131	N/A
b. Amounts paid to Other System in Fiscal Year 2020	(1,337)	0
c. Litigation Income in Fiscal Year 2020	(1,505)	0
d. Changes in Accrued Benefits Payable in Fiscal Year 2020	0	578
e. Interest on a. through d. to June 30, 2020	216	20
f. Total Change at June 30, 2020	\$ 6,505	\$ 598
3. Actuarial Asset (Gain)/Loss (1. + 2.)	\$ 71,456	\$ 4,830
4. Adjustment for VSF assets in excess of liabilities		
a. Excess Assets at June 30, 2019	N/A	\$ (91,788)
b. Interest on a. to June 30, 2020	N/A	(6,425)
c. Excess Assets at June 30, 2020	N/A	93,052
d. Actuarial Adjustment for Excess Assets	\$ 0	\$ (5,161)
5. Adjusted Actuarial Asset (Gain)/Loss (3. + 4.)	\$ 71,456	\$ (331)

SECTION V – SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB 25, which has been superseded by GASB 67, 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) ¹	(2) Accrued Liability (AL)	(3) Unfunded AL (UAL) ¹ (2) - (1)	(4) Funded Ratio (1) / (2)	(5) Covered Payroll ²	(6) UAL as a % of Covered Payroll (3) / (5)
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%
2019	14,337,618	22,824,419	8,486,801	62.8%	1,336,843	634.8%
2020	15,346,377	23,491,617	8,145,240	65.3%	1,348,006	604.2%

¹ The Unfunded Accrued Liability excludes contributions receivable in the Actuarial Value of Assets.

² 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, 2020	June 30, 2019
FFVSF		
Active	\$ 143,169	\$ 143,243
Retiree	<u>330,941</u>	<u>341,499</u>
Total	\$ 474,110	\$ 484,742
FOVSF		
Active	\$ 139,332	\$ 138,507
Retiree	<u>152,948</u>	<u>155,617</u>
Total	\$ 292,280	\$ 294,124
Total VSF AL	\$ 766,390	\$ 778,866

Table VI-2
VSF Member Data

VARIABLE SUPPLEMENTS FUNDS				
MEMBERS INCLUDED IN THE JUNE 30, 2020 (LAG) AND JUNE 30, 2019 (LAG) ACTUARIAL VALUATIONS				
	June 30, 2020		June 30, 2019	
	FFVSF	FOVSF	FFVSF	FOVSF
Actives				
Number	8,389	2,690	8,621	2,623
Average Age	38.4	47.8	38.3	47.8
Retirees				
Number	3,215	1,490	3,305	1,522
Average Age	73.1	73.3	72.9	73.4

Table VI-3
VSF Statement of Assets

(\$ Thousands)				
Valuation Date	June 30, 2020 ¹		June 30, 2019 ²	
	MVA ³	AVA	MVA ⁴	AVA
FFVSF	\$ 493,727	\$ 504,358	\$ 519,268	\$ 519,268
FOVSF	348,788	355,084	351,386	351,386
Total	\$ 842,515	\$ 859,442	\$ 870,654	\$ 870,654

¹ Includes preliminary SKIM amounts as determined by the Actuary in a letter dated August 28, 2020 to the Comptroller's Office.

² Includes preliminary SKIM amounts as determined by the Actuary in a letter dated August 29, 2019 to the Comptroller's Office. AVA was restarted to equal MVA at June 30, 2019 in the Revised 2021 A&M.

³ Includes Accrued Benefits Payable of \$19,451,000 for FFVSF and \$8,932,000 for FOVSF.

⁴ Includes Accrued Benefits Payable of \$19,953,000 for FFVSF and \$9,008,000 for FOVSF.

Table VI-4
Development of VSF Actuarial Value of Assets

(\$ Thousands)				
	June 30, 2020		June 30, 2019	
	FFVSF	FOVSF	FFVSF	FOVSF
1. Market Value of Assets (MVA)				
a. Beginning of Year (BOY) ¹	\$ 519,268	\$ 351,386	\$ 550,507	\$ 355,712
b. End of Year (EOY) ²	\$ 493,727	\$ 348,788	\$ 519,268	\$ 351,386
2. Contributions				
a. Employee	\$ 0	\$ 0	\$ 0	\$ 0
b. Employer	0	0	0	0
c. Total Contributions	\$ 0	\$ 0	\$ 0	\$ 0
3. Net Investment Income				
a. Investment Income	\$ 21,737	\$ 15,993	\$ 28,259	\$ 20,699
b. Investment Expenses	(220)	(154)	(280)	(219)
c. Total Net Investment Income	\$ 21,517	\$ 15,839	\$ 27,979	\$ 20,480
4. Benefit Payments and Other Cash Flow	\$ (44,850)	\$ (25,802)	\$ (45,218)	\$ (24,806)
5. Preliminary Transferable Earnings from FIRE to VSFs - EOY ³	\$ (2,208)	\$ 7,365	\$ (14,000)	\$ 0
6. Net Cash Flow (2.c. + 4. + 5.)	\$ (47,058)	\$ (18,437)	\$ (59,218)	\$ (24,806)
7. Expected Investment Return (EIR)	\$ 34,806	\$ 23,709	\$ 27,979	\$ 20,480
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ (13,289)	\$ (7,870)	\$ 0	\$ 0
9. AVA @ EOY				
a. AVA @ BOY	\$ 519,268	\$ 351,386	\$ 550,507	\$ 355,712
b. Net Cash Flow (6.)	\$ (47,058)	\$ (18,437)	\$ (59,218)	\$ (24,806)
c. Expected Investment Return (7.)	\$ 34,806	\$ 23,709	\$ 27,979	\$ 20,480
d. Phase in of UIR				
20% of UIR for prior year	\$ (2,658)	\$ (1,574)	N/A	N/A
20% of UIR for second prior year	N/A	N/A	N/A	N/A
20% of UIR for third prior year	N/A	N/A	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A	N/A	N/A
Total	\$ (2,658)	\$ (1,574)	N/A	N/A
e. AVA (9.a. + 9.b. + 9.c. + 9.d.)	\$ 504,358	\$ 355,084	\$ 519,268	\$ 351,386

¹ Includes Accrued Benefits Payable for 6/30/2019 of \$19,953,000 for FFVSF and \$9,008,000 for FOVSF and Accrued Benefits Payable for 6/30/2018 of \$20,427,000 for FFVSF and \$9,079,000 for FOVSF

² Includes Accrued Benefits Payable for 6/30/2020 of \$19,451,000 for FFVSF and \$8,932,000 for FOVSF and Accrued Benefits Payable for 6/30/2019 of \$19,953,000 for FFVSF and \$9,008,000 for FOVSF.

³ Reflects preliminary SKIM amounts as determined by the Actuary in a letter dated August 28, 2020 for 6/30/2020 and a letter dated August 29, 2019 for 6/30/2019 to the Comptroller's Office.

Table VI-5
Preliminary SKIM Calculation as of June 30, 2020

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

(\$ Thousands)	Preliminary	
Total FIRE Pension Fund		
1. FY2020 Equity Earnings	\$	250,588
2. FY2020 Hypothetical Earnings		156,725
3. FY2020 Excess Earnings (1. - 2.)		93,863
4. Deficit at June 30, 2019		0
5. Hypothetical Interest Rate (HIR)		1.625%
6. Deficit with interest (4. x (1+HIR))		0
7. Potential SKIM (3. - 6.), not less than zero	\$	93,863
	FFVSF	FOVSF
Allocations to VSF		
8. Allocation Percentage	65.606%	34.394%
9. Potential SKIM (7. x 8.)	\$ 61,580	\$ 32,283
10. APV of Accumulated Plan Benefits	431,680	259,012
11. MVA Prior to SKIM	493,727	348,788
12. Unfunded APV of Accumulated Plan Benefits (10. - 11.), not less than zero	0	0
13. SKIM Payable (Lesser of 9. and 12., not less than zero)	0	0
14. Rounded Estimate, for FY20 Financial Statements ¹	\$ 0	\$ 0

¹ Included in MVA at June 30, 2020

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 AutoCOLA payable to a retiree reduces VSF benefits by an amount equal to such AutoCOLA 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 AutoCOLA, 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

