REPORT ON EXAMINATION

OF THE

NEW YORK CITY FIRE PENSION FUNDS

AS OF JUNE 30, 2018

EXAMINER: **CHONG KIM**

DATE OF REPORT: **SEPTEMBER 15, 2022**

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December 17, 2025

Honorable Kaitlin Asrow
Acting Superintendent of Financial Services
New York, New York 10004

Dear Kaitlin Asrow:

In accordance with instructions contained in Appointment No. 32011, dated October 28, 2019, and annexed hereto, an examination has been made into the condition and affairs of the New York City Fire Pension Funds, hereinafter referred to as "the Fund," or "System." The Fund's home office is located at One Battery Plaza, 9th Floor, New York, NY 10004.

Wherever "Department" appears in this report, it refers to the New York State Department of Financial Services.

This report includes the results of the Department's examination of the Firefighters' Variable Supplements Fund ("FFVSF") and the Fire Officers' Variable Supplements Fund ("FOVSF") in accordance with Appointment No. 32012 and 32013, respectively.

The report indicating the results of this examination is respectfully submitted.

1. EXECUTIVE SUMMARY

During the examination of the System, the examiner identified several areas for consideration by the System, which are summarized below. A separate examination of the investments and investment practices for the five New York City retirement systems was performed. The Investment Examination Report is submitted with this report as a separate document as referenced in section 7. The following areas for consideration are noted:

- The System should consider establishing or maintaining separate accounts for each benefit plan or fund and account for distributions, contributions, and investment experience by plan or fund. (See sections 5D and 8G of this report.)
- The System should consider ceasing asset transfers or benefit payments from the qualified pension plan ("QPP") for providing any non-QPP benefits. (See section 8G of this report.)
- The System should consider disclosing the assets and liabilities for each benefit plan or fund separately as well as separately determining the employer contribution for each benefit plan or fund in future actuarial valuation reports. (See section 8G of this report.)
- The System should consider revising the actuarial cost method to follow the Entry Age Normal ("EAN") actuarial cost method as defined by the Actuarial Standards Board ("ASB") and described under New York City Administrative Code ("NYCAC") Section 13-331(b)(2)(e). (See section 8B of this report.)
- The System should consider determining the normal cost contribution from the explicitly calculated plan normal cost based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-331(b)(2)(e). The System should also consider using the EAN actuarial cost method defined by the ASB for determining the explicitly calculated plan normal cost. (See section 8F of this report.)
- The System should consider revising the amortization method so that the Unfunded Accrued Liability ("UAL") as of the valuation date is scheduled to be fully amortized. If the current amortization method is retained, then the actuarial valuation report should disclose that the UAL as of the valuation date is not expected to be fully amortized. (See section 8E of this report.)

- The System should consider following the requirements for special accidental death benefits ("SADB") in accordance with General Municipal Law. (See section 8G of this report.)
- The System should consider updating the calculation procedures so that each optional form of payment and benefits attributed to member contributions are determined in an equitable manner and in accordance with NYCAC. (See section 6A of this report.)

2. SCOPE OF EXAMINATION

The prior examination was conducted as of June 30, 2013. This examination covers the period from July 1, 2013 through June 30, 2018. As necessary, the examiner reviewed transactions occurring subsequent to June 30, 2018, but prior to the date of this report (i.e., the completion date of the examination).

The Superintendent has the authority under New York Insurance Law Section 314(b)(3) "to make an examination into the affairs" of the System. The examination provides an independent review of the System to better enable the System's Board to determine appropriate action as may be needed in the interest of the System and to assist the Board in meeting its obligations in overseeing the affairs of the System. The examination was conducted in accordance with New York Insurance Law Section 310. In accordance with the direction in New York Insurance Law Section 314(b)(3), the objective of this examination was to review and report on the System's governance, including but not limited to fiduciary, financial, actuarial, investment, risk management, information technology, and member treatment.

The examination comprised a verification of assets and liabilities as of June 30, 2018 to determine whether the System's filed 2018 annual statement fairly presents its financial condition. The examiner reviewed the System's income and disbursements necessary to accomplish such verification and utilized examination procedures, as deemed appropriate, in such review and in the review or audit of the following matters:

History of the System
Management and control
Corporate governance
Growth of the System
Accounts and records
Financial statements
Member benefits
Investments
Actuarial

Sections 1 to 6 of this report on examination are confined to financial statements and comments on those matters which involve laws, regulations or rules, or which require explanation or description.

A separate examination report on the investments and investment practices for the five New York City retirement systems was performed. The Investment Examination Report is submitted with this report as a separate document referenced in section 7.

The actuarial review is included under section 8 of this report.

3. DESCRIPTION OF SYSTEM

A. History

The System was established pursuant to Local Law No. 53 enacted July 14, 1941. In accordance with this law, all participants that were covered under Article 1-A on that date, and those subsequently appointed to the Fire Department, were granted the option of membership in either Article 1-A or Subchapter Two. Effective July 1, 1980, the Article 1-A fund was terminated, and its assets were transferred to the Subchapter Two fund.

The System operates pursuant to NYCAC Title 13, Chapter 3, Subchapter 2. Under the NYCAC, the System is subject to the supervision of the Department which may examine its affairs with the same powers and jurisdiction as are applicable to a life insurance company under Article 3 of the New York Insurance Law. The System is also subject to assessment for expenses pursuant to Section 313 of the New York Insurance Law.

New State laws, effective July 1, 1980, July 1, 1981 and July 1, 1982, amended the benefit provisions of the System by establishing a new plan known as the Improved Benefits Plan ("IBP"). The Original Plan ("OP") was closed to new entrants on July 1, 1981. Membership in the IBP is mandatory for uniformed employees hired on or after that date. Members of the OP have the option to transfer to the IBP, which provides increased benefits and higher member and City contributions.

Effective September 8, 2016, the System was granted corpus funding pursuant to Chapter 298 of Laws of New York, 2016 ("the Law"). Under the Law, the System ceased to be part of the New York City Fire Department ("the Fire Department") and became a separate entity.

The System administers the New York City Fire Pension Fund Qualified Pension Plan ("QPP"), New York City Fire Group Life Insurance Plan ("GLIP"), New York City Fire Excess Benefit Plan ("EBP"), New York City Firefighters' Variable Supplements Fund ("FFVSF"), and New York City Fire Officers' Variable Supplements Fund ("FOVSF").

QPP

QPP operates pursuant to provisions under Title 13, Chapter 3 of NYCAC and is intended to be a qualified plan under Internal Revenue Code ("IRC") Section 401(a). It provides a pension benefit for full time uniformed employees of the Fire Department.

GLIP

GLIP operates pursuant to the System's Rules and Regulations. It provides a tax-free death benefit of up to $50,000 to beneficiaries of an eligible deceased member. GLIP assets ("Reserve Fund") are required to be separate from and independent of the System and all System funds in accordance with Rule 30.

EBP

EBP operates pursuant to the provisions of NYCAC Section 13-379.1. It provides replacement benefit payments to those retirees that have their QPP retirement benefits limited due to the maximum pension benefit requirements under IRC Section 415. EBP assets are required to be held separate and apart from the assets held by the other funds of the System and accounted for separately from the other System assets in accordance with NYCAC Section 13-379.1(c).

FFVSF

FFVSF operates pursuant to the provisions of NYCAC Sections 13-382 to 13-391.1. It provides supplemental benefits to Firefighters and Wipers of the Fire Department who retired on or after October 1, 1968 with 20 or more years of service and receiving a service retirement benefit from the QPP.

Under current law, FFVSF is not to be construed as constituting a pension or retirement system. Instead, it provides supplemental payments, other than pension or retirement system allowances, in accordance with applicable statutory provisions. The New York State Legislature has reserved to itself and the State of New York the right and power to amend, modify, or repeal FFVSF and the payment it provides.

FOVSF

FOVSF operates pursuant to the provisions of NYCAC Sections 13-392 to 13-401. It provides supplemental benefits to Fire Officers' of the Fire Department who retired on or after October 1, 1968 with 20 or more years of service and receiving a service retirement benefit from the QPP.

Under current law, FOVSF is not to be construed as constituting a pension or retirement system. Instead, it provides supplemental payments, other than pension or retirement system

allowances, in accordance with applicable statutory provisions. The New York State Legislature has reserved to itself and the State of New York the right and power to amend, modify, or repeal FOVSF and the payment it provides.

B. Management - QPP

The QPP is managed by a board of trustees. The QPP board of trustees also administers the EBP. Such board consists of the Fire Commissioner who also serves as chairperson, the Comptroller of the New York City, a representative of the New York City Mayor, the Commissioner of Department of Finance, the President of the Uniformed Firefighters' Association of Greater New York, the Vice-President of the Uniformed Firefighters' Association of Greater New York, the Treasurer of the Uniformed Firefighters' Association of Greater New York, the Chairperson of the board of trustees of the Uniformed Firefighters' Association of Greater New York, three elected members of the executive board of the Uniformed Fire Officers' Association of Greater New York (one is a rank above captain, another shall be a captain, another shall be a lieutenant), and the President of the Uniformed Pilots and Marine Engineers Association of Greater New York.

The 12 board members and their principal business affiliation, as of June 30, 2018, were as follows:

Name	Principal Business Affiliation
Edward Brown	Treasurer Uniformed Firefighters Association of Greater New York
Bill De Blasio	Mayor City of New York
Peter De Vita	Representative Uniformed Pilots' and Marine Engineers' Association of Greater New York
John Farina	Captains' Representative Uniformed Fire Officers' Association of Greater New York

Name	Principal Business Affiliation
Gerald Fitzgerald	President Uniformed Firefighters Association of Greater New York
Jacques Jiha	Commissioner Department of Finance, City of New York
John Kelly	Vice Chairman Uniformed Firefighters Association of Greater New York
Jack Kielty	Lieutenants' Representative Uniformed Fire Officers' Association of Greater New York
Paul Mannix	Chiefs' Representative Uniformed Fire Officers' Association of Greater New York
LeRoy McGinnis	Vice President Uniformed Firefighters Association of Greater New York
Daniel Nigro	Fire Commissioner and Chairperson Board of Trustees of the New York Fire Pension Fund, Subchapter 2
Scott Stringer	Comptroller City of New York

LeRoy McGinnis was replaced by Robert Eustace in January 2020.

The examiner's review of the minutes of the meetings of the board of trustees and its committees indicated that meetings were well attended and that each board member attended a majority of meetings.

The following is a listing of the principal officers of the Fund as of June 30, 2018:

Name	Title
Bill de Blasio	Mayor, City of New York
Daniel Nigro	Fire Commissioner and Chairperson
Patrick Dunn	Executive Director
Rosemary DeBellis	General Counsel
Michael Sohn	Chief of Staff

LeRoy McGinnis was appointed as the Deputy Executive Director in November 2019.

C. Management - FFVSF

The FFVSF is administered independently by a board of trustees. The members of the board are trustees of the monies that the FFVSF receives and have the power to invest the same monies in accordance with the limitations and restrictions imposed by law upon savings banks; and have the same investment powers as are vested by the Administrative Code, and the Retirement and Social Security Law in the board of trustees of the QPP. The Comptroller of the City of New York (the "Comptroller") is the custodian of the assets and provides certain administrative services to the FFVSF.

The five board members and their principal business affiliation, as of June 30, 2018, were as follows:

Name	Principal Business Affiliation
Edward Brown	Treasurer Uniformed Firefighters Association of Greater New York
Bill de Blasio	Mayor City of New York
Jacques Jiha	Commissioner, Department of Finance City of New York
LeRoy McGinnis	Vice President Uniformed Firefighters Association of Greater New York
Scott Stringer	Comptroller City of New York

LeRoy McGinnis was replaced by Robert Eustace in January 2020.

The examiner's review of the minutes of the meetings of the board of trustees and its committees indicated that meetings were well attended and that each board member attended a majority of the meetings.

The following is a listing of the Executive officials of the Fund as of June 30, 2018:

Name	Title
Bill de Blasio	Mayor, City of New York
Daniel Nigro	Fire Commissioner and Chairperson
Patrick Dunn	Executive Director
Rosemary DeBellis	General Counsel
Michael Sohn	Chief of Staff

LeRoy McGinnis was appointed as the Deputy Executive Director in November 2019.

D. Management - FOVSF

The FOVSF is administered independently by a board of trustees. The members of the board are trustees of the monies that the FOVSF receives and have the power to invest the same monies in accordance with the limitations and restrictions imposed by law upon savings banks; and have the same investment powers as are vested by the Administrative Code, and the Retirement and Social Security Law in the board of trustees of the QPP. The Comptroller of the City of New York (the "Comptroller") is the custodian of the assets and provides certain administrative services to the Fund.

The five board members and their principal business affiliation, as of June 30, 2018, were as follows:

Name	Principal Business Affiliation
Bill de Blasio	Mayor City of New York
John Farina	Captains' Representative Uniformed Fire Officers' Association of Greater New York

Name	Principal Business Affiliation
Jacques Jiha	Commissioner, Department of Finance City of New York
Paul Mannix	Chiefs' Representative Uniformed Fire Officers' Association of Greater New York
Scott Stringer	Comptroller City of New York

The examiner's review of the minutes of the meetings of the board of trustees and its committees indicated that meetings were well attended and that each board member attended most of the meetings.

The following is a listing of the Executive officials of the Fund as of June 30, 2018:

Name	Title
Bill de Blasio	Mayor, City of New York
Daniel Nigro	Fire Commissioner and Chairperson
Patrick Dunn	Executive Director
Rosemary DeBellis	General Counsel
Michael Sohn	Chief of Staff

LeRoy McGinnis was appointed as the Deputy Executive Director in November 2019.

4. SIGNIFICANT OPERATING RESULTS

Indicated below is significant information concerning the operations of the System during the period under examination as extracted from its filed annual statements.

The following tables indicate the System's financial growth (decline) during the period under review for each program:

Change in Fiduciary Net Position from July 1, 2013 to June 30, 2018 (in thousands)			
	QPP	FFVSF	FOVSF
Beginning Net Position at 7/1/2013	$ 9,127,192	$395,369	$267,423
Contributions	5,825,571	0	0
Net Investment Income and Other	4,693,121	174,745	130,291
Net Transfers/Reimbursements	(257,616)	197,653	59,963
Benefit Payments	(6,114,813)	(237,687)	(111,044)
Admin Expenses	(6,412)	0	0
Ending Net Position at 6/30/2018	$13,267,043	$530,080	$346,633

The following table indicates the number of members as reported in the annual comprehensive financial reports, as of June 30, 2018:

Membership as of June 30, 2018*			
	QPP	FFVSF	FOVSF
Retirees and beneficiaries	16,593	3,387	1,532
Terminated vested	68	0	0
Other inactive	35	0	0
Active members	11,237	8,627	2,610
Total	27,933	12,014	4,142

* Final headcount disclosed in the 2019 Annual Comprehensive Financial Report

The active members are only those members receiving salaries, and the pensioners and beneficiaries are only those receiving benefits.

5. FINANCIAL STATEMENTS

The following statements show the fiduciary net position of the System as of June 30, 2018, as contained in the System's 2018 filed financial statements and the statement of changes in the fiduciary net position for each of the fiscal years under review.

A. Independent Accountants

The firm of Deloitte and Touche, LLP ("D&T") was retained by the System to audit the System's financial statements of plan net assets as of June 30th of each year for the years 2014 and 2015, and the related statements of changes in plan net assets for the year then ended.

D&T concluded that the financial statements presented fairly, in all material respects, the financial position of the System at the respective audit dates. Balances reported in these audited financial statements were reconciled to the corresponding years' annual statements with no material discrepancies noted.

The firm of Marks Paneth, LLP ("Marks Paneth") was retained by the System to audit the System's financial statements of plan net assets as of June 30th of each year for the years 2016, 2017, and 2018 and the related statements of changes in plan net assets for the year then ended.

Marks Paneth concluded that the financial statements presented fairly, in all material respects, the financial position of the System at the respective audit dates. Balances reported in these audited financial statements were reconciled to the corresponding years' annual statements with no material discrepancies noted.

