



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

JUNE 30, 2020 (LAG) ACTUARIAL VALUATION

prepared by the
New York City
Office of the Actuary

2022



OFFICE OF THE ACTUARY

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MICHAEL J. SAMET
INTERIM CHIEF ACTUARY

September 2, 2022

Board of Trustees
New York City Police Pension Fund
233 Broadway, Room 2501
New York, NY 10279

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 Police Pension Fund (POLICE) 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 \$2,490,134,303 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 POLICE 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

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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 Police Pension Fund (POLICE) 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 POLICE 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	\$ 52,485,567,383	\$ 50,614,795,903
2. Actuarial Value of Assets (AVA) ²	<u>44,398,420,584</u>	<u>42,526,542,519</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 8,087,146,799	\$ 8,088,253,384
4. Market Value of Assets (MVA)	41,293,014,000	40,119,424,000
5. Unfunded Accrued Liability (MVA Basis) (1. - 4.)	\$ 11,192,553,383	\$ 10,495,371,903
6. Funded Ratio (MVA Basis) (4. / 1.)	78.7%	79.3%
Contribution³		
1. Normal Cost	\$ 1,516,064,524	\$ 1,532,592,781
2. Amortization of Unfunded Accrued Liability	943,383,024	871,927,122
3. Administrative Expenses	<u>30,686,755</u>	<u>33,207,825</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 2,490,134,303	\$ 2,437,727,728
5. Statutory Contribution (4.)	\$ 2,490,134,303	\$ 2,437,727,728
Participant Data		
1. Active Members		
a. Number	35,895	36,401
b. Annual Salary ⁴	\$ 4,299,648,848	\$ 4,244,805,002
c. Average Salary	\$ 119,784	\$ 116,612
2. Terminated Nonvested Members/Actives Off Payroll ⁵	1,544	1,640
3. Deferred Vested Members	753	497
4. Retirees and Beneficiaries		
a. Number	51,465	50,727
b. Total Annual Benefits	\$ 2,860,164,965	\$ 2,716,137,415
c. Average Annual Benefit	\$ 55,575	\$ 53,544

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 effective 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.

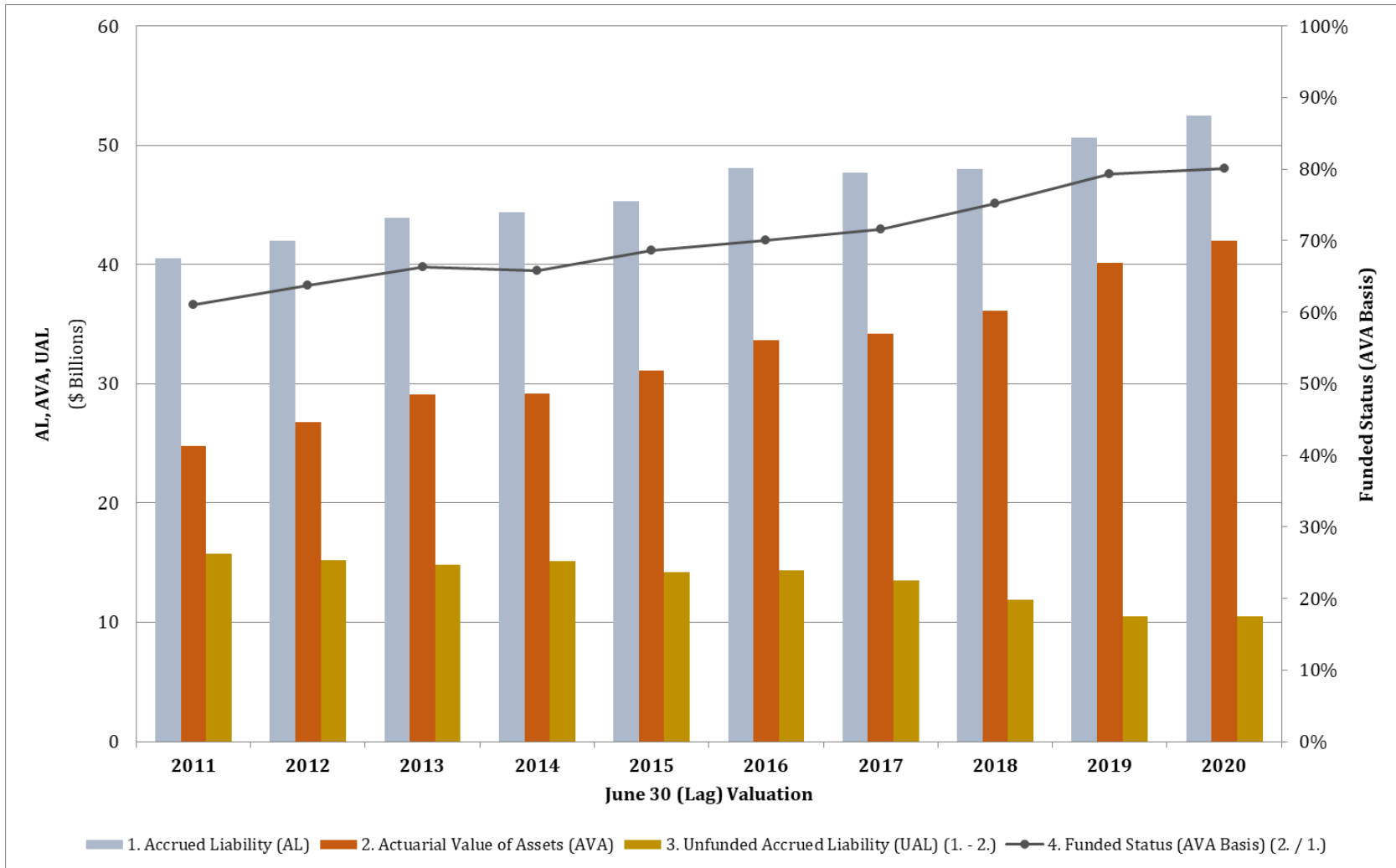
Table I-2
Actuarial Liabilities

NEW YORK CITY POLICE 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	\$ 17,538,090,565	\$ 17,202,005,566
2. Terminated Nonvested Members/Actives Off Payroll ¹	5,605,481	66,025,523
3. Deferred Vested Members	174,891,626	97,941,392
4. Retirees and Beneficiaries	<u>33,530,478,042</u>	<u>31,959,121,515</u>
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 51,249,065,714	\$ 49,325,093,996
6. Actuarial Adjustments ²	<u>1,236,501,669</u>	<u>1,289,701,907</u>
7. Total Accrued Liability (5. + 6.)	\$ 52,485,567,383	\$ 50,614,795,903
Present Value of Benefits		
1. Active Members	\$ 30,724,395,323	\$ 30,600,252,966
2. Terminated Nonvested Members/Actives Off Payroll ¹	5,605,481	66,025,523
3. Deferred Vested Members	174,891,626	97,941,392
4. Retirees and Beneficiaries	<u>33,530,478,042</u>	<u>31,959,121,515</u>
5. Present Value of Benefits Pre-Adjustments (1. to 4.)	\$ 64,435,370,472	\$ 62,723,341,396
6. Actuarial Adjustments ²	<u>2,208,082,121</u>	<u>2,278,816,565</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 66,643,452,593	\$ 65,002,157,961

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	\$ 9,815	\$ 23,690
Receivables		
Investment Securities Sold	\$ 608,688	\$ 865,477
Member Loans	218,592	238,644
Transferrable Earnings due from VSFs to QPP	0	0
Accrued Interest and Dividends	<u>1,009</u>	<u>2,294</u>
Total Receivables	\$ 828,289	\$ 1,106,415
INVESTMENTS AT FAIR VALUE		
Short-Term Investments		
Commercial Paper	\$ 238,555	\$ 235,970
Discount Notes	0	162,145
Short-term Investment Fund	293,923	234,110
U.S. Treasury Bills	636,923	0
Debt Securities	10,781,708	10,795,466
Equity Securities	16,356,881	13,218,301
Alternative Investments	9,485,329	8,857,894
Collective Trust Funds		
Fixed Income	137,770	132,311
Bank Loans	514,197	536,357
Corporate and Other	11,597	50,620
Domestic Equity	356,956	87,942
International Equity	2,872,858	5,984,252
Mortgage Debt Security	205,647	204,347
Treasury Inflation Protected Securities	0	457,367
U.S. Government and Agency	0	25,958
Collateral From Securities Lending	<u>3,430,138</u>	<u>3,733,667</u>
Total Investments	\$45,322,482	\$44,716,707
OTHER ASSETS	<u>9,716</u>	<u>7,093</u>
TOTAL ASSETS	\$46,170,302	\$45,853,905
LIABILITIES		
Accounts Payable	\$ 49,637	\$ 265,086
Payables for Investment Securities Purchased	1,026,317	863,328
Accrued Benefits Payable	54,183	69,608
Accrued Transfers to VSFs	317,013	802,792
Security Lending	<u>3,430,138</u>	<u>3,733,667</u>
TOTAL LIABILITIES	\$ 4,877,288	\$ 5,734,481
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	\$41,293,014	\$40,119,424

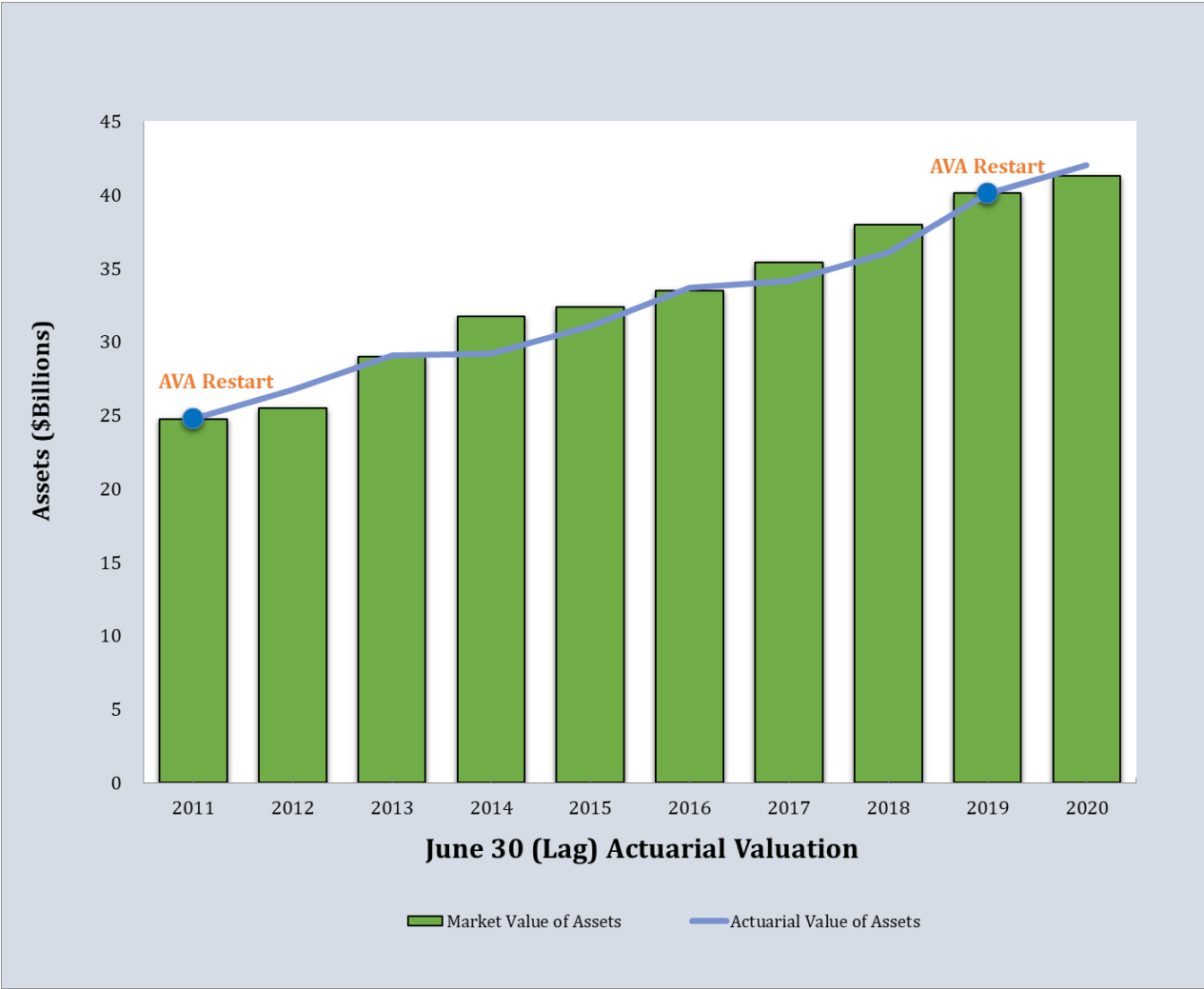
Table II-2
Statement of Changes in Plan Net Assets

(\$ Thousands)		
	June 30, 2020	June 30, 2019
ADDITIONS		
Contributions		
Member Contributions	\$ 280,129	\$ 278,087
Employer Contributions	<u>2,458,907</u>	<u>2,558,256</u>
Total Contributions	\$ 2,739,036	\$ 2,836,343
Investment Income (Loss)		
Interest Income	\$ 421,859	\$ 548,925
Dividend Income	497,886	494,434
Net Appreciation (Depreciation) in Fair Value	<u>1,191,629</u>	<u>1,772,808</u>
Total Investment Income (Loss)	\$ 2,111,374	\$ 2,816,167
Less Investment Expenses	226,384	249,849
Net Income (Loss)	\$ 1,884,990	\$ 2,566,318
Securities Lending Transactions		
Securities Lending Income	\$ 12,194	\$ 17,063
Securities Lending Fees	<u>(1,172)</u>	<u>(1,679)</u>
Net Securities Lending Income (Loss)	<u>\$ 11,022</u>	<u>\$ 15,384</u>
Net Investment Income (Loss)	\$ 1,896,012	\$ 2,581,702
Other		
Net Receipts from Other Retirement Systems	\$ 2,053	\$ 1,907
Transferrable Earnings due from VSFs to QPP	0	139,836
Litigation Income	<u>4,435</u>	<u>2,201</u>
TOTAL ADDITIONS	\$ 4,641,536	\$ 5,561,989
DEDUCTIONS		
Benefit Payments and Withdrawals	\$ 3,039,785	\$ 2,853,799
Accrued Transfers to VSFs	401,358	518,628
Administrative Expenses	<u>26,803</u>	<u>29,005</u>
TOTAL DEDUCTIONS	\$ 3,467,946	\$ 3,401,432
NET INCREASE (DECREASE) IN PLAN NET ASSETS	\$ 1,173,590	\$ 2,160,557
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	\$ 40,119,424	\$ 37,958,867
End of Year	\$ 41,293,014	\$ 40,119,424