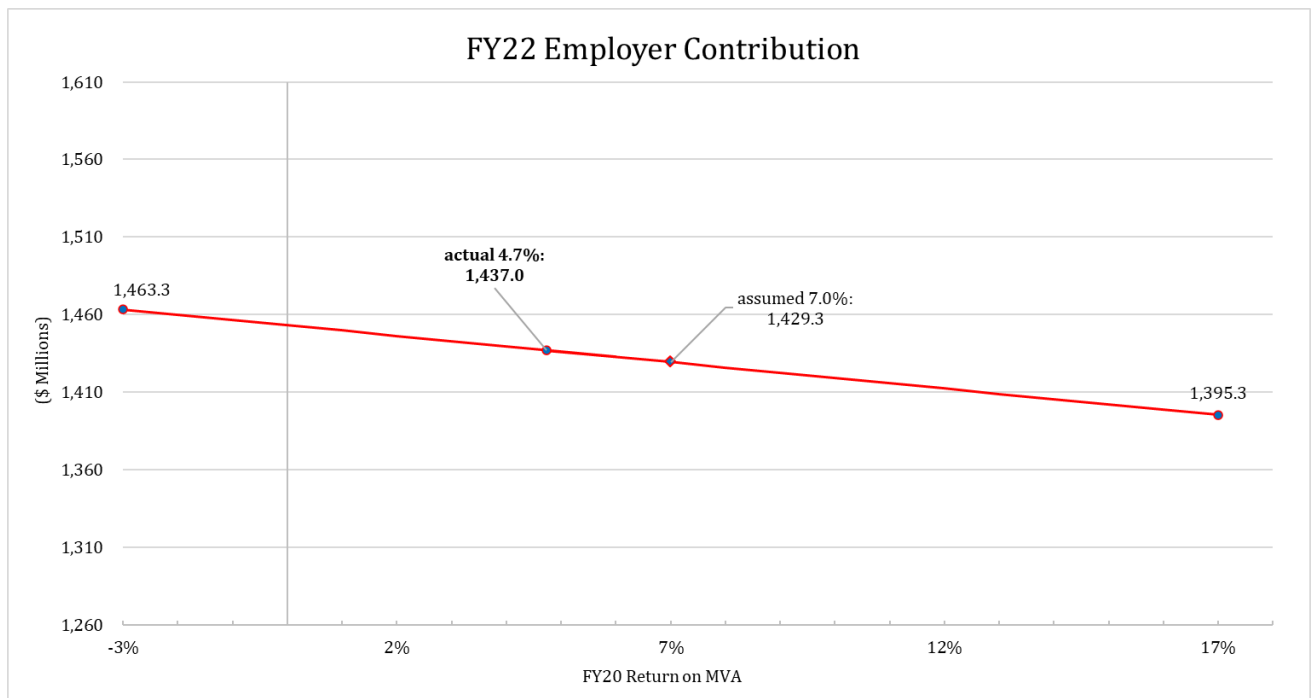
The funded status of FIRE depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Risks faced by the Plan are described in this Section. These risks have been separated, based on the Actuary's professional 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 FY22 employer contributions for a range of investment return outcomes if returns had differed from the assumed rate of return by up to 10% (i.e., from -3% to 17%). In addition, the actual investment return and employer contribution are shown.¹

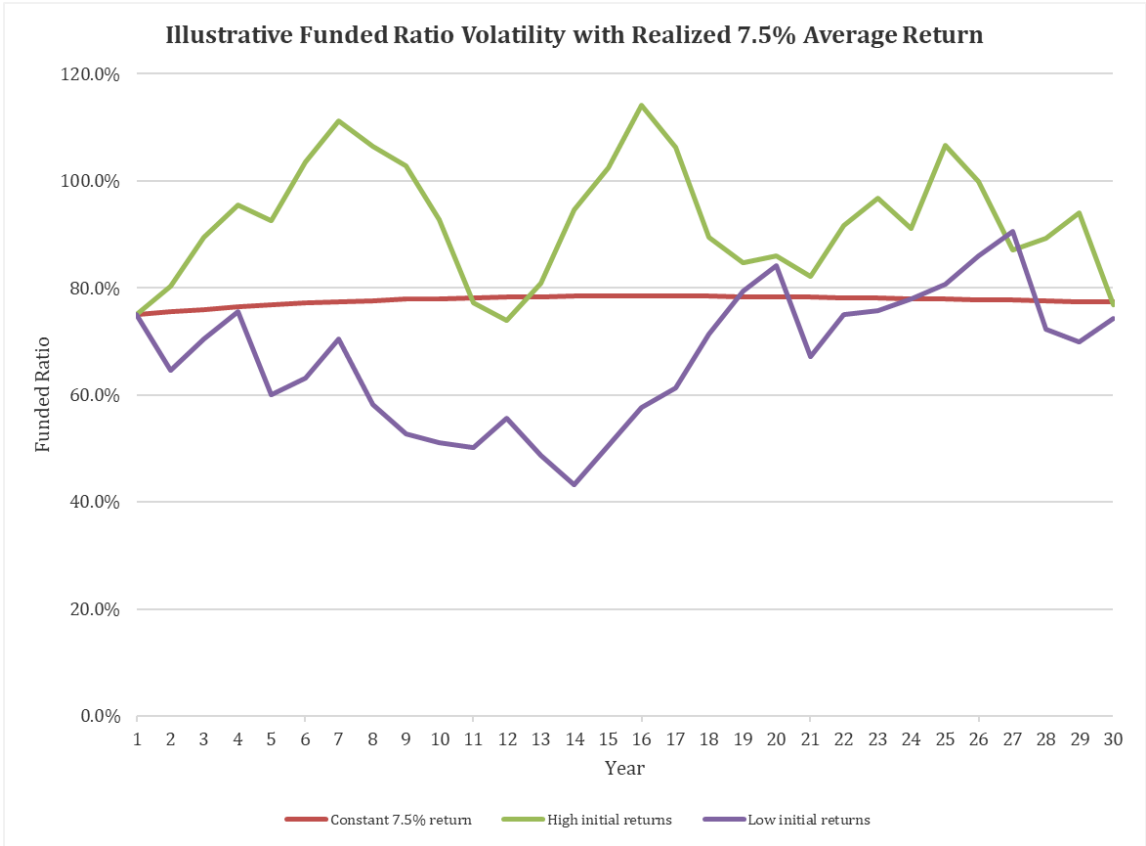
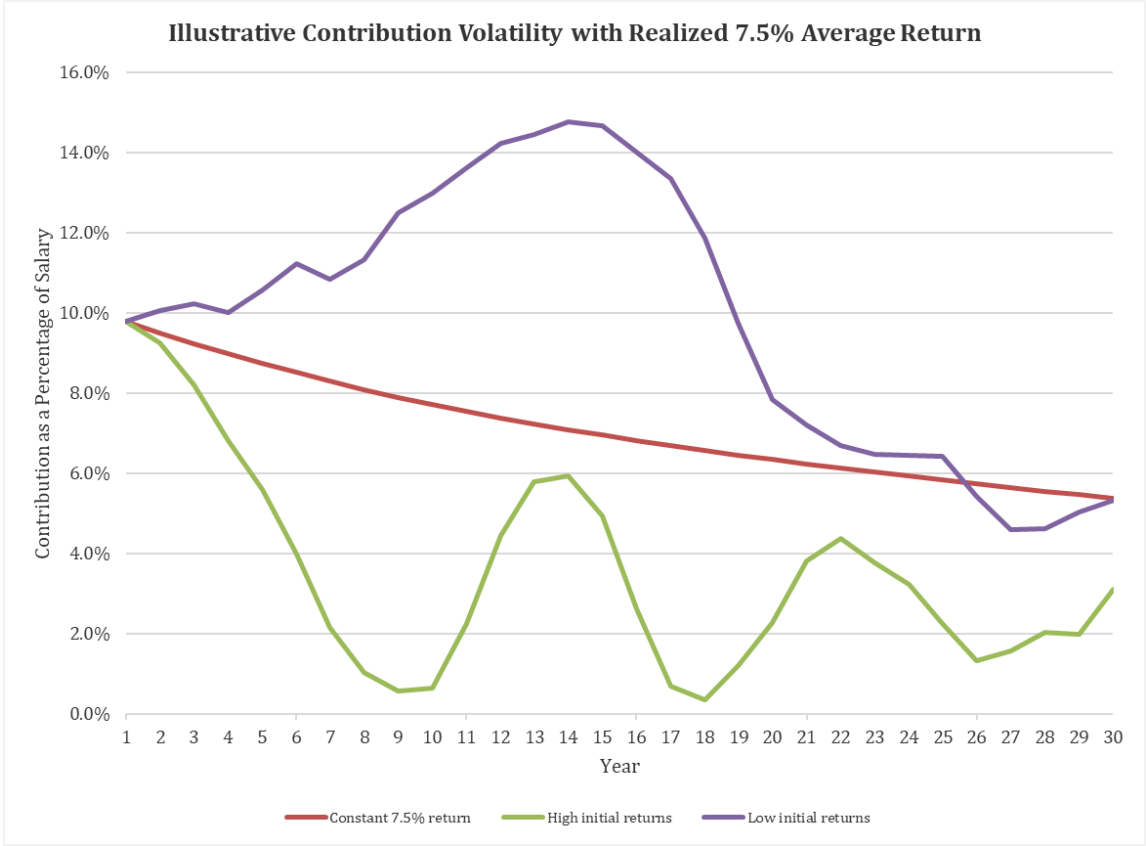


Investment Risk: The Risk of Volatile Realized Returns

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 the Plan and the VSFs are considered in aggregate.