B. Statement of Fiduciary Net Position as of June 30, 2018 (In thousands)

QPP

Assets	
Cash and equivalents	$ 2,883
Receivable for investment securities sold	143,921
Receivable for member loans	25,248
Receivable for accrued interest and dividends	25,777
Other receivables	129
Investments at fair value	13,487,544
Securities lending collateral	1,140,436
Other assets	2,899
Total assets	$14,828,837
Liabilities	
Accounts payable	$ 177,540
Payable for investment securities purchased	203,986
Accrued benefits payable	10,832
Transferrable earnings from QPP to VSFs	29,000
Payable for securities lending transactions	1,140,436
Total liabilities	$ 1,561,794
Fiduciary net position (total assets minus total liabilities)	$13,267,043

FFVSF

Assets	
Cash and equivalents	$ 1,467
Receivable for accrued interest and dividends	199
Receivables from QPP to VSFs	29,000
Investments at fair value	519,885
Securities lending collateral	16,842
Total assets	$567,393
Liabilities	
Accounts payable	$ 44
Accrued benefits payable	20,427
Payable for securities lending transactions	16,842
Total liabilities	$ 37,313
Fiduciary net position (total assets minus total liabilities)	$530,080

FOVSF

Assets	
Cash and equivalents	$ 1,085
Receivable for accrued interest and dividends	245
Other receivables	33
Investments at fair value	354,486
Securities lending collateral	12,008
Total assets	$367,857
Liabilities	
Accounts payable	$ 50
Payable for investment securities purchased	87
Accrued benefits payable	9,079
Payable for securities lending transactions	12,008
Total liabilities	$ 21,224
Fiduciary net position (total assets minus total liabilities)	$346,633

C. Statement of Changes in Fiduciary Net Position for the Examination Period ended June 30, 2018 (In thousands)

QPP

	2014	2015	2016	2017	2018
Contributions					
Member contributions	$ 108,859	$ 108,582	$ 116,619	$ 108,368	$ 108,338
Employer contribution	969,956	988,784	1,054,478	1,061,170	1,200,417
Total contribution	$ 1,078,815	$ 1,097,366	$ 1,171,097	$ 1,169,538	$ 1,308,755
Investment earnings:					
Interest and dividend income	259,856	342,961	282,436	295,614	328,369
Net appreciation (depreciation)	1,352,930	(8,490)	(44,510)	1,067,973	952,687
Net securities lending income	(970)	4,986	5,793	5,722	4,740
Investment expenses	(42,803)	(68,027)	(46,321)	(84,438)	(96,936)
Net investment (loss) income	$ 1,569,013	$ 271,430	$ 197,398	$ 1,284,871	$ 1,188,860
Other income	39,980	41,201	43,673	47,284	9,411
Total additions	$ 2,687,808	$ 1,409,997	$ 1,412,168	$ 2,501,693	$ 2,507,026
Benefits payments and withdrawals	1,099,162	1,150,505	1,290,862	1,265,817	1,308,467
Transfers from QPP to VSFs	120,000	40,000	36,873	45,743	15,000
Administrative expenses	0	0	0	0	6,412
Total deductions	$ 1,219,162	$ 1,190,505	$ 1,327,735	$ 1,311,560	$ 1,329,879
Net (decrease) increase	$ 1,468,646	$ 219,492	$ 84,433	$ 1,190,133	$ 1,177,147
Net position restricted for benefits					
Beginning of year	9,127,192	10,595,838	10,815,330	10,899,763	12,089,896
End of Year	$10,595,838	$10,815,330	$10,899,763	$12,089,896	$13,267,043

FFVSF

	2014	2015	2016	2017	2018
Contributions					
Member contributions	$ 0	$ 0	$ 0	$ 0	$ 0
Employer contribution	0	0	0	0	0
Total contribution	$ 0	$ 0	$ 0	$ 0	$ 0
Investment earnings:					
Interest and dividend income	10,726	11,435	12,753	12,104	12,707
Net appreciation (depreciation)	58,245	7,226	(8,428)	34,802	22,865
Net securities lending income	56	227	344	288	238
Investment expenses	0	0	0	(439)	(404)
Net investment (loss) income	$ 69,027	$ 18,888	$ 4,669	$46,755	$35,406
Transfers from QPP to VSFs	110,000	30,000	18,739	23,914	15,000
Total additions	$179,027	$ 48,888	$ 23,408	$ 70,669	$50,406
Benefits payments and withdrawals	50,425	47,415	46,002	47,273	46,572
Total deductions	$ 50,425	$ 47,415	$ 46,002	$ 47,273	$ 46,572
Net (decrease) increase	$128,602	$ 1,473	$ (22,594)	$ 23,396	$ 3,834
Net position restricted for benefits					
Beginning of year	395,369	523,971	525,444	502,850	526,246
End of Year	$523,971	$525,444	$502,850	$526,246	$530,080

FOVSF

	2014	2015	2016	2017	2018
Contributions					
Member contributions	$ 0	$ 0	$ 0	$ 0	$ 0
Employer contribution	0	0	0	0	0
Total contribution	$ 0	$ 0	$ 0	$ 0	$ 0
Investment earnings:					
Interest and dividend income	7,358	7,406	7,692	7,242	8,551
Net appreciation (depreciation)	43,907	4,650	(6,934)	32,860	17,000
Net securities lending income	180	193	279	240	162
Investment expenses	0	0	0	(247)	(248)
Net investment (loss) income	$ 51,445	$ 12,249	$ 1,037	$ 40,095	$ 25,465
Transfers from QPP to VSFs	10,000	10,000	18,134	21,829	0
Total additions	$ 61,445	$ 22,249	$ 19,171	$ 61,924	$ 25,465
Benefits payments and withdrawals	21,742	21,970	21,567	21,717	24,048
Total deductions	$ 21,742	$ 21,970	$ 21,567	$ 21,717	$ 24,048
Net (decrease) increase	$ 39,703	$ 279	$ (2,396)	$ 40,207	$ 1,417
Net position restricted for benefits					
Beginning of year	267,423	307,126	307,405	305,009	345,216
End of Year	$307,126	$307,405	$305,009	$345,216	$346,633

D. GLIP and EBP Financial Reporting

The fiduciary net position and change in fiduciary net position for each year during the examination period were not provided for the GLIP or EBP. The System confirmed GLIP and EBP are not accounted for separately from other System assets (i.e., QPP) and variable supplements funds.

The System should consider establishing or maintaining separate accounts for each benefit plan or fund and account for distributions, contributions, and investment experience by plan or fund.

6. TREATMENT OF MEMBERS

The examiner reviewed a sample of various types of retirement benefits to members and beneficiaries. The examiner also reviewed the various controls involved, checked the accuracy of the computations and traced the accounting data to the books of account.

Based upon the samples reviewed, the following recommendations were noted.

A. Benefit Calculations

The examiner reviewed 19 benefit calculations and noted administrative practices where benefits did not appear to be determined equitably or in accordance with NYCAC.

The examiner observed that for some members that each optional form of payment was not actuarially equivalent[1] to the final maximum benefit payable as required under NYCAC Section 13-369(a) and Section 13-370(a). This resulted in a lower optional form of payment amounts for the observed members. OA stated that "the amounts are close but not fully actuarially equivalent; this matches historical administrative practice by NYCRS."

The examiner observed that the "best of" methodology was not separately applied to benefits attributed to an excess or deficit in required member contributions (including increased take home pay or "ITHP" contributions after 20 years) as required under NYCAC Section 13-313-34[2] and Section 13-359-2(b). Instead, benefits appear to have been determined using the most favorable actuarial equivalence factor based on the ***net*** balance of member contributions and ITHP after 20 years. This method would result in certain members receiving a different and lower retirement allowance despite having the same member contribution balance or ITHP balance after 20 years as another member.

The System should consider updating the calculation procedures so that each optional form of payment and benefits attributed to member contributions are determined in an equitable manner and in accordance with NYCAC.

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[1] For grandfathered members eligible for actuarial equivalence under prior actuarial assumptions the greater of the old and current conversion factors should be applied to the final maximum benefit payable.

[2] New York City Administrative Code Section 13-313-34 indicates "better-of-two-computations method" applies to the retirement allowance *(or portion thereof)*.

7. INVESTMENT EXAMINATION REPORT

The Investment Examination Report is submitted with this report as a separate document.

The Investment Examination Report is based on a review of the five New York City retirement systems and includes all related findings and recommendations.

8. ACTUARIAL REVIEW

A. Actuarial Valuation

Each year the New York City Office of the Actuary ("OA") performs an actuarial valuation to determine the System's funded status and the annual required contribution from participating employers. Annual required employer contributions together with member contributions and investment income are intended to fund members' retirement benefits during their active service.

The valuation date each year is the System's fiscal year end, June 30th. Fiscal and member information are provided as of the valuation date and are used to calculate the required employer contribution for the fiscal year starting one year after the valuation date. For example, the results of the June 30, 2017 actuarial valuation were used to determine the annual required employer contribution for the fiscal year July 1, 2018 to June 30, 2019. The lag between the valuation date and fiscal year required employer contribution allows participating employers to budget for upcoming pension costs and provides the Board with information to make appropriate decisions regarding the plan. OA has implemented a one-year lag methodology[3] ("OYLM") to determine the fiscal year required employer contribution using actuarial valuation results from one year before.

As the actuarial valuation projects future expected events and the present value of benefits payable from such events, the results of the actuarial valuation are highly dependent on the actuarial assumptions used to predict the future as well as member and financial information as of the valuation date. Financial information and member data are provided to OA by the System. Actuarial assumptions are adopted by the System's Board.

The results of an actuarial valuation determine the System's funded status and annual required employer contribution. This is done by applying actuarial methods to allocate the present value of future benefits between the past and the future (actuarial cost method), determine the value of plan assets (asset valuation method), and amortization of the unfunded accrued liability (amortization method). Together these methods determine the annual required employer contribution and represent the System's contribution allocation procedure.

[3] The one-year lag methodology was revised starting with the June 30, 2017 actuarial valuation

B. Actuarial Cost Method

An actuarial cost method allocates the cost or present value of projected benefits to individual time periods before benefits are expected to be paid. As pension plans are generally funded over long periods of time, actuaries often use an actuarial cost method as a fundamental component for determining the required employer contribution each year.

There are various actuarial cost methods that may be used to allocate costs. Costs may be determined on an individual member or group basis, but the allocation should relate to expected compensation or service or the benefit formula on which the projected benefit is based.

The cost allocated to a time period, generally one year, is called the normal cost ("NC"). The present value of future benefits not funded by the present value of future normal costs is called the actuarial accrued liability or accrued liability ("AL"). The sum of the AL and the present value of future normal costs should equal the present value of future benefits ("PVFB") as shown in the following formula:

$$PVFB = AL + PVFNC$$

Costs are determined annually as of the June 30th valuation date, based on the System's fiscal year, July 1st to June 30th. Accordingly, if as of the June 30, 2017 valuation date, salaries are expected to be paid for only the next ten years, then there would be ten years of future NCs; one NC for each year of future salary.

The System's Board adopted an entry age normal ("EAN") actuarial cost method to allocate costs for the System beginning with the June 30, 2010 actuarial valuation. Regarding EAN and the resulting normal contribution, NYCAC Section 13-331(b)(2)(e) provides:

> "(e)(i) Notwithstanding the preceding subparagraphs of this paragraph or any other provision of law to the contrary, the normal contribution payable to the contingent reserve fund in fiscal year two thousand eleven – two thousand twelve, and in each fiscal year thereafter, shall be the entry age normal contribution, as determined by the actuary pursuant to this subparagraph in a manner consistent with the entry age actuarial cost method. The actuary shall determine the entry age normal contribution for each such fiscal year as of June thirtieth of the second fiscal year preceding the fiscal year in which such normal contribution is payable, based on the latest mortality and other tables applicable at the time he or she performs such

calculations, and the valuation rate of interest as provided for the pension fund in paragraph two of subdivision b of section 13-638.2 of this title.

(ii) In calculating the entry age normal contribution payable in any such fiscal year pursuant to this subparagraph, the actuary, in his or her discretion, may make certain adjustments in the calculation methodology, provided that such adjustments are generally accepted as consistent with the entry age actuarial cost method, and are designed, in general, to fund, on a level basis over the working lifetimes of members from their ages at entry, the actuarial present value of benefits to which such members are expected to become entitled, as determined by the actuary. Such generally accepted adjustments in the calculation methodology, in the discretion of the actuary, may include, but are not limited to, the calculation of the entry age normal contribution (A) on an individual member basis by calculating the amount of the entry age normal contribution attributable to each individual member, and then adding together such individual member amounts, (B) on an aggregate basis for all members or (C) on any combination of an individual member basis and an aggregate basis which is consistent with the entry age actuarial cost method, and the preceding provisions of this item.

(iii) For each such fiscal year, the actuary, in his or her discretion, shall determine, in accordance with the provisions of item (ii) of this subparagraph, the methodology for calculating the entry age normal contribution payable for that particular fiscal year.

(iv) The methodology determined by the actuary in accordance with item (iii) of this subparagraph may provide for the actuary to calculate the entry age normal contribution on an individual member basis by (A) multiplying the entry age normal contribution rate for each individual member, as determined by the actuary, by the salary expected to be paid to that member during the fiscal year in which such normal contribution is payable, and (B) calculating the sum of the individual entry age normal contributions attributable to all such members. The actuary, in his or her discretion, may make any adjustments to such methodology for determining the entry age normal contribution on an individual basis which he or she deems appropriate, and which are consistent with the provisions of item (ii) of this subparagraph.

(v) In the alternative, the methodology determined by the actuary in accordance with item (iii) of this subparagraph may provide for the actuary to calculate the entry age normal contribution on an aggregate basis by multiplying the entry age normal contribution rate for all members in the aggregate, as determined by the actuary, by the aggregate amount of the salaries expected to be paid to all members during the fiscal year in which the normal contribution is payable. The actuary, in his or her discretion, may make any adjustments to such methodology for determining the entry age normal contribution on an aggregate basis which he or she deems appropriate, and which are consistent with the provisions of item (ii) of this subparagraph.

(vi) In the alternative, the methodology determined by the actuary in accordance with item (iii) of this subparagraph may provide for the calculation of the entry age normal contribution on any other basis which the actuary deems appropriate, and which is consistent with the entry age actuarial cost method and the provisions of item (ii) of this subparagraph.

(vii) (A) Where the methodology determined by the actuary in accordance with item (iii) of this subparagraph requires the determination of an entry age normal contribution rate for each individual member in order to calculate the entry age normal contribution for each individual member, the actuary shall determine such rate for each such member in accordance with the entry age actuarial cost method, and such rate, as determined by the actuary for each such member, shall be consistent with a method designed, in general, to fund, on a level basis over the working lifetime of that particular member from his or her age at entry, the actuarial present value of benefits to which such member is expected to become entitled, as determined by the actuary.

(B) Where the methodology determined by the actuary in accordance with item (iii) of this subparagraph requires the determination of an entry age normal contribution rate for all members in the aggregate in order to calculate the entry age normal contribution for all members in the aggregate, the actuary shall determine such rate in accordance with the entry age actuarial cost method, and such rate, as determined by the actuary, shall be consistent with a method designed, in general, to fund, on a level basis over the working lifetimes of members from their ages at entry, the actuarial present value of benefits to which such members are expected to become entitled, as determined by the actuary."

The actuarial valuation report defines EAN actuarial cost method as:

"The Present Value (PV) of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the earnings (or service) of the individual between the 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 the valuation date by the PV of Future Normal Costs or future member contributions is the Accrued Liability (AL)."

Under the adopted actuarial cost method, the QPP's NC and AL is equal to the sum of the individually determined NC and AL.

The calculation of the QPP's AL under the EAN cost method from June 30, 2014 to June 30, 2017 as reported in the annual statement filings with the Department is provided in Table 1 below.

Table 1: Actuarial Accrued Liability under the Entry Age Normal Cost Method (Results in $ Thousands)				
Valuation Date June 30,	2014	2015	2016	2017
Present Value of Future Benefits (PVFB) [4]	$22,764,018	$22,692,067	$24,305,092	$26,746,925
Present Value of Future Normal Costs (PVFNC)	3,938,785	4,003,425	4,179,664	5,804,270
Actuarial Accrued Liability (AL): [AL = PVFB – PVFNC]	18,825,234	18,688,642	20,125,429	20,942,655

It is important to note the actuarial cost method alone does not determine the required employer contribution each year under the System's contribution allocation procedure. Additional considerations, such as the level of QPP assets accumulated as of the valuation date and the need for additional employer contributions if QPP experience was less favorable than expected, are needed when determining the required employer contribution. These items are covered in the Asset Valuation Method and Amortization Method.