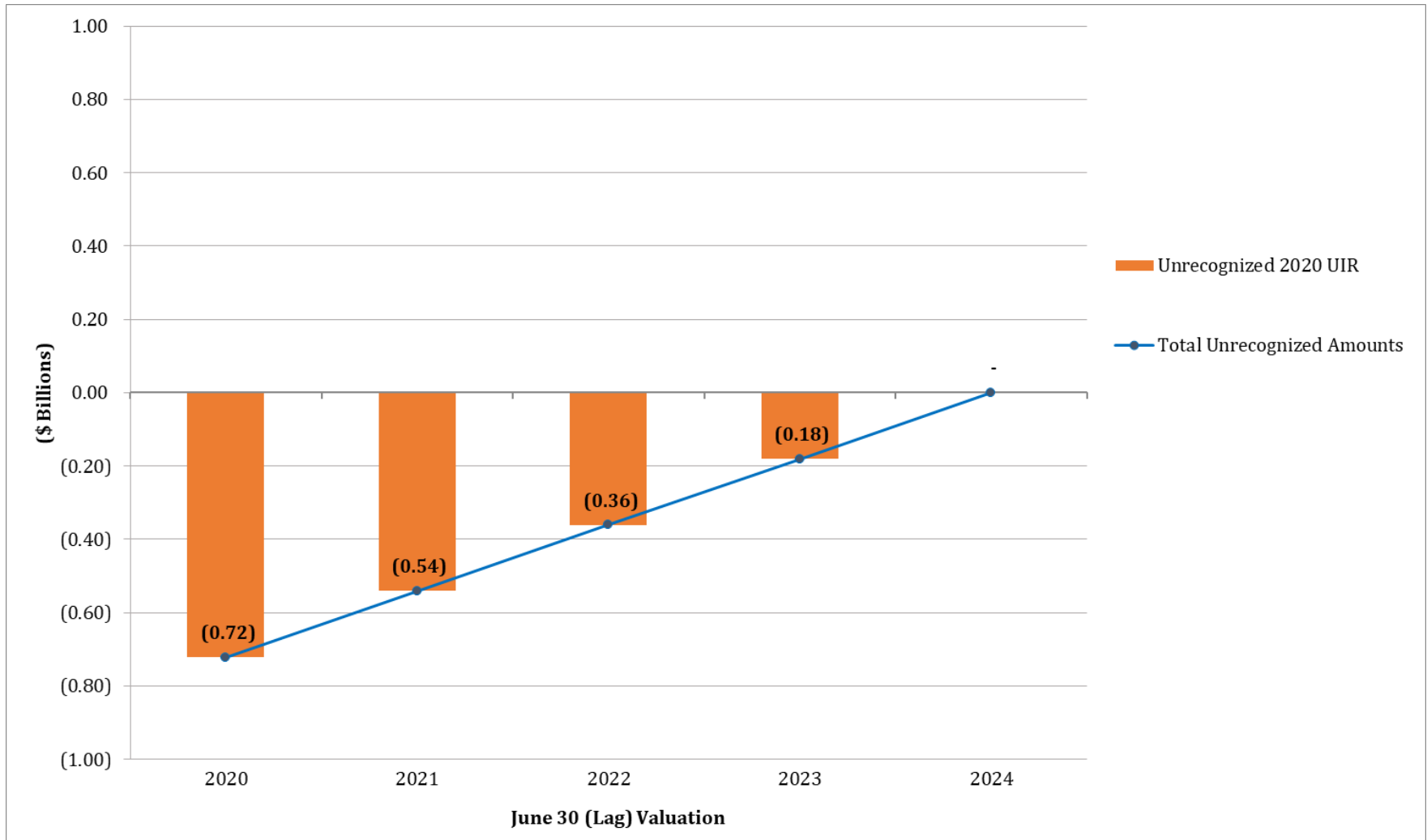
Table II-3
Development of Actuarial Value of Assets

(\$ Thousands)		
Valuation Date	June 30, 2020	June 30, 2019
1. Market Value of Assets (MVA)		
a. Beginning of Year (BOY)	\$ 40,119,424	\$ 37,958,867
b. End of Year (EOY)	\$ 41,293,014	\$ 40,119,424
2. Contributions		
a. Employee	\$ 280,129	\$ 278,087
b. Employer	<u>2,458,907</u>	<u>2,558,256</u>
c. Total Contributions	\$ 2,739,036	\$ 2,836,343
3. Net Investment Income		
a. Investment Income	\$ 2,122,396	\$ 2,831,551
b. Investment Expenses	<u>(226,384)</u>	<u>(249,849)</u>
c. Total Net Investment Income	\$ 1,896,012	\$ 2,581,702
4. Benefit Payments and Other Cash Flow	\$ (3,060,100)	\$ (2,878,696)
5. Preliminary Transferable Earnings from POLICE to VSFs - EOY	\$ (401,358)	\$ (378,792)
6. Net Cash Flow (2.c. + 4. + 5.)	\$ (722,422)	\$ (421,145)
7. Expected Investment Return (EIR)	\$ 2,797,313	\$ 2,581,702
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ (901,301)	\$ 0
9. Preliminary AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 40,119,424	\$ 37,958,867
b. Net Cash Flow (6.)	\$ (722,422)	\$ (421,145)
c. Expected Investment Return (7.)	\$ 2,797,313	\$ 2,581,702
d. Phase in of UIR		
20% of UIR for prior year	\$ (180,260)	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	\$ (180,260)	N/A
e. Lower Corridor Bound (80% of 1.b.)	\$ 33,034,411	\$ 32,095,539
f. Upper Corridor Bound (120% of 1.b.)	\$ 49,551,617	\$ 48,143,309
g. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d., bounded by e. and f.)	\$ 42,014,055	\$ 40,119,424
10. Receivable Amounts		
a. PV 1-year Adjusted Employer Contribution	\$ 2,356,641	\$ 2,377,116
b. PV Future Administrative Expense Reimbursement	<u>\$ 27,725</u>	<u>\$ 30,003</u>
c. Total Receivable Contributions	\$ 2,384,366	\$ 2,407,119
11. Final AVA @EOY (9g. + 10.c.)	\$ 44,398,421	\$ 42,526,543

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	\$ 1,516,064,524	\$ 1,532,592,781
Amortization of Unfunded Accrued Liability		
-Initial UAL	1,333,968,608	1,295,115,154
-2011 (Gain)/Loss	32,652,194	32,652,194
-2012 (Gain)/Loss	(58,789,449)	(58,789,449)
-2013 (Gain)/Loss	(27,789,355)	(27,789,355)
-2014 (Gain)/Loss	(25,983,043)	(25,983,043)
-2014 Assumption Change ²	70,722,523	70,722,523
-2015 (Gain)/Loss	(104,289,367)	(104,289,367)
-2016 (Gain)/Loss	2,510,395	2,510,395
-2016 SADB	46,805,208	46,805,208
-2016 Enhanced ADR	1,442,093	1,442,093
-2017 (Gain)/Loss	4,907,592	4,907,592
-2017 No VSF Escalation Offset	1,515,961	1,515,961
-2017 Non-Uniformed Service	5,541,419	5,541,419
-2017 Assumption Change ³	(39,298,270)	(39,298,270)
-2017 Method Change ³	(43,410,786)	(43,410,786)
-2018 (Gain)/Loss	(174,973,511)	(174,973,511)
-2019 (Gain)/Loss	(39,400,185)	(39,400,185)
-2019 Assumption Change ⁴	9,683,002	9,683,002
-2019 Method Change ⁴	(85,034,453)	(85,034,453)
-2020 (Gain)/Loss	32,602,448	NA
Total	943,383,024	871,927,122
Administrative Expenses	30,686,755	33,207,825
Total Contribution to the New York City Police Pension Fund	\$ 2,490,134,303	\$ 2,437,727,728

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 POLICE 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	\$ 13,211,374,581	22	\$ 1,333,968,608	11	\$ 11,037,668,084
(Gain)/Loss	6/30/11	\$ 276,060,031	15	\$ 32,652,194	5	\$ 129,427,108
(Gain)/Loss	6/30/12	\$ (497,039,100)	15	\$ (58,789,449)	6	\$ (270,901,064)
(Gain)/Loss	6/30/13	\$ (234,946,852)	15	\$ (27,789,355)	7	\$ (144,783,170)
(Gain)/Loss	6/30/14	\$ (219,675,273)	15	\$ (25,983,043)	8	\$ (149,991,587)
Assumption Change ¹	6/30/14	\$ 706,645,098	20	\$ 70,722,523	13	\$ 571,412,946
(Gain)/Loss	6/30/15	\$ (881,721,022)	15	\$ (104,289,367)	9	\$ (656,867,905)
(Gain)/Loss	6/30/16	\$ 21,224,294	15	\$ 2,510,395	10	\$ 17,045,465
SADB	6/30/16	\$ 395,717,583	15	\$ 46,805,208	10	\$ 317,805,143
Enhanced ADR	6/30/16	\$ 13,611,142	18	\$ 1,442,093	13	\$ 11,651,600
(Gain)/Loss	6/30/17	\$ 41,491,543	15	\$ 4,907,592	11	\$ 35,576,320
No VSF Escalation Offset	6/30/17	\$ 14,308,348	18	\$ 1,515,961	14	\$ 12,816,792
Non-Uniformed Service	6/30/17	\$ 55,368,731	20	\$ 5,541,419	16	\$ 50,606,563
Assumption Change ²	6/30/17	\$ (392,660,331)	20	\$ (39,298,270)	16	\$ (358,888,296)
Method Change ²	6/30/17	\$ (433,751,763)	20	\$ (43,410,786)	16	\$ (396,445,526)
(Gain)/Loss	6/30/18	\$ (1,479,324,567)	15	\$ (174,973,511)	12	\$ (1,343,531,414)
(Gain)/Loss	6/30/19	\$ (333,111,349)	15	\$ (39,400,185)	13	\$ (318,339,547)
Assumption Change ³	6/30/19	\$ 96,750,593	20	\$ 9,683,002	18	\$ 94,162,223
Method Change ³	6/30/19	\$ (849,647,000)	20	\$ (85,034,453)	18	\$ (826,916,381)
(Gain)/Loss	6/30/20	\$ 275,639,445	15	\$ 32,602,448	14	\$ 275,639,445

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

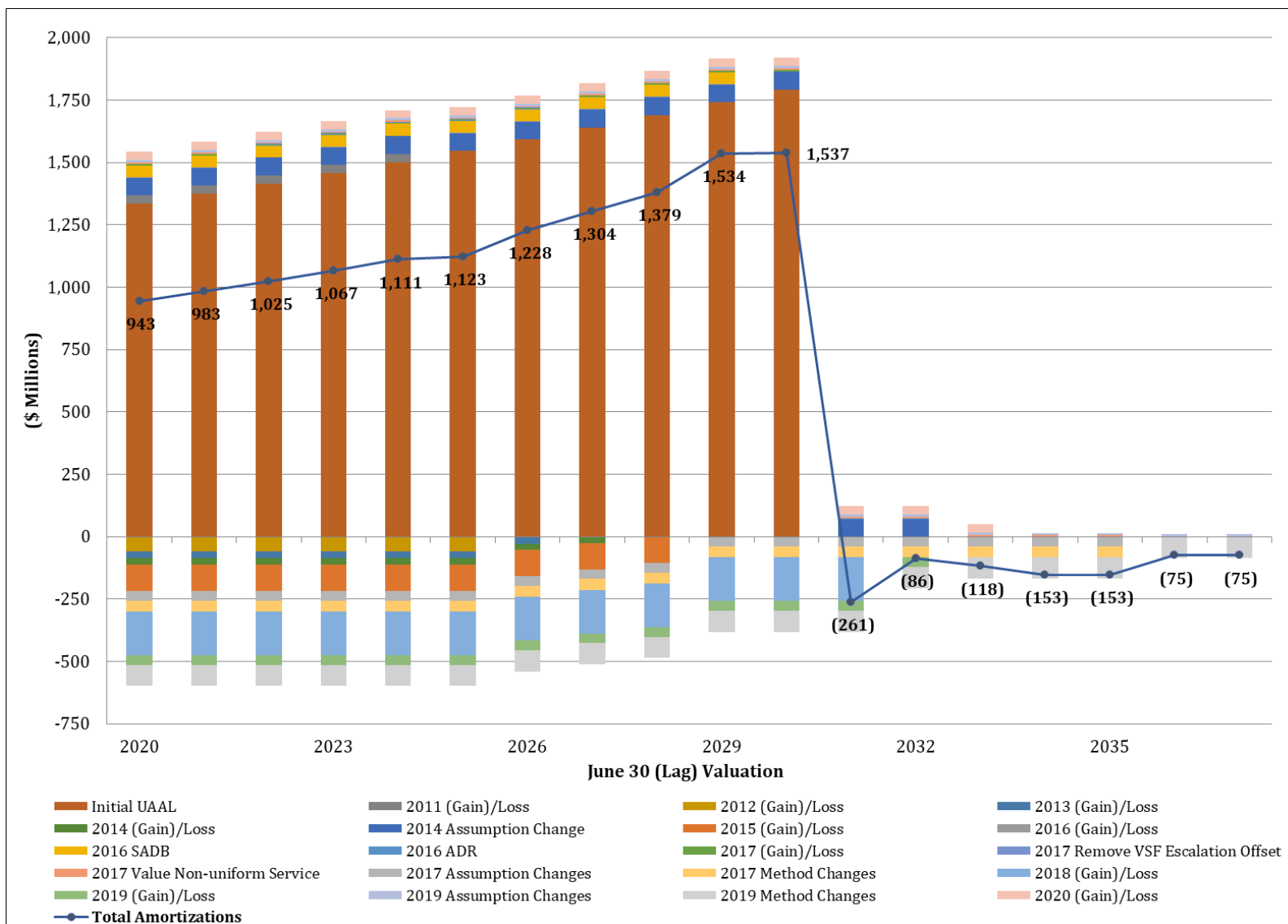


Table III-4
Reconciliation of Outstanding UAL Bases

Amounts Remaining to be Amortized, as of		
June 30 (Lag) Valuation Date	2020	2019
Unfunded Accrued Liability, June 30, 2010	\$ 11,037,668,084	\$ 11,485,703,889
2011 (Gain)/Loss	129,427,108	150,460,912
2012 (Gain)/Loss	(270,901,064)	(306,294,364)
2013 (Gain)/Loss	(144,783,170)	(160,418,835)
2014 (Gain)/Loss	(149,991,587)	(163,654,526)
2014 Assumption Change	571,412,946	597,928,028
2015 (Gain)/Loss	(656,867,905)	(708,119,852)
2016 (Gain)/Loss	17,045,465	18,198,463
2016 SADB	317,805,143	339,302,286
2016 Enhanced ADR	11,651,600	12,192,265
2017 (Gain)/Loss	35,576,320	37,682,867
2017 Removal of VSF Escalation Offset	12,816,792	13,347,969
2017 Non-uniformed Service	50,606,563	52,302,481
2017 Assumption Changes	(358,888,296)	(370,915,296)
2017 Method Changes	(396,445,526)	(409,731,137)
2018 (Gain)/Loss	(1,343,531,414)	(1,413,724,010)
2019 (Gain)/Loss	(318,339,547)	(333,111,349)
2019 Assumption Changes	94,162,223	96,750,593
2019 Method Changes	(826,916,381)	(849,647,000)
2020 (Gain)/Loss	275,639,445	
Sum of Outstanding Amortization Amounts	\$ 8,087,146,799	\$ 8,088,253,384