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

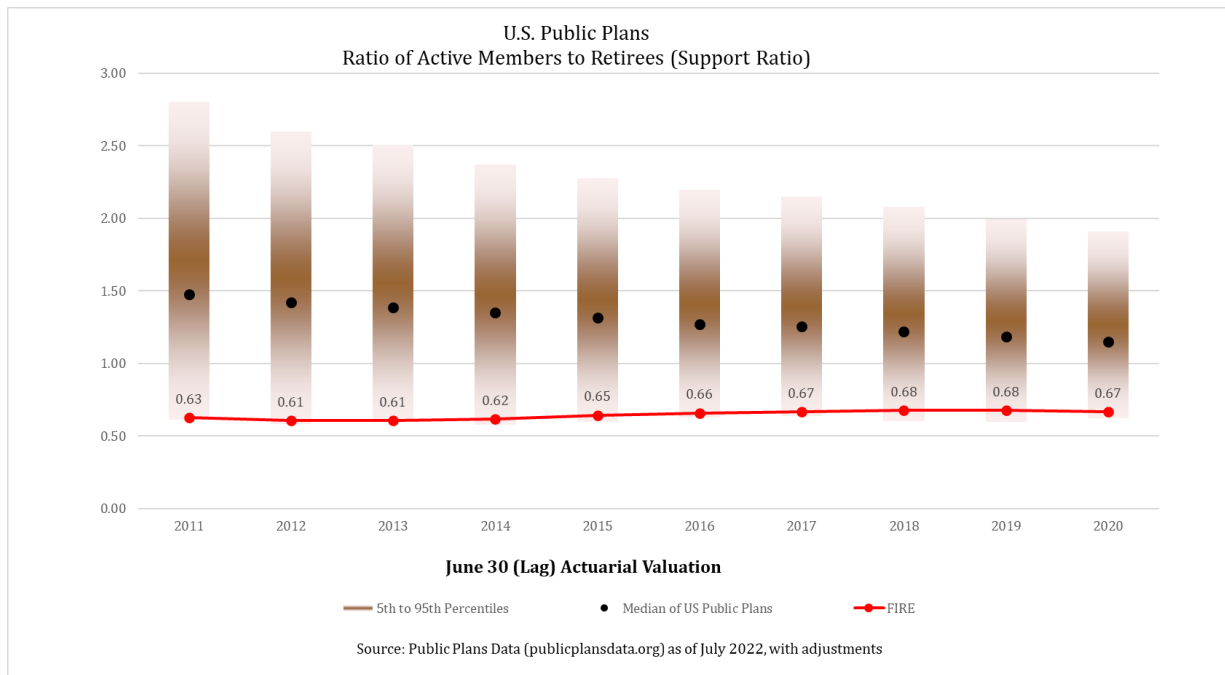


Maturity Risk: The Risk of Demographic Imbalance

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.

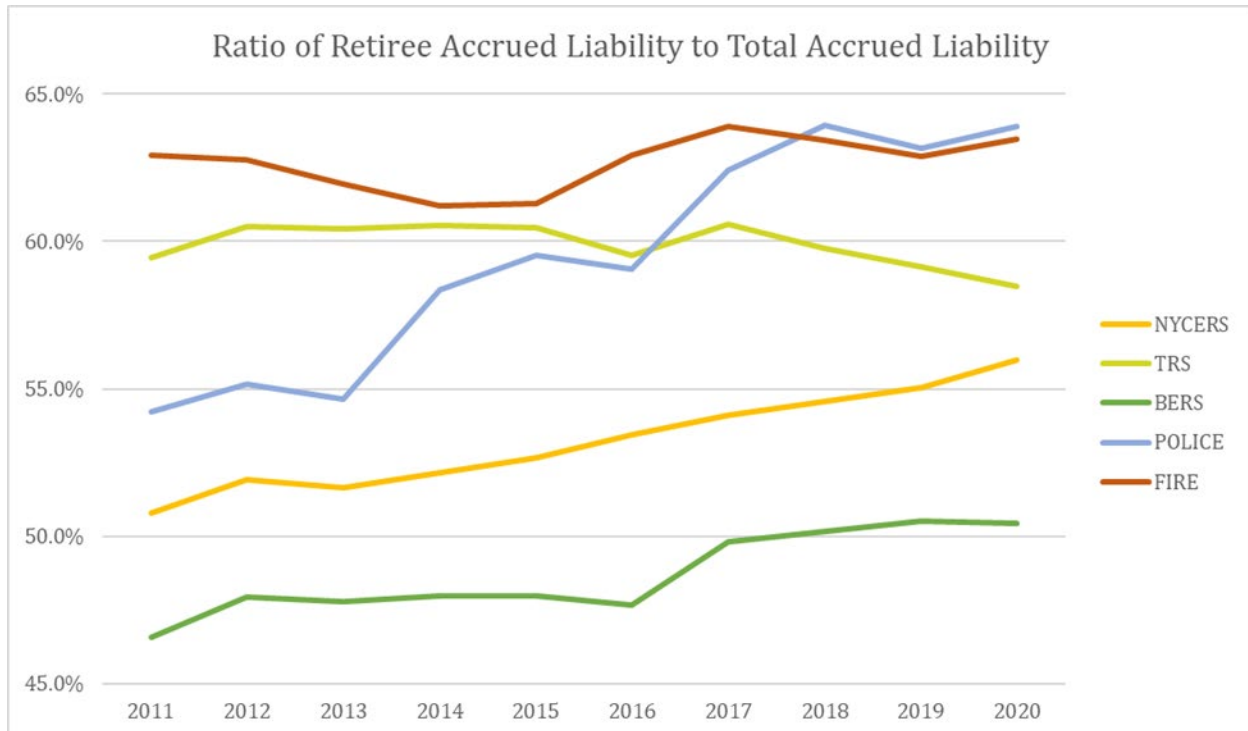


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst U.S. public pensions has declined from 1.48 in the 2011 valuation year to 1.15 in the 2020 valuation year. Over that same period, the Plan's Support Ratio has ranged from 0.63 to 0.67, meaning 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

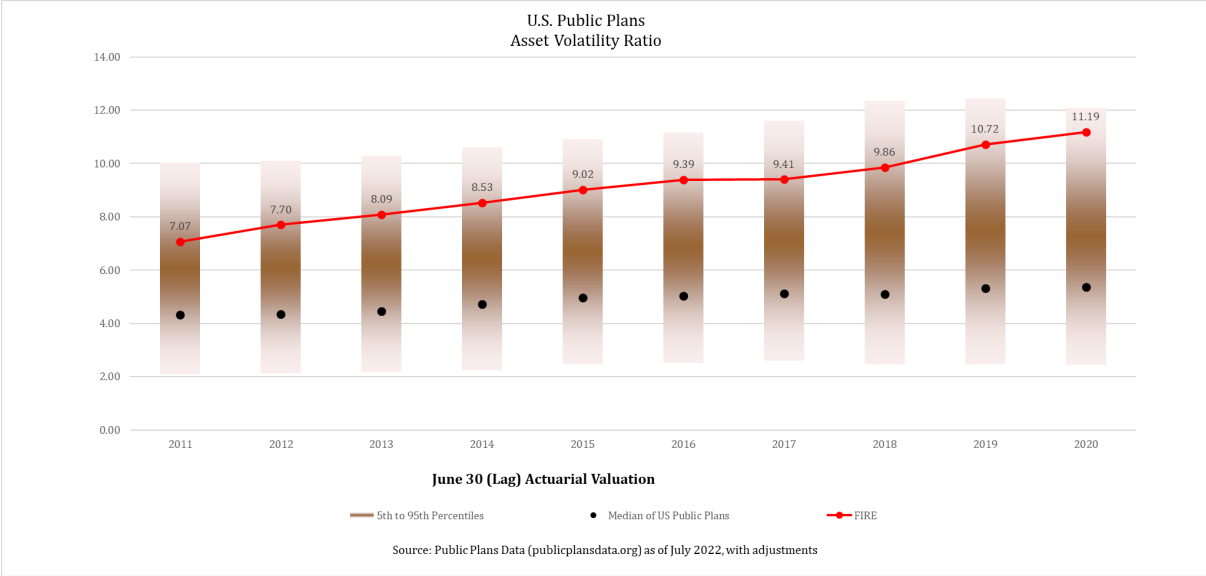
We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for FIRE; the other New York City Retirement Systems (NYCRS)¹ are included for comparison. 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); Police Pension Fund (POLICE)



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 five and six. 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 and/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, 2020	
Valuation Date	June 30, 2020 (Lag)
Results at 7.0%	
1. Accrued Liability (AL)	\$ 23,491,616,573
2. Actuarial Value of Assets (AVA)	<u>16,745,000,411</u>
3. Unfunded Accrued Liability (1. - 2.)	\$ 6,746,616,162
4. Normal Cost	\$ 603,605,747
Results at 6.0%	
1. Accrued Liability (AL)	\$ 26,191,586,583
2. Actuarial Value of Assets (AVA) ¹	<u>16,745,000,411</u>
3. Unfunded Accrued Liability (1. - 2.)	\$ 9,446,586,172
4. Normal Cost	\$ 744,643,390
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	11.5%
2. Increase in Unfunded Accrued Liability	40.0%
3. Increase in Normal Cost	23.4%

¹ Disregarding certain actuarial methodologies (e.g., receivable contributions) that would be revalued under a discount rate of 6.0%

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-2020 was subsequently applied to these base rates.¹

This scale MP-2020 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 FY2021, NYC settled 10,618 claims and lawsuits for \$933.7 million. On occasion, these settlements involve NYCERS. The 1996 case *Gulino v. Board of Education* awards damages to plaintiffs that in some cases include counterfactual service and salary in NYCERS. It remains a continuing risk that litigation may expand the scope of pension benefits beyond what is intended or codified in statute.