Observations:

The EAN actuarial cost method used by OA does not appear to follow the EAN actuarial cost method as defined under NYCAC Section 13-331(b)(2)(e) or by the ASB. The ASB defines the EAN actuarial cost method as:

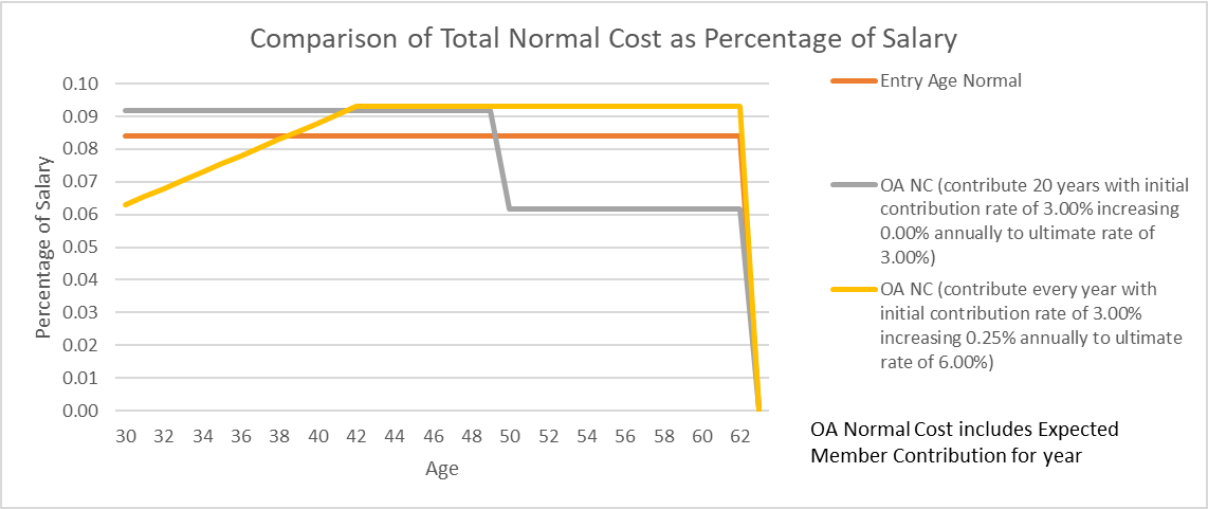
> "A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the *Actuarial accrued liability*. (ASOP No. 4)"

The NYCAC and ASB require the entire PVFB (i.e., actuarial present value of benefits to which such members are expected to become entitled as referenced under NYCAC Section 13-331) to be allocated on a level basis. However, the method used by OA only allocates *a portion* of the PVFB on a level basis. Under OA's method, the "employer" portion of the PVFB is

[4] Includes the present value of future asset transfers to Variable Supplements Funds

allocated on a level basis as NC. The "employee" portion of the PVFB is then allocated each year as the expected employee contributions for the year that may increase, decrease, or even stop based on the member's benefit plan or tier. As a result, the QPP's NC (or total NC) is not determined on a level basis each year as defined under the ASB definition of the EAN actuarial cost method or the methodology described under NYCAC Section 13-331(b)(2)(e).

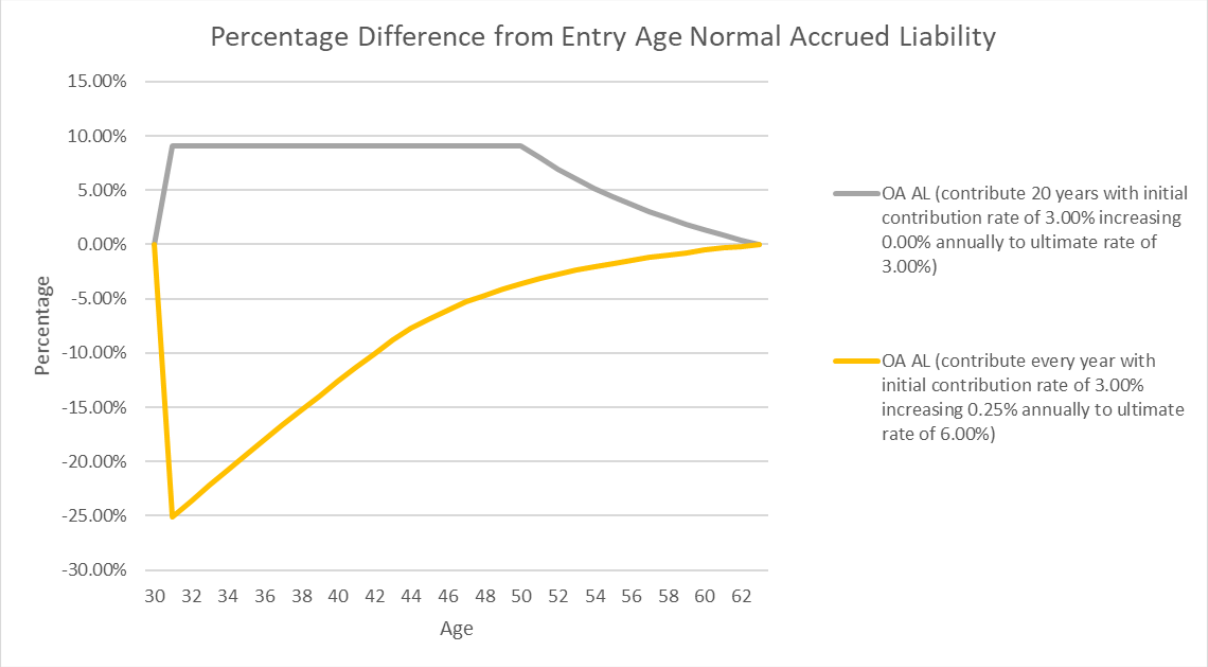
This is illustrated in the following example for an individual who enters the QPP at age 30 with a starting salary of $40,000, receives 3% annual salary increases, and retires at age 63 with a retirement benefit valued (present value) at $600,000 at retirement. The example also assumes an interest rate of 7% and that the member works each year until retirement (i.e., not assumed to leave for any reason prior to retirement).



The orange line represents the level percent of pay EAN NC as defined by the ASB, while the gray and yellow line represent OA's calculation of the QPP's NC (employee and employer portions) for the same individual under two different employee contribution scenarios.

In this illustrative example, OA's method does not provide a level total NC as a percentage of salary. The member contributing for only 20 years (gray line) has a higher total NC than the EAN actuarial cost method for the first 20 years followed by a lower NC after 20 years once member contributions stop. The member contributing an increasing percentage of salary (yellow line) initially has a lower total NC than the EAN actuarial cost method. However, the total NC increases each year as the member's contribution percentage increases and eventually leading to a higher total NC.

OA's method also causes the AL to deviate from the EAN AL as defined by the ASB illustrated below:



As shown in the example above, OA's method will consistently overstate or understate the AL depending on the schedule of member contributions after entry until the ultimate retirement age.

The purpose of an actuarial cost method is to allocate plan costs to the past (AL) and future (NC). Future contributions and who pays such future contributions should not impact the actuarial cost method's allocation to the past (AL). Instead, the allocation of NC and AL should reflect the plan's benefit formula or the member's compensation or service. Allowing the attribution of NC to vary based on expected member contributions does not appear to follow generally accepted actuarial practices for selecting an actuarial cost method[5] or NYCAC Section 13-331(b)(2)(e).

Recommendation:

The System should consider revising the actuarial cost method to follow the EAN actuarial cost method as defined by the ASB and described under NYCAC Section 13-331(b)(2)(e).

[5] ASOP 4 (Doc. No. 205), Section 3.13(b)

C. Asset Valuation Method

Fluctuations in the market value of assets can lead to dramatic changes in required employer contributions and funded status from year to year. To mitigate these fluctuations, actuaries often use an asset valuation method to calculate an actuarial value of assets ("AVA") to be used in place of the market value of assets ("MVA"). AVA is typically designed to provide a more stable and predictable value of assets from year to year often by recognizing investment gains or losses over a period of time instead of immediately as under the MVA. However, the AVA should still relate to the MVA within a reasonable range and recognize investment gains and losses over a reasonable period.

The System's Board adopted a new asset valuation method beginning with the June 30, 2011 actuarial valuation. Under this method investment gains and losses are recognized or "phased-in" over a six-year period. The annual percentage recognized is 15% for the first four years and 20% for the last two years. Investment gains and losses are determined based on an assumed 7% expected return on the AVA. If the total net investment income on the MVA exceeds the expected investments return of 7% on the AVA, then there is an investment gain. If the total net investment income on the MVA is less than the assumed 7% investment return on the AVA, then there is an investment loss. These investment gains and losses are referred to in the asset valuation method as unexpected investment returns ("UIR"). The MVA is then adjusted by the unrecognized portion of the UIRs to determine the AVA.

Beginning with the June 30, 2014 actuarial valuation, the asset valuation method was revised to restrict the AVA to within 80% to 120% of the market value as of the valuation date.

An abbreviated summary of the System's pension plan AVA calculation from June 30, 2014 to June 30, 2017 is provided in Table 2 below.

Table 2: Actuarial Value of Assets (Results in $ Thousands)					
Valuation Date (VD) June 30,		2014	2015	2016	2017
(1)	MVA as of the VD	$10,595,838	$10,815,330	$10,899,763	$12,089,896
(2)	Actual Investment Return on MVA for fiscal year ending on the VD	1,569,013	271,430	197,398	1,284,871
(3)	Expected Investment Return on AVA for fiscal year ending on the VD	640,808	686,202	732,668	774,057
(4)	Unexpected Investment Return (UIR): [(2) – (3)]	928,205	(414,772)	(535,270)	510,814
(5)	Phase-in of current year and 5 prior year's UIR	786,984	310,602	(182,688)	275,320
(6)	Preliminary AVA: [(1) – (5)]	9,808,854	10,504,728	11,082,451	11,814,576
(7)	Minimum AVA: [80% x (1)]	8,476,670	8,652,264	8,719,810	9,671,917
(8)	Maximum AVA: [120% x (1)]	12,715,006	12,978,396	13,079,716	14,507,875
(9)	Final AVA as of the VD: [(6), but not less than (7) and not greater than (8)]	9,808,854	10,504,728	11,082,451	11,814,576

The asset valuation method produced an AVA that exceeded and fell short of the MVA over the examination period due to the phased recognition of yearly unexpected investment gains and losses.

Observations:

The asset valuation method used results in an investment gain or loss even if the actual investment return on the MVA exactly matched the assumed return on the MVA for the year. For example, if the AVA was greater than the MVA at the beginning of the year there would be an investment loss if the actual investment income on the MVA matched the assumed return assumption (7%). Similarly, if the actual investment income on the MVA matched the assumed return, but the AVA was less than the MVA at the beginning of the year, then there would be an investment gain. Consequently, the AVA is not expected to converge to the MVA until many years into the future even if expected investment returns on MVA are exactly met.

Recommendation:

The System should consider revising the asset valuation method to determine the investment gain or loss by comparing the actual net investment income on the MVA against the expected investment income on the MVA. The recommended change would allow the AVA to timely converge to the MVA over the phase-in period if assumed investment returns on the MVA are exactly met in the future in accordance with generally accepted actuarial practices.

The System indicated that the asset valuation method was changed starting with the June 30, 2019 actuarial valuation and reflects expected investment income on the MVA consistent with this recommendation.

D. Funding Ratios

A measure for evaluating a pension plan's funding adequacy is the funding ratio or funded status. Specifically, it is the ratio of AVA to AL as of the valuation date. A funding ratio of 100% signifies the AVA is sufficient to cover all benefit costs or NCs attributed to service or salaries rendered to date, and that future contributions will be needed to pay only for benefit costs attributed to future service or salaries, specifically future NCs. However, a plan will rarely have a funding ratio of exactly 100%. Plan experience, the difference between what was assumed in the actuarial valuation and what occurred each year, will cause the plan to deviate from a funding ratio of 100%. A plan with a funding ratio of less than 100% has an unfunded actuarial accrued liability ("UAL") which is equal to AL minus AVA. A plan with UAL will need to make contributions exceeding the NC to fund all benefit costs if actuarial assumptions are exactly met in the future. The additional contribution needed to eliminate the UAL is generally amortized over a period of time in accordance with a pension plan's amortization method.

The System's funded ratio for each of the last ten years (2008-2017) is shown in Table 3[6] below.

[6] Results from Table V-1 of the June 30, 2017 (lag) actuarial valuation report dated November 21, 2019.

Table 3: Unfunded Actuarial Accrued Liability and Funded Ratio (Results in $ Thousands)				
Valuation Date June 30	AVA	AL	UAL	Funded Ratio
2008	$ 6,942,992	$ 6,986,243	$ 43,251	99.4%
2009	7,304,758	7,327,560	22,802	99.7%
2010	7,392,656	15,349,598	7,956,942	48.2%
2011	7,955,668	15,808,930	7,853,262	50.3%
2012	8,520,769	16,358,108	7,837,339	52.1%
2013	9,144,587	17,003,722	7,859,135	53.8%
2014	9,808,854	18,028,695	8,219,841	54.4%
2015	10,504,728	18,688,642	8,183,914	56.2%
2016	11,082,451	20,125,429	9,042,978	55.1%
2017	11,814,576	20,942,655	9,128,079	56.4%

The System has yet to reach 60% funded since the dramatic AL increase in 2010, despite having the actuarially determined and statutory required contribution paid each year.[7]

E. Amortization Method for Unfunded Actuarial Accrued Liability

In conjunction with the System's adoption of the EAN actuarial cost method commencing with the June 30, 2010 actuarial valuation, an amortization method for determining the additional annual contribution needed to eliminate the System's UAL was established.

An initial UAL balance (or base) of $7,095,864,159 was established by the System effective June 30, 2010 equal to the System's UAL after OA's adjustment for the OYLM. Pursuant to the System's amortization method, the initial UAL ("IUAL") was amortized over 21 annual installments with the first installment due for the fiscal year beginning July 1, 2011 (one year after the valuation date). Annual installments would increase by 3% each year from a first installment of approximately $533 million to a projected final installment of roughly $963 million for the fiscal year beginning July 1, 2031.

Starting with the June 30, 2011 actuarial valuation and each actuarial valuation thereafter, the UAL is re-measured by OA and additional separate UAL bases are established to amortize changes in UAL attributed to the following:

- Actuarial gains and losses (amortized over 14 annual installments)
- Actuarial assumption or method changes (amortized over 19 annual installments)

[7] Page 158, Table 10 from the Annual Comprehensive Financial Report for the fiscal year ended June 30, 2017.

- Enacted changes in benefits (per OA's valuation reports, if not defined in statute, then amortized on the remaining working lifetime of the members impacted by the benefit change)

Unlike the IUAL installments, the annual installments for each of the post-2010 bases are fixed amounts and will not increase each year in the future.

The total remaining amortization balance as of June 30, 2017 for each amortization based listed in the June 30, 2017 (lag) actuarial valuation report is summarized in Table 4 below:

Table 4: Schedule of Unfunded Accrued Liability Bases as of June 30, 2017
(Amounts in $1,000s)

Amortization Base	Date Established	Outstanding Balance at 6/30/2017	Remaining Payments	Payment on 12/31/2017
Initial UAL	6/30/2010	$ 7,166,307	15	$ 636,581*
(Gain)/Loss	6/30/2011	(134,174)	9	(19,909)
(Gain)/Loss	6/30/2012	22,598	10	3,110
(Gain)/Loss	6/30/2013	56,251	11	7,252
(Gain)/Loss	6/30/2014	82,002	12	9,981
Assumption Change	6/30/2014	331,095	17	32,784
(Gain)/Loss	6/30/2015	4,379	13	507
(Gain)/Loss	6/30/2016	169,577	14	18,745
Enhanced ADR	6/30/2016	2,795	21	249
SADB	6/30/2016	877,473	14	96,997
(Gain)/Loss	6/30/2017	59,849	14	0
No VSF Escalation Offset	6/30/2017	462	21	0
Non-Uniformed Service	6/30/2017	2,645	19	0
Assumption Change	6/30/2017	407,309	19	0
Method Change	6/30/2017	(320,833)	19	0
	Total	$ 8,727,736		$ 786,299

* Payments to increase by 3% annually

The projected net amortization payments each year and their discounted value as of June 30, 2017 are estimated by the examiner as follows:

Fiscal Year Ending 6/30	Mid-Year Net Amortization Payment (Amounts in $1,000s)	Discounted Value as of June 30, 2017 (Amounts in $1,000s)
2018	$ 786,299	$ 760,143
2019	821,439	742,164
2020	841,110	710,221
2021	861,370	679,746
2022	882,239	650,667
2023	903,733	622,916
2024	925,872	596,426
2025	948,675	571,136
2026	972,163	546,987
2027	1,016,264	534,393
2028	1,038,071	510,149
2029	1,056,485	485,232
2030	1,072,939	460,551
2031	1,099,661	441,141
2032	1,011,964	379,403
2033	41,998	14,716
2034	41,998	13,753
2035	9,214	2,820
2036	9,214	2,635
2037	9,214	2,463
2038	295	74
	Total	$ 8,727,736

The discounted value of projected net amortization payments as of June 30, 2017 was approximately $8.728 billion. However, the UAL as of June 30, 2017 was approximately $9.128 billion.

