REPORT ON EXAMINATION

OF THE

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM

AS OF JUNE 30, 2017

EXAMINER: **DENISE SAUNDERS**

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

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September 5, 2025

Honorable Adrienne A. Harris
Superintendent of Financial Services
New York, New York 10004

Dear Adrienne A. Harris:

In accordance with instructions contained in Appointment No. 31833, dated November 9, 2018, and annexed hereto, an examination has been made into the condition and affairs of the New York City Employees' Retirement System, hereinafter referred to as "the System," or "NYCERS" at its home office located at 335 Adams Street, Brooklyn, NY 11201.

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

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 13-127(b)(2)(d). (See section 8B of this report.)
- The System should consider determining the employer normal cost contribution from the explicitly calculated plan NC based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-127(b)(2)(d). 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 may want to 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.)

2. SCOPE OF EXAMINATION

The prior examination was conducted as of June 30, 2012. This examination covers the period from July 1, 2012 through June 30, 2017. As necessary, the examiner reviewed transactions occurring subsequent to June 30, 2017, 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, 2017 to determine whether the System's filed 2017 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
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 as 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 by enactment of Chapter 427 of the Laws of 1920 and began Operations on October 1, 1920. The legal provisions of the retirement law governing this retirement system were part of the New York City Charter until it was recodified in 1937 when such provisions were transferred to NYCAC Chapter 3, Title B . The laws were subsequently recodified, changing Title B to Title 13.

Certain sections of the Retirement and Social Security Law ("RSSL"), especially with regard to federal old age and survivors insurance benefits to employees of the State and its political subdivisions, apply to the System.

The System administers the New York City Employees' Retirement System Qualified Pension Plan or QPP, New York City Public Employees' Group Life Insurance Plan ("GLIP"), Excess Benefit Plan ("EBP"), Correction Officers' Variable Supplements Fund ("COVSF"), Housing Police Officers' Variable Supplements Fund ("HPOVSF"), Housing Police Superior Officers' Variable Supplements Fund ("HPSOVSF"), Transit Police Officers' Variable Supplements Fund ("TPOVSF"), and Transit Police Superior Officers' Variable Supplements Fund ("TPSOVSF").

QPP

QPP operates pursuant to provisions under Title 13, Chapter 1 of NYCAC and is intended to be a qualified plan under Internal Revenue Code ("IRC") Section 401(a). It provides a pension benefit for employees of New York City ("City") and various related employers not covered by the City's four other main pension systems.

GLIP

GLIP operates pursuant to Rule 37 (renumber by R-45 on July 9, 2015). 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 37-2.

EBP

EBP operates pursuant to the provisions of NYCAC Section 13-196. 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 retirement system and accounted for separately from the other System assets in accordance with NYCAC Section 13-196(3).

COVSF

COVSF operates pursuant to the provisions of NYCAC Section 13-194. It provides supplemental benefits to members of the Uniformed Correction Force ("UCF") that retire on or after July 1, 1999, with 20/25 or more years of service from the System.

Under current law, COVSF 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 COVSF and the payment it provides.

HPOVSF

HPOVSF operates pursuant to the provisions of NYCAC Section 13-191. It provides supplemental benefits to housing police officers who are service retirees of the System that retired on or after July 1, 1987 with 20 or more years of service. Effective April 2, 1995, the housing police force (consisting of housing police officers and superior officers) was merged into the New York City Police Department. As a result of the merger, the active members of the housing police force were transferred from the System to the New York City Police Department, Subchapter Two Pension Fund and will, if eligible, be covered at retirement under the terms of the police officers' or police superior officers' variable supplements funds. Only inactive members of the housing police (retirees, vested terminations, etc.) remain in HPOVSF.

Under current law, HPOVSF 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 HPOVSF and the payment it provides.

HPSOVSF

HPSOVSF operates pursuant to the provisions of NYCAC Section 13-192. It provides supplemental benefits to housing police superior officers who are service retirees of the System that retired on or after July 1, 1987 with 20 or more years of service. Effective April 2, 1995, the housing police force (consisting of housing police officers and superior officers) was merged into the New York City Police Department. As a result of the merger, the active members of the housing police force were transferred from the System to the New York City Police Department, Subchapter Two Pension Fund and will, if eligible, be covered at retirement under the terms of the police officers' or police superior officers' variable supplements funds. Only inactive members of the housing police (retirees, vested terminations, etc.) remain in HPSOVSF.