June 30 (Lag) Valuation Date	2020	2019
1. Accrued Liability (AL)	\$ 52,485,567,383	\$ 50,614,795,903
2. Actuarial Value of Assets (AVA) ¹	44,398,420,584	42,526,542,519
3. Unfunded Accrued Liability (UAL) (1. - 2.)	\$ 8,087,146,799	\$ 8,088,253,384

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	2,424,690	2,424,690	100.0%
2014	2,320,910	2,320,910	100.0%
2015	2,309,619	2,309,619	100.0%
2016	2,393,940	2,393,940	100.0%
2017	2,293,840	2,293,840	100.0%
2018	2,415,153	2,415,153	100.0%
2019	2,558,256	2,558,256	100.0%
2020	2,458,907	2,458,907	100.0%
2021	2,437,728	2,437,728	100.0%
2022	2,490,134	2,490,134	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	2,424,690	3,459,872	70.1%
2014	2,320,910	3,420,312	67.9%
2015	2,309,619	3,512,778	65.7%
2016	2,393,940	3,540,326	67.6%
2017	2,293,840	3,509,985	65.4%
2018	2,415,153	3,673,054	65.8%
2019	2,558,256	3,994,618	64.0%
2020	2,458,907	4,084,569	60.2%
2021	2,437,728	4,288,264	56.8%
2022	2,490,134	4,349,379	57.3%

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 POLICE PENSION FUND DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS JUNE 30, 2020							
	AL		AVA		UAL = AL - AVA		Total
	QPP	VSF	QPP	VSF	QPP	VSF	
AL, AVA, and UAL at June 30, 2019	\$ 49,822,681,285	\$ 5,865,869,618	\$ 42,526,542,519	\$ 5,073,755,000	\$ 7,296,138,766	\$ 792,114,618	\$ 8,088,253,384
Normal Cost, Administrative Expenses, and Actuarial Adjustments ¹	1,573,875,757	107,531,993	(2,407,118,519)	0	3,980,994,276	107,531,993	4,088,526,269
Contributions Made (Employer and Employee) in Fiscal Year 2020 ²	0	0	2,351,028,984	388,007,424	(2,351,028,984)	(388,007,424)	(2,739,036,408)
Benefit Payments in Fiscal Year 2020	(3,039,785,000)	(451,710,000)	(3,039,785,000)	(451,710,000)	0	0	0
Interest and Expected Return on Assets	3,493,165,939	402,595,656	2,784,660,933	352,970,969	708,505,006	49,624,687	758,129,693
Actuarial Adjustments ³ at June 30, 2020	0	0	2,384,365,584	0	(2,384,365,584)	0	(2,384,365,584)
Expected AL, AVA, and UAL at June 30, 2020	\$ 51,849,937,981	\$ 5,924,287,267	\$ 44,599,694,501	\$ 5,363,023,393	\$ 7,250,243,480	\$ 561,263,874	\$ 7,811,507,354
Actual AL, AVA, and UAL at June 30, 2020	\$ 51,870,184,110	\$ 5,943,201,273	\$ 44,398,420,584	\$ 5,327,818,000	\$ 7,471,763,526	\$ 615,383,273	\$ 8,087,146,799
AL and UAL (Gain)/Loss; AVA Gain/(Loss)	\$ 20,246,129	\$ 18,914,006	\$ (201,273,917)	\$ (35,205,393)	\$ 221,520,046	\$ 54,119,399	\$ 275,639,445

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	\$ 180,260	\$ 39,494
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	\$ 180,260	\$ 39,494
2. Non-Benefit Payment Cash Flow		
a. Administrative Expenses paid in Fiscal Year 2020	\$ 26,803	N/A
b. Amounts paid to Other System in Fiscal Year 2020	0	0
c. Litigation Income in Fiscal Year 2020	(6,488)	(53)
d. Changes in Accrued Benefits Payable in Fiscal Year 2020	0	(4,093)
e. Interest on a. through d. to June 30, 2020	699	(143)
f. Total Change at June 30, 2020	\$ 21,014	\$ (4,289)
3. Actuarial Asset (Gain)/Loss (1. + 2.)	\$ 201,274	\$ 35,205

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 POLICE 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	24,748,860	40,524,580	15,775,720	61.1%	3,480,066	453.3%
2012	26,777,077	42,015,625	15,238,548	63.7%	3,478,154	438.1%
2013	29,087,154	43,900,094	14,812,940	66.3%	3,607,607	410.6%
2014	29,212,981	44,384,022	15,171,041	65.8%	3,618,095	419.3%
2015	31,092,977	45,297,561	14,204,584	68.6%	3,564,030	398.6%
2016	33,692,647	48,059,916	14,367,269	70.1%	3,717,425	386.5%
2017	34,162,505	47,696,250	13,533,745	71.6%	3,968,885	341.0%
2018	36,098,314	48,024,798	11,926,484	75.2%	4,053,205	294.2%
2019	40,119,424	50,614,796	10,495,372	79.3%	4,244,805	247.3%
2020	42,014,055	52,485,567	10,471,512	80.0%	4,299,649	243.5%

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 Police Pension Fund administers both the Police Officer's Variable Supplements Fund (POVSF) and the Police Superior Officers' Variable Supplements Fund (PSOVSF). The POVSF and PSOVSF (the Funds) operate pursuant to the provisions of Title 13, Chapter 2 of the Administrative Code of the City of New York (ACCNY) and provide supplemental benefits to retirees who were Police Officers and Police Superior Officers, respectively, of the New York City Police Department, Subchapter One Pension Fund or New York City Police 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
POVSF		
Active	\$ 446,209	\$ 443,491
Retiree	<u>1,617,090</u>	<u>1,594,428</u>
Total	\$ 2,063,299	\$ 2,037,919
PSOVSF		
Active	\$ 1,357,706	\$ 1,375,564
Retiree	<u>2,522,196</u>	<u>2,452,387</u>
Total	\$ 3,879,902	\$ 3,827,951
Total VSF AL	\$ 5,943,201	\$ 5,865,870

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	
	POVSF	PSOVSF	POVSF	PSOVSF
Actives				
Number	23,357	12,538	23,709	12,692
Average Age	35.1	42.9	35.0	43.0
Retirees				
Number	12,976	19,999	12,799	19,423
Average Age	62.8	62.4	62.6	62.2

Table VI-3
VSF Statement of Assets

(\$ Thousands)				
Valuation Date	June 30, 2020 ¹		June 30, 2019 ²	
	MVA ³	AVA	MVA ⁴	AVA
POVSF	\$ 1,952,107	\$ 2,061,624	\$ 1,976,399	\$ 1,976,399
PSOVSF	<u>3,217,735</u>	<u>3,266,194</u>	<u>3,097,356</u>	<u>3,097,356</u>
Total	\$ 5,169,842	\$ 5,327,818	\$ 5,073,755	\$ 5,073,755

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 \$78,659,000 for POVSF and \$121,306,000 for PSOVSF.

⁴ Includes Accrued Benefits Payable of \$77,820,000 for POVSF and \$118,052,000 for PSOVSF.

Table VI-4
Development of VSF Actuarial Value of Assets

(\$ Thousands)				
	June 30, 2020		June 30, 2019	
	POVSF	PSOVSF	POVSF	PSOVSF
1. Market Value of Assets (MVA)				
a. Beginning of Year (BOY) ¹	\$ 1,976,399	\$ 3,097,356	\$ 2,068,782	\$ 2,771,210
b. End of Year (EOY) ²	\$ 1,952,107	\$ 3,217,735	\$ 1,976,399	\$ 3,097,356
2. Contributions				
a. Employee	\$ 0	\$ 0	\$ 0	\$ 0
b. Employer	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
c. Total Contributions	\$ 0	\$ 0	\$ 0	\$ 0
3. Net Investment Income				
a. Investment Income	\$ (3,223)	\$ 148,059	\$ 104,816	\$ 177,460
b. Investment Expenses	<u>(998)</u>	<u>(1,545)</u>	<u>(1,122)</u>	<u>(1,313)</u>
c. Total Net Investment Income	\$ (4,221)	\$ 146,514	\$ 103,694	\$ 176,147
4. Benefit Payments and Other Cash Flow	\$ (164,879)	\$ (282,685)	\$ (164,241)	\$ (260,629)
5. Preliminary Transferable Earnings from POLICE to VSFs - EOY ³	\$ 144,808	\$ 256,550	\$ (31,836)	\$ 410,628
6. Net Cash Flow (2.c. + 4. + 5.)	\$ (20,071)	\$ (26,135)	\$ (196,077)	\$ 149,999
7. Expected Investment Return (EIR)	\$ 132,675	\$ 207,088	\$ 103,694	\$ 176,147
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ (136,896)	\$ (60,574)	\$ 0	\$ 0
9. AVA @ EOY				
a. AVA @ BOY	\$ 1,976,399	\$ 3,097,356	\$ 2,068,782	\$ 2,771,210
b. Net Cash Flow (6.)	\$ (20,071)	\$ (26,135)	\$ (196,077)	\$ 149,999
c. Expected Investment Return (7.)	\$ 132,675	\$ 207,088	\$ 103,694	\$ 176,147
d. Phase in of UIR				
20% * UIR for prior year	\$ (27,379)	\$ (12,115)	N/A	N/A
20% * UIR for second prior year	N/A	N/A	N/A	N/A
20% * UIR for third prior year	N/A	N/A	N/A	N/A
20% * UIR for fourth prior year	N/A	N/A	N/A	N/A
20% * UIR for fifth prior year	N/A	N/A	N/A	N/A
Total	\$ (27,379)	\$ (12,115)	N/A	N/A
e. AVA @ EOY (9.a. + 9.b. + 9.c. + 9.d.)	\$ 2,061,624	\$ 3,266,194	\$ 1,976,399	\$ 3,097,356

¹ Includes Accrued Benefits Payable for 6/30/2019 of \$77,820,000 for POVSF and \$118,052,000 for PSOVSF and Accrued Benefits Payable for 6/30/2018 of \$76,906,000 for POVSF and \$115,640,000 for PSOVSF.

² Includes Accrued Benefits Payable for 6/30/2020 of \$78,659,000 for POVSF and \$121,306,000 for PSOVSF and Accrued Benefits Payable for 6/30/2019 of \$77,820,000 for POVSF and \$118,052,000 for PSOVSF.

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 POLICE Pension Fund		
1. FY2020 Equity Earnings	\$	726,285
2. FY2020 Hypothetical Earnings		440,798
3. FY2020 Excess Earnings (1. - 2.)		285,487
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	\$	285,487
	POVSF	PSOVSF
Allocations to VSF		
8. Allocation Percentage	50.320%	49.680%
9. Potential SKIM (7. x 8.)	\$ 143,657	\$ 141,830
10. APV of Accumulated Plan Benefits	1,999,577	3,761,172
11. MVA Prior to SKIM	1,809,107	3,076,735
12. Unfunded APV of Accumulated Plan Benefits (10. - 11.), not less than zero	190,470	684,437
13. SKIM Payable (Lesser of 9. and 12., not less than zero)	143,657	141,830
14. Rounded Estimate, for FY20 Financial Statements ¹	\$ 143,000	\$ 141,000

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

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

E. VSF DROP

Members 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.

Summary of VSF Actuarial Assumptions and Methods

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

1. **POVSF vs. PSOVSF Membership:** Amongst current active members, 40% of members who become eligible for VSF benefits are assumed to retire as Police Officers, while the remaining 60% are assumed to retire as Police Superior Officers.
2. **COLA:** 1.5% per year for AutoCOLA, used to estimate future COLA on the first \$18,000 of POLICE 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 of the Variable Supplements Funds is provided by the Office of the Comptroller. The same Actuarial Asset Valuation Method is used to determine the Actuarial Value of Assets of the POVSF and the PSOVSF 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 POLICE to the POVSF and the PSOVSF are recognized through a methodology where the PV of future VSF transfers from POLICE to the POVSF and PSOVSF is included directly as an actuarial liability of POLICE. This amount is computed as the excess, if any, of the PV of benefits of the POVSF and PSOVSF over the AVA of the POVSF and PSOVSF, 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 POLICE transfer to the Funds a portion of the amount by which earnings on equity investments of POLICE 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 Police Officers and Police Superior Officers, limited to not allow assets to exceed the actuarial present value of accumulated plan benefits of the VSFs

SECTION VII - RISK AND UNCERTAINTY

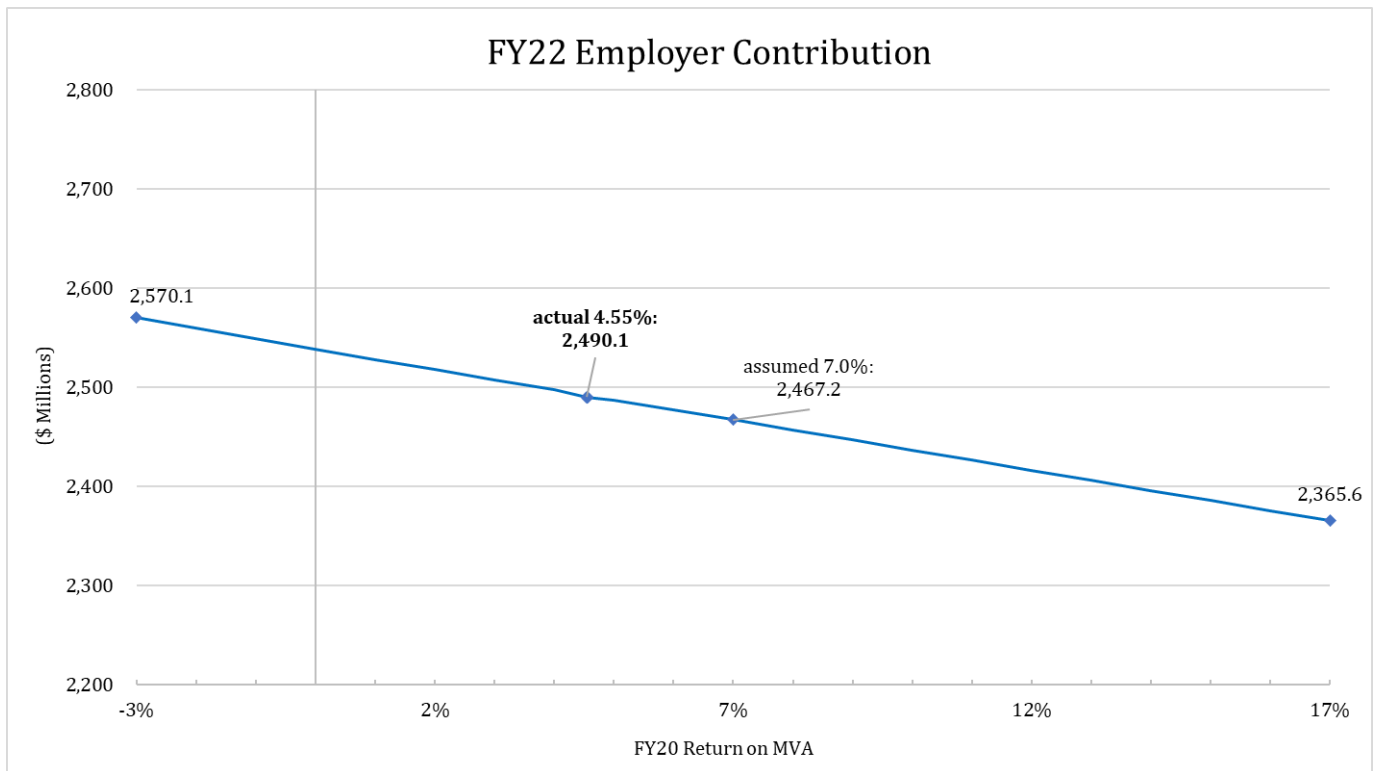
The funded status of POLICE depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Risks faced by the Plan are described in this Section. These risks have been separated, based on the Actuary's professional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