Observations:

The amortization payments are not expected to amortize the UAL as of the valuation date due to the OYLM adjustment. The OYLM adjusts the UAL as of the valuation date by the present value of the employer normal cost contribution for the year immediately following the valuation date as shown in Table 5 below:

Table 5: Development of Adjusted UAL / Outstanding Amortization Balance (Amounts in $1,000s)				
June 30 Valuation Date	2014	2015	2016	2017
1. Accrued Liability (AL)	$18,028,696	$18,688,642	$20,125,429	$20,942,655
2. Actuarial Value of Assets (AVA)	9,808,854	10,504,728	11,082,451	11,814,576
3. Unfunded Accrued Liability (UAL): [(1) - (2)]	8,219,842	8,183,914	9,042,978	9,128,079
4. PV 1-year Adjusted Employer Contribution	401,939	407,206	395,787	1,160,488*
5. Adjusted UAL / Outstanding Amortization Balance: [(3) - (4)]	$ 7,817,903	$ 7,776,708	$ 8,647,191	$ 7,967,591

* Prior to the June 30, 2017 actuarial valuation only the adjusted employer normal cost was included. Starting with the June 30, 2017 actuarial valuation the entire employer contribution was adjusted by OA. Under the prior methodology, items 4 and 5 would be roughly (in thousands) $400,344 and $8,727,736, respectively.

The adjustments under OYLM include using employer contributions (line 4 from Table 5) for fiscal years starting after the valuation date to reduce the UAL as of the valuation date. However, only one component of the employer contribution, the amortization of the unfunded accrued liability as shown in valuations reports under the table entitled “statutory contributions”, by definition is intended to apply towards reducing the UAL. The normal cost component of the statutory employer contribution is not intended to fund the UAL but is instead intended, by definition, to fund future expected costs which would otherwise increase the UAL at the next valuation date. That is, reflecting future fiscal year contributions for the normal cost would have little effect on changing the UAL from year to year if a reasonable actuarially determined contribution is paid each year. Employer normal cost contributions during the year would fund the expected increase in AL attributed to the normal cost for the year. Consequently, if all actuarial assumptions were exactly met during the year, the UAL next year wouldn’t be impacted by the employer normal cost contributions for the year. Only contributions made to amortize the UAL would then reduce the UAL next year if all actuarial assumptions were exactly met.

It appears OYLM is effectively measuring assets and the AL at different dates which results in the OYLM apparently double counting the employer normal cost contribution by applying it to fund the UAL at the valuation date and future costs after the valuation date. Consideration should be given as to whether this practice deviates from generally accepted actuarial practices for

calculating assets and liabilities as of the same measurement date[8] (i.e., valuation date) or appropriately reflecting events after the measurement date.[9]

Table 4 also noted that 14 of the 15 amortization bases listed in the June 30, 2017 actuarial valuation used a level dollar amortization amount. Only the IUAL is amortized using a 3% annual increasing dollar amount. The combined outstanding balance for the 14 level dollar amortization bases was roughly $1.562 billion as of June 30, 2017, while the outstanding balance for the IUAL base was approximately $7.166 billion as of June 30, 2017. The IUAL amortization payment of $665,678,921 represents almost 47% of the entire statutory employer contribution of $1,398,565,399 for the fiscal year ended June 30, 2019.

Best practices from the Government Finance Officers Association ("GFOA") recommend a funding policy that provides reasonable assurance that the cost of those benefits will be funded in an equitable and sustainable manner.[10] This includes for consistently amortizing bases as either a level percentage of compensation (i.e., increasing dollar amount) or level dollar amount and to balance the equitable allocation of cost among generations with contribution volatility. While the IUAL amortization is required by statute, the IUAL amortization doesn't appear to follow GFOA best practices and poses funding concerns for the participating employers since it represents roughly 47% of the entire statutory employer contribution for the fiscal year ended June 30, 2019, and the IUAL amortization payment will continue to increase by 3% annually through the fiscal year ending June 30, 2032. The New York State and Local Retirement System, which effectively amortizes all valuation gains and losses over the remaining working lifetimes of its active members, notes these concerns on page 131 of its publicly available 2017 Annual Comprehensive Financial Report under its amortization policy which states "the fact that the method does not allow arbitrary amortization periods or increasing payments is useful in a public setting, as budgetary pressures can inspire a temptation to fund benefits over time frames that extend beyond the working lifetimes of the benefit recipients, and/or with back-loaded payments, which is not prudent and compromises intergenerational equity."

[8] ASOP No. 4 (Doc. No. 205), Section 2.16
[9] ASOP No. 4 (Doc. No. 205), Section 3.4.2
[10] Core Elements of a Funding Policy for Governmental Pension and OPEB Plans.

Recommendations:

While the law specifies how the System sets the IUAL, the System has discretion on how to set the UAL, subject to amortization, after that point. The System should consider revising the amortization method so that the UAL as of the valuation date is scheduled to be fully amortized. If the current amortization method is retained, then the actuarial valuation report should disclose that the UAL as of the valuation date is not expected to be fully amortized.

F. Contribution Allocation Procedure

The actuarial cost method determines the NC (annual cost allocation of future benefits and service) and AL (NCs attributed to the past), the asset valuation method determines the value of assets, and the amortization method determines the annual installments needed to eliminate any UAL (unfunded NCs attributed to the past). Together these components comprise the contribution allocation procedure or method of calculating the employer required contribution each year. The relationship of these components can be shown symbolically in the following equation and represent the basic funding formula[11] commonly employed by defined benefit pension plan actuaries.

$$PVFB = PVFNC + PVFAI + AVA$$

Where:

PVFB = Present Value of Future Benefits
PVFNC = Present Value of Future Normal Costs
PVFAI = Present Value of Future Annual Installments
AVA = Actuarial Value of Assets

When determining the annual required contribution for a given year this relationship reduces to:

$$ARC = NC + AI$$

Where:

ARC = Annual Required Contribution
NC = Normal Cost
AI = Annual Installment (i.e., net amortization payment for the year)

[11] General rules for reasonable funding methods under 26 CFR §1.412(c)(3)-1(b)

These relationships are commonly applied when calculating the required contribution for the year commencing on or immediately following the valuation date. However, the System uses the results from an actuarial valuation to determine the required contribution for the fiscal year starting one year after the valuation date under the OYLM. OYLM was revised by OA during the examination period with the old OYLM used for actuarial valuations prior to June 30, 2017 and the new OYLM used for actuarial valuations on and after June 30, 2017.

The calculation of the required employer contribution under the old OYLM for the fiscal years ended June 30, 2018 based on the June 30, 2016 actuarial valuation is summarized in Table 6 below:

Table 6: Fiscal Year Ending June 30, 2018 Required Employer Contribution (Old OYLM)

For Fiscal Year Ending (FYE) June 30, 2018	($ in 1,000s)	How Derived	
Present Value of Future Benefits at June 30, 2016	$24,305,092	Actuarial Cost Method	1
Present Value of Future Employee Contributions at June 30, 2016	216,806	Actuarial Cost Method	2
Present Value of Future Employer Normal Costs at June 30, 2016	3,962,858	Actuarial Cost Method	3
Actuarial Accrued Liability at June 30, 2016	20,125,429	(1) - (2) - (3)	4
Actuarial Value of Assets at June 30, 2016	11,082,451	Asset Valuation Method	5
Unfunded Actuarial Accrued Liability at June 30, 2016	9,042,978	(4) - (5)	6
Present Value of Employer Normal Cost for FYE June 30, 2017	395,786	Normal Cost [A] ÷ sqrt(1.07)	7
Present Value of Reimbursed Expenses	0	See below [B]	8
Adjusted Unfunded Actuarial Accrued Liability	8,647,191	(6) - (7) - (8)	9
Net Remaining Unfunded Actuarial Accrued Liability Balance	8,647,191	Actuarial Valuation	10
Annual Installment for FYE June 30, 2018	786,299	Actuarial Valuation	11
Present Value of Future Salaries at June 30, 2016	12,241,638	Actuarial Valuation	12
Mid-year Value of Projected Salaries for FYE June 30, 2017	1,167,792	Projected by Actuary	13
Adjusted Present Value of Future Salaries at June 30, 2016	11,112,691	(12) - [(13) ÷ sqrt(1.07)]	14
Normal Cost Percent (approximate)	35.661%	(3) ÷ (14)	15
Mid-year Value of Projected Salaries for FYE June 30, 2018	1,161,265	Projected by OA	16
Employer Normal Cost for FYE June 30, 2018	414,119	(15) × (16)	17
Reimburse Administrative Expenses from FYE June 30, 2016	0	See below [B]	18
Total Required Employer Contribution for FYE June 30, 2018	$1,200,417	(11) + (17) + (18)	19

[A] = Employer normal cost ($409,404,419) for the fiscal year ending June 30, 2017 as determined in the June 30, 2015 actuarial valuation

[B] = No administrative expenses expected to be reimbursed (no administrative expenses were paid from plan assets during the fiscal years ended June 30, 2015, and June 30, 2016)

The calculation of the required employer contribution under the new OYLM for the fiscal year ended June 30, 2019 based on the June 30, 2017 actuarial valuation is summarized in Table 7 below:

Table 7: Fiscal Year Ending June 30, 2019 Required Employer Contribution (New OYLM)			
For Fiscal Year Ending (FYE) June 30, 2019	($ in 1,000s)	How Derived	
Present Value of Future Benefits at June 30, 2017	$26,746,925	Actuarial Cost Method	1
Present Value of Future Employee Contributions at June 30, 2017	275,047	Actuarial Cost Method	2
Present Value of Future Employer Normal Costs at June 30, 2017	5,529,222	Actuarial Cost Method	3
Actuarial Accrued Liability at June 30, 2017	20,942,655	(1) - (2) - (3)	4
Actuarial Value of Assets at June 30, 2017	11,814,576	Asset Valuation Method	5
Unfunded Actuarial Accrued Liability at June 30, 2017	9,128,079	(4) - (5)	6
Present Value of Employer Normal Cost for FYE June 30, 2018	400,344	Normal Cost [A] ÷ sqrt(1.07)	7
Present Value of Annual Installment for FYE June 30, 2018	760,143	Installment [B] ÷ sqrt(1.07)	8
Present Value of Reimbursed Expenses	0	See below [C]	9
Adjusted Unfunded Actuarial Accrued Liability	7,967,591	(6) - (7) - (8) – (9)	10
Net Remaining Unfunded Actuarial Accrued Liability Balance	7,967,591	Actuarial Valuation	11
Annual Installment for FYE June 30, 2019	821,439	Actuarial Valuation	12
Employer Normal Cost for FYE June 30, 2018	521,429	See below [D]	13
Estimated Employer Normal Cost for FYE June 30, 2019	577,126	(13) x (1.07)^(1.5)	14
Reimburse Administrative Expenses from FYE June 30, 2017	0	See below [C]	15
Total Required Employer Contribution for FYE June 30, 2019	$1,398,565	(12) + (14) + (15)	16

[A] = Employer normal cost ($414,118,544) for the fiscal year ending June 30, 2018 as determined in the June 30, 2016 actuarial valuation

[B] = Annual installment ($786,298,508) for the fiscal year ending June 30, 2018

[C] = No administrative expenses expected to be reimbursed (no administrative expenses were paid from plan assets during the fiscal years ended June 30, 2016 and June 30, 2017)

[D] = Employer normal cost for the fiscal year July 1, 2017 to June 30, 2018 based on the June 30, 2017 actuarial valuation by OA.

The primary difference between the old OYLM and the new OYLM was the calculation of the employer normal cost (lines 17 of Table 6 and line 14 of Table 7). The old OYLM for the fiscal year ended June 30, 2018 determined the required employer contribution using an aggregate approach where the combined member expected salaries for the period July 1, 2017 to June 30, 2018 were multiplied by a single normal cost rate. The new OYLM for the fiscal year ended June 30, 2019 determined the required employer contribution by summing the individually determined employer normal cost for the period July 1, 2017 to June 30, 2018. The individually determined employer normal costs under the new OYLM for the period July 1, 2017 to June 30, 2018 also used expected salaries for the period July 1, 2017 to June 30, 2018 but then adjusted with interest (line 14) for 1.5 years to reflect the assumption that the employer normal cost contribution would be paid mid-year during the fiscal year July 1, 2018 to June 30, 2019. As a result, expected salaries from July 1, 2017 to June 30, 2018 were used to determine the employer normal cost contribution for the fiscal year ended June 30, 2018 and the fiscal year ended June 30, 2019.

NYCAC Section 13-331(b)(2)(e) defines the normal contribution as the entry age normal contribution as determined by the actuary in a manner consistent with the entry age actuarial cost method that is designed to fund expected benefits on a level basis over the working lifetimes of members. As previously listed in section 8B, NYCAC Section 13-331(b)(2)(e) describes two methods under the actuary's discretion for calculating the entry age normal contribution:

1) Multiply the entry age normal contribution rate determined for each individual member, by the salary expected to be paid to that member during the fiscal year which such normal contribution is payable. The entry age normal contribution is the sum of the individually determined amounts.
2) Multiply the entry age normal contribution rate determined for all members in aggregate, by the aggregate amount of salaries expected to be paid to all members during the fiscal year in which the normal contribution is payable.

NYCAC Section 13-331(b)(2)(e) does not describe other methods, but does allow the actuary to use other alternative methodologies but such methodologies must be consistent with the entry age actuarial cost method.

Observations:

The old and new OYLM do not appear to follow NYCAC Section 13-331(b)(2)(e) and are not consistent with the entry age normal actuarial cost method due to the following:

1) As noted in section 8B, the actuarial cost method for calculating the AL and NCs does not appear to follow the entry age normal cost method as defined under the NYCAC or by the ASB.
2) The normal contribution determined under the old OYLM is not expected to fund benefits on a level basis even if all actuarial assumptions were exactly met. This is due to how the old OYLM reflects events after the valuation date as noted in section 8E. This is illustrated in the Table 6 above. Line 3 lists the present value of future employer normal costs on and after July 1, 2016. However, the employer normal cost rate (line 15) and the resulting employer normal cost contribution (line 17) is based on future

salaries on and after July 1, 2017 which is one year less than the number of years of future employer normal costs. This is shown in line 14 which excludes salaries from July 1, 2016 to June 30, 2017. This means the employer normal cost contribution (line 17) for the fiscal year will be greater than the employer normal cost under the actuarial cost method discussed in section 8B for the same year since the costs are spread over a shorter number of years of salaries. Further, this difference is expected to grow as the number of years of future normal costs and salaries decreases. Consequently, the normal contribution each year is not expected to be level as required under NYCAC Section 13-331(b)(2)(e).

3) The new OYLM does not base the normal contribution on salaries expected to be paid during the fiscal year in which the normal contribution is payable. As illustrated in Table 7, the normal contribution payable for the fiscal year ended June 30, 2019 is based on expected salaries to be paid for the fiscal year ended June 30, 2018. This does not appear to follow requirements under NYCAC Section 13-331(b)(2)(e).
4) The new OYLM appears to effectively defers normal contributions for one-year which results in a member's benefit not being funded over their working lifetime. For example, if the member's last year of expected salaries is for the fiscal year ending June 30, 2018 (i.e., member is assumed to retire on June 30, 2018), the final normal contribution would be payable during the fiscal year ending June 30, 2018. However, as noted in 3) above, the new OYLM would determine a final normal contribution payable during the fiscal year ending June 30, 2019, after the member has retired. This appears to be inconsistent with the intent and methods detailed under NYCAC Section 13-331(b)(2)(e).
5) The change from the old OYLM to the new OYLM effectively charged participating employers a normal contribution twice for the same year of salaries (i.e., fiscal year ended June 30, 2018 salaries). This appears to be inconsistent with the intent and methods detailed under NYCAC Section 13-331(b)(2)(e).

Based on these apparent inconsistencies, the required employer contribution determined under OYLM is expected to differ from what would be considered a reasonable actuarially

determined contribution.[12] In addition, the implications of the OYLM on future expected employer and employee contributions and funded status were not disclosed in the actuarial valuation reports for the examination period.

Recommendations:

The System should consider determining the normal cost contribution from the explicitly calculated plan normal cost based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-331(b)(2)(e). The System should also consider using the EAN actuarial cost method defined by the ASB for determining the explicitly calculated plan normal cost.

The System should consider disclosing the implications of the System's contribution allocation procedure on the plan's funding over the short and long term in the actuarial valuation reports.

The System should consider disclosing member contributions and the impact of expected member contributions towards the plan's overall funding in the actuarial valuation reports. Possible additions include listing expected member contributions as a separate component of the actuarial contribution for the fiscal year, disclosing expected member contributions as a percentage of salary for the fiscal year, or disclosing historical member contributions made each year. If member contributions are expected to increase or decrease in future years, disclosing the expected impact of changing member contributions on the plan's funding in the valuation report would provide useful information to any interested parties.