¹ Retirement Plans Experience Committee. “Mortality Improvement Scale MP-2020 Report,” “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/reports/annual-claims-report>

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 study¹ 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.

Participating employers have historically contributed 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 approximately 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 promises for future funding can be disregarded for political expediency or other priorities. In

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.

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 (BMC) - Members contribute 3.0% of salary for a maximum of 25 years.

Additional Member Contributions (AMC) – Effective September 8, 2019, Tier 3 Enhanced Plan members are required to contribute an additional 2.1% (previously 2.0%) of salary for a maximum of 25 years. Chapter 298/16 states that the AMC rate for Tier 3 Enhanced Plan members is required to be reviewed by the Actuary every 3 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 City 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 City 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 1/60th 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 the 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: $\frac{1}{3}$ of [FS (Tier 1) or FAS (Tier 2)]

10 or more years of service: $\frac{1}{2}$ 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 (New York City-paid)

a. Eligibility for all Tiers: No age or service requirement. Death due to the performance of duties while an active member.

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.

2. Special Accidental Death Benefits (New York State-paid)

a. Eligibility: No age or service requirement. Death due to the performance of duties while an active member. Payable only to the surviving spouse or children until age 18 (or age 23, if a full-time student), if there is no surviving spouse.

b. Benefits: A monthly pension is payable to the beneficiary in an amount that when added to the New York City-paid Accidental Death Benefit (outlined in 1.) and any payable Social Security benefit is equal to the decedent's last year's wages including overtime and any other type of pensionable earnings.

3. 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

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

At least 10 years of Credited Service: 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.

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 Retirement 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 or beneficiaries of an Accidental Death benefit. 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

1. Eligibility:
 - a. Tier 3 and Tier 3 Modified members receiving service, vesting, disability retirement, and survivor benefits.
 - b. Tier 3 Enhanced Plan members receiving vested or service retirement benefits.
 - c. All members above receive COLA, if greater.
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 June 30, 2020 (Lag) actuarial valuation results reflect the following Chapter amendments from the prior five years.

- **Chapter 89 of the Laws of 2020** (Chapter 89/20) provides death benefits to statutory beneficiaries of members whose death was a result of or was attributed to COVID-19.
- **Chapter 58 of the Laws of 2020** (Chapter 58/20) grants a 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits pursuant to Section 208(f) of the General Municipal Law (GML). (Similar legislation was enacted in each of the previous years.)
- **Chapter 250 of the Laws of 2019** (Chapter 250/19) relates to presumptive evidence of disability caused by cancer of firefighters who have been retired for five years or less.
- **Chapter 266 of the Laws of 2018** (Chapter 266/18) extends the deadline to file a Notice of Participation in the World Trade Center Rescue, Recovery, and Cleanup Operations to September 11, 2022.
- **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 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 following legislation was adopted after the June 30, 2020 valuation date and could have an impact on future years' valuations:

Chapter 704 of the Laws of 2021 (Chapter 704/21) establishes a presumption with respect to Parkinson's Disease that results in death or disability for paid firefighters in New York State.

Chapter 540 of the Laws of 2021 (Chapter 540/21) amends Section 443 of the Retirement and Social Security Law to change the salary base for FIRE Tier 2 members who are hired on or after July 1, 2000 to a salary base used for such members who joined prior to July 1, 2000.

Chapter 424 of the Laws of 2021 (Chapter 424/21) expands eligibility of certain public service employees for participation in the World Trade Center Rescue, Recovery, or Clean-up Operations.

Chapter 327 of the Laws of 2021 (Chapter 327/21) and **Chapter 528 of the Laws of 2022** (Chapter 528/22) extend the 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits (SADB). Note that the June 30, 2020 valuation assumes that future legislation on this 3% COLA increase will continue to pass in subsequent years. For more information on this COLA assumption, see Page 64.

Chapter 78 of the Laws of 2021 (Chapter 78/21) amends Chapter 89/20 by extending the eligibility window of these death benefits through December 31, 2022.

SECTION XI - ACTUARIAL ASSUMPTIONS AND METHODS

The results in this valuation report are based upon standard actuarial models (including but not limited to Entry Age Normal and related parameters) that are widely used in actuarial practice. The models are intended to calculate the liabilities associated with these plan provisions using data and assumptions as of the measurement date, and using actuarial assumptions and methods further described below. Most of this liability and cashflow modeling is currently implemented using ProVal, a ubiquitous actuarial valuation and projection software program developed by Winklevoss Technologies (WinTech). These results are reviewed for accuracy, reasonability, and consistency with prior results, consistent with the requirements of Actuarial Standard of Practice 56. The model is also reviewed extensively when significant changes are made to the software by experts who are familiar with the applicable actuarial methods used therein.

No changes were made to any of the actuarial assumptions and methods since the prior year.

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		
Age	Years of Service Since First Eligible	
	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%

¹100% 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

¹N/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 MORTALITY FOR ACTIVE MEMBERS BASE RATES			
Age	Ordinary Death		Accidental Death
	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

¹Probabilities 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 RATES					
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 RATES					
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 RATES					
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%

¹Salary 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. **Actuarial Interest Rate (AIR):** 7.0% per annum, net of investment expenses.
2. **Mortality Assumption:** The mortality base tables are projected from 2012 using mortality improvement table MP-2020. The post-commencement 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

3. **Marital Assumption:** All active members are assumed to be married and females are assumed to be two years younger than their male spouses.
4. **Credited Service:** Calculated in whole year increments for valuation purposes.
5. **Loans:** Except for Death Benefits, it is assumed that Tier 1 and 2 members take a loan at retirement equal to 25% of their member contribution balances.
6. **Inflation:** The long-term Consumer Price Index inflation rate is assumed to be 2.5% per year. AutoCOLA is assumed to be 1.5% per year, and Escalation is assumed at 2.5% per year. Beneficiaries receiving Special Accidental Death Benefits, if any, are assumed to receive increases at 3.0% per year.
7. **Form of Payment:** Retiring members are assumed to elect the Maximum Retirement Allowance (i.e., single life annuity) form of payment.
8. **Actuarial Asset Valuation Method (AAVM):**

The Actuary reset the Actuarial Value of Assets to Market Value as of June 30, 2019.

Beginning with the June 30, 2020 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years.

In accordance with this AAVM, the UIR are phased into the AVA over a five-year period at 20% per year, with the calculation of the EIR based on the MVA.

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.

9. **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 expected 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 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.

The explicit UALs that are developed under EAN each year are financed over fixed periods. For more information see Page 11.

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).

10. **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.
11. **WTC Disability and Death Benefits:** Obligations attributable to the WTC Disability Benefits Law and to the WTC Death Benefits Law are determined through estimation techniques for post-retirement reclassifications.
12. **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.

13. Excess Benefit Plan: The valuation includes liabilities and costs, if any, associated with benefits in excess of the Internal Revenue Code Section 415 limitation.

SECTION XII - SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2020 (Lag) and June 30, 2019 (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, 2020 and June 30, 2019.