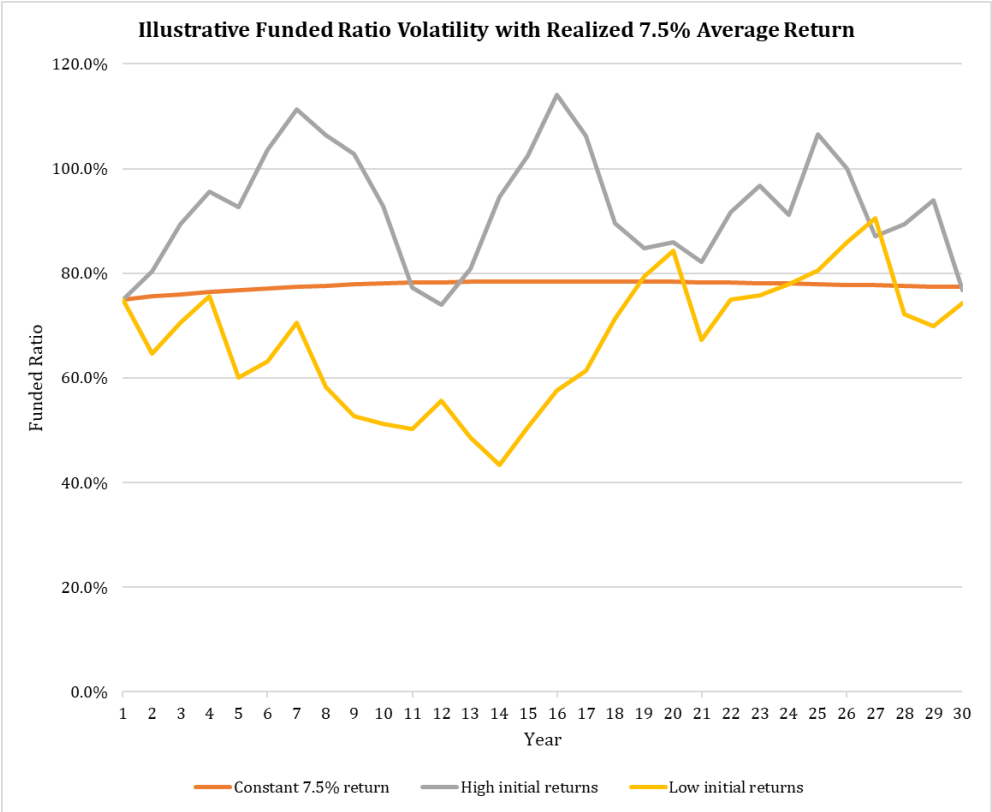
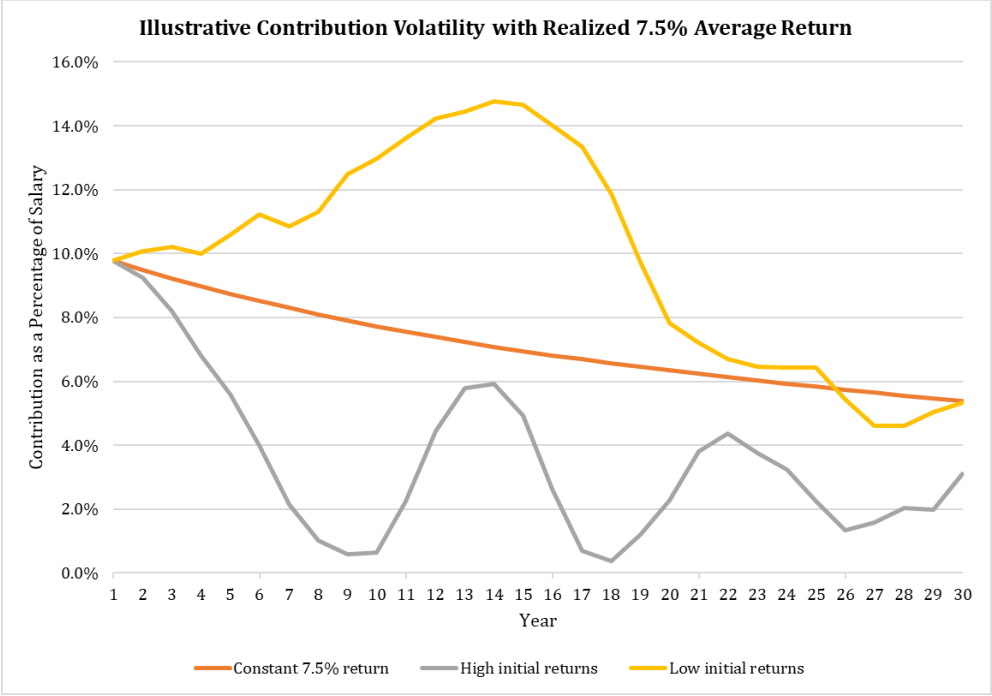


Investment Risk: The Risk of Volatile Realized Returns

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 POLICE 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*.

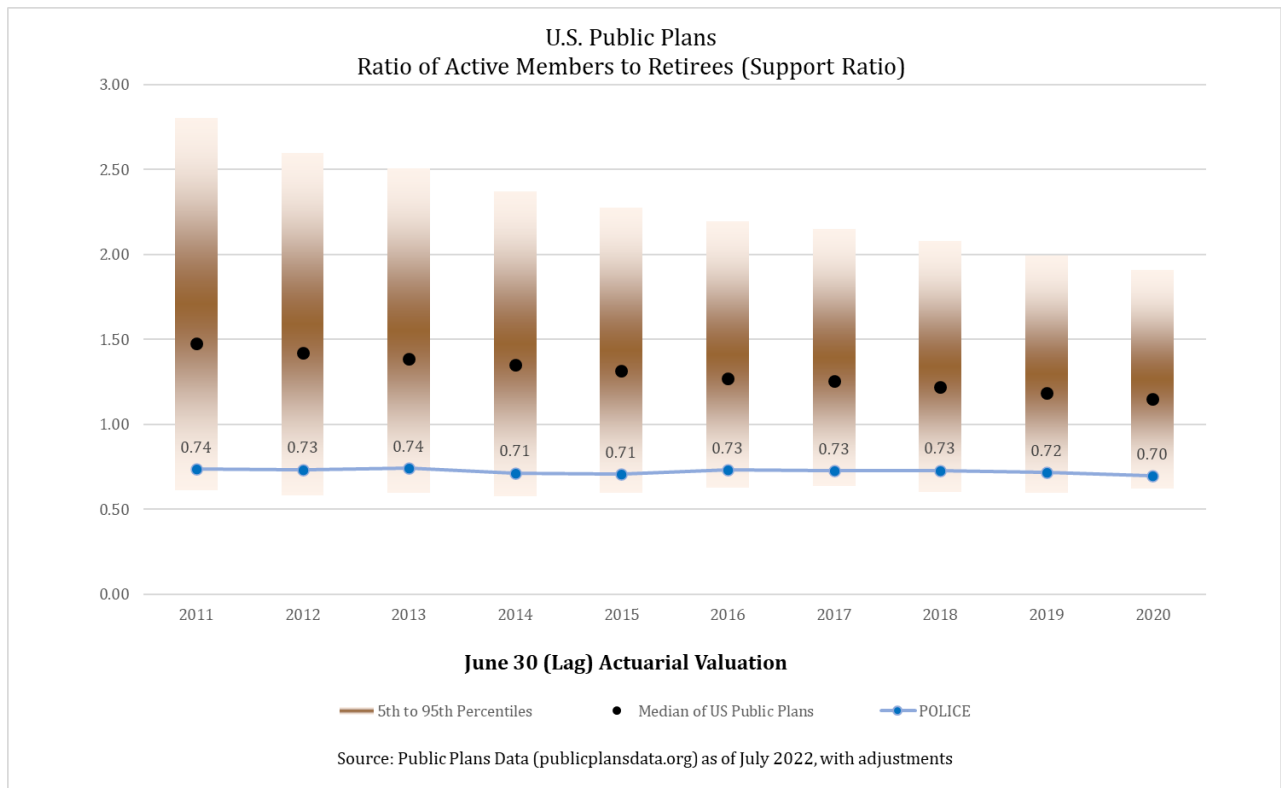


Maturity Risk: The Risk of Demographic Imbalance

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 POLICE, this ratio has been below one, meaning fewer active workers exist to support pensioner payments.

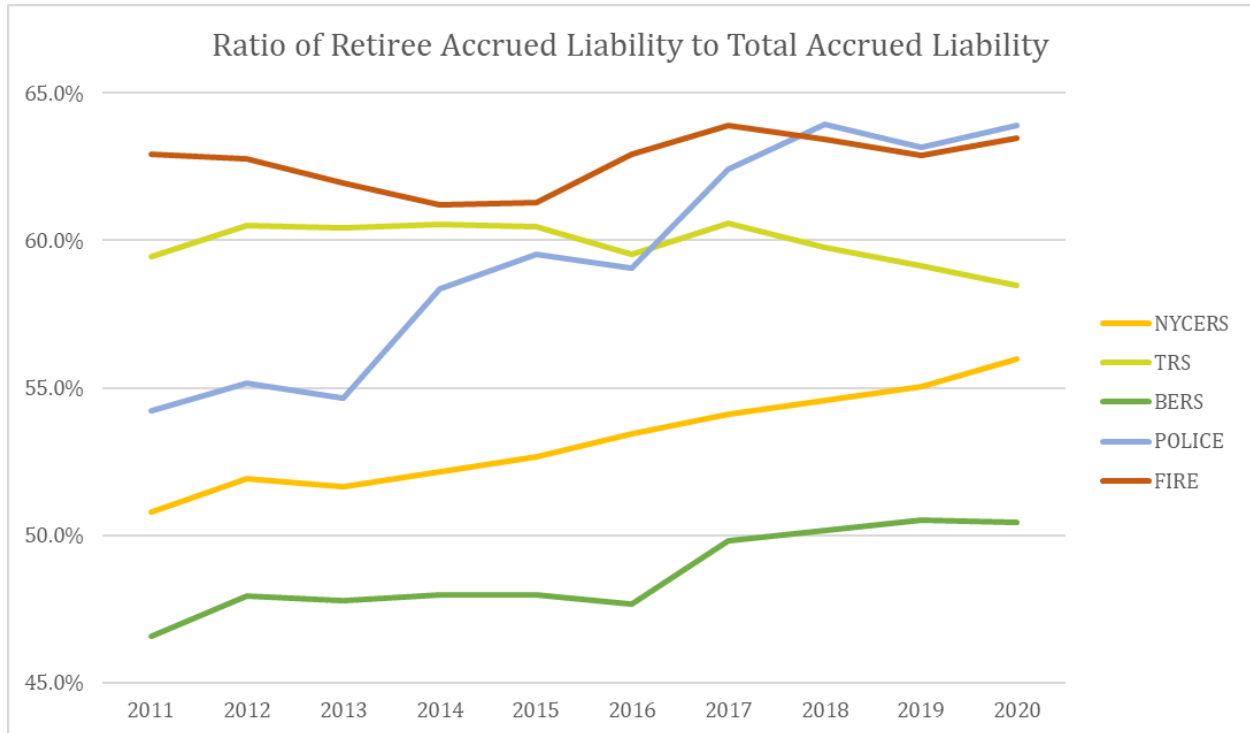


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst US public pensions has declined from 1.48 in the 2011 valuation year to 1.15 in the 2020 valuation year. Over that same period, the Plan's Support Ratio declined from 0.74 to 0.70, meaning fewer active workers exist to support guaranteed pensioner payments.

Because the Plan's Support Ratio is below the median, POLICE'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

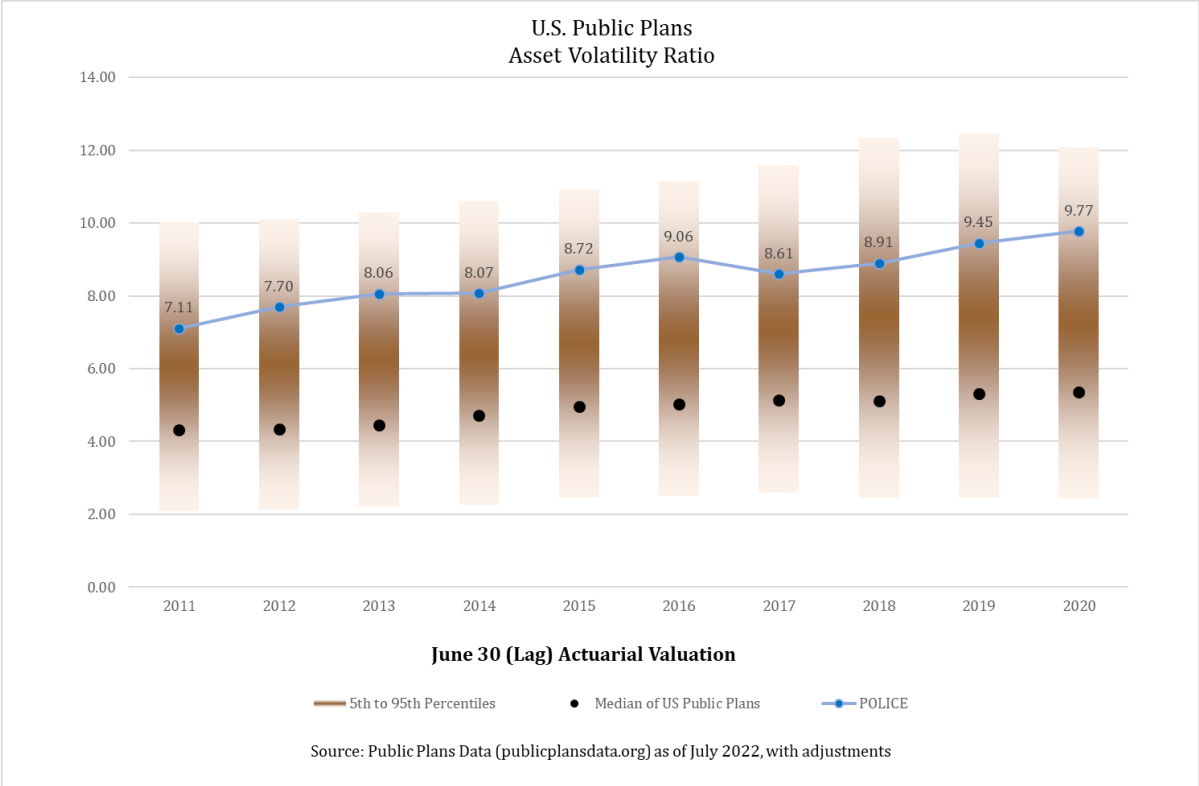
We can also consider the ratio of the Plan’s retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for POLICE; the other New York City Retirement Systems (NYCRS)¹ are included for comparison. The ratio for POLICE has been between 55-65% for the past few years, indicating that POLICE 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 POLICE 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); Fire Pension Fund (FIRE)



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 POLICE, since ratios are greater than the average, POLICE 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, and Normal Cost of the Plan are shown below:

NEW YORK CITY POLICE PENSION FUND	
SENSITIVITY ANALYSIS AS OF JUNE 30, 2020	
Valuation Date	June 30, 2020 (Lag)
Results at 7.0%	
1. Accrued Liability (AL)	\$ 52,485,567,383
2. Actuarial Value of Assets (AVA)	44,398,420,584
3. Unfunded Accrued Liability (1. - 2.)	\$ 8,087,146,799
4. Normal Cost	\$ 1,516,064,524
Results at 6.0%	
1. Accrued Liability (AL)	\$ 59,215,362,207
2. Actuarial Value of Assets (AVA) ¹	44,398,420,584
3. Unfunded Accrued Liability (1. - 2.)	\$ 14,816,941,623
4. Normal Cost	\$ 1,870,543,205
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	12.8%
2. Increase in Unfunded Accrued Liability	83.2%
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

POLICE 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 POLICE.