Under current law, HPSOVSF 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 HPSOVSF and the payment it provides.

TPOVSF

TPOVSF operates pursuant to the provisions of NYCAC Section 13-191. It provides supplemental benefits to transit police officers who are service retirees of the System that retired on or after July 1, 1987 with 20 or more years of service. Effective April 30, 1995, the transit police force (consisting of transit police officers and superior officers) was merged into the New York City Police Department. As a result of the merger, the active members of the transit police force were transferred from the System to the New York City Police Department, Subchapter Two Pension Fund and will, if eligible, be covered at retirement under the terms of the police officers' or police superior officers' variable supplements funds. Only inactive members of the transit police (retirees, vested terminations, etc.) remain in TPOVSF.

Under current law, TPOVSF 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 TPOVSF and the payment it provides.

TPSOVSF

TPSOVSF operates pursuant to the provisions of NYCAC Section 13-192. It provides supplemental benefits to transit police superior officers who are service retirees of the System that retired on or after July 1, 1987 with 20 or more years of service. Effective April 30, 1995, the transit police force (consisting of transit police officers and superior officers) was merged into the New York City Police Department. As a result of the merger, the active members of the transit police force were transferred from the System to the New York City Police Department, Subchapter Two Pension Fund and will, if eligible, be covered at retirement under the terms of the police officers' or police superior officers' variable supplements funds. Only inactive members of the transit police (retirees, vested terminations, etc.) remain in TPSOVSF.

Under current law, TPSOVSF 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 TPSOVSF and the payment it provides.

B. Management

Prior to July 1, 1969, the management of the System was vested in the Board of Estimate of City of New York. Legislation was enacted in 1969 establishing a board of trustees to administer the System. The board consists of representative of the Mayor, the Comptroller of the City of New York ("Comptroller"), the Public Advocate, the five borough presidents, and the chief executive officers of each of the three employee organizations representing the largest membership in the System (District Council 37- AFSCME, Local 100 – Transport Workers Union, and Local 237 – International Brotherhood of Teamsters).

Each member of the board has one vote except for the borough presidents, who have one-fifth vote each. The maximum number of votes cast by the board is therefore seven. Each vote of the board requires at least three and three-fifths votes for passage of any resolution. The number constitutes a quorum of the board.

The 11 board members and their titles as of June 30, 2017, were as follows

Name	Title/Affiliation
Laticia James	Public Advocate Represented by Lawrence Schimmel
Ruben Diaz, Jr.	Borough President – Bronx Represented by Albert Rodriguez
Gregory Floyd	President, Local 237 – International Brotherhood of Teamsters Represented by Susan Milisits
Scott Stringer	Comptroller of the City of New York Represented by John Dorsa
Eric Adams	Borough President – Brooklyn Represented by Andrew Gounardes
Melinda Katz	Borough President – Queens Represented by Angelina Martinez-Rubio
James Oddo	Borough President – Staten Island Represented by John Zaccone
John Adler	Chairperson Representative of the Mayor's office
Henry Garrido	Executive Director, District Council 37 – AFSCME Represented by Raymond Santander
John Samuelsen	President, Local 100 – TWU Represented by David Katzman
Gale Brewer	Borough President – Manhattan Represented by Aldrin Bonilla

In September 2017, Anthony Utano was appointed to the board replacing John Samuelsen.

In March 2018, Ruben Diaz, Jr. designated Marricka Scott_McFadden to serve as an alternate representative when needed. Additionally, James Oddo designated Marei LaFrancesa to serve as an alternate representative when needed.

In August 2018, Scott Springer designated Susannah Vickers, David Jeter and Jennifer Conovitz wherein one of them could serve as an alternate representative when needed.

In September 2018, Tonya Cantlo-Cockfield replaced Andrew Gounardes as the Brooklyn Borough President's representative.