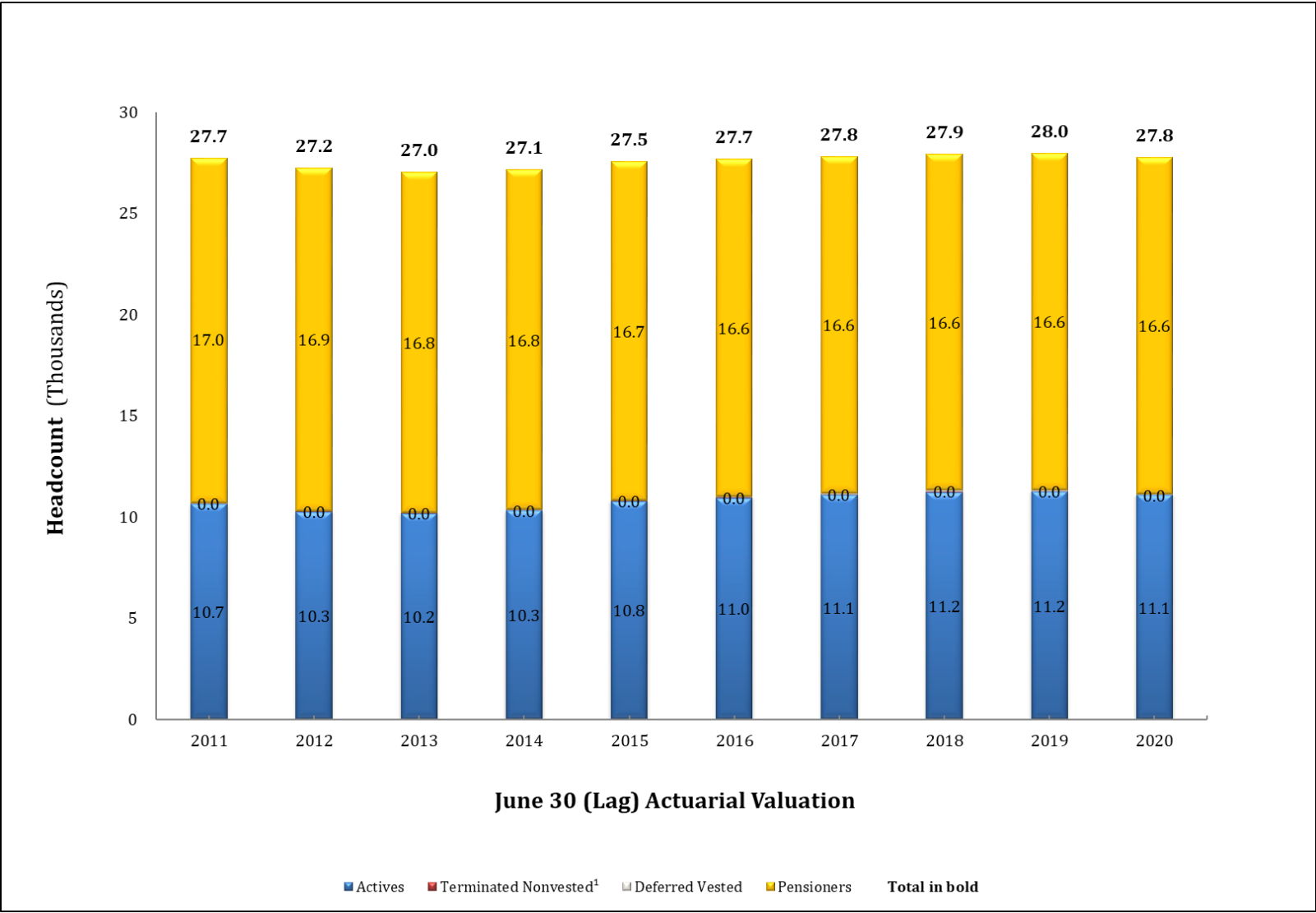
Beginning at June 30, 2020, FIRE members who are no longer on payroll but not otherwise classified have been classified as Active, Terminated Nonvested, or Deferred Vested members, using actuarial judgment and consideration of available data, including leave of absence data when available.

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 MEMBERSHIP DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	(1) Active Members	(2) Active Off Payroll / Terminated Nonvested	(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, 2019	11,244	28	67	4,903	686	10,056	656	327	16,628	27,967
New Entrants	307	0	1	0	0	0	7	0	7	315
Rehires	14	(14)	0	0	0	0	0	0	0	0
Terminated Nonvested	(1)	0	0	0	0	0	0	0	0	(1)
Withdrawal / Cashout	(18)	0	0	0	0	0	0	0	0	(18)
Accidental Death	(4)	0	0	0	0	0	4	0	4	0
Ordinary Death	(4)	0	0	0	0	0	0	0	0	(4)
Service Retirement	(125)	0	(4)	129	0	0	0	0	129	0
Ordinary Disability Retirement	(3)	0	0	0	3	0	0	0	3	0
Accidental Disability Retirement	(344)	(1)	0	0	0	345	0	0	345	0
Reclassifications	13	(13)	0	(36)	(1)	37	0	0	0	0
Pensioner Death with Beneficiary	0	0	0	(9)	(1)	(25)	17	18	0	0
Pensioner Death without Beneficiary	0	0	0	(207)	(49)	(195)	(12)	(25)	(488)	(488)
Pension Payroll Adjustments	0	0	0	(1)	0	0	(2)	(1)	(4)	(4)
Net Change	(165)	(28)	(3)	(124)	(48)	162	14	(8)	(4)	(200)
Number at June 30, 2020	11,079	0	64	4,779	638	10,218	670	319	16,624	27,767

Graph XII-2
Headcount Summary by Status



¹ Active Off Payroll prior to June 30, 2020.

Table XII-3
Summary of Active Membership

NEW YORK CITY FIRE PENSION FUND		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2020 (LAG) AND JUNE 30, 2019 (LAG) ACTUARIAL VALUATIONS		
	June 30, 2020 (Lag)	June 30, 2019 (Lag)
Number		
Males	10,945	11,117
Females	134	127
Total	11,079	11,244
Annual Salary ¹		
Males	\$ 1,334,436,033	\$ 1,324,585,776
Females	13,570,365	12,257,226
Total	\$ 1,348,006,398	\$ 1,336,843,002
Average Salary ¹		
Males	\$ 121,922	\$ 119,150
Females	101,271	96,514
Total Average	\$ 121,672	\$ 118,894
Average Age		
Males	40.8	40.6
Females	36.7	36.1
Total Average	40.7	40.6
Average Past Service		
Males	14.1	13.9
Females	7.8	7.1
Total Average	14.0	13.8

¹Salaries 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

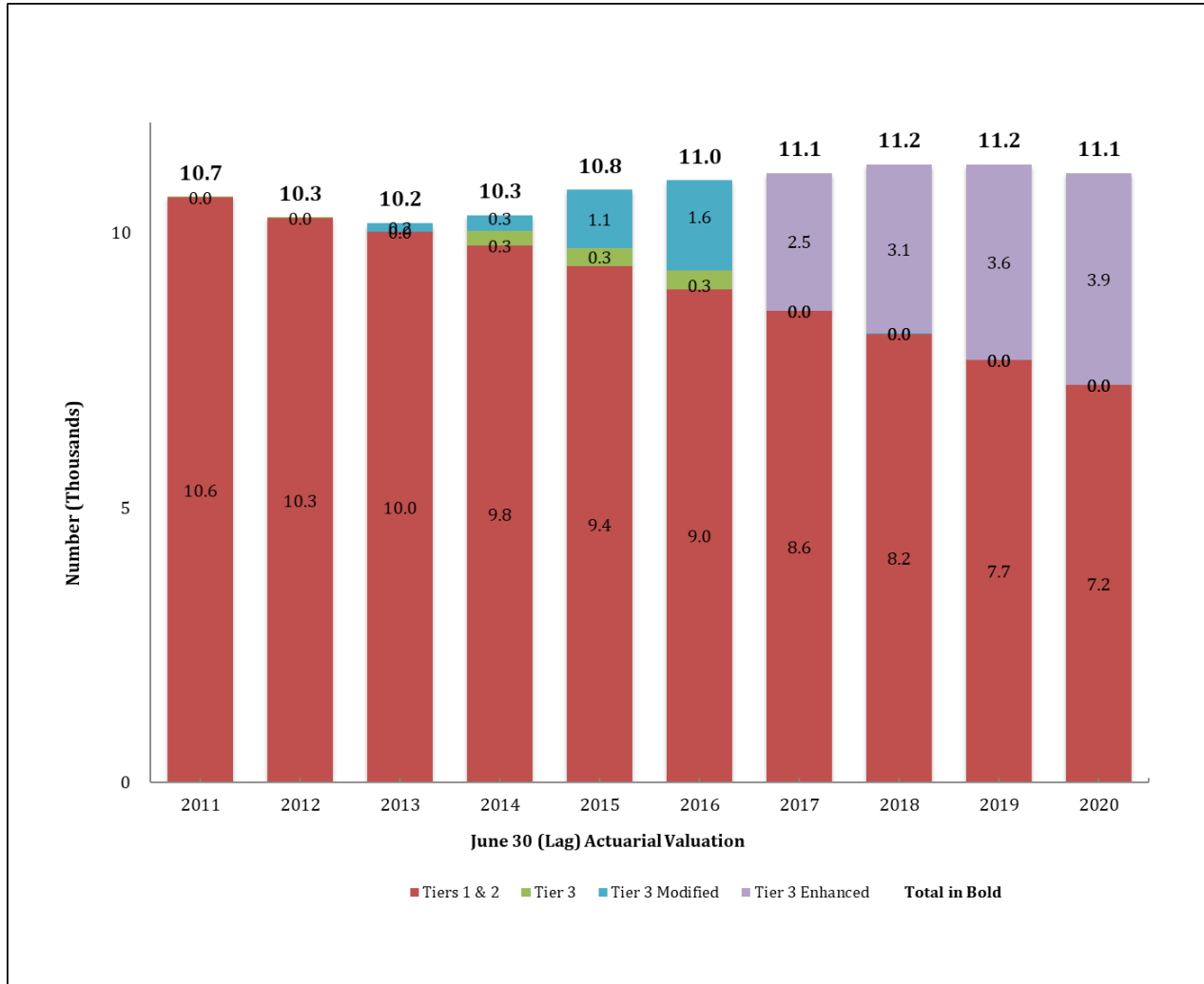


Table XII-5
Schedule of Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
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%
2019	11,244	1,336,843,002	118,894	2.3%
2020	11,079	1,348,006,398	121,672	2.3%