Inflation Risk: The Risk of Higher than Assumed Inflation

POLICE 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

March 29, 1940

B. Eligibility Requirements

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 Revised: April 1, 2012 to March 31, 2017 and did not elect to join Tier 3 Enhanced.

Tier 3 Enhanced: On or after April 1, 2017 and those in Tier 3 and Tier 3 Revised 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 Police force; or City service in a position of Police Surgeon classified in the non-competitive class of civil service.

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 Revised, 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 April 10, 2017, Tier 3 Enhanced Plan Members are required to contribute an additional 1.0% of salary for a maximum of 25 years. Chapter 59/17 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 Revised, 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 Police 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 Police Service includes service in Uniformed Transit Police Force, Uniformed Housing Police Force, Uniformed Correction Force, Uniformed Sanitation Force, and the New York City Fire Department, provided all such service immediately precedes the Uniformed Police Force service.
- **Tier 3, Tier 3 Revised, and Tier 3 Enhanced:** Police Service includes service in the uniformed force of the New York City Fire Department and the New York State and Local Police and Fire 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 Revised 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 Revised	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 Revised, 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 Revised

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 Revised, 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 Revised, 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: 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 Revised, 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 Revised, 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 Revised, and Tier 3 Enhanced

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

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

J. Vested 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 Revised 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 Revised 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 431 of the Laws of 2019** (Chapter 431/19) allows New York City Police Pension Fund (POLICE) members subject to Article 14 of the RSSL (Tier 3, Tier 3 Revised, and Tier 3 Enhanced) to purchase prior service as a cadet in the New York Police Department (NYPD) and use the appointment date as a cadet to determine the initial date of POLICE membership for plan or tier eligibility provided such purchase of service is made within five years of the effective date.
- **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 59 of the Laws of 2017** (Chapter 59/17), Part SSS, signed into law on April 10, 2017, changes the Accidental Disability Retirement and Ordinary Disability Retirement benefits for current Tier 3 and Tier 3 Revised members who elect to participate in the Enhanced Disability Benefits Plan. Members as of April 1, 2017 and later are mandated into the Enhanced Disability Benefits Plan.
- **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 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. 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 POLICE 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	45.00%	0.00%
37	45.00%	10.00%
38	45.00%	10.00%
39	45.00%	10.00%
40	45.00%	10.00%
41	45.00%	10.00%
42	45.00%	10.00%
43	45.00%	10.00%
44	45.00%	10.00%
45	45.00%	10.00%
46	45.00%	11.00%
47	45.00%	12.00%
48	45.00%	13.00%
49	45.00%	14.00%
50	45.00%	15.00%
51	45.00%	15.00%
52	45.00%	15.00%
53	45.00%	15.00%
54	45.00%	15.00%
55	45.00%	15.00%
56	45.00%	15.00%
57	45.00%	15.00%
58	45.00%	15.00%
59	45.00%	15.00%
60	45.00%	20.00%
61	45.00%	30.00%
62	45.00% ¹	50.00% ¹
63	100.00%	100.00%

¹100% for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-1b
Early Service Retirement

NEW YORK CITY POLICE PENSION FUND		
PROBABILITIES OF EARLY SERVICE RETIREMENT FOR TIER 3, TIER 3 REVISED, 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 POLICE PENSION FUND	
PROBABILITIES OF TERMINATION	
Years Of Service	Probability of Termination
0	3.000%
1	2.250%
2	1.500%
3	1.500%
4	1.500%
5	1.500%
6	1.350%
7	1.200%
8	1.050%
9	0.900%
10	0.750%
11	0.600%
12	0.450%
13	0.380%
14	0.300%
15	0.230%
16	0.150%
17	0.150%
18	0.150%
19	0.150%
20	N/A

Table XI-3
Active Disability Rates

NEW YORK CITY POLICE 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 Revised Non-Enhanced Plan
15	0.0360%	0.168%	0.098%	0.098%
16	0.0360%	0.168%	0.098%	0.098%
17	0.0360%	0.168%	0.098%	0.098%
18	0.0360%	0.168%	0.098%	0.098%
19	0.0360%	0.168%	0.098%	0.098%
20	0.0400%	0.180%	0.105%	0.105%
21	0.0440%	0.192%	0.112%	0.112%
22	0.0480%	0.204%	0.119%	0.119%
23	0.0520%	0.216%	0.126%	0.126%
24	0.0560%	0.228%	0.133%	0.133%
25	0.0600%	0.240%	0.140%	0.140%
26	0.0640%	0.312%	0.182%	0.182%
27	0.0680%	0.384%	0.224%	0.224%
28	0.0720%	0.456%	0.266%	0.266%
29	0.0760%	0.528%	0.308%	0.308%
30	0.0800%	0.600%	0.350%	0.350%
31	0.0840%	0.720%	0.420%	0.420%
32	0.0880%	0.840%	0.490%	0.490%
33	0.0920%	0.960%	0.560%	0.560%
34	0.0960%	1.080%	0.630%	0.630%
35	0.1000%	1.200%	0.700%	0.700%
36	0.1040%	1.260%	0.735%	0.728%
37	0.1080%	1.320%	0.770%	0.756%
38	0.1120%	1.380%	0.805%	0.784%
39	0.1160%	1.440%	0.840%	0.812%
40	0.1200%	1.500%	0.875%	0.840%
41	0.1240%	1.560%	0.910%	0.854%
42	0.1280%	1.620%	0.945%	0.868%
43	0.1320%	1.680%	0.980%	0.882%
44	0.1360%	1.740%	1.015%	0.896%
45	0.1400%	1.800%	1.050%	0.910%
46	0.1440%	1.920%	1.120%	0.938%
47	0.1480%	2.040%	1.190%	0.966%
48	0.1520%	2.160%	1.260%	0.994%
49	0.1560%	2.280%	1.330%	1.022%
50	0.1600%	2.400%	1.400%	1.050%
51	0.2000%	2.640%	1.540%	1.120%
52	0.2400%	2.880%	1.680%	1.190%
53	0.3200%	3.120%	1.820%	1.260%
54	0.4800%	3.360%	1.960%	1.330%
55	0.6400%	3.600%	2.100%	1.400%
56	0.8000%	4.080%	2.380%	1.540%
57	1.6000%	4.560%	2.660%	1.680%
58	2.4000%	5.040%	2.940%	1.820%
59	3.2000%	5.520%	3.220%	1.960%
60	4.8000%	6.000%	3.500%	2.100%
61	6.4000%	7.200%	4.200%	2.240%
62	8.0000% ¹	8.4000% ¹	4.900% ¹	2.450% ¹
63	N/A	N/A	N/A	N/A

¹N/A for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-4
Active Mortality Rates

NEW YORK CITY POLICE PENSION FUND			
PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS BASE RATES			
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.040%	0.030%	0.010%
16	0.040%	0.030%	0.010%
17	0.040%	0.030%	0.010%
18	0.040%	0.030%	0.010%
19	0.040%	0.030%	0.010%
20	0.040%	0.030%	0.010%
21	0.040%	0.030%	0.010%
22	0.040%	0.030%	0.010%
23	0.040%	0.030%	0.010%
24	0.040%	0.030%	0.010%
25	0.040%	0.030%	0.010%
26	0.040%	0.030%	0.010%
27	0.040%	0.030%	0.010%
28	0.040%	0.030%	0.010%
29	0.040%	0.030%	0.010%
30	0.040%	0.030%	0.010%
31	0.040%	0.030%	0.011%
32	0.040%	0.030%	0.012%
33	0.040%	0.030%	0.013%
34	0.040%	0.030%	0.014%
35	0.040%	0.030%	0.015%
36	0.042%	0.032%	0.016%
37	0.044%	0.034%	0.017%
38	0.046%	0.036%	0.018%
39	0.048%	0.038%	0.019%
40	0.050%	0.040%	0.020%
41	0.060%	0.046%	0.021%
42	0.070%	0.052%	0.022%
43	0.080%	0.058%	0.023%
44	0.090%	0.064%	0.024%
45	0.100%	0.070%	0.025%
46	0.110%	0.076%	0.026%
47	0.120%	0.082%	0.027%
48	0.130%	0.088%	0.028%
49	0.140%	0.094%	0.029%
50	0.150%	0.100%	0.030%
51	0.160%	0.110%	0.031%
52	0.170%	0.120%	0.032%
53	0.180%	0.130%	0.033%
54	0.190%	0.140%	0.034%
55	0.200%	0.150%	0.035%
56	0.220%	0.160%	0.036%
57	0.240%	0.170%	0.037%
58	0.260%	0.180%	0.038%
59	0.280%	0.190%	0.039%
60	0.300%	0.200%	0.040%
61	0.320%	0.220%	0.041%
62	0.340% ¹	0.240% ¹	0.0420% ¹
63	N/A	N/A	N/A

¹Proposed probabilities are N/A for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-5
Service Retiree Mortality

NEW YORK CITY POLICE PENSION FUND					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES					
BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0100%	0.0084%	68	1.4988%	1.0632%
16	0.0135%	0.0103%	69	1.6917%	1.1644%
17	0.0181%	0.0112%	70	1.8929%	1.2629%
18	0.0217%	0.0131%	71	2.1028%	1.4563%
19	0.0240%	0.0140%	72	2.3212%	1.6586%
20	0.0251%	0.0142%	73	2.5833%	1.8689%
21	0.0268%	0.0150%	74	2.8558%	2.0889%
22	0.0284%	0.0158%	75	3.1397%	2.3314%
23	0.0301%	0.0168%	76	3.4343%	2.6045%
24	0.0315%	0.0179%	77	3.7415%	2.8700%
25	0.0327%	0.0191%	78	4.2304%	3.1787%
26	0.0342%	0.0204%	79	4.7399%	3.4795%
27	0.0354%	0.0217%	80	5.2682%	3.8105%
28	0.0371%	0.0231%	81	5.7202%	4.3289%
29	0.0394%	0.0247%	82	6.1782%	4.8678%
30	0.0427%	0.0265%	83	7.0179%	5.4288%
31	0.0492%	0.0316%	84	7.8631%	5.9122%
32	0.0556%	0.0360%	85	8.7167%	6.3661%
33	0.0616%	0.0398%	86	9.5810%	7.1650%
34	0.0669%	0.0427%	87	10.4516%	8.0050%
35	0.0724%	0.0455%	88	11.8437%	8.8541%
36	0.0755%	0.0474%	89	13.2486%	9.6498%
37	0.0779%	0.0497%	90	14.6752%	10.5687%
38	0.0808%	0.0521%	91	16.3354%	12.0267%
39	0.0845%	0.0551%	92	18.0374%	13.4340%
40	0.0901%	0.0588%	93	19.7642%	14.8636%
41	0.1003%	0.0633%	94	21.5622%	16.4543%
42	0.1106%	0.0702%	95	23.4692%	17.7952%
43	0.1212%	0.0792%	96	25.3619%	19.0707%
44	0.1323%	0.0907%	97	27.1816%	20.2419%
45	0.1439%	0.1052%	98	29.0095%	21.1759%
46	0.1563%	0.1228%	99	30.6920%	21.8544%
47	0.1693%	0.1427%	100	32.1584%	22.1859%
48	0.1827%	0.1652%	101	33.7521%	23.0680%
49	0.1964%	0.1865%	102	35.1259%	24.0803%
50	0.2104%	0.1992%	103	36.3671%	25.2770%
51	0.2802%	0.2104%	104	37.3834%	26.6309%
52	0.3506%	0.2186%	105	38.1051%	28.0912%
53	0.4209%	0.2250%	106	38.4698%	29.6244%
54	0.4903%	0.2863%	107	38.6325%	31.1943%
55	0.5297%	0.3409%	108	38.8076%	32.7579%
56	0.5857%	0.3910%	109	38.9794%	34.2712%
57	0.6387%	0.4376%	110	50.0000%	50.0000%
58	0.6875%	0.4613%	111	50.0000%	50.0000%
59	0.7316%	0.5005%	112	50.0000%	50.0000%
60	0.7720%	0.5393%	113	50.0000%	50.0000%
61	0.8439%	0.5785%	114	50.0000%	50.0000%
62	0.9155%	0.6152%	115	50.0000%	50.0000%
63	0.9888%	0.6536%	116	50.0000%	50.0000%
64	1.0644%	0.7279%	117	50.0000%	50.0000%
65	1.1433%	0.8032%	118	50.0000%	50.0000%
66	1.2263%	0.8884%	119	50.0000%	50.0000%
67	1.3135%	0.9736%	120	100.0000%	100.0000%