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

The following is a listing of the principal officers of the System as of June 30, 2017:

Name	Title
John Adler	Chairperson
Karen Mazza	Interim Executive Director
Scott Stringer	Comptroller
Sherry Chan	Actuary

In September 2017, Melanie Whinnery was appointed Executive Director.

The members of the board of trustees for the Variable Supplement Funds as of June 30, 2017 were as follows:

COVSF

Name	Title
John Adler	Representative of the Mayor's office
John Dorsa	Representative of the Comptroller's Office
Patrick Ferraiuolo	Representative of the Correction Captains' Association
Elias Husamudeen	Chairperson Representative of the Correction Officers' Benevolent Association Inc.
Jacques Jiha	Commissioner, New York City Department of Finance
Susannah Vickers	Representative of the Comptrollers' Office

HPOVSF*

Name	Title
John Adler	Representative of the Mayor's office
John Dorsa	Representative of the Comptroller's Office
Patrick Ferraiuolo	Representative of the Correction Captains' Association
Elias Husamudeen	Chairperson Representative of the Correction Officers' Benevolent Association Inc.
Jacques Jiha	Commissioner, New York City Department of Finance
Susannah Vickers	Representative of the Comptrollers' Office

HPSOVSF*

Name	Title
John Adler	Representative of the Mayor's office
John Dorsa	Representative of the Comptroller's Office
Patrick Ferraiuolo	Representative of the Correction Captains' Association
Elias Husamudeen	Chairperson Representative of the Correction Officers' Benevolent Association Inc.
Jacques Jiha	Commissioner, New York City Department of Finance
Susannah Vickers	Representative of the Comptrollers' Office

TPOVSF*

Name	Title
John Adler	Representative of the Mayor's office
John Dorsa	Representative of the Comptroller's Office
Patrick Ferraiuolo	Representative of the Correction Captains' Association
Elias Husamudeen	Chairperson Representative of the Correction Officers' Benevolent Association Inc.
Jacques Jiha	Commissioner, New York City Department of Finance
Susannah Vickers	Representative of the Comptrollers' Office

TPSOVSF*

Name	Title
John Adler	Representative of the Mayor's office
John Dorsa	Representative of the Comptroller's Office
Patrick Ferraiuolo	Representative of the Correction Captains' Association
Elias Husamudeen	Chairperson Representative of the Correction Officers' Benevolent Association Inc.
Jacques Jiha	Commissioner, New York City Department of Finance
Susannah Vickers	Representative of the Comptrollers' Office

*The examiner noted that the composition of the board of trustees was missing some of the representatives required by the NYCAC: TPOVSF's board did not include any representative from the Transit Police Patrolmen's Benevolent Association; TPSOVSF's board did not include any representative From the Transit Police Superior Officers; HPOVSF's board did not include and representative from the Housing Police Patrolmen's Benevolent Association; HPSOVSF's board did not include any representative from the Housing Police Superior Officers.

C. Membership and Employers

Membership in the System is open to all New York City ("NYC") employees who are not eligible to participate in the NYC Teachers' Retirement System, the NYC Police Pension Fund, the NYC Fire Department Pension Fund, or the NYC Board of Education Retirement System. All NYC employees holding permanent civil service positions in the competitive or labor class are required to become members of the System six months after their date of appointment but may voluntarily join the System prior to their mated membership date. All other eligible employees have the option of joining the System upon appointment or at any time thereafter.

All members who joined the System are in the category of Tier I, II, III, IV and VI. On March 16, 2012, the Governor signed into law Chapter of the Laws of 2012, which amends portions of the Retirement and Social Security Law and Education Law by introducing a new Tier VI level of benefits for all employees who are hired, or who elect to join a Retirement System on or after April 1, 2012, including NYCERS. Tier VI increase the age requirement to 63 for most non-uniformed employees to retire and receive a full pension, require member contributions for non-uniformed employees, lengthen the final average salary ("FAS") period from three to five years, cap FAS for non-uniformed employees to an amount equal to the Governor's salary, extend and harmonize the Tier III benefits for the uniformed employees and to DA investigators and offer an optional defined contribution plan to certain non-represented employees.