G. Allocation of Employer Contribution to Other Benefit Plans

Besides the QPP, the System administers GLIP, EBP and two variable supplements funds (FFVSF and FOVSF) (collectively, "VSFs"). These plans and VSFs provide additional benefits to members not otherwise payable from the QPP. For instance, GLIP provides a tax-free death benefit of up to $50,000 upon a member's pre-retirement death while EBP provides replacement benefit payments for those retirees that have their QPP retirement benefits limited due to the maximum pension benefit requirements of IRC Section 415. Eligible retirees under the VSFs receive an additional payment of up to $12,000 annually.

[12] ASOP 4 (Doc. No. 205) Section 3.21

According to the applicable provisions governing each of these plans, each plan and VSF is required to have funds separate from the QPP and the assets of each fund may only be used to provide benefits for that fund as noted in Rule 30 for the GLIP, NYCAC Sections 13-379.1(c) an 13-379.1(f) for the EBP, NYCAC Section 385(d) for FFVSF, and NYCAC Section 13-395(d) for FOVSF. However, the System's funding for these other benefit plans or VSFs is done by either allocating a portion of the required employer contribution from the QPP or by transferring a portion of the QPP assets to the other separate plan or fund. GLIP and EBP are funded by allocating a portion of the required employer contribution. The GLIP portion is calculated using a one-year term cost, which is essentially the expected GLIP death benefit payments for the year. The EBP portion is estimated by OA based on the EBP benefit payments for the year. Funding for VSFs is done by transferring a portion of the QPP assets to the VSFs. The transfer amounts are based on the "excess" earnings of certain QPP equity investments.

Table 7 below summarizes results for each benefit plan and VSF from the June 30, 2017 actuarial valuation report.

Table 8: Other Benefit Plan Results from June 30, 2017 Actuarial Valuation
(Results in $ Thousands)

Plan	AL	MVA	AVA	2019 Fiscal Year Contribution
QPP	$20,942,655 [A]	$12,089,896	$ 11,814,576	$1,398,565
GLIP	Not Disclosed [B]	Not Disclosed [B]	Not Disclosed [B]	Not Disclosed [B]
EBP	Not Disclosed [B]	Not Disclosed [B]	Not Disclosed [B]	Not Disclosed [B]
FFVSF	500,484 [A]	547,077	547,690	0
FOVSF	296,746 [A]	354,337	338,903	0

[A] – overfunded portion of FFVSF and FOVSF (AVA minus AL) is included in QPP AL as a reduction in QPP AL

[B] – included in QPP, if any

Starting with the June 30, 2016 (lag) actuarial valuation, OA reflected a change in valuing the accidental death benefit for those members who are eligible for special accidental death benefits ("SADB") pursuant to Section 208(f) of the New York State General Municipal Law ("General Municipal Law"). Liabilities and required employer contributions for QPP now reflect SADBs. However, the SADB is a separate benefit from the accidental death benefit provided under the QPP. The SADB, when added to the QPP accidental death benefit, is intended to provide a monthly payment equal to 100% of the deceased's salary. Pursuant to Municipal Law Section

208-f(b) and (e), SADBs must be paid by the city, town, or village that employed the deceased member and SADBs are not defined as QPP benefits under Title 13 of the New York City Administrative Code.

Liabilities and assets were not disclosed on an individual plan basis for the QPP, GLIP, and EBP. In addition, SADBs were included in the results for the QPP.

Observations:

The System's administrative practices do not indicate the costs and required contributions attributed to each benefit plan or fund and do not appear to follow the applicable provisions for each plan as noted below. In addition, the System's administrative practices raise concerns that the transfer of assets between benefit plans may not comply with requirements under the IRC.

The Department notified the System of its concerns and the System stated the following:

i) GLIP contributions and liabilities are accounted for separately from the QPP contributions and liabilities;
ii) VSFs are part of the QPP; and
iii) The SADB is part of the same defined benefit plan as the QPP.

GLIP

Page 63 of the OA's June 30, 2017 actuarial valuation report stated "liabilities for group life lump sum death benefits are calculated under the One-Year Term Cost method." This means GLIP costs are determined for one-year of coverage only. However, the calculation of the fiscal year ended June 30, 2019 QPP contribution of $1,398,565,399 was determined using OA's OYLM, OA's entry age normal cost method (which included the present value of future GLIP benefits for all years), and the combined QPP and GLIP assets. Consequently, OA did not combine two separate calculations, but simply reallocated part of the QPP contribution to cover expected GLIP payments for the year.

The Department also requested in 2020 a reconciliation of GLIP contributions, benefit payments, investment income, and expenses. The System stated "GLIP is not accounted for separately from the QPP assets."

Including GLIP assets and liabilities when calculating the QPP contribution is inconsistent with expected GLIP Rule 30, New York City Fire Department Group Life Insurance Plan (Article

1-B) Reserve Fund requires the GLIP to be "separate from and independent of the Pension Fund and all funds of the Pension Fund and shall be held in trust by the Board of Trustees of the Pension Fund." Rule 30 further states GLIP assets "shall consist of all premiums paid by the City and other monies received and paid into the Fund for group term life insurance purposes, and of the investment earnings upon such monies, and shall be used only to pay the group term life insurance." Paragraphs (a) and (b) of Rule 32 then defines the GLIP premium as follows:

> Premiums. (a) The Actuary shall investigate the Plan's claim experience in accordance with the methods of investigation provided by Section B19-7.61 of the Administrative Code. On the basis of such investigation and upon the recommendation of the Actuary, the Board of Trustees of the Pension Fund shall certify the premium rates computed to be necessary to fund the group term life insurance authorized to be paid by the plan.
>
> (b) The Board of Trustees of the Pension Fund shall determine the premium which the City of New York is required to pay into the Reserve Fund to discharge the obligation of the Plan for each fiscal year of the City during which these Rules and Regulations are effective."

Rules 30 and 32 show the GLIP is intended to be funded on a one-year term cost basis based solely on expected GLIP claims, GLIP premiums, and GLIP assets. However, OA's calculations do not appear to follow these rules.

For example, OA's Preliminary 2021 employer contribution letter stated $2,429,754 as the present value as of June 30, 2020 of expected GLIP payments, not the employer contribution needed, as shown below.

> The Preliminary 2021 Employer Contribution includes an amount to fund the Group Life Insurance Plan. The present value as of June 30, 2020 of expected future payments to be paid from the Group Life Insurance Plan is $2,429,754. If necessary, a portion of the Fiscal Year 2020 contribution should be used to true-up the current reserve balance to this amount.

OA did not determine the required GLIP contribution. Instead, the actual contribution needed is dependent on the GLIP assets already accumulated (*i.e.*, true-up the current reserve balance). If GLIP assets already exceeded $2,429,754, then no contribution would be needed. In addition, the reserve determined by OA appears to represent the present value of all future GLIP

payments for current members rather than the expected GLIP claims to be paid for any particular fiscal year.

VSFs

VSF benefits are not actuarially funded, but instead rely on assets transferred from the QPP. The SKIM calculation does not provide an actuarial measure of the annual cost of providing VSF benefits. While the calculation of the QPP contribution reflects normal costs and unfunded VSF liabilities, normal costs attributed to the VSFs were not disclosed in the June 30, 2017 actuarial valuation report. Further, the portion of the QPP employer contribution attributed to VSF benefits was not the amount that was contributed to VSF assets. Based on the VSF liabilities disclosed in the June 30, 2017 actuarial valuation report, DFS estimates the fiscal year ended June 30, 2019 employer contribution attributed to VSFs to be approximately $14 million.[13] However, the average annual amount transferred to the VSFs over the seven-year period ended June 30, 2021, was roughly $21 million, roughly 50% higher than the estimated $14 million for the 2019 fiscal year. This indicates VSF benefits are effectively receiving preferred funding treatment over the QPP. This is further apparent when comparing funded status over the last several years as shown below.

Fiduciary Net Position as a percentage of the total pension liability				
Fiscal Year Ended	QPP	FFVSF	FOVSF	Total
6/30/2021	78.45%	120.64%	139.58%	79.98%
6/30/2020	64.74%	101.88%	118.26%	66.15%
6/30/2019	63.79%	105.80%	117.54%	65.36%
6/30/2018	62.96%	101.00%	95.34%	64.45%
6/30/2017	59.31%	98.21%	95.21%	60.95%
6/30/2016	55.30%	92.23%	86.31%	56.86%
6/30/2015	58.32%	99.81%	89.43%	60.06%
6/30/2014	62.05%	99.04%	89.77%	63.73%

FFVSF and FOVSF were consistently and significantly better funded than the QPP over the seven-year period.

[13] OA calculated VSF normal cost of approximately $13 million, increased with 7.0% annual interest for 1.5 years.

Not all System members receive a VSF benefit. As of June 30, 2017, roughly 30% of QPP retirees and beneficiaries receive a FFVSF or FOVSF benefit. As VSFs assets are restricted to provide VSF benefits only, but do not constitute a pension or retirement system[14], and may be repealed by the legislature, it raises the question of whether the use of QPP assets to fund VSF benefits at a faster rate and higher level than the QPP is appropriate and equitable to all System members.

SADB

The System's historical administrative practice illustrates that SADBs were not considered part of the QPP and were consequently excluded from the calculation of the QPP- required employer contribution each year prior to the June 30, 2016 actuarial valuation. OA provided the following response regarding the SADB[15]:

> "Our understanding is that the NYC Pension Funds pay out the SADB benefits more as a convenience than due to a requirement by law. The City's Office of Management and Budget sends out the amount of the SADB benefits paid out during the year to the State for reimbursement. However, because reimbursement is capped at an amount that is materially less than what was paid, the OA started to include the State's portion of SADB in its valuation beginning June 30, 2016. The benefits as valued in the valuation are not split up between the City and State portions."

This historical practice appears to follow SADB requirements under the General Municipal Law. General Municipal Law Section 208-f(b) states that "the special accidental death benefit shall be paid by the county, city, town, or village which employed the deceased member at the time of death." General Municipal Law Section 208-f(e) describes how the monies for the SADBs are appropriated as shown below:

> "There shall be appropriated to the general fund an amount equal to the special accidental death benefits paid pursuant to subdivisions b and c of this section during each preceding state fiscal year, as certified to the comptroller by the appropriate municipal official, for the purposes of reimbursing such special accidental death benefits.

[14] New York City Administrative Code Sections 13-383(b) and 13-393(b)

[15] SADB is a New York State paid monthly pension payable to the beneficiary in an amount that when added to the New York City paid accidental death benefit and any payable Social Security benefit is equal to the decedent's last year's wages, including overtime and any other type of pension earnings. See Special Accidental Death Benefits under Section VIII of the June 30, 2020 actuarial valuation report.

> The monies appropriated and made available pursuant to this subdivision shall be paid under rules and regulations adopted by the comptroller and subject to the approval of the director of the budget upon the audit and warrant of the comptroller on vouchers certified or approved as provided by law."

It appears that SADBs were first included in the QPP calculation due to a lack of full reimbursement to the QPP from the State. However, the liability, normal cost, and required contributions attributed to SADBs were not disclosed in the actuarial valuation report. As a result, the annual cost to participating employers for providing SADBs was not disclosed. The use of QPP assets to pay SADBs and the inclusion of SADB costs when determining the QPP employer contribution does not appear to follow the General Municipal Law.

Recommendations:

The System should consider establishing or maintaining separate accounts for each benefit plan or fund and account for distributions, contributions, and investment experience by plan or fund.

The System should consider ceasing asset transfers or benefit payments from the QPP for providing any non-QPP benefits.

The System should consider disclosing the assets and liabilities for each benefit plan or fund separately as well as separately determining the employer contribution for each benefit plan or fund in future actuarial valuation reports.

The System should consider following the requirements for SADBs in accordance with General Municipal Law.

H. Actuarial Assumptions

Actuarial valuations utilize numerous assumptions to value expected future distributions from the System. Actuarial assumptions commonly found for pension valuations include:

(i) Expected rates of decrement from active service for causes such as withdrawal from employment, mortality, disability and retirement;

(ii) Post-retirement mortality for healthy and disabled members and beneficiaries;

(iii) Actuarial interest rate or "AIR" (i.e., the expected long-term compound rate of return on the System's investments); and

(iv) Expected rates for salary increases including overtime.

The System's withdrawal rate of decrement and expected rates of salary increases vary by service. The remaining decrements, other than retirement, vary by age and gender. Retirement rates of decrement vary by (i) age; (ii) reduced or unreduced retirement; (iii) duration since first eligible for unreduced retirement; and (iv) eligibility for full escalation.

Pursuant to NYCAC Section 13-321, the System's actuary is required to investigate "mortality, service and compensation experience" every five years and, as technical advisor to the System's Board, provides recommendations as to the AIR assumption. To assist in fulfilling those duties, during the examination period the System's actuary engaged the Gabriel Roeder Smith and Company ("GRS") to evaluate and make recommendations about the actuarial assumptions and methods being used.

In October 2015 GRS issued its experience study report, which covered experience over the four-year and ten-year periods ended June 30, 2013. Based on this analysis, the OA recommended changes to the post-retirement mortality assumptions to closer match the actual recent and expected future experience of the System. Specifically, new post-retirement mortality tables primarily based on member experience and a new mortality improvement projection assumption to reflect anticipated continued mortality improvements in the future. The Board adopted these assumptions changes effective with the fiscal year ending June 30, 2016. The OA established an amortization base of approximately $328 million as of June 30, 2014 to reflect the increase in liability due to the assumption changes. This amortization base is recognized through annual installments of roughly $33 million for the fiscal year ended June 30, 2016 through the fiscal year ending June 30, 2034.

Starting with the June 30, 2017 actuarial valuation, demographic assumptions, including post-retirement mortality tables were adjusted from lives-weighted to amounts-weighted tables and the mortality improvement rates were updated to reflect U.S. population mortality experience through 2016. These assumptions changes resulted in an increase in liability of approximately $407 million as of June 30, 2017 with an annual installment of roughly $41 million for the fiscal year ended June 30, 2019 through the fiscal year ending June 30, 2037.

Observations:

The examiner identified several assumptions not disclosed in the June 30, 2017 actuarial valuation report such as assumed forms of payment at retirement, treatment of inactive members, liability loads and other assumptions.

The examiner noted several inconsistencies when applying actuarial assumptions such as actual pensionable earnings were not used, there was no projected mortality improvement for pre-retirement, application of first annual September COLA increase, and other applications.

Recommendation:

The System should consider re-evaluating certain actuarial assumptions and disclosing all the relevant assumptions in the actuarial valuation report.

I. Valuation Data

Each year census data as of June 30th is submitted to the OA from the System's administrative staff and the employer's payroll facilities. The OA then reviews the data for reasonableness and consistency. If portions of the data are missing or inconsistent the OA may make an approximation or assumption for the data element in question. Regular adjustments to the census data include assuming a single life annuity (maximum) for retirees with a missing form of payment and establishing an annual salary rate for each active member which includes expected overtime earnings. Adjustments to the data are generally intended to be used for only a short period of time and for unique situations when additional time is needed by the employer to research and resolve, normally the next year.

OA indicated the salary as of June 30th used in the actuarial valuation is based on the member's annual salary rate provided by the System as of the last payroll prior to June 30th, plus an annual assumed overtime pay estimated by OA. OA's estimated annual salary rate is retained each year as part of each member's historical pensionable earnings. Actual pensionable earnings are not used in the actuarial valuation for active and inactive members. The examiner reviewed pensionable earnings reported by the System for a sample of active members and noted significant differences between the actual pensionable earnings and the estimated salary.

Observations:

The results of the actuarial valuation are highly dependent on the data used. The Department's review of the pensionable earnings reported by the System for a sample of members noted instances of significant differences between the actual pensionable earnings and the estimated annual salary used for the actuarial valuation. As most benefits provided by System are based on average pensionable earnings, not reflecting actual historical pensionable earnings in the actuarial valuations increases the inaccuracy of the actuarial results, particularly for those members near retirement or no longer working.

Recommendations:

The System should consider reflecting actual historical pensionable earnings in the actuarial valuation and calculating final accrued benefits for members no longer working.

The System should consider developing and implementing new procedures or modifying existing procedures to monitor the reasonableness of member records and the actuarial valuation data. Examples include, but are not limited to, checking a member's status or service, checking missing data items such as member contribution balance, and checking the reasonableness of large changes in data values.

J. Gain/Loss Analysis

The System incurs an actuarial gain or loss each year due to the difference between what was expected to happen and the actual events that occurred during the year. Expected experience is based on the actuarial assumptions, assets, and valuation data as of the prior valuation date projected to the current valuation date. Actual experience is based on the assets and valuation data as of the current valuation date.

An analysis of the gain/loss provides a better understanding of the underlying causes for the change in liability attributed to assumptions such as salary increases, cost of living increases, investment returns, rates of retirement, death, disability, withdrawal, and other assumptions.