Table XI-6
Disabled Retiree Mortality

NEW YORK CITY POLICE PENSION FUND					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES					
BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0138%	0.0095%	68	1.8368%	1.2141%
16	0.0187%	0.0117%	69	2.0342%	1.3912%
17	0.0252%	0.0127%	70	2.2544%	1.5837%
18	0.0301%	0.0148%	71	2.5045%	1.7848%
19	0.0334%	0.0159%	72	2.7644%	1.9944%
20	0.0347%	0.0168%	73	3.0535%	2.2258%
21	0.0371%	0.0185%	74	3.3359%	2.4880%
22	0.0402%	0.0205%	75	3.6300%	2.7766%
23	0.0431%	0.0227%	76	4.1253%	3.0785%
24	0.0467%	0.0251%	77	4.6178%	3.3525%
25	0.0503%	0.0274%	78	5.1289%	3.6752%
26	0.0544%	0.0298%	79	5.5682%	4.1794%
27	0.0586%	0.0322%	80	6.0116%	4.7030%
28	0.0633%	0.0348%	81	6.7832%	5.2484%
29	0.0681%	0.0374%	82	7.6009%	5.7185%
30	0.0730%	0.0400%	83	8.4279%	6.1948%
31	0.0781%	0.0425%	84	9.2040%	7.0110%
32	0.0830%	0.0450%	85	10.1002%	7.8321%
33	0.0898%	0.0476%	86	11.5115%	8.6046%
34	0.0933%	0.0491%	87	12.7944%	9.3702%
35	0.0972%	0.0512%	88	14.1662%	10.2595%
36	0.1019%	0.0534%	89	15.7578%	11.5941%
37	0.1080%	0.0563%	90	17.3856%	12.9378%
38	0.1153%	0.0590%	91	19.0388%	14.3081%
39	0.1286%	0.0629%	92	20.6360%	15.3704%
40	0.1417%	0.0688%	93	22.5718%	16.4875%
41	0.1550%	0.0766%	94	24.4562%	17.6613%
42	0.1690%	0.0865%	95	26.1404%	18.7606%
43	0.1838%	0.0992%	96	28.0695%	19.7397%
44	0.1997%	0.1148%	97	29.6855%	20.6328%
45	0.2170%	0.1330%	98	30.9177%	21.2676%
46	0.2279%	0.1538%	99	32.6552%	21.8544%
47	0.2387%	0.1769%	100	33.9880%	22.1859%
48	0.2492%	0.2017%	101	34.9681%	23.0680%
49	0.3237%	0.2316%	102	35.9346%	24.0803%
50	0.3948%	0.2637%	103	36.6434%	25.2770%
51	0.4620%	0.2870%	104	37.3834%	26.6309%
52	0.5249%	0.3323%	105	38.1051%	28.0912%
53	0.5528%	0.3677%	106	38.4698%	29.6244%
54	0.5891%	0.4196%	107	38.6325%	31.1943%
55	0.6260%	0.4722%	108	38.8076%	32.7579%
56	0.6814%	0.5135%	109	38.9794%	34.2712%
57	0.7288%	0.5258%	110	50.0000%	50.0000%
58	0.7710%	0.5452%	111	50.0000%	50.0000%
59	0.8525%	0.5823%	112	50.0000%	50.0000%
60	0.9273%	0.6153%	113	50.0000%	50.0000%
61	1.0007%	0.6486%	114	50.0000%	50.0000%
62	1.0735%	0.7169%	115	50.0000%	50.0000%
63	1.1411%	0.7851%	116	50.0000%	50.0000%
64	1.2250%	0.8630%	117	50.0000%	50.0000%
65	1.3055%	0.9419%	118	50.0000%	50.0000%
66	1.4653%	1.0252%	119	50.0000%	50.0000%
67	1.6473%	1.1204%	120	100.0000%	100.0000%

Table XI-7
Beneficiary Mortality

NEW YORK CITY POLICE 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 POLICE PENSION FUND		
ANNUAL RATES OF MERIT AND SALARY INCREASE		
Years of Service	Merit Increase	Salary Increase ¹
0	0.00%	3.00%
1	5.00%	8.00%
2	11.00%	14.00%
3	14.00%	17.00%
4	20.00%	23.00%
5	38.00%	41.00%
6	1.60%	4.60%
7	1.80%	4.80%
8	2.00%	5.00%
9	3.60%	6.60%
10	2.30%	5.30%
11	2.20%	5.20%
12	2.10%	5.10%
13	2.00%	5.00%
14	3.30%	6.30%
15	1.70%	4.70%
16	1.60%	4.60%
17	1.50%	4.50%
18	1.40%	4.40%
19	2.70%	5.70%
20	1.20%	4.20%
21	1.00%	4.00%
22	0.90%	3.90%
23	0.80%	3.80%
24	0.70%	3.70%
25	0.60%	3.60%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

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

**Table XI-9
Overtime Assumptions**

NEW YORK CITY POLICE PENSION FUND					
OVERTIME ASSUMPTION					
Years of Service	All Tiers Baseline	Tier 1 & Tier 2 Dual Service	Tier 1 & Tier 2 Dual Disability	Tier 3, Tier 3 Revised, & Tier 3 Enhanced Dual Service	Tier 3, Tier 3 Revised, & Tier 3 Enhanced Dual Disability
0-15	17.00%	21.00%	8.00%	20.00%	12.00%
16	17.00%	21.00%	9.00%	20.00%	12.00%
17	17.00%	21.00%	10.00%	20.00%	13.00%
18	17.00%	21.00%	11.00%	20.00%	13.00%
19	17.00%	21.00%	12.00%	20.00%	14.00%
20	17.00%	21.00%	12.00%	20.00%	14.00%
21	17.00%	21.00%	12.00%	20.00%	14.00%
22	17.00%	21.00%	12.00%	20.00%	14.00%
23	16.00%	20.00%	11.00%	18.00%	13.00%
24	15.00%	18.00%	10.00%	17.00%	12.00%
25	14.00%	17.00%	9.00%	16.00%	11.00%
26	13.00%	16.00%	8.00%	15.00%	10.00%
27	12.00%	15.00%	7.00%	14.00%	9.00%
28	10.00%	14.00%	6.00%	13.00%	8.00%
29	9.00%	13.00%	6.00%	12.00%	7.00%
30	8.00%	12.00%	6.00%	10.00%	6.00%
31	7.00%	10.00%	6.00%	9.00%	6.00%
32	7.00%	9.00%	6.00%	9.00%	6.00%
33	7.00%	9.00%	6.00%	9.00%	6.00%
34+	7.00%	9.00%	6.00%	9.00%	6.00%

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	0.876	0.876
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 POLICE 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 the 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.

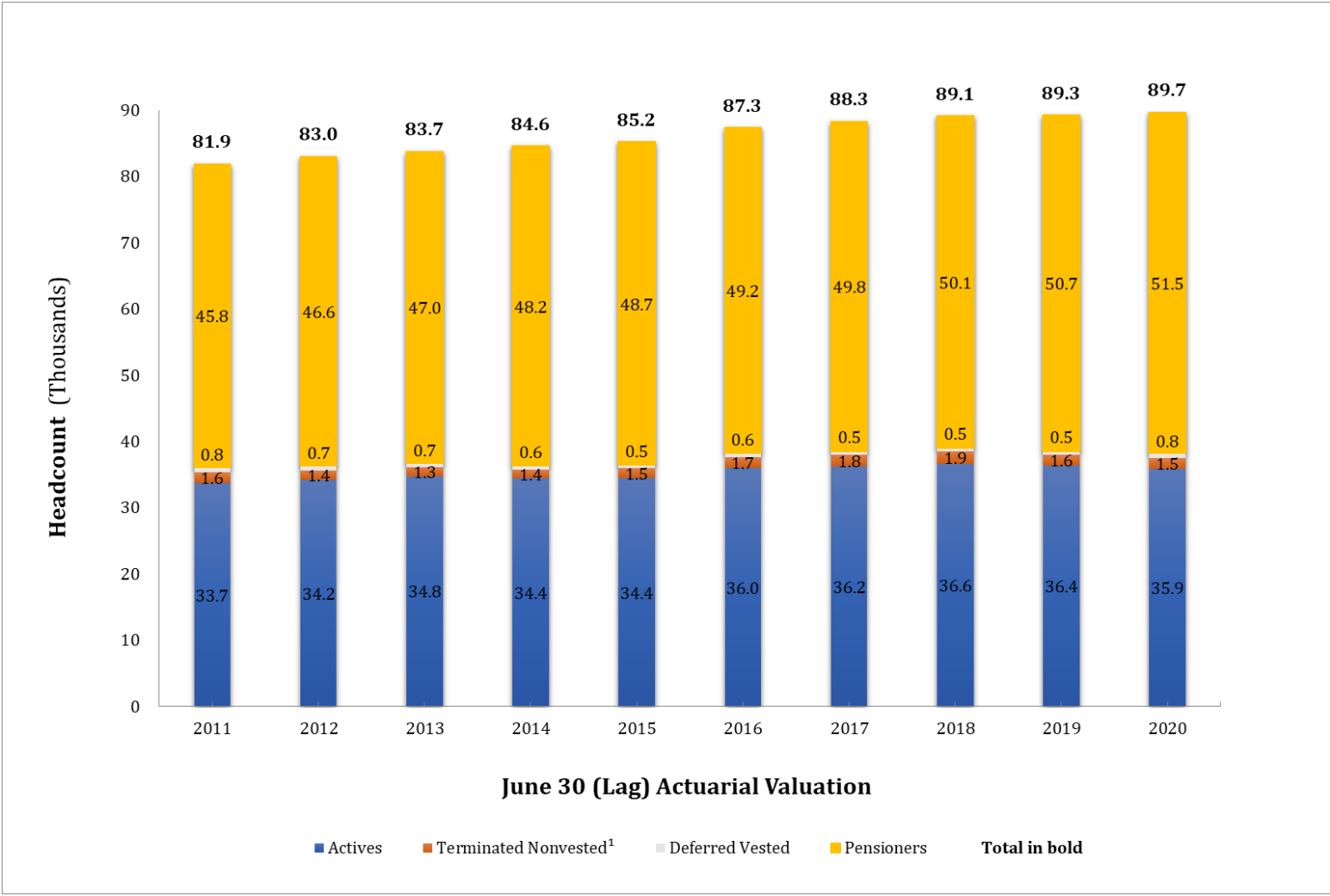
Beginning at June 30, 2020, POLICE members who are no longer on payroll but not otherwise classified have been classified as Active, Terminated Nonvested, or Deferred Vested members, using actuarial judgment and consideration of available data, including leave of absence data when available.

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	36,401	1,640	497	33,966	2,752	12,665	475	869	50,727	89,265
New Entrants	1,601	89	0	0	0	0	0	0	0	1,690
Rehires	80	(72)	(1)	(4)	(1)	0	0	0	(5)	2
Terminated Nonvested	(330)	330	0	0	0	0	0	0	0	0
Vested Termination	(124)	(3)	127	0	0	0	0	0	0	0
Withdrawal / Cashout	(118)	(191)	(2)	0	0	0	0	0	0	(311)
Accidental Death	(2)	0	0	0	0	0	2	0	2	0
Ordinary Death	(34)	0	(1)	0	0	0	0	0	0	(35)
Service Retirement	(1,395)	(2)	(85)	1,482	0	0	0	0	1,482	0
Ordinary Disability Retirement	(30)	0	(1)	0	31	0	0	0	31	0
Accidental Disability Retirement	(182)	0	0	0	0	182	0	0	182	0
Reclassifications	28	(247)	219	(95)	(5)	88	42	(6)	24	24
Pensioner Death with Beneficiary	0	0	0	(41)	(9)	(8)	0	58	0	0
Pensioner Death without Beneficiary	0	0	0	(560)	(144)	(220)	(5)	(54)	(983)	(983)
Pension Payroll Adjustments	0	0	0	1	0	0	0	4	5	5
Net Change	(506)	(96)	256	783	(128)	42	39	2	738	392
Number at June 30, 2020	35,895	1,544	753	34,749	2,624	12,707	514	871	51,465	89,657

**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 POLICE PENSION FUND		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2020 (LAG) AND THE JUNE 30, 2019 (LAG) ACTUARIAL VALUATIONS		
	June 30, 2020 (Lag)	June 30, 2019 (Lag)
Number		
Males	29,279	29,829
Females	6,616	6,572
Total	35,895	36,401
Annual Salary ¹		
Males	\$ 3,551,862,022	\$ 3,517,319,891
Females	747,786,826	727,485,111
Total	4,299,648,848	\$ 4,244,805,002
Average Salary ¹		
Males	\$ 121,311	\$ 117,916
Females	113,027	110,695
Total Average	\$ 119,784	\$ 116,612
Average Age		
Males	38.0	37.8
Females	37.4	37.5
Total Average	37.9	37.8
Average Past Service		
Males	12.1	11.9
Females	10.7	10.7
Total Average	11.8	11.7

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

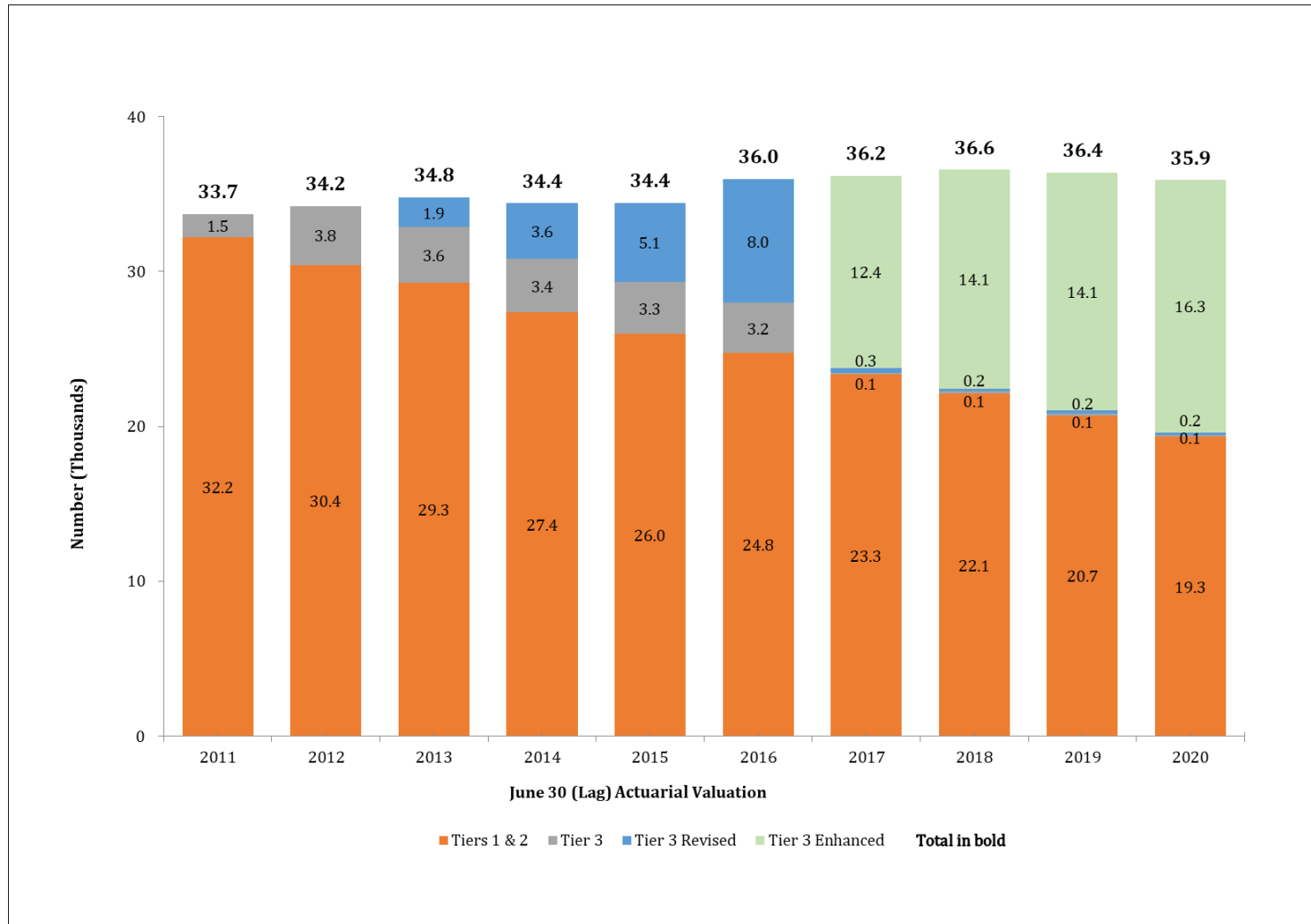


Table XII-5
Schedule of Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2011	33,705	3,480,066,072	103,251	3.1%
2012	34,240	3,478,153,934	101,582	(1.6%)
2013	34,775	3,607,606,894	103,741	2.1%
2014	34,402	3,618,095,284	105,171	1.4%
2015	34,435	3,564,029,659	103,500	(1.6%)
2016	35,961	3,717,425,239	103,374	(0.1%)
2017	36,165	3,968,885,246	109,744	6.2%
2018	36,562	4,053,204,563	110,858	1.0%
2019	36,401	4,244,805,002	116,612	5.2%
2020	35,895	4,299,648,848	119,784	2.7%