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, 2020

AGE \ SVC	MALE TOTAL									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	53	0	0	0	0	0	0	0	0	53
25 TO 29	902	221	0	0	0	0	0	0	0	1,123
30 TO 34	925	872	104	0	0	0	0	0	0	1,901
35 TO 39	208	513	858	464	2	0	0	0	0	2,045
40 TO 44	24	55	450	1,417	230	1	0	0	0	2,177
45 TO 49	1	2	136	857	545	131	1	0	0	1,673
50 TO 54	2	0	4	142	494	337	105	0	0	1,084
55 TO 59	0	0	0	2	132	214	207	96	0	651
60 TO 64	0	0	0	0	1	36	64	91	34	226
65 TO 69	0	0	0	1	1	0	1	4	4	11
70 & UP	0	0	0	0	0	1	0	0	0	1
TOTAL	2,115	1,663	1,552	2,883	1,405	720	378	191	38	10,945

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	2,949	0	0	0	0	0	0	0	0	2,949
25 TO 29	57,810	24,219	0	0	0	0	0	0	0	82,029
30 TO 34	63,650	99,071	13,064	0	0	0	0	0	0	175,785
35 TO 39	15,854	60,216	110,952	62,164	294	0	0	0	0	249,481
40 TO 44	1,928	6,413	58,477	193,400	33,082	123	0	0	0	293,422
45 TO 49	67	320	17,715	118,175	79,824	19,746	120	0	0	235,967
50 TO 54	260	0	582	19,409	71,696	51,350	16,362	0	0	159,659
55 TO 59	0	0	0	293	18,972	31,162	31,659	16,046	0	98,132
60 TO 64	0	0	0	0	163	5,363	9,425	14,380	5,976	35,307
65 TO 69	0	0	0	162	163	0	121	569	527	1,541
70 & UP	0	0	0	0	0	164	0	0	0	164
TOTAL ¹	142,518	190,239	200,790	393,603	204,193	107,907	57,688	30,995	6,503	1,334,436

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	55,650	0	0	0	0	0	0	0	0	55,650
25 TO 29	64,091	109,589	0	0	0	0	0	0	0	73,045
30 TO 34	68,811	113,613	125,619	0	0	0	0	0	0	92,470
35 TO 39	76,222	117,380	129,315	133,975	147,091	0	0	0	0	121,996
40 TO 44	80,313	116,606	129,949	136,485	143,833	122,649	0	0	0	134,783
45 TO 49	66,526	159,859	130,258	137,894	146,466	150,734	120,333	0	0	141,044
50 TO 54	129,971	0	145,422	136,685	145,134	152,373	155,824	0	0	147,287
55 TO 59	0	0	0	146,526	143,725	145,617	152,944	167,148	0	150,741
60 TO 64	0	0	0	0	162,592	148,970	147,272	158,027	175,761	156,227
65 TO 69	0	0	0	161,545	162,592	0	121,074	142,161	131,731	140,070
70 & UP	0	0	0	0	0	163,638	0	0	0	163,638
TOTAL	67,384	114,395	129,375	136,526	145,333	149,871	152,613	162,279	171,126	121,922

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

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2020 (cont'd)

AGE \ SVC	FEMALE TOTAL									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0
25 TO 29	29	2	0	0	0	0	0	0	0	31
30 TO 34	25	8	3	0	0	0	0	0	0	36
35 TO 39	7	7	2	4	0	0	0	0	0	20
40 TO 44	2	3	3	9	3	0	0	0	0	20
45 TO 49	0	0	5	8	4	0	0	0	0	17
50 TO 54	1	2	0	1	2	0	0	0	0	6
55 TO 59	1	1	0	0	1	0	0	0	0	3
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	0	1	0	0	0	0	1
TOTAL	65	23	13	22	11	0	0	0	0	134

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0
25 TO 29	1,780	243	0	0	0	0	0	0	0	2,023
30 TO 34	1,688	911	331	0	0	0	0	0	0	2,930
35 TO 39	605	853	257	494	0	0	0	0	0	2,209
40 TO 44	157	380	384	1,224	401	0	0	0	0	2,546
45 TO 49	0	0	675	1,068	575	0	0	0	0	2,318
50 TO 54	134	354	0	145	304	0	0	0	0	936
55 TO 59	133	161	0	0	152	0	0	0	0	445
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	0	163	0	0	0	0	163
TOTAL¹	4,496	2,902	1,647	2,931	1,594	0	0	0	0	13,570

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0
25 TO 29	61,382	121,431	0	0	0	0	0	0	0	65,257
30 TO 34	67,508	113,873	110,463	0	0	0	0	0	0	81,391
35 TO 39	86,415	121,922	128,531	123,492	0	0	0	0	0	110,469
40 TO 44	78,438	126,694	128,049	136,001	133,550	0	0	0	0	127,288
45 TO 49	0	0	134,968	133,480	143,706	0	0	0	0	136,324
50 TO 54	133,815	176,932	0	145,122	151,812	0	0	0	0	156,071
55 TO 59	132,788	160,500	0	0	152,072	0	0	0	0	148,453
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	0	162,895	0	0	0	0	162,895
TOTAL	69,172	126,163	126,726	133,225	144,915	0	0	0	0	101,271

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

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2020 (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
<i>NUMBER:</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	53	0	0	0	0	0	0	0	0	53
25 TO 29	931	223	0	0	0	0	0	0	0	1,154
30 TO 34	950	880	107	0	0	0	0	0	0	1,937
35 TO 39	215	520	860	468	2	0	0	0	0	2,065
40 TO 44	26	58	453	1,426	233	1	0	0	0	2,197
45 TO 49	1	2	141	865	549	131	1	0	0	1,690
50 TO 54	3	2	4	143	496	337	105	0	0	1,090
55 TO 59	1	1	0	2	133	214	207	96	0	654
60 TO 64	0	0	0	0	1	36	64	91	34	226
65 TO 69	0	0	0	1	1	0	1	4	4	11
70 & UP	0	0	0	0	1	1	0	0	0	2
TOTAL	2,180	1,686	1,565	2,905	1,416	720	378	191	38	11,079

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	2,949	0	0	0	0	0	0	0	0	2,949
25 TO 29	59,590	24,462	0	0	0	0	0	0	0	84,052
30 TO 34	65,338	99,982	13,396	0	0	0	0	0	0	178,715
35 TO 39	16,459	61,069	111,209	62,658	294	0	0	0	0	251,690
40 TO 44	2,084	6,793	58,861	194,624	33,482	123	0	0	0	295,967
45 TO 49	67	320	18,390	119,243	80,399	19,746	120	0	0	238,285
50 TO 54	394	354	582	19,554	72,000	51,350	16,362	0	0	160,595
55 TO 59	133	161	0	293	19,124	31,162	31,659	16,046	0	98,578
60 TO 64	0	0	0	0	163	5,363	9,425	14,380	5,976	35,307
65 TO 69	0	0	0	162	163	0	121	569	527	1,541
70 & UP	0	0	0	0	163	164	0	0	0	327
TOTAL ¹	147,014	193,140	202,438	396,534	205,787	107,907	57,688	30,995	6,503	1,348,006

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	55,650	0	0	0	0	0	0	0	0	55,650
25 TO 29	64,006	109,695	0	0	0	0	0	0	0	72,835
30 TO 34	68,777	113,615	125,194	0	0	0	0	0	0	92,264
35 TO 39	76,554	117,441	129,313	133,885	147,091	0	0	0	0	121,884
40 TO 44	80,169	117,127	129,936	136,482	143,701	122,649	0	0	0	134,714
45 TO 49	66,526	159,859	130,425	137,853	146,446	150,734	120,333	0	0	140,997
50 TO 54	131,252	176,932	145,422	136,744	145,161	152,373	155,824	0	0	147,335
55 TO 59	132,788	160,500	0	146,526	143,788	145,617	152,944	167,148	0	150,731
60 TO 64	0	0	0	0	162,592	148,970	147,272	158,027	175,761	156,227
65 TO 69	0	0	0	161,545	162,592	0	121,074	142,161	131,731	140,070
70 & UP	0	0	0	0	162,895	163,638	0	0	0	163,267
TOTAL	67,438	114,555	129,353	136,501	145,330	149,871	152,613	162,279	171,126	121,672

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

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-7
Detailed Reconciliation of Active Membership

TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2020							TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2019				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
1	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
2	M	7,180	1,002,457,089	139,618	45.6	19.4	7,642	1,062,077,354	138,979	45.1	18.8
2	F	47	6,254,659	133,078	44.0	16.5	47	6,201,712	131,951	43.0	15.2
		7,227	1,008,711,748	139,575	45.6	19.4	7,689	1,068,279,066	138,936	45.0	18.7
3	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
3	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
3 Modified	M	2	249,889	124,945	34.5	6.0	2	196,388	98,194	33.5	4.5
3 Modified	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	249,889	124,945	34.5	6.0	2	196,388	98,194	33.5	4.5
3 Enhanced	M	3,763	331,729,055	88,155	31.5	4.1	3,473	262,312,034	75,529	30.8	3.2
3 Enhanced	F	87	7,315,706	84,089	32.7	3.2	80	6,055,514	75,694	32.1	2.3
		3,850	339,044,761	88,064	31.6	4.0	3,553	268,367,548	75,533	30.8	3.2
ALL TIERS		11,079	1,348,006,398	121,672	40.7	14.0	11,244	1,336,843,002	118,894	40.6	13.8

JUNE 30, 2020 MEMBERS ALSO PRESENT AS OF JUNE 30, 2019							JUNE 30, 2019 MEMBERS ALSO PRESENT AS OF JUNE 30, 2020				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
1	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
2	M	7,167	1,000,877,460	139,651	45.6	19.4	7,167	995,286,946	138,871	44.6	18.4
2	F	47	6,254,659	133,078	44.0	16.5	47	6,201,712	131,951	43.0	15.2
		7,214	1,007,132,119	139,608	45.6	19.4	7,214	1,001,488,658	138,826	44.6	18.3
3	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
3	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
3 Modified	M	2	249,889	124,945	34.5	6.0	2	196,388	98,194	33.5	4.5
3 Modified	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	249,889	124,945	34.5	6.0	2	196,388	98,194	33.5	4.5
3 Enhanced	M	3,448	314,360,160	91,172	31.8	4.3	3,448	260,570,223	75,571	30.8	3.2
3 Enhanced	F	79	6,883,570	87,134	33.1	3.4	79	5,996,941	75,911	32.1	2.3
		3,527	321,243,730	91,081	31.8	4.3	3,527	266,567,164	75,579	30.8	3.2
ALL TIERS		10,743	1,328,625,738	123,674	41.1	14.4	10,743	1,268,252,210	118,054	40.1	13.4

ADDITIONS DURING THE YEAR ¹							SEPARATIONS FROM MEMBERSHIP DURING THE YEAR ¹				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
1	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
2	M	13	1,579,629	121,510	41.6	16.5	475	66,790,408	140,611	51.7	24.6
2	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		13	1,579,629	121,510	41.6	16.5	475	66,790,408	140,611	51.7	24.6
3	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
3	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
3 Modified	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
3 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
3 Enhanced	M	315	17,368,895	55,139	28.6	1.4	25	1,741,811	69,672	30.6	2.0
3 Enhanced	F	8	432,136	54,017	28.8	1.0	1	58,573	58,573	30.0	1.0
		323	17,801,031	55,112	28.6	1.4	26	1,800,384	69,246	30.6	2.0
ALL TIERS		336	19,380,660	57,681	29.1	1.9	501	68,590,792	136,908	50.6	23.5

1.62

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, 2019 and are no longer members on June 30, 2020. Members are included as separations and additions if the tier or gender has changed.

Table XII-8
Distribution of Pension Benefits by Cause and Age as of June 30, 2020

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>SERVICE RETIREMENT:</i>									
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	11	972,167	88,379	0	0	0	11	972,167	88,379
45 TO 49	50	4,290,658	85,813	1	95,543	95,543	51	4,386,201	86,004
50 TO 54	140	13,352,139	95,372	0	0	0	140	13,352,139	95,372
55 TO 59	328	32,599,314	99,388	0	0	0	328	32,599,314	99,388
60 TO 64	687	60,496,568	88,059	2	190,623	95,312	689	60,687,191	88,080
65 TO 69	686	55,725,380	81,232	5	440,034	88,007	691	56,165,414	81,281
70 TO 74	600	38,453,578	64,089	1	46,118	46,118	601	38,499,696	64,059
75 TO 79	706	41,359,228	58,582	0	0	0	706	41,359,228	58,582
80 TO 84	819	43,463,605	53,069	1	47,687	47,687	820	43,511,292	53,063
85 TO 89	499	24,430,431	48,959	0	0	0	499	24,430,431	48,959
90 & UP	243	11,470,815	47,205	0	0	0	243	11,470,815	47,205
TOTAL	4,769	326,613,883	68,487	10	820,005	82,001	4,779	327,433,888	68,515
<i>ORDINARY DISABILITY:</i>									
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	3	189,747	63,249	0	0	0	3	189,747	63,249
40 TO 44	6	269,001	44,834	0	0	0	6	269,001	44,834
45 TO 49	7	300,760	42,966	0	0	0	7	300,760	42,966
50 TO 54	10	466,946	46,695	0	0	0	10	466,946	46,695
55 TO 59	12	363,443	30,287	0	0	0	12	363,443	30,287
60 TO 64	36	995,077	27,641	1	29,895	29,895	37	1,024,972	27,702
65 TO 69	42	1,196,012	28,476	0	0	0	42	1,196,012	28,476
70 TO 74	47	2,678,463	56,989	0	0	0	47	2,678,463	56,989
75 TO 79	86	5,963,745	69,346	0	0	0	86	5,963,745	69,346
80 TO 84	183	11,714,040	64,011	0	0	0	183	11,714,040	64,011
85 TO 89	134	7,352,849	54,872	0	0	0	134	7,352,849	54,872
90 & UP	71	3,815,214	53,735	0	0	0	71	3,815,214	53,735
TOTAL	637	35,305,297	55,424	1	29,895	29,895	638	35,335,192	55,384
<i>ACCIDENTAL DISABILITY:</i>									
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	74	7,641,444	103,263	1	69,307	69,307	75	7,710,751	102,810
40 TO 44	340	36,227,627	106,552	1	136,309	136,309	341	36,363,936	106,639
45 TO 49	653	71,663,998	109,746	1	80,176	80,176	654	71,744,174	109,701
50 TO 54	1,038	115,799,430	111,560	1	87,173	87,173	1,039	115,886,603	111,537
55 TO 59	1,650	185,156,700	112,216	1	104,679	104,679	1,651	185,261,379	112,212
60 TO 64	2,072	217,846,130	105,138	8	725,045	90,631	2,080	218,571,175	105,082
65 TO 69	1,449	144,657,040	99,832	2	213,954	106,977	1,451	144,870,994	99,842
70 TO 74	833	67,605,500	81,159	4	378,951	94,738	837	67,984,451	81,224
75 TO 79	770	51,482,408	66,860	0	0	0	770	51,482,408	66,860
80 TO 84	757	42,434,323	56,056	0	0	0	757	42,434,323	56,056
85 TO 89	413	20,171,294	48,841	0	0	0	413	20,171,294	48,841
90 & UP	150	7,308,550	48,724	0	0	0	150	7,308,550	48,724
TOTAL	10,199	967,994,444	94,911	19	1,795,594	94,505	10,218	969,790,038	94,910