The June 30, 2017 actuarial valuation report included the development of the actuarial gain or loss experience as summarized in Table 9 below:

Table 9: Development of Experience (Gain) / Loss at June 30, 2017		
1.	Expected Accrued Liability	(Results in $1,000s)
A	Accrued Liability at June 30, 2016	$20,974,704
B	Total Normal Cost and Administrative Expenses at June 30, 2016	478,916
C	Interest on 1a and 1b to June 30, 2017	1,501,753
D	Fiscal Year 2017 Benefit Payments with Interest to June 30, 2017	(1,380,735)
E	Expected Accrued Liability at June 30, 2017	$21,574,638
2.	Actual Accrued Liability at June 30, 2017 before changes	$21,739,665
3.	Expected Total Actuarial Value of Assets	
A	Total Actuarial Value of Assets at June 30, 2016	$11,931,726
B	Interest on 3a to June 30, 2017	835,221
C	Total Contribution Paid in Fiscal Year 2017	1,169,538
D	Interest on 3c to June 30, 2017	40,242
E	Fiscal Year 2017 Benefit Payments with Interest to June 30, 2017	(1,380,735)
F	Expected Total Actuarial Value of Assets at June 30, 2017	$12,595,992
4.	Actual Total Actuarial Value of Assets at June 30, 2017	$12,701,169
5.	Accrued Liability (Gain) / Loss [2. – 1.e]	$ 165,027
6.	Actuarial Value of Asset (Gain) / Loss [3.f – 4.]	$ (105,177)
7.	Total Actuarial (Gain) / Loss [5. + 6.]	$ 59,850

The System experienced a higher-than-expected accrued liability resulting in a liability loss of approximately $165 million and higher than expected assets resulting in an asset gain of roughly $105 million for a total loss of approximately $60 million. However, the sources of the liability gain were not provided. OA has indicated it is developing a more detailed gain/loss analysis for future valuations.

Observations:

The development of the experience gain/loss provided above did not appear to appropriately measure plan experience as of the valuation date. The total normal cost and administrative expenses for determining the expected AL as of June 30, 2017 on line 1B was not

the NC attributed to the fiscal year ended June 30, 2017 nor entirely based on expected values as shown below (amounts are in thousands).

Aggregate Employer Normal Cost for Fiscal Year 7/1/2017 - 6/30/2018 *	+	Actual Employee Contributions for Fiscal Year 7/1/2016 -6/30/2017 **	+	Administrative Expenses for Fiscal Year 7/1/2016 – 6/30/2017 **	=	Total Normal Cost and Administrative Expenses at June 30, 2016
*Discounted 1.5 years at 7.00% annual interest						
**Discounted 0.5 years at 7.00% annual interest						
Values in $1,000s						
414,118*(1.07)^(-1.5)	+	108,368*(1.07)^(-.5)	+	0*(1.07)^(-.5)	=	$478,916

In addition, the NC and AL are based on the System's EAN actuarial cost method and therefore may not have been appropriate for measuring plan experience. For example, the AL as of June 30, 2016 under Governmental Accounting Standards Board Statement No. 67 (which is uses EAN as defined by the ASB) was approximately $20.9 billion (includes AL for FFVSF and FOVSF). However, OA's AL as of June 30, 2016 on Table 9, line 1, was roughly $21.0 billion.

Recommendations:

The System should consider re-evaluating the calculation of the experience gain/loss as of the valuation date.

The System should also consider including a more detailed gain/loss analysis and a reconciliation of the total AL in future valuation reports. Separate gain/loss analysis by plan (QPP, EBP, GLIP, VSFs, etc.) and further breakdown of the AL gain or loss by source, such as salary increases, cost of living adjustments, decrements (separately for withdrawal, retirement, death, disability, etc.), and data changes would provide valuable insight to the Board and other interested parties. This follows GFOA best practices which urge fiduciaries to take such additional steps to enhance the reliability of their actuarial valuations.[16]

[16] Enhancing Reliability of Actuarial Valuations for Pension Plans

9. SUMMARY AND CONCLUSIONS

Below are the recommendations contained in this report. Recommendations and comments regarding the investments and investment practices for the five New York City retirement systems are contained in a separate document, which is submitted with this report as referenced in section 7.

Item	Description	Page No(s).
A	The System should consider establishing or maintaining separate accounts for each benefit plan or fund and account for distributions, contributions, and investment experience by plan or fund.	21, 50
B	The System should consider updating the calculation procedures so that each optional form of payment and benefits attributed to member contributions are determined in an equitable manner and in accordance with NYCAC.	22
C	The System should consider revising the actuarial cost method to follow the EAN actuarial cost method as defined by the ASB and described under NYCAC Section 13-331(b)(2)(e).	30
D	The System should consider revising the asset valuation method to determine the investment gain or loss by comparing the actual net investment income on the MVA against the expected investment income on the MVA.	33
E	The System should consider revising the amortization method so that the UAL as of the valuation date is scheduled to be fully amortized. If the current amortization method is retained, then the actuarial valuation report should disclose that the UAL as of the valuation date is not expected to be fully amortized.	39
F	The System should consider determining the normal cost contribution from the explicitly calculated plan normal cost based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-331(b)(2)(e). The System should also consider using the EAN actuarial cost method defined by the ASB for determining the explicitly calculated plan normal cost.	44
G	The System should consider disclosing the implications of the System's contribution allocation procedure on the plan's funding over the short and long term in the actuarial valuation reports.	44

Item	Description	Page No(s).
H	The System should consider disclosing member contributions and the impact of expected member contributions towards the plan's overall funding in the actuarial valuation reports.	44
I	The System should consider ceasing asset transfers or benefit payments from the QPP for providing any non-QPP benefits.	50
J	The System should consider disclosing the assets and liabilities for each benefit plan or fund separately as well as separately determining the employer contribution for each benefit plan or fund in future actuarial valuation reports.	50
K	The System should consider following the requirements for SADBs in accordance with General Municipal Law.	50
L	The System should consider re-evaluating certain actuarial assumptions and disclosing all the relevant assumptions in the actuarial valuation report.	52
M	The System should consider reflecting actual historical pensionable earnings in the actuarial valuation and calculating final accrued benefits for members no longer working.	53
N	The System should consider developing and implementing new procedures or modifying existing procedures to monitor the reasonableness of member records and the actuarial valuation data.	53
O	The System should consider re-evaluating the calculation of the experience gain/loss as of the valuation date.	55
P	The System should also consider including a more detailed gain/loss analysis and a reconciliation of the total AL in future valuation reports.	55

Respectfully submitted,

/s/
Chong Kim
Associate Insurance Examiner

STATE OF NEW YORK)
) SS:
COUNTY OF NEW YORK)

Chong Kim, being duly sworn, deposes and says that the foregoing report, subscribed by him, is true to the best of him knowledge and belief.

/s/
Chong Kim

Subscribed and sworn to before me

this_____ day of _____

Jason Fesmire performed an actuarial review of the June 30, 2017, actuarial valuation report of the New York City Fire Pension Fund and Group Life Insurance Plan. The results of this review are provided in section 8 of this report.

The purpose of the actuarial review is to determine whether the plans noted above are being funded on an adequate basis using actuarial methods and assumptions that are reasonable, consistent, follow generally recognized and accepted actuarial principles and practices which are consistent with Actuarial Standards of Practice, and regarding actuarial matters whether the plans are in compliance with applicable law, plan provisions, and policies.

In preparing this report, Mr. Fesmire relied on, without audit, information provided by the New York City Fire Pension Fund and the New York City Office of the Actuary. This information included member data, financial information, plan provisions, policies, and actuarial and annual reports.

Jason Fesmire is a member of the American Academy of Actuaries, an Enrolled Actuary under ERISA, and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in section 8 of this report. This review was conducted in accordance with the applicable standards of practice prescribed by the Actuarial Standards Board.

This report was prepared under the direction of the New York State Department of Financial Services. The significant findings and recommendations are included herein.

STATE OF NEW YORK
COUNTY OF ALBANY

Jason Fesmire, being duly sworn, deposes and says that the foregoing report sections, subscribed by him, are true to the best of his knowledge and belief.

/s/
Jason Fesmire, EA, MAAA
Retirement Systems Actuary

STATE OF NEW YORK
COUNTY OF ALBANY

Sworn to before me this: _____ day of December 2025

_____
Notary Public

APPOINTMENT NO. 32011

NEW YORK STATE

DEPARTMENT OF FINANCIAL SERVICES

*I, **LINDA A. LACEWELL**, Superintendent of Financial Services of the State of New York, pursuant to the provisions of the Financial Services Law and the Insurance Law, do hereby appoint:*

CHONG KIM

as a proper person to examine the affairs of the

CITY OF NEW YORK FIRE DEPARTMENT PENSION FUND, SUBCHAPTER 2

and to make a report to me in writing of the condition of said

FUND

with such other information as he shall deem requisite.

In Witness Whereof, I have hereunto subscribed my name and affixed the official Seal of the Department at the City of New York

this 28th day of October, 2019

LINDA A. LACEWELL
Superintendent of Financial Services

By: Mark McLeod

MARK MCLEOD
DEPUTY CHIEF - LIFE BUREAU

NEW YORK CITY PENSION SYSTEMS

INVESTMENT ANALYSIS REPORT

EXAMINER: **ROBERT D. SELVAGGIO, Ph.D.**

DATE OF REPORT: **SEPTEMBER 15, 2022**

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December 17, 2025

Honorable Kaitlin Asrow
Acting Superintendent of Financial Services
New York, New York 10004

Dear Kaitlin Asrow:

In accordance with instructions contained in Appointments 32422; 32423; 32424; 32425 and 32426, dated July 21, 2022, respectively, and annexed hereto, a review and analysis was conducted on the investment portfolios and the investment practices of the five New York City Public Pension Funds ("the Systems"). These five pension funds comprising the Systems are the New York City Police Pension Fund ("POLICE"), the New York City Employees' Retirement System ("NYCERS"), the New York City Board of Education Retirement System ("BERS"), the New York City Fire Pension Fund ("FIRE"), and the Teachers' Retirement System of the City of New York ("TRS").

Wherever "Department" appears in this report, it refers to the New York State Department of Financial Services.

The report indicating the results of this review is respectfully submitted.

1. EXECUTIVE SUMMARY

The material recommendations and comments contained in this report are summarized below.

- We recommend that each of the Boards establish in writing formal risk appetite and risk tolerance statements for each benefit plan. (See item 4A of this report.)
- We recommend that each of the Systems follow the lead of BERS in developing formal Asset-Liability Matching ("ALM") reports. (See item 4B of this report.)
- We recommend that in the instances where the Chief Risk Officer ("CRO") position becomes vacant, the position be filled with as little gap as possible. (See item 4C of this report.)
- We recommend that the CRO have a direct reporting line to the NYC Comptroller and either a dotted reporting line to each of the five Boards or formal advisory responsibility. (See item 4C of this report.)
- We recommend that the Systems' actuaries, when evaluating and proposing assumptions, pay more attention to the news impacting Consumer Price Index ("CPI") inflation and to demonstrate an understanding or disclose their reliance on others regarding: 1) an approach to forecasting inflation that is consistent with economic theory and practice; and 2) an approach to viewing portfolio returns in a manner more consistent with modern portfolio theory (i.e., the approach used by each of the System's general consultants). (See item 4E of this report.)
- We believe from a financial practice standpoint that the differing demographic factors and natures of these additional promised benefits outside the Qualified Pension Plans ("QPP") should be analyzed separately from the QPP to provide improved liability-driven investing and greater transparency of the costs and financial risks of providing additional Variable Supplements Funds ("VSF") and Tax Deferred Annuities ("TDA") benefits. (See item 4F of this report.)
- We recommend that each of the Systems prepare a Derivative Usage Policy Statement that lays out the acceptable uses of exchange-traded and over-the-counter derivatives and maintain an inventory listing which managers are employing derivatives and for what purpose (i.e., hedging, speculation, or arbitrage). (See item 4M of this report.)

- We recommend that the seven critical action recommendations from the 2015 Funston Group report be adopted as soon as practicable. (See item 4Q of this report.)
- It is our opinion that each Board would benefit from additional specific knowledge in banking, finance, or investments in performing its fiduciary duties. (See item 4Q of this report.)

2. SCOPE OF EXAMINATION

The Department conducted a risk-focused review of the investment portfolio management functions of the Systems. The analysis and review was done on a coordinated basis to the extent where common investment functions are carried out by the New York City Comptroller's Bureau of Asset Management ("Bureau of Asset Management or BAM") on behalf of the Systems.

The review consisted of document reviews, discussions with BAM personnel, Pension System personnel and consultants.

The review consisted of the following:

- Analysis of risk appetite and risk tolerance statements and how they are reflected in policies, guidelines, and strategic plans.
- Investment portfolio ALM and risk reports for comprehensiveness of metrics, and for consistency of limits outlined in risk tolerance statements and guidelines.
- Risk guidelines and an assessment of the methods for maintaining risk levels that comply with stated objectives as promulgated in the risk guidelines.
- Assessment and confirmation that the required risk signoffs and escalation procedures are adhered to as well as take into consideration the current market environment and the impact of COVID-19 on rate of return assumptions.
- Assessment and review of return targets
- Incorporation of the work of the Department's Life Bureau's pension actuary to opine on strategy and asset allocation and their appropriateness considering pension liability projections.
- Portfolio (option-adjusted) duration and convexity assessment for appropriateness of calculation methodology and consistency with stated risk/ALM tolerances.
- Liquidity haircuts applied to all investment asset categories confirmation for reasonableness.
- Comparison of stated return expectations with those from academic and institutional literature – for example, internal equity return expectations was compared to those from risk-free rates, betas and equity return premia published by New York University Professor

Aswath Damodaran[1] or Bloomberg. Consistency with macroeconomic assumptions driving return assumptions across asset classes was also assessed.

- Asset valuation performed in a manner specific to a given asset class.
- Security Lending practices.
- Portfolio credit risk metrics and management in aggregate and on an individual credit basis and the rationale for each internal rating or a substantial sample as well as the review frequency.
- Derivative usage plan, and an analysis of the hedge criteria and hedge effectiveness as well as derivative valuation methodologies.
- Evaluation of counterparty credit risk measurement (current and potential) and management, initial and variation margin processes, and readiness for LIBOR transition.
- Analysis of asset allocation and allocation among investment managers on a risk/return (cost/benefit) basis.
- Backgrounds of external investment managers and advisors (including analysis of possible conflicts of interest).

3. OVERVIEW

A. Bureau of Asset Management

The New York City Comptroller ("the Comptroller") is by law the custodian of City-held trust funds and the assets of the New York City Public Pension Funds. These five pension funds comprising the Systems are the New York City Employees' Retirement System, the Teachers' Retirement System of the City of New York, the New York City Police Pension Fund, the New York City Fire Pension Fund, and the New York City Board of Education Retirement System.

The Comptroller serves as Trustee on four of the five funds. Further, the Comptroller is delegated to serve as investment advisor by all five pension boards. The Bureau of Asset Management oversees the investment portfolio for each system and related defined contribution funds. In this role, the Comptroller provides investment advice, implements Board decisions, and reports on investment performance.

[1] See, in particular, links within https://pages.stern.nyu.edu/~adamodar/pdfiles/papers/ERP2022Formatted.pdf

Each of the five New York City Retirement Systems has its own Board of Trustees which, working with the Bureau of Asset Management and the Board's consultants, makes decisions on the funds' asset allocations based on factors including economic risk, return, performance, and beneficiary distributions. BAM advises the Boards on all investment-related topics, including investment policy and strategy, asset allocation, manager structure, manager selection and financial and economic developments that may affect the Systems.

B. Systems

The following are brief descriptions of the five pension funds comprising the Systems as detailed on the New York City Comptroller's website[2]:

Teachers' Retirement System of the City of New York

Teachers' Retirement System of the City of New York is a cost-sharing, multiple-employer public employee retirement system for pedagogical employees in New York City public schools, certain Charter Schools, and certain other specified school and college employees.

New York City Employees' Retirement System

New York City Employees' Retirement System is a cost-sharing, multiple-employer public employee retirement system for employees of the City not covered by one of the other Pension Systems, as well as employees of certain component units of the City and certain other government units.

New York City Police Pension Fund

New York City Police Pension Fund is a single-employer public employee retirement system for full-time uniformed employees of the Police Department.

[2] https://comptroller.nyc.gov/services/financial-matters/pension/overview/

New York City Fire Pension Fund

New York City Fire Pension Fund is a single-employer public employee retirement system for full-time uniformed employees of the Fire Department.

New York City Board of Education Retirement System

New York City Board of Education Retirement System is a cost-sharing, multiple-employer public employee retirement system for non-pedagogical employees of the Department of Education and certain Charter Schools, as well as certain employees of the School Construction Authority.