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	920	0	0	0	0	0	0	0	0	920
25 TO 29	3,206	987	0	0	0	0	0	0	0	4,193
30 TO 34	1,464	3,288	1,107	4	0	0	0	0	0	5,863
35 TO 39	507	1,482	2,870	1,598	3	0	0	0	0	6,460
40 TO 44	109	583	1,029	2,849	680	1	0	0	0	5,251
45 TO 49	2	85	367	1,199	1,432	436	2	0	0	3,523
50 TO 54	3	2	42	516	612	710	264	0	0	2,149
55 TO 59	1	1	0	33	149	223	221	122	0	750
60 TO 64	1	2	3	1	14	11	26	74	23	155
65 TO 69	0	0	2	2	0	3	0	1	0	8
70 & UP	0	0	0	4	1	1	0	0	1	7
TOTAL	6,213	6,430	5,420	6,206	2,891	1,385	513	197	24	29,279

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	52,136	0	0	0	0	0	0	0	0	52,136
25 TO 29	216,698	100,086	0	0	0	0	0	0	0	316,784
30 TO 34	103,748	389,935	147,815	515	0	0	0	0	0	642,013
35 TO 39	36,173	178,955	389,691	226,278	442	0	0	0	0	831,540
40 TO 44	8,042	70,251	137,148	404,691	102,605	137	0	0	0	722,875
45 TO 49	263	10,445	48,305	166,963	218,420	70,781	251	0	0	515,428
50 TO 54	411	301	5,505	71,452	90,640	111,693	44,914	0	0	324,916
55 TO 59	130	161	0	4,367	22,170	33,460	35,907	20,790	0	116,986
60 TO 64	135	319	487	177	2,120	1,621	3,868	13,287	4,567	26,581
65 TO 69	0	0	323	317	0	585	0	241	0	1,467
70 & UP	0	0	0	632	163	164	0	0	178	1,137
TOTAL ¹	417,738	750,452	729,274	875,391	436,560	218,443	84,940	34,318	4,745	3,551,862

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	56,670	0	0	0	0	0	0	0	0	56,670
25 TO 29	67,592	101,404	0	0	0	0	0	0	0	75,551
30 TO 34	70,866	118,593	133,528	128,688	0	0	0	0	0	109,502
35 TO 39	71,348	120,752	135,781	141,601	147,287	0	0	0	0	128,721
40 TO 44	73,784	120,500	133,283	142,047	150,890	137,466	0	0	0	137,664
45 TO 49	131,476	122,877	131,621	139,252	152,528	162,341	125,352	0	0	146,304
50 TO 54	137,065	150,445	131,065	138,473	148,104	157,315	170,129	0	0	151,194
55 TO 59	130,238	161,196	0	132,324	148,794	150,046	162,477	170,407	0	155,981
60 TO 64	135,395	159,428	162,239	176,731	151,399	147,405	148,755	179,558	198,566	171,488
65 TO 69	0	0	161,718	158,643	0	195,026	0	241,116	0	183,364
70 & UP	0	0	0	157,911	163,281	164,323	0	0	178,163	162,487
TOTAL	67,236	116,711	134,552	141,056	151,007	157,720	165,575	174,203	197,716	121,311

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	199	0	0	0	0	0	0	0	0	199
25 TO 29	811	161	0	0	0	0	0	0	0	972
30 TO 34	537	677	208	0	0	0	0	0	0	1,422
35 TO 39	206	343	604	293	0	0	0	0	0	1,446
40 TO 44	34	168	317	661	127	0	0	0	0	1,307
45 TO 49	1	18	115	339	231	36	1	0	0	741
50 TO 54	1	0	14	136	157	83	21	0	0	412
55 TO 59	1	0	0	5	30	30	27	9	0	102
60 TO 64	0	0	1	0	1	1	5	6	1	15
65 TO 69	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	0	0	0	0	0	0
TOTAL	1,790	1,367	1,259	1,434	546	150	54	15	1	6,616

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	11,225	0	0	0	0	0	0	0	0	11,225
25 TO 29	52,999	16,557	0	0	0	0	0	0	0	69,556
30 TO 34	37,042	77,156	26,926	0	0	0	0	0	0	141,124
35 TO 39	14,150	39,406	79,126	40,136	0	0	0	0	0	172,817
40 TO 44	2,535	19,625	41,360	91,258	18,813	0	0	0	0	173,592
45 TO 49	58	2,234	14,906	45,958	34,437	5,494	172	0	0	103,260
50 TO 54	135	0	1,817	18,264	22,703	12,553	3,175	0	0	58,648
55 TO 59	143	0	0	654	4,291	4,630	4,067	1,502	0	15,286
60 TO 64	0	0	161	0	126	124	732	920	219	2,281
65 TO 69	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	0	0	0	0	0	0
TOTAL ¹	118,287	154,977	164,295	196,270	80,370	22,802	8,146	2,421	219	747,787

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	56,407	0	0	0	0	0	0	0	0	56,407
25 TO 29	65,350	102,836	0	0	0	0	0	0	0	71,559
30 TO 34	68,979	113,968	129,450	0	0	0	0	0	0	99,243
35 TO 39	68,687	114,885	131,003	136,983	0	0	0	0	0	119,514
40 TO 44	74,564	116,818	130,473	138,061	148,130	0	0	0	0	132,817
45 TO 49	58,350	124,085	129,617	135,568	149,079	152,624	172,303	0	0	139,352
50 TO 54	135,315	0	129,763	134,294	144,603	151,246	151,209	0	0	142,348
55 TO 59	142,764	0	0	130,741	143,043	154,332	150,615	166,835	0	149,861
60 TO 64	0	0	161,196	0	125,801	123,941	146,356	153,264	218,892	152,080
65 TO 69	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	0	0	0	0	0	0
TOTAL	66,082	113,371	130,496	136,869	147,197	152,012	150,854	161,406	218,892	113,027

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	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	1,119	0	0	0	0	0	0	0	0	1,119
25 TO 29	4,017	1,148	0	0	0	0	0	0	0	5,165
30 TO 34	2,001	3,965	1,315	4	0	0	0	0	0	7,285
35 TO 39	713	1,825	3,474	1,891	3	0	0	0	0	7,906
40 TO 44	143	751	1,346	3,510	807	1	0	0	0	6,558
45 TO 49	3	103	482	1,538	1,663	472	3	0	0	4,264
50 TO 54	4	2	56	652	769	793	285	0	0	2,561
55 TO 59	2	1	0	38	179	253	248	131	0	852
60 TO 64	1	2	4	1	15	12	31	80	24	170
65 TO 69	0	0	2	2	0	3	0	1	0	8
70 & UP	0	0	0	4	1	1	0	0	1	7
TOTAL	8,003	7,797	6,679	7,640	3,437	1,535	567	212	25	35,895

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	63,361	0	0	0	0	0	0	0	0	63,361
25 TO 29	269,697	116,642	0	0	0	0	0	0	0	386,340
30 TO 34	140,790	467,091	174,741	515	0	0	0	0	0	783,137
35 TO 39	50,323	218,361	468,817	266,414	442	0	0	0	0	1,004,357
40 TO 44	10,578	89,877	178,508	495,949	121,418	137	0	0	0	896,466
45 TO 49	321	12,678	63,211	212,921	252,858	76,275	423	0	0	618,687
50 TO 54	547	301	7,321	89,716	113,342	124,247	48,089	0	0	383,563
55 TO 59	273	161	0	5,020	26,462	38,090	39,974	22,291	0	132,272
60 TO 64	135	319	648	177	2,245	1,745	4,599	14,207	4,786	28,862
65 TO 69	0	0	323	317	0	585	0	241	0	1,467
70 & UP	0	0	0	632	163	164	0	0	178	1,137
TOTAL ¹	536,025	905,430	893,569	1,071,661	516,930	241,245	93,086	36,739	4,964	4,299,649

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	56,623	0	0	0	0	0	0	0	0	56,623
25 TO 29	67,139	101,605	0	0	0	0	0	0	0	74,800
30 TO 34	70,360	117,804	132,883	128,688	0	0	0	0	0	107,500
35 TO 39	70,579	119,650	134,950	140,885	147,287	0	0	0	0	127,037
40 TO 44	73,969	119,676	132,621	141,296	150,456	137,466	0	0	0	136,698
45 TO 49	107,101	123,088	131,143	138,440	152,049	161,600	141,002	0	0	145,096
50 TO 54	136,628	150,445	130,739	137,602	147,389	156,679	168,734	0	0	149,771
55 TO 59	136,501	161,196	0	132,115	147,830	150,555	161,186	170,162	0	155,249
60 TO 64	135,395	159,428	161,978	176,731	149,692	145,449	148,368	177,586	199,413	169,776
65 TO 69	0	0	161,718	158,643	0	195,026	0	241,116	0	183,364
70 & UP	0	0	0	157,911	163,281	164,323	0	0	178,163	162,487
TOTAL	66,978	116,125	133,788	140,270	150,401	157,163	164,173	173,298	198,563	119,784

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	2	420,755	210,378	81.0	42.5	2	409,860	204,930	80.0	41.5
1	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	420,755	210,378	81.0	42.5	2	409,860	204,930	80.0	41.5
2	M	15,937	2,290,008,826	143,691	43.5	17.9	17,094	2,373,451,092	138,847	43.1	17.5
2	F	3,409	466,771,534	136,923	43.0	16.6	3,607	477,808,102	132,467	42.8	16.3
		19,346	2,756,780,360	142,499	43.4	17.7	20,701	2,851,259,194	137,735	43.1	17.3
3	M	84	10,966,706	130,556	35.5	9.5	111	13,994,144	126,073	34.0	8.6
3	F	12	1,532,350	127,696	38.3	8.9	14	1,777,386	126,956	36.1	8.3
		96	12,499,056	130,199	35.8	9.4	125	15,771,530	126,172	34.3	8.6
3 Revised	M	149	16,094,301	108,015	32.5	5.7	167	15,837,268	94,834	31.1	4.5
3 Revised	F	23	2,467,951	107,302	33.1	5.8	35	3,151,704	90,049	32.1	4.4
		172	18,562,252	107,920	32.6	5.7	202	18,988,972	94,005	31.3	4.5
3 Enhanced	M	13,107	1,234,371,434	94,177	31.3	5.0	12,455	1,113,627,527	89,412	30.7	4.4
3 Enhanced	F	3,172	277,014,991	87,331	31.4	4.4	2,916	244,747,919	83,933	31.0	4.0
		16,279	1,511,386,425	92,843	31.3	4.9	15,371	1,358,375,446	88,373	30.7	4.3
ALL TIERS		35,895	4,299,648,848	119,784	37.9	11.8	36,401	4,244,805,002	116,612	37.8	11.7

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	2	420,755	210,378	81.0	42.5	2	409,860	204,930	80.0	41.5
1	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	420,755	210,378	81.0	42.5	2	409,860	204,930	80.0	41.5
2	M	15,749	2,265,579,796	143,855	43.6	18.0	15,749	2,180,050,587	138,425	42.6	17.0
2	F	3,302	453,270,614	137,272	43.3	16.8	3,302	435,429,865	131,869	42.3	15.8
		19,051	2,718,850,410	142,714	43.6	17.8	19,051	2,615,480,452	137,288	42.6	16.8
3	M	84	10,966,706	130,556	35.5	9.5	84	10,526,631	125,317	34.5	8.5
3	F	11	1,419,293	129,027	38.4	9.0	11	1,392,148	126,559	37.4	8.0
		95	12,385,999	130,379	35.8	9.4	95	11,918,779	125,461	34.8	8.4
3 Revised	M	145	15,747,966	108,607	32.5	5.6	145	14,185,788	97,833	31.5	4.6
3 Revised	F	23	2,467,951	107,302	33.1	5.8	23	2,245,035	97,610	32.1	4.9
		168	18,215,917	108,428	32.6	5.7	168	16,430,823	97,803	31.6	4.7
3 Enhanced	M	11,870	1,166,255,245	98,252	31.7	5.4	11,870	1,062,295,629	89,494	30.7	4.4
3 Enhanced	F	2,762	253,731,350	91,865	32.0	4.9	2,762	229,868,541	83,225	31.0	3.9
		14,632	1,419,986,595	97,047	31.8	5.3	14,632	1,292,164,170	88,311	30.8	4.3
ALL TIERS		33,948	4,169,859,676	122,831	38.4	12.4	33,948	3,936,404,084	115,954	37.4	11.3