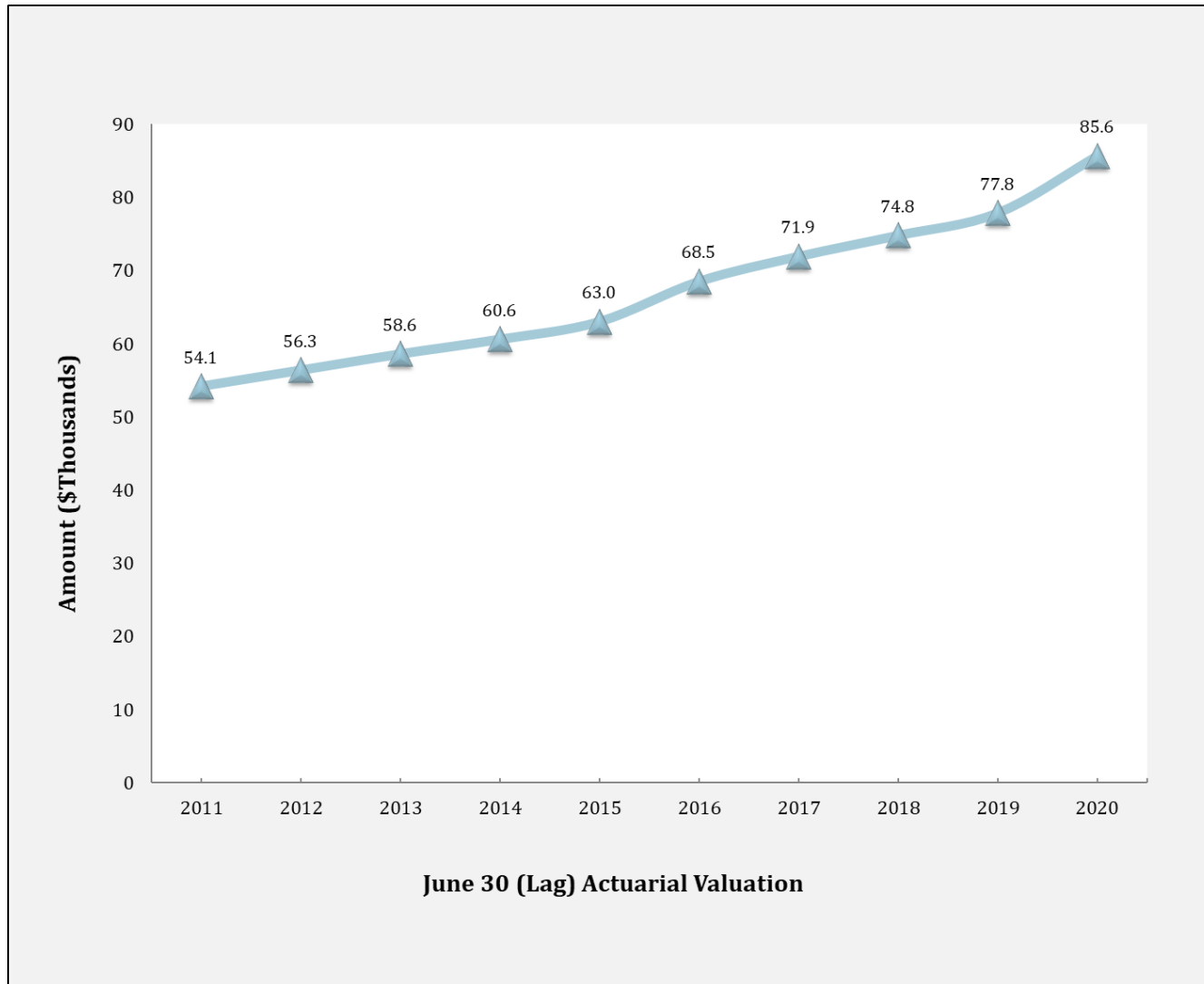
Table XII-8

Distribution of Pension Benefits by Cause and Age as of June 30, 2020 (cont'd)

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>ACCIDENTAL DEATH:</i>									
UNDER 30	0	0	0	8	732,322	91,540	8	732,322	91,540
30 TO 34	0	0	0	1	101,716	101,716	1	101,716	101,716
35 TO 39	0	0	0	4	603,756	150,939	4	603,756	150,939
40 TO 44	0	0	0	5	608,293	121,659	5	608,293	121,659
45 TO 49	0	0	0	36	4,468,516	124,125	36	4,468,516	124,125
50 TO 54	0	0	0	67	8,784,367	131,110	67	8,784,367	131,110
55 TO 59	0	0	0	104	13,824,526	132,928	104	13,824,526	132,928
60 TO 64	1	64,829	64,829	128	17,713,773	138,389	129	17,778,602	137,819
65 TO 69	1	75,459	75,459	74	9,774,229	132,084	75	9,849,688	131,329
70 TO 74	2	122,145	61,073	69	8,519,857	123,476	71	8,642,002	121,718
75 TO 79	0	0	0	71	7,478,486	105,331	71	7,478,486	105,331
80 TO 84	1	73,962	73,962	42	4,130,733	98,351	43	4,204,695	97,784
85 TO 89	0	0	0	36	3,214,699	89,297	36	3,214,699	89,297
90 & UP	0	0	0	20	1,489,609	74,480	20	1,489,609	74,480
TOTAL	5	336,395	67,279	665	81,444,882	122,474	670	81,781,277	122,062
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	1	93,127	93,127	1	52,464	52,464	2	145,591	72,796
30 TO 34	0	0	0	2	130,545	65,273	2	130,545	65,273
35 TO 39	0	0	0	5	236,482	47,296	5	236,482	47,296
40 TO 44	0	0	0	1	101,543	101,543	1	101,543	101,543
45 TO 49	1	122,869	122,869	0	0	0	1	122,869	122,869
50 TO 54	0	0	0	8	511,510	63,939	8	511,510	63,939
55 TO 59	1	23,535	23,535	12	591,956	49,330	13	615,491	47,345
60 TO 64	0	0	0	20	809,985	40,499	20	809,985	40,499
65 TO 69	0	0	0	28	1,117,874	39,924	28	1,117,874	39,924
70 TO 74	0	0	0	25	855,264	34,211	25	855,264	34,211
75 TO 79	0	0	0	44	1,498,054	34,047	44	1,498,054	34,047
80 TO 84	0	0	0	54	1,658,338	30,710	54	1,658,338	30,710
85 TO 89	0	0	0	38	732,329	19,272	38	732,329	19,272
90 & UP	0	0	0	78	774,862	9,934	78	774,862	9,934
TOTAL	3	239,531	79,844	316	9,071,206	28,706	319	9,310,737	29,187
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	1	93,127	93,127	9	784,786	87,198	10	877,913	87,791
30 TO 34	0	0	0	3	232,261	77,420	3	232,261	77,420
35 TO 39	77	7,831,191	101,704	10	909,545	90,955	87	8,740,736	100,468
40 TO 44	357	37,468,795	104,955	7	846,145	120,878	364	38,314,940	105,261
45 TO 49	711	76,378,285	107,424	38	4,644,235	122,217	749	81,022,520	108,174
50 TO 54	1,188	129,618,515	109,106	76	9,383,050	123,461	1,264	139,001,565	109,970
55 TO 59	1,991	218,142,992	109,565	117	14,521,161	124,112	2,108	232,664,153	110,372
60 TO 64	2,796	279,402,604	99,929	159	19,469,321	122,449	2,955	298,871,925	101,141
65 TO 69	2,178	201,653,891	92,587	109	11,546,091	105,927	2,287	213,199,982	93,223
70 TO 74	1,482	108,859,686	73,455	99	9,800,190	98,992	1,581	118,659,876	75,054
75 TO 79	1,562	98,805,381	63,256	115	8,976,540	78,057	1,677	107,781,921	64,271
80 TO 84	1,760	97,685,930	55,503	97	5,836,758	60,173	1,857	103,522,688	55,747
85 TO 89	1,046	51,954,574	49,670	74	3,947,028	53,338	1,120	55,901,602	49,912
90 & UP	464	22,594,579	48,695	98	2,264,471	23,107	562	24,859,050	44,233
TOTAL	15,613	1,330,489,550	85,217	1,011	93,161,582	92,148	16,624	1,423,651,132	85,638

Beginning June 30, 2020, disclosed pensioner benefits include VSF benefits, anticipated increases due to non-finalized pensioners, and other anticipated changes not otherwise reflected in the census data.

Graph XII-9
Pensioner Average Benefits



Beginning June 30, 2020, disclosed pensioner benefits include VSF benefits, anticipated increases due to non-finalized pensioners, and other anticipated changes not otherwise reflected in the census data.

Table XII-10
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
June 30 (Lag) Actuarial Valuation	Added to Rolls		Removed from Rolls		End of Year Rolls		% Increase In Annual Allowances	Average Annual Allowances
	Number	Annual Allowances ¹	Number	Annual Allowances	Number	Annual Allowances ¹		
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	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
2019	559	78,160,361	524	24,799,933	16,628	1,294,170,638	4.3%	77,831
2020	560	157,961,990	564	28,481,496	16,624	1,423,651,132	10.0%	85,638

¹ Allowances shown through June 30, 2019 are those presented in the census data. Beginning 2016, SADB payments to beneficiaries are included. Beginning June 30, 2020, disclosed pensioner benefits include VSF benefits, anticipated increases due to non-finalized pensioners, and other changes not otherwise reflected in the census data.

APPENDIX: ACRONYMS AND ABBREVIATIONS

Revised 2021 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2021
2019 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2019
AAVM	Actuarial Asset Valuation Method
ACCNYS	Administrative Code of the City of New York
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contributions
AVA	Actuarial Value of Assets
BERS	Board of Education Retirement System
BMC	Basic Member Contributions
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
EIR	Expected Investment Return
FAS	Final Average Salary
FIRE	Fire Pension Fund
FFVSF	Firefighters Variable Supplements Fund
FOVSF	Fire Officers Variable Supplements Fund
FS	Final Salary
GASB	Governmental Accounting Standards Board
IRC	Internal Revenue Code
ITHP	Increased-Take-Home-Pay
MVA	Market Value of Assets
NYCERS	New York City Employees' Retirement System
NYCRS	New York City Retirement Systems
OYLM	One-Year Lag Methodology
POLICE	Police Pension Fund
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
PVFS	Present Value of Future Salary
TRS	Teachers' Retirement System
UAL	Unfunded Accrued Liability
UIR	Unexpected Investment Return
VSF	Variable Supplements Fund
WTC	World Trade Center