4. ANALYSIS SUMMARY

A. Risk Appetite

Risk appetites across the five Systems are currently expressed implicitly in: (1) the minimization of the modeled portfolio standard deviation given the 7% AIR/required expected return; and (2) the Basket Clause limits placed on certain asset classes, notably for private equity, junk bonds and alternatives exposures that are imposed to address the uncertainties surrounding the inputs to the optimization calculus.

The Boards can enhance their risk oversight practices by approving a risk appetite statement. For example, a formal written risk appetite statement aimed in part at shortfall probabilities would help guide decision making around the choice of target expected return.

Risk tolerances are currently articulated and are based only on permitted variances from target asset allocations. There are no formal limits on duration or convexity, stress tests or VaR-type metrics.

We recommend that each of the Boards establish in writing formal risk appetite and risk tolerance statements for each benefit plan.[3] A good starting point might be the risk appetite statement on page 87 of the "2021 Comprehensive Annual Report of the New York State and Local Retirement System."[4]

[3] See, for example, *Report of the NACD Blue Ribbon Commission, Risk Governance: Balancing Risk and Reward* (2014).

[4] https://www.osc.state.ny.us/files/retirement/resources/pdf/comprehensive-annual-financial-report-2021.pdf

B. Investment Portfolio Asset Liability Matching

ALM reports provide the Boards and other decision-makers with important information about how the impacts of economic, demographic, and other factors might differ between pension liabilities and assets so that allocation changes can be made as necessary to bring asset and liability exposures into balance.

Only BERS is developing formal ALM reports (with Segal Marco). We recommend that each of the Systems follow the lead of BERS in developing formal ALM reports.

C. Risk Guidelines and Practices

In May 2022 and subsequent to the time when we conducted two interviews with the BAM Risk team (the Senior Risk Officer), which was the *de facto* risk team for the five Pension Systems, Ed Berman joined BAM as CRO. Prior to that, the CRO position was vacant for the better part of two years posing what we consider a material weakness. The CRO's "second line of defense" function is a critical one,[5] typically encompassing:

- Evaluation of the funds' risk tolerances
- Establishment of risk limits (e.g., duration, convexity, stress test limits)
- Identification, measurement, and aggregation of risks
- Independent assessment of fund risk profiles
- Provision of risk reports to Chief Investment Officer ("CIO"), Comptroller and Boards.
- Monitoring of adequacy of the first line (i.e., the office of the CIO)

We recommend that in the instances where the CRO position becomes vacant, the position be filled with as little gap as possible.

Our interview with the then Risk team uncovered considerable confusion about to whom the office of the CRO should report; at the time it reported into the Deputy Chief Investment Officer and was more of an analytical support function than a second line of defense. The CIO indicated in our interview that when a new CRO is hired, that function will report into the Comptroller. Now that the CRO position has been filled, we recommend that the CRO have a

[5] Ibid.

direct reporting line to the NYC Comptroller and either a dotted reporting line to each of the five Boards or formal advisory responsibility.

The Senior Risk Officer provides a robust risk set of metrics that are reported to the various Boards, but the only formal limits/guidelines in place are tolerance bands around the Systems' asset allocation targets. The Risk Management team might consider conducting incremental risk/return impacts when evaluating new investments within the asset allocation tolerance bands (for example, those that go from the middle of bands to the top or bottom). That said, the BarraOne risk report the Senior Risk Officer prepares is a valuable tool. It reports the risk breakdown (risk contributions) of the portfolio asset classes to the portfolio and asset class returns relative to benchmarks. The report summarizes the duration, convexity, yield to worst and option adjusted spread to the swap curve for the fixed income portfolio. This is a state-of-the-practice set of metrics.

D. Required Risk Signoffs and Escalation Procedures

The Trustees adopt allocation limits (rebalancing bands) around each investment strategy, aimed at ensuring that the portfolio remains reasonably diversified. Asset allocations within these bands are monitored daily and are reviewed and discussed during every BAM rebalancing committee meeting. These meetings occur at least once monthly and during the pandemic have been held twice weekly. In the event one of these rebalancing bands is breached, the BAM rebalancing committee is convened, and the breach is immediately cured. We suggest that that the CRO should monitor compliance with asset allocation tolerance limits, supervise cures of breaches and sign off on glidepaths back to compliance. The CIO has authority to tailor allocations within their tolerance bands.

E. Return Targets

The pandemic itself has not changed return assumptions, and the average investment returns of each of the five pension funds has exceeded its 7% expected return target over the combined 2020 and 2021 fiscal years (each at least doubled the 7% expected return assumption).[6]

[6] Given the public equity market performance in 2022 in the face of negative GDP growth and inflation not seen in 40 years, it is likely the funds will report returns of well under 7% for the fiscal year ended 2022. The S&P500 index sank 20.6% in the first half of 2022, the worst first half on record for 52 years.

The New York City Office of the Actuary ("Office of the Actuary") in January 2021 proposed lowering the expected return target to 6.8% by the fiscal year beginning June 30, 2022. This proposal was primarily based on reducing the system-wide inflation assumption from 2.5% to 2.3% and adding an invariant 4.5% "real return" assumption. During the course of our examination, we questioned the Office of the Actuary in April 2021 regarding the inflation and invariant real return assumptions. The Office of the Actuary later rescinded the proposed assumption changes for inflation and expected return in July 2021 citing a lack of approval from the State legislature.[7]

This event raised questions as to the Office of the Actuary's justification for the original proposed inflation and expected return assumptions. Documents provided to us in late 2025 indicate that the inflation assumption was based on backward-looking inflation rates from the immediate post-global financial crisis decade. During our April 2021 discussion, we suggested that lowering the inflation assumption to 2.3% made little sense in the 2021 market environment in which we were seeing strong monetary accommodation in the face of massive amounts of government spending and significant supply chain disruptions all indicating a situation of "too many dollars chasing too few goods." During the spring of 2021, the running inflation rate was over 5% year over year –an appropriate time not to be lowering the inflation assumption (and the rate as of our July 2022 post-exam review was 9.1%). Observations of fiscal and monetary policy and supply chain disruptions as of April 2021 did not support a reduction in this assumption which was later acknowledged by the Office of the Actuary.[8]

In addition, the Office of the Actuary's original proposal to lower the expected return assumption to 6.8% was based on an invariant 4.5% "real return" assumption plus its 2.3% inflation assumption. In fact, the expected return is a function of the point chosen on the efficient frontier or capital market line (as modified by allocation constraints) so there is a *multiplicity* of expected return/standard deviation pairs that can be chosen by the Pension Boards all of which are

[7] The Actuarial Interest Rate ("AIR") assumption, currently 7%, is set in statute, enacted by the State legislature and signed into law by the Governor, and cannot be arbitrarily changed.

[8] The Office of the Actuary proposed, to each System, a revised inflation assumption of 2.5% in July 2021 noting "since the proposed Original 2021 A&M was introduced, uncertainty related to inflation assumptions due to recent economic conditions have unfolded, as indicated by the Chair of the Federal Reserve at its most recent Federal Open Market Committee meeting in June, that supports, especially considering the State legislature's failure to enact consistent changes to the AIR, a short-term continuation and subsequent reevaluation of the 2.5% inflation assumption." As of this report, each System continues to use a 7% assumed interest rate.

independent of any inflation assumption. There is simply no single expected real rate of return that applies to all asset allocations. Thus, the "return assumption" is a direct function of current asset allocation and the expected return, risk, and correlation assumptions about each asset class. Further, over the 10 years between June 2011 and June 2021, the inflation rate as measured by the "Consumer Price Index for All Urban Consumers: All Items" averaged about 1.86% per year, while the annual NYC pension investment returns averaged about 7.5% (i.e., not 4.5% above that CPI inflation). Over this same period, each of the five pension funds continued to assume a 2.5% inflation and 4.5% real return assumption. This does not support the Office of the Actuary's generalization that nominal investment returns tend to a level of "inflation + 4.5%."

We believed that the Pension Systems need to develop a consistent view about the nature of Expected Return and its dependence on asset allocation and risk preference. There needed to be a single agreed-upon understanding of why a particular asset allocation (i.e., expected return, standard deviation pair) is selected. In addition, the Systems' actuaries, when evaluating and proposing assumptions, needed to pay more attention to the news impacting CPI inflation and to demonstrate an understanding or to disclose their reliance on others regarding: 1) an approach to forecasting inflation that is consistent with economic theory and practice; and 2) an approach to viewing portfolio returns in a manner more consistent with modern portfolio theory (i.e., the approach used by each of the System's general consultants).

The examiner notes that Milliman conducted an independent actuarial review that was completed subsequent to our examination in November 2023. That review provided our own recommended approach to determining an investment return assumption, i.e. mapping the Systems' target asset allocation to expected return estimates for each asset class rather than simply assuming 4.5% + inflation forecast.

In the autumn of 2025, POLICE and FIRE indicated to examiners that the Office of the Actuary now surveys the five investment consultants annually regarding: 1) their long-term expectations of inflation, and 2) real rates of return by asset class with such information published in the City's and the Systems' yearly GASB 67/68 reports. The sums of these are indeed the expected returns for each asset class and will not except by rare coincidence equal 4.5% + inflation forecast. POLICE and FIRE have also noted that all economic assumptions are reviewed biennially by outside actuarial auditors hired by the Comptroller, a sitting member of each of the five Boards, with these reviews published on the Comptroller's website. These are excellent

innovations and appropriate responses to our examination concerns regarding inflation forecasting and expected nominal portfolio return determination.

F. Actuarial

The interviews with the Systems' Chief Actuary were led by the examination's actuarial team. As explained above, the investment aspect of those interviews covered confusion about the relationship between AIR and expected portfolio returns and the assumptions underlying inflation projections. In particular, as explained in item D above, we do not agree with the Chief Actuary's rationale for the proposed 2.3% inflation assumption or the development of the expected return using inflation + 4.5%.

More importantly, the Actuarial team uncovered that the QPP are co-invested with the TDA or the VSF. VSFs and TDAs represent additional benefits provided by the city whose assets are held exclusively for providing such additional benefits. However, assets of the QPP are often used to fund these additional benefits. We believe from a financial practice standpoint that the differing demographic factors and natures of these additional promised benefits outside the QPP should be analyzed separately from the QPP to provide improved liability-driven investing and greater transparency of the costs and financial risks of providing additional VSF and TDA benefits.

G. Duration and Convexity

Duration (portfolio sensitivity to interest rate changes) and convexity (the change in portfolio sensitivity to interest rate changes as rates change) are reported in the BarraOne risk reports, but there are no formal stated risk tolerances for either. We suggest the establishment of a formal risk tolerance range for portfolio duration.

H. Liquidity Management

Liquidity Management is adequate. The Comptroller's Bureau of Accountancy is responsible for projecting employer contributions to the Systems and benefit payments to the beneficiaries (among other cash sources and uses). These liquidity sources and requirements are communicated to the Bureau of Asset Management's Head of the Short-term Trading Desk, under the purview of the Head of Fixed Income who in turn reports to the Deputy CIO. All three of these people are members of the Rebalancing Committee. The Head of the Short-term Trading Desk is

responsible for ensuring that the Systems' liquidity needs are met and works in consultation with members of the Rebalancing Committee to affect asset transfers as needed.

I. Stated Return Expectations

Our review of the asset-class-level assumptions about return expectations, standard deviations, and correlations across each of the five Systems' general consultants in their independent asset allocation studies finds a high level of consistency. This provides general comfort with the reasonableness of these inputs to the respective asset allocation models. And it explains the very similar asset allocations among the funds (despite differing basket clause restrictions), each of which is targeting a 7% expected return:

System's Asset Allocations: September 2021

	Teachers	NYCERS	Police	Fire	BERS
U.S. Equity	28.15%	29.04%	32.33%	28.68%	32.60%
REITS	0.00%	0.00%	0.00%	0.00%	0.00%
World ex USA	10.57%	12.53%	8.85%	8.97%	9.71%
Infrastructure	1.32%	1.28%	1.33%	1.12%	2.04%
Emerging Markets	9.43%	5.27%	5.35%	6.17%	5.61%
INTL FOF	0.79%	0.73%	0.64%	0.51%	0.94%
Fixed Income	29.46%	28.62%	21.50%	25.54%	21.39%
Global Equity	0.42%	0.49%	0.00%	1.85%	2.03%
Alternative Credit	8.05%	7.47%	10.86%	9.15%	10.21%
Hedge Funds	0.00%	0.00%	5.66%	5.10%	0.00%
Private Equity	6.77%	8.39%	7.97%	7.62%	8.85%
Private Real Estate	4.11%	5.43%	5.35%	4.71%	5.90%
Cash	0.93%	0.76%	0.17%	0.57%	0.71%

Using our own asset allocation model, we were able to replicate the asset allocation for Police Retirement System based on its 7% target expected return and the inputs used by the general consultant. Thus we find the asset allocation model and inputs to that model to be adequate for the purposes to which they are put.

J. Asset Valuation

BAM has adequate procedures in place to ensure proper valuation of Levels 1,2 and 3 assets.

Public markets securities are priced by an independent financial data vendor. These valuations may contain Level 1, 2 or 3 securities. In addition, the valuation policies for prospective

managers are reviewed and discussed as part of the operational due diligence process. Investment managers with assets that are not priced by a vendor are required to have an annual audit that includes valuation testing as part of the agreed-upon procedures. Classifications for all valuations are compiled by BAM's Financial Reporting Group and reported in the Systems' ACFRs (Annual Comprehensive Financial Reports) under GASB 72.

K. Securities Lending

Securities Lending follows current preferred practices. Our review of Securities Lending procedures revealed:

- Debt of US Treasury securities: no limit
- Registered Money Market Mutual Funds and Similar pooling agreements: must be AAA rated, maximum amount of investment in any single approved fund shall not exceed 10% of the total value of the Lender's cash collateral at time of purchase.
- Reverse Repurchase Agreements: with counterparties rated at least A-2 or P-2 by Standard & Poor's or Moody's Investors Services respectively, or a 'Primary Dealer' in Government Securities as per the NY Federal Reserve Bank or an affiliate of any such dealer or any counterparty approved by the lender included on the approved counterparty/borrower list.
- Collateral must be marked to market daily with the following minimum margin levels:

Government, Agency GSE and Supranational debt securities	100%
All other Fixed Income Securities	102%
Equities	110%
Corporate Debt	108%
Non-Agency Residential Mortgage-Backed Securities (RMBS)	108%

- Investment Parameters
    - No Investment with a maturity longer than 2 years from settlement date, except for repurchase agreements which are limited to 1 year.
    - Maximum weighted average maturity of investment portfolio 1 year.
    - Maximum weighted average interest rate exposure of investment portfolio 180 days.
    - Maximum of 25% of portfolio at time of purchase can be invested in instruments with maturities greater than 1 year.

  - When purchasing an investment with a maturity of 397 days or less, the issuer's short-term credit rating must not be on negative credit watch (issuers rated A-1+ by S&P or F1+ by Fitch are excepted)
  - When purchasing an investment with a maturity of 397 days or less, the issuer's long-term credit rating must not be on negative credit watch (issuers rated AA or better are excepted)
- Prohibited Securities
  - Securities whose interest rate reset provision are:
  - Based on a formula that magnifies change in interest rates
  - Tied to long-term interest rates
  - Is not paid above certain level or cease to pay interest when a certain level is reached
  - Tied to more than one index
  - Tied to an index that materially lags short-term interest rates

- Security Monitoring
  - Any issue in the portfolio is downgraded by any rating agency
  - Any repurchase agreement counterparty in the Portfolio is downgraded by any rating agency
  - Any money market fund in the Portfolio is downgraded by any rating agency
  - Any issuer of an asset in the portfolio defaults on such asset

Note: Investment guidelines for TRS differs slightly from the other Systems, specifically TRS accepts only Collateral for reverse repo in the form of Government, Agency GSE and Supranational debt securities

L. Portfolio Credit Risk Metrics and Management

Credit Ratings are Attached to Virtually all Fixed Income Investments. The vast preponderance of fixed income investments is rated by an NRSRO. However, as with any large portfolio of fixed income investments, not all investments are covered. In these instances, managers generally support the credit quality using internal ratings. Credit quality is aggregated and reported daily in the "Risk Ribbon" report and monthly in the MSCI "Blue Box" reports as

shown below. We are satisfied that credit quality is measured and aggregated in an adequate manner.