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	188	24,429,030	129,942	34.5	10.2	1,345	193,400,505	143,792	48.8	23.1
2	F	107	13,500,920	126,177	34.9	10.8	305	42,378,237	138,945	48.0	21.3
		295	37,929,950	128,576	34.7	10.4	1,650	235,778,742	142,896	48.7	22.8
3	M	0	0	0	0.0	0.0	27	3,467,513	128,426	32.7	9.2
3	F	1	113,057	113,057	37.0	8.0	3	385,238	128,413	31.3	9.3
		1	113,057	113,057	37.0	8.0	30	3,852,751	128,425	32.5	9.2
3 Revised	M	4	346,335	86,584	34.0	6.8	22	1,651,480	75,067	28.6	3.3
3 Revised	F	0	0	0	0.0	0.0	12	906,669	75,556	32.3	3.5
		4	346,335	86,584	34.0	6.8	34	2,558,149	75,240	29.9	3.4
3 Enhanced	M	1,237	68,116,189	55,066	27.0	0.8	585	51,331,898	87,747	29.5	4.5
3 Enhanced	F	410	23,283,641	56,789	27.8	1.0	154	14,879,378	96,619	31.0	5.8
		1,647	91,399,830	55,495	27.2	0.9	739	66,211,276	89,596	29.8	4.8
ALL TIERS		1,948	129,789,172	66,661	28.4	2.3	2,453	308,400,918	125,724	42.5	16.9

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	2	200,921	100,461	0	0	0	2	200,921	100,461
40 TO 44	199	17,038,682	85,622	58	4,827,713	83,236	257	21,866,395	85,083
45 TO 49	1,957	170,151,295	86,945	490	37,565,477	76,664	2,447	207,716,772	84,886
50 TO 54	5,149	434,363,070	84,359	1,033	76,383,368	73,943	6,182	510,746,438	82,618
55 TO 59	6,641	481,258,728	72,468	1,510	98,385,013	65,156	8,151	579,643,741	71,113
60 TO 64	4,862	318,289,751	65,465	974	58,099,079	59,650	5,836	376,388,830	64,494
65 TO 69	2,376	145,812,654	61,369	380	21,233,113	55,877	2,756	167,045,767	60,612
70 TO 74	2,465	136,098,952	55,213	96	4,847,149	50,491	2,561	140,946,101	55,036
75 TO 79	3,131	155,114,084	49,541	81	3,896,768	48,108	3,212	159,010,852	49,505
80 TO 84	1,890	83,655,366	44,262	32	1,554,840	48,589	1,922	85,210,206	44,334
85 TO 89	861	35,664,214	41,422	16	755,050	47,191	877	36,419,264	41,527
90 & UP	528	20,626,894	39,066	18	631,972	35,110	546	21,258,866	38,936
TOTAL	30,061	1,998,274,611	66,474	4,688	308,179,542	65,738	34,749	2,306,454,153	66,375
<i>ORDINARY DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	3	217,917	72,639	2	84,592	42,296	5	302,509	60,502
35 TO 39	41	1,986,536	48,452	15	703,116	46,874	56	2,689,652	48,030
40 TO 44	74	3,316,954	44,824	43	1,854,858	43,136	117	5,171,812	44,204
45 TO 49	131	5,520,284	42,140	62	2,438,151	39,325	193	7,958,435	41,235
50 TO 54	228	8,202,078	35,974	125	4,232,569	33,861	353	12,434,647	35,226
55 TO 59	187	5,937,864	31,753	123	3,450,514	28,053	310	9,388,378	30,285
60 TO 64	130	3,508,114	26,985	80	2,116,347	26,454	210	5,624,461	26,783
65 TO 69	75	2,426,108	32,348	30	773,537	25,785	105	3,199,645	30,473
70 TO 74	265	7,567,209	28,556	17	390,333	22,961	282	7,957,542	28,218
75 TO 79	399	10,564,581	26,478	15	337,975	22,532	414	10,902,556	26,335
80 TO 84	230	8,317,262	36,162	7	158,068	22,581	237	8,475,330	35,761
85 TO 89	152	7,191,240	47,311	4	125,606	31,402	156	7,316,846	46,903
90 & UP	181	8,196,692	45,286	5	225,701	45,140	186	8,422,393	45,282
TOTAL	2,096	72,952,839	34,806	528	16,891,367	31,991	2,624	89,844,206	34,239
<i>ACCIDENTAL DISABILITY:</i>									
UNDER 30	1	44,090	44,090	1	56,857	56,857	2	100,947	50,474
30 TO 34	28	2,003,556	71,556	7	474,060	67,723	35	2,477,616	70,789
35 TO 39	241	20,138,707	83,563	46	3,500,798	76,104	287	23,639,505	82,368
40 TO 44	404	34,780,432	86,090	92	7,228,953	78,576	496	42,009,385	84,696
45 TO 49	866	75,869,241	87,609	146	11,469,061	78,555	1,012	87,338,302	86,303
50 TO 54	1,873	158,993,323	84,887	281	20,432,033	72,712	2,154	179,425,356	83,299
55 TO 59	2,043	152,039,413	74,420	387	26,830,345	69,329	2,430	178,869,758	73,609
60 TO 64	1,393	91,984,680	66,034	213	13,141,639	61,698	1,606	105,126,319	65,458
65 TO 69	700	42,009,978	60,014	75	4,005,628	53,408	775	46,015,606	59,375
70 TO 74	1,291	61,187,067	47,395	41	1,694,752	41,335	1,332	62,881,819	47,209
75 TO 79	1,492	66,368,298	44,483	37	1,548,125	41,841	1,529	67,916,423	44,419
80 TO 84	656	28,739,466	43,810	8	317,267	39,658	664	29,056,733	43,760
85 TO 89	253	12,750,502	50,397	2	61,675	30,838	255	12,812,177	50,244
90 & UP	126	5,531,924	43,904	4	152,747	38,187	130	5,684,671	43,728
TOTAL	11,367	752,440,677	66,195	1,340	90,913,940	67,846	12,707	843,354,617	66,369

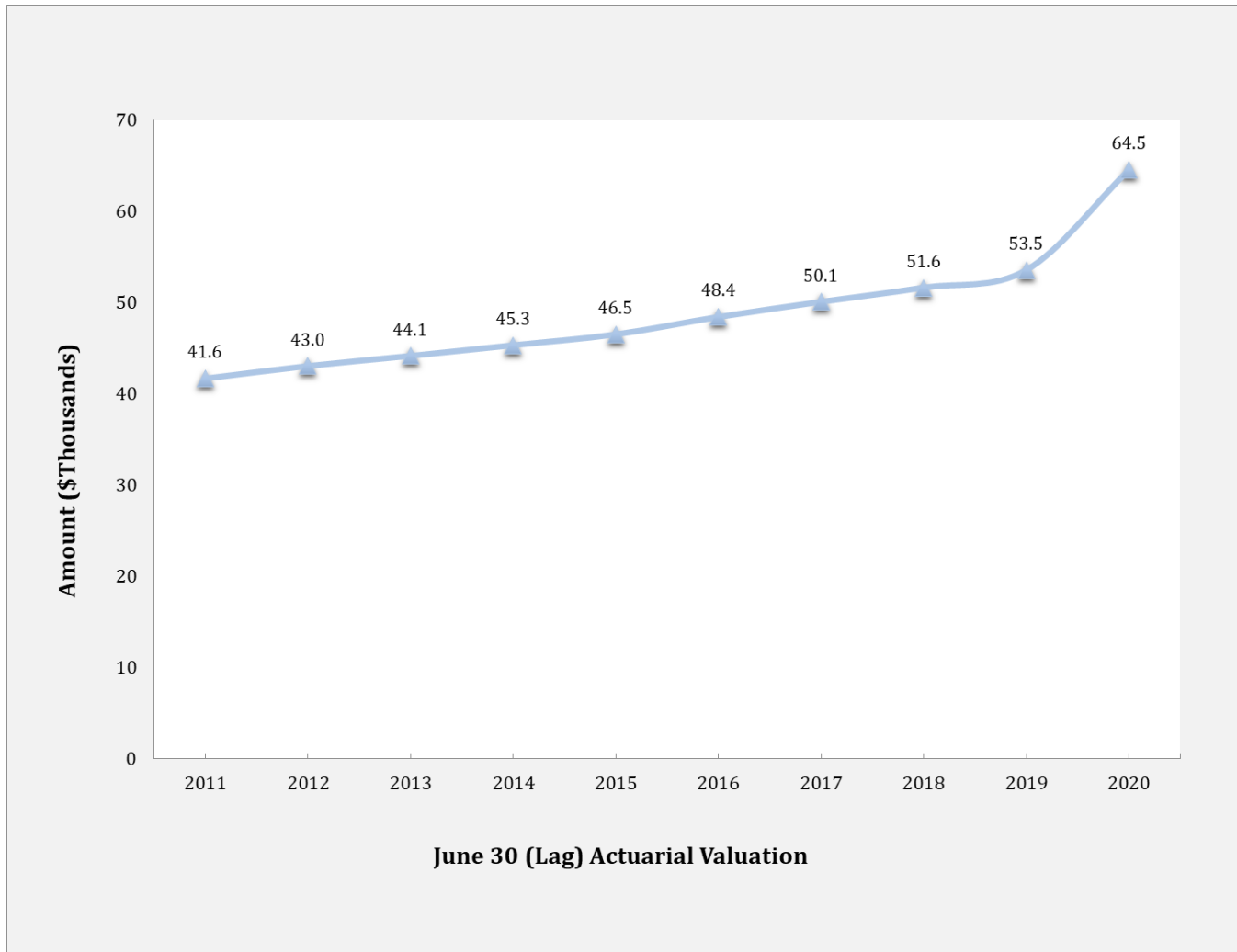
Table XII-8

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	4	547,669	136,917	17	2,356,544	138,620	21	2,904,213	138,296
30 TO 34	0	0	0	1	154,504	154,504	1	154,504	154,504
35 TO 39	1	130,794	130,794	3	418,512	139,504	4	549,306	137,327
40 TO 44	0	0	0	16	2,133,484	133,343	16	2,133,484	133,343
45 TO 49	2	213,785	106,893	20	2,721,279	136,064	22	2,935,064	133,412
50 TO 54	3	400,769	133,590	57	7,237,331	126,971	60	7,638,100	127,302
55 TO 59	8	871,931	108,991	84	11,047,812	131,522	92	11,919,743	129,562
60 TO 64	7	784,953	112,136	60	7,182,223	119,704	67	7,967,176	118,913
65 TO 69	4	320,932	80,233	45	4,633,916	102,976	49	4,954,848	101,119
70 TO 74	3	348,761	116,254	55	5,761,570	104,756	58	6,110,331	105,351
75 TO 79	1	109,186	109,186	65	5,780,731	88,934	66	5,889,917	89,241
80 TO 84	3	135,062	45,021	24	1,650,186	68,758	27	1,785,248	66,120
85 TO 89	2	89,337	44,669	16	1,067,170	66,698	18	1,156,507	64,250
90 & UP	3	109,032	36,344	10	593,712	59,371	13	702,744	54,057
TOTAL	41	4,062,211	99,078	473	52,738,974	111,499	514	56,801,185	110,508
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	8	326,932	40,867	8	432,386	54,048	16	759,318	47,457
30 TO 34	5	173,558	34,712	6	145,843	24,307	11	319,401	29,036
35 TO 39	2	44,033	22,017	3	86,438	28,813	5	130,471	26,094
40 TO 44	1	13,585	13,585	14	541,436	38,674	15	555,021	37,001
45 TO 49	5	208,921	41,784	15	734,753	48,984	20	943,674	47,184
50 TO 54	5	228,917	45,783	35	1,390,406	39,726	40	1,619,323	40,483
55 TO 59	4	141,494	35,374	65	2,559,469	39,376	69	2,700,963	39,144
60 TO 64	2	59,840	29,920	62	2,121,892	34,224	64	2,181,732	34,090
65 TO 69	2	52,991	26,496	68	1,887,932	27,764	70	1,940,923	27,727
70 TO 74	1	34,573	34,573	110	3,067,738	27,889	111	3,102,311	27,949
75 TO 79	1	19,546	19,546	128	3,442,962	26,898	129	3,462,508	26,841
80 TO 84	0	0	0	116	3,181,134	27,424	116	3,181,134	27,424
85 TO 89	0	0	0	88	2,158,398	24,527	88	2,158,398	24,527
90 & UP	0	0	0	117	2,012,296	17,199	117	2,012,296	17,199
TOTAL	36	1,304,390	36,233	835	23,763,083	28,459	871	25,067,473	28,780
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	13	918,691	70,669	26	2,845,787	109,453	39	3,764,478	96,525
30 TO 34	36	2,395,031	66,529	16	858,999	53,687	52	3,254,030	62,578
35 TO 39	287	22,500,991	78,401	67	4,708,864	70,282	354	27,209,855	76,864
40 TO 44	678	55,149,653	81,342	223	16,586,444	74,379	901	71,736,097	79,618
45 TO 49	2,961	251,963,526	85,094	733	54,928,721	74,937	3,694	306,892,247	83,079
50 TO 54	7,258	602,188,157	82,969	1,531	109,675,707	71,637	8,789	711,863,864	80,995
55 TO 59	8,883	640,249,430	72,076	2,169	142,273,153	65,594	11,052	782,522,583	70,804
60 TO 64	6,394	414,627,338	64,846	1,389	82,661,180	59,511	7,783	497,288,518	63,894
65 TO 69	3,157	190,622,663	60,381	598	32,534,126	54,405	3,755	223,156,789	59,429
70 TO 74	4,025	205,236,562	50,990	319	15,761,542	49,409	4,344	220,998,104	50,874
75 TO 79	5,024	232,175,695	46,213	326	15,006,561	46,032	5,350	247,182,256	46,202
80 TO 84	2,779	120,847,156	43,486	187	6,861,495	36,692	2,966	127,708,651	43,058
85 TO 89	1,268	55,695,293	43,924	126	4,167,899	33,079	1,394	59,863,192	42,943
90 & UP	838	34,464,542	41,127	154	3,616,428	23,483	992	38,080,970	38,388
TOTAL	43,601	2,829,034,728	64,885	7,864	492,486,906	62,625	51,465	3,321,521,634	64,539

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	2,142	141,323,253	1,021	30,315,285	45,755	1,905,326,699	6.2%	41,642
2012	1,893	133,158,449	1,010	32,287,109	46,638	2,006,198,039	5.3%	43,016
2013	1,346	99,488,158	1,034	33,621,831	46,950	2,072,064,366	3.3%	44,133
2014	2,220	144,660,995	958	32,759,640	48,212	2,183,965,721	5.4%	45,299
2015	1,574	117,371,844	1,083	37,069,856	48,703	2,264,267,709	3.7%	46,491
2016	1,458	151,061,292	1,010	36,517,652	49,151	2,378,811,349	5.1%	48,398
2017	1,681	153,211,878	1,033	38,982,214	49,799	2,493,041,013	4.8%	50,062
2018	1,401	137,291,868	1,076	42,965,087	50,124	2,587,367,794	3.8%	51,619
2019	1,729	170,887,518	1,126	42,117,897	50,727	2,716,137,415	5.0%	53,544
2020	1,905	647,894,232	1,167	42,510,013	51,465	3,321,521,634	22.3%	64,539

¹ Allowances shown through June 30, 2019 are those presented in 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 anticipated 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
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
POVSF	Police Officer's Variable Supplements Fund
PSOVSF	Police Superior Officers' Variable Supplements Fund
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNCS	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