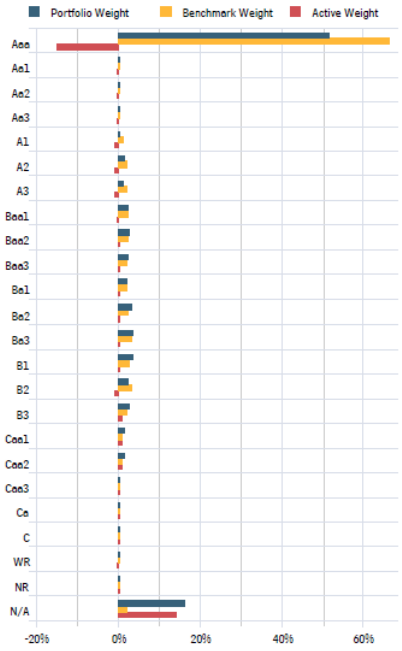
BarraOne Fixed Income Summary

COMPANY: NYCRS - BERS
PORTFOLIO: FIXED INCOME
BENCHMARK: Fixed Income
POSITIONS: 3,714
MODEL: BIM303L

CURRENCY: USD
ANALYSIS DATE: December 31, 2020
MARKET VALUE: 2,534,338,224
ACCEPTED: 3,695

Portfolio Allocation by Moody's Rating

Rating	Weight (%) Portfolio	Benchmark	Active	Cont. To Eff. Dur	Spread Duration	Total Risk	Active Risk CR	%CR to Active TR
Total	**100.00**	**100.00**	**-0.00**	**5.62**	**5.40**	**4.13**	**2.12**	**100.00**
Aaa	51.33	66.12	-14.79	3.20	6.67	3.74	1.38	65.25
Aa1	0.19	0.31	-0.12	0.02	8.31	7.72	0.00	0.04
Aa2	0.21	0.57	-0.36	0.03	13.00	11.86	-0.00	-0.16
Aa3	0.27	0.56	-0.29	0.03	10.87	9.82	-0.00	-0.21
A1	0.54	1.33	-0.79	0.05	9.12	8.03	-0.01	-0.34
A2	1.49	2.10	-0.62	0.12	8.09	7.55	-0.00	-0.12
A3	1.28	1.94	-0.66	0.11	8.43	8.23	-0.00	-0.16
Baa1	2.27	2.33	-0.06	0.17	7.55	8.82	0.02	0.81
Baa2	2.76	2.58	0.18	0.24	8.74	9.89	0.00	0.04
Baa3	2.43	1.96	0.47	0.20	8.31	11.62	-0.00	-0.08
Ba1	1.95	1.87	0.08	0.10	5.18	12.03	0.01	0.25
Ba2	3.02	2.59	0.43	0.13	4.29	12.39	0.03	1.19
Ba3	3.58	3.13	0.45	0.11	3.19	8.23	0.03	1.26
B1	3.50	2.93	0.57	0.11	3.13	9.84	0.04	1.86
B2	2.28	3.02	-0.74	0.06	2.77	9.17	-0.05	-2.20
B3	2.81	1.99	0.82	0.07	2.51	12.08	0.07	3.49
Caa1	1.81	0.98	0.83	0.04	2.38	15.60	0.09	4.19
Caa2	1.49	0.72	0.78	0.03	2.25	16.63	0.09	4.31
Caa3	0.37	0.24	0.13	0.01	2.24	15.62	0.01	0.57
Ca	0.13	0.08	0.05	0.00	2.33	19.83	0.01	0.25
C	0.02	0.02	0.00	0.00	2.38	19.75	-0.00	-0.05
WR	0.27	0.59	-0.32	0.01	2.18	12.68	-0.01	-0.53
NR	0.07	0.03	0.05	0.62	129.17	714.18	-0.13	-5.91
Not Rated	15.93	2.01	13.92	0.18	1.35	1.17	0.56	26.24



M. Derivatives

There is no BAM or System Derivatives Usage Plan as derivatives are generally not employed except in the case of several hedge funds that use derivatives in their speculative activities and several alternative credit funds with derivative hedging needs, and perhaps the use of credit default swaps ("CDS") in synthetic asset replication (their documentation does not limit the use of CDS to hedging). The hedge fund group reviews counterparty credit risk for a fund prior to making any recommendation to the BAM Investment Committee and Trustees, and once an investment approved by the Boards is implemented, ongoing metrics are made available to BAM through the funds' shareholder reports including metrics and policies covering derivative counterparty risk.

We recommend that each of the Systems prepare a Derivative Usage Policy Statement that lays out the acceptable uses of exchange-traded and over-the-counter derivatives and maintain an inventory listing which managers are employing derivatives and for what purpose (i.e., hedging,

speculation, or arbitrage). Page 16 of "The General Investment Policies for the New York State Common Retirement Fund" provides a good example of a basic Derivatives Usage Policy Statement[9] as does the New York State Teachers Retirement System Investment Policy Manual, page 13.[10]

The examiner notes that several of the systems have indicated an understanding of the importance of a Derivative Usage Policy and have agreed to undertake a process to explore the development of one.

N. LIBOR Transition

BAM's Chief Compliance Officer reported that the Systems are on a glide path to be fully prepared for LIBOR transition (fallbacks, etc.) by year-end 2021. As of July 2022, this goal has not been achieved. However, the Chief Compliance Officer assures us that, "*Consistent with our fiduciary duty, since 2019 BAM has actively monitored the retirement of the London Interbank Offered Rate (LIBOR) and the impact its retirement will have on the Systems. BAM believes the asset classes, securities lending, short term trading, and the Custodian Bank have proactive plans underway designed to mitigate the risk of the 2023 LIBOR transition.*" The examiner suggests a review of progress toward LIBOR transition with BAM at year-end 2022.

O. Asset Allocation

The examiner reviewed asset allocation on a risk/return basis. As highlighted above, we have replicated the asset allocation program of the Police Retirement System in an Excel program and verified outputs. The asset allocation process used by the general consultants is based on modern portfolio theory. Rocaton, for example, provides the relevant point of an efficient frontier to the Board (choices of expected return and minimum standard deviations for each) – there is no concept of a single "possible" expected return.

Each Board chooses its own expected return target and regardless of that choice, the consultant's optimizations will choose allocations that maximize risk adjusted return subject to "basket clause" allocation constraints. Perhaps unsurprisingly, all five Boards currently choose an

[9] https://www.osc.state.ny.us/files/common-retirement-fund/pdf/general-investment-policies.pdf
[10] https://www.nystrs.org/NYSTRS/media/PDF/IPM.pdf

expected return consistent with the Actuary's "AIR", 7%. Here is an explanation from the Police Penson Fund's Investment Policy Statement:

The AIR assumption is a key actuarial assumption affecting future NYCPPF funding rates and pension liabilities. Based on the actuarial assumptions and methods recommended by the Actuary and adopted by the Board, a 7.0% per annum return on assets, together with employee and annual employer contributions, is expected to fully fund the Plan over time to allow it to meet current and future benefit obligations. Investment performance that exceeds or underperforms the AIR assumption may materially affect future funding rates. The Board seeks to have long-term investment performance that will equal or exceed its AIR assumption.

This we believe is a very clear statement of how the Office of Chief Actuary should determine its AIR, rather than adding an inflation assumption to a "constant" 4.5% real return. The AIR assumption will drive to a large extent the System's asset allocations but should in no way represent a "return *possibility*". Of course, basket clause constraints are built into the optimizations and shadow prices of each are reported.

P. Backgrounds and Diligence of Investment Managers

The team interviewed BAM's Chief Compliance Officer who informed us that: (1) "Daily Alert Reports" capture deviations from investment guidelines by investment managers; and (2) the general consultants of each system provide manager screening including performance and any potential conflicts of interest, and Compliance is generally on top of the various operational risks (including conflicts of interest) of the Systems' portfolio of investment managers at their point of hiring and through their tenures.

Our review of ongoing diligence of investment managers performed by BAM revealed a considerable amount of activity applied to Public Equity, Fixed Income and Private Investment managers. This includes review of monthly and quarterly reports; periodic and ad hoc in-person meeting and calls; periodic performance comparisons against benchmarks; and reviews of manager-supplied reports of compliance with investment guidelines.

While the above processes were fully adequate, we note that there is, however, no consolidated diligence report generated across each investment manager. We recommend that BAM create a report that consolidates a set of key data from the diligence materials for each of the 300 managers and update those data on a regular basis.

Q. Other

In addition to items in our work plan we observed the following:

(1) Several action recommendations (some critical) of a 2015 report by the Funston Group that was commissioned by the Comptroller with which we agree are still to be acted on and a number of these had been stalled due to the extended absence of a CRO. We recommend that the seven critical action recommendations from the 2015 Funston Group report be adopted as soon as practicable.

Funston Report	BAM Update
1. The Risk Management Division ("RMD") should adopt and implement a recognized enterprise-wide risk management framework to establish processes and tools to help identify and manage risks within BAM. Chartered and constructed in-house ERM platform.	Since 2015, the Risk department has implemented software, due diligence processes, and reports, all designed to identify and manage risks within BAM. BAM investment staff integrated risk management into their portfolio oversight. Risk improvements include but are not limited to: • BAM Risk Ribbon • MSCI • Quarterly Trustee Risk Reports • Risk Register • Operational Due Diligence for proposed investments
2.RMD should develop a Risk Management Division Charter which clearly outlines the roles and responsibilities of the Division (operations risk support and independent reassurance) and its relationships with operating management and the Boards of Trustees.	BAM has put this recommendation on hold until a Chief Risk Officer is hired, as we believe they should play a meaningful role in developing a Division Charter.
3. RMD should develop an Operational Risk Appetite policy statement to assist in the prioritization of identified operational risks, i.e., how much performance variability is acceptable.	BAM has put this recommendation on hold until a Chief Risk Officer is hired, as we believe they should play a meaningful role in developing a formal Risk Appetite policy statement.
4. RMD should continue their efforts to fill their two open positions as well as to identify its overall short and long-term staffing needs.	BAM understands the importance of these roles, and a search to fill all open Risk positions is underway. Postings for a Chief Risk Officer and a Risk Officer are on the Comptroller's job website (link), and BAM aims to fill both roles as soon as possible.
5. BAM should arrange or provide in-house training in specific areas of risk so BAM staff can retain or acquire professional certifications.	BAM encourages all employees in the Bureau to attend relevant educational workshops and conferences to learn about the industry and strengthen their skill sets. Prior to the work from home directive, the Risk staff attended conferences hosted by MSCI, and other Risk-

Funston Report	BAM Update
	focused industry groups. The Bureau expects in-person training to resume once it is safe to do so again.
6. BAM should develop or obtain relevant Risk Management training courses to ensure that all BAM employees are being provided with the most up-to-date understanding of their role in risk management activities.	BAM investment staff integrates risk management into their portfolio oversight. This is demonstrated in their investment memos, monthly portfolio meetings, investment committee discussions, and overall ongoing due diligence.
7. Create an Operational Risk Committee made up of the CIO's direct reports who would meet on a regular basis to review risk reports and coordinate bureau-wide and divisional responses to accelerate the reduction of operational risk.	Since 2016, BAM has implemented an Investment Committee and Rebalancing Committee, and both incorporate risk management into their discussions and focus. BAM will place this recommendation on hold until a Chief Risk Officer is hired so they can help determine the best way to design such a committee.

(2) After reviewing the backgrounds of the Systems' Board members to the extent possible given a degree of opacity regarding the compositions of Board meeting attendees, it is our opinion that each Board would benefit from additional specific knowledge in banking, finance, or investments in performing its fiduciary duties. A greater weight toward financial literacy relative to union or political representation would benefit the New York City taxpayers who are the ultimate guarantors of the defined benefit pension plans. The New York State Teachers' Retirement System Board of Trustees, for example, requires[11]:

a. Two present or former school board members, experienced in the fields of finance and investment, elected by the Board of Regents based on recommendations of the New York State School Boards Association. At least one of these individuals must have experience as an executive of an insurance company.
b. One present or former bank executive elected by the Board of Regents.

Of course, the "school board member" requirement is specific only to this fund.

The examiner notes the NYCERS response detailing a considerable amount of available Board onboarding and continuing investment and risk education.

[11] https://nystrs.org/About-Us/Retirement-Board

(3) While we recognize the long-standing literature showing that for long-term investments the asset allocation decision is far more important than the security selection decision, we did interview the portfolio managers for Private Equity ("PE") and Alternative Fixed Income, two asset types to which funds and insurers have pivoted for return enhancement in this low interest rate environment. These asset types are often associated with risk issues such as opacity, illiquidity, complexity, timing uncertainty of returns and funding drawdowns; thus, we thought it was important to understand the System's approach to these investments.

BAM's Private Equity team works with three special consultants to cover the five Systems. On an annual basis, the PE team and the special consultants present to the Boards an annual strategic plan, including planned investment amounts on various strategies, geographies, and managers. Once the strategic plan is approved, the team has bi-weekly pipeline calls to discuss investment opportunities and review the due diligence process throughout the year.

The process of manager due diligence is rigorous. The PE team interviews potential new managers, reviewing all their market materials, takes in the due diligence of the Investment, Risk and Compliance teams at BAM and of the special consultants, and produces a due diligence memo.

BAM maintains and monitors a zero-dollar gift policy, and the compliance office requires employees to report and disclose any expenses paid by the third party. This minimizes any untoward influence in the manager selection process.

The PE team and the special consultants monitor the performance (gross and net returns) and look for strategy drift. Each manager is assigned a public equity benchmark, e.g., the Russel 3000. The valuation methodologies are in preferred order: (1) trade data; (2) public market comparable or recent transactions; and (3) DCF (Discount Cash Flow) Analysis.

The Head of Private Equity noted that during his 6 years on the PE team only two deals could not close because of the "GP (General Partner) Expense Provision" that has the

Systems refusing to agree to cover GP legal expenses. In 2020-2021, they added 4-5 new high performing managers and the Head of Private Equity notes he can access the managers with whom the team would like to invest. The PE team reports that it is mostly on track to achieve the investment target that the Boards have set for them. The feared inability to invest with top-flight GPs due to the GP Expense Provision has not materialized

Alternative Credit ("AC") includes Opportunistic Fixed Income, High Yield (i.e., below investment grade) and Bank Loans. The surveillance and due diligence processes conducted by the AC team, are like those conducted by the PE team. However, the AC team doesn't work with special consultants; they work with the Systems' general consultants. While general consultants can initiate a recommendation of a manager, it is our impression that the AC team at BAM does all the leg work, including monitoring performance (each manager is reviewed in a quarterly report). Given the size of the AC team of four people, it would be preferable to have a specialist consultant or two assigned by the Boards.

In terms the AC team's reporting slides, we do note that it would be helpful if the reports could have footnotes or an appendix to clarify various terms. A report should stand on its own and not rely on the reader to make assumptions or need to spend time trying to make educated guesses to decipher things. However, once the reader understands all the terms used in the report, it proves to comprehensive and informative.

5. SUMMARY AND CONCLUSIONS

Following are the recommendations and comments contained in this report:

Item	Description	Page No(s).
A	We recommend that each of the Boards establish in writing formal risk appetite and risk tolerance statements for each benefit plan.	7
B	We recommend that each of the Systems follow the lead of BERS in developing formal ALM reports.	8
C	We recommend that in the instances where the CRO position becomes vacant, the position be filled with as little gap as possible.	8
D	We recommend that the CRO have a direct reporting line to the NYC Comptroller and either a dotted reporting line to each of the five Boards or formal advisory responsibility.	8
E	We recommend that the Systems' actuaries, when evaluating and proposing assumptions, pay more attention to the news impacting CPI inflation and to demonstrate an understanding or disclose their reliance on others regarding: 1) an approach to forecasting inflation that is consistent with economic theory and practice; and 2) an approach to viewing portfolio returns in a manner more consistent with modern portfolio theory (i.e., the approach used by each of the System's general consultants).	11
F	We believe from a financial practice standpoint that the differing demographic factors and natures of these additional promised benefits outside the QPP should be analyzed separately from the QPP to provide improved liability-driven investing and greater transparency of the costs and financial risks of providing additional VSF and TDA benefits.	12
G	We recommend that each of the Systems prepare a Derivative Usage Policy Statement that lays out the acceptable uses of exchange-traded and over-the-counter derivatives and maintain an inventory listing which managers are employing derivatives and for what purpose (i.e., hedging, speculation, or arbitrage).	16
H	We recommend that the seven critical action recommendations from the 2015 Funston Group report be adopted as soon as practicable.	19

Item	Description	Page No(s).
I	It is our opinion that each Board would benefit from additional specific knowledge in banking, finance, or investments in performing its fiduciary duties. A greater weight toward financial literacy relative to union or political representation would benefit the New York City taxpayers who are the ultimate guarantors of the defined benefit pension plans.	20

Respectfully submitted,

Robert D. Selvaggio, Ph.D.
Rutter Associates, LLC

STATE OF NEW YORK)
) SS:
COUNTY OF NEW YORK)

Robert D. Selvaggio, being duly sworn, deposes and says that the foregoing report, subscribed by him, is true to the best of his knowledge and belief.

Robert D. Selvaggio

Subscribed and sworn to before me

this 17 day of December 2025

Melissa N Vasami
Notary Public, State of New York
Reg. No. 01VA0018901
Qualified in Westchester County
Commission Expires December 19, 2027