The System is a cost-sharing multiple-employer public employee retirement system. In addition to the various department of the City of New York, members of the System are also employed by the New York City Transit Authority, the Triborough Bridge and Tunnel Authority, the New York City Housing Authority, the New York City Health and Hospitals Corporation, the New York City Housing Development Corporation, the City University of New York, the New York City School Construction Authority, the New York City Municipal Water Finance Authority, and certain employees in departments of the State of New York which had formerly been New York City departments.

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, 2012 to June 30, 2017 (in thousands)						
	QPP	COVSF	HPOVSF	HPSOVSF	TPOVSF	TPSOVSF
Beginning Net Position at 7/1/20212	$42,655,336	$35,925	$0	$0	$0	$0
Contributions	18,366,433	0	0	0	0	0
Net Investment Income and Other	22,227,199	100	0	0	0	0
Net Transfers /Reimbursements	(512,339)	453,212	10,313	13,549	20,027	15,238
Benefit Payments	(21,114,614)	(201,072)	(10,313)	(13,549)	(20,027)	(15,238)
Payments to other Systems	(35,147)	0	0	0	0	0
Admin Expenses	(270,086)	0	0	0	0	0
Ending Net Position at 6/30/2017	$61,316,782	$288,165	$0	$0	$0	$0

The following table indicates the number of members as reported in the annual comprehensive financial reports, as of June 30, 2017:

Membership as of June 30, 2017						
	QPP	COVSF	HPOVSF	HPSOVSF	TPOVSF	TPSOVSF
Retirees and beneficiaries	150,419	7,858	153	215	315	243
Terminated vesteds	8,417	0	0	0	0	0
Other inactives	19,149	0	0	0	0	0
Active members	186,898	9,406	0	0	0	0
Total	364,883	17,264	153	215	315	243

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 plan net assets of the System as of June 30, 2017, as contained in the System's 2017 filed financial statements and the statement of changes in the plan net assets 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 2013, 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 and 2017 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, 2017 (In thousands)

QPP

Assets	
Cash and equivalents	$ 163,875
Receivable for investment securities sold	687,047
Receivable for member loans	1,102,986
Receivable for accrued interest and dividends	301,680
Other receivables	0
Receivables from QPP to VSFs (excluding COVSF)	0
Receivables from QPP to COVSF	0
Investments at fair value	60,741,062
Securities lending collateral	7,034,093
Other assets	93,948
Total assets	$70,124,691
Liabilities	
Accounts payable	$ 209,206
Payable for investment securities purchased	955,572
Accrued benefits payable	321,457
Payable from QPP to VSFs (excluding COVSF)	5,493
Payable from QPP to COVSF	281,000
Due to other retirement systems	1,088
Payable for securities lending transactions	7,034,093
Total liabilities	$ 8,807,909
Fiduciary net position (total assets minus total liabilities)	$61,316,782

COVSF

Assets	
Cash and equivalents	$ 8,106
Receivable for investment securities sold	0
Receivable for member loans	0
Receivable for accrued interest and dividends	37
Other receivables	12
Receivables from QPP to VSFs (excluding COVSF)	0
Receivables from QPP to COVSF	281,000
Investments at fair value	43,529
Securities lending collateral	0
Other assets	0
Total assets	$332,684
Liabilities	
Accounts payable	$ 0
Payable for investment securities purchased	0
Accrued benefits payable	44,519
Payable from QPP to VSFs (excluding COVSF)	0
Payable from QPP to COVSF	0
Due to other retirement systems	0
Payable for securities lending transactions	0
Total liabilities	$ 44,519
Fiduciary net position (total assets minus total liabilities)	$288,165

HPOVSF

Assets	
Cash and equivalents	$ 69
Receivable for investment securities sold	0
Receivable for member loans	0
Receivable for accrued interest and dividends	0
Other receivables	0
Receivables from QPP to VSFs (excluding COVSF)	901
Receivables from QPP to COVSF	0
Investments at fair value	0
Securities lending collateral	0
Other assets	0
Total assets	$970
Liabilities	
Accounts payable	$ 0
Payable for investment securities purchased	0
Accrued benefits payable	970
Payable from QPP to VSFs (excluding COVSF)	0
Payable from QPP to COVSF	0
Due to other retirement systems	0
Payable for securities lending transactions	0
Total liabilities	$970
Fiduciary net position (total assets minus total liabilities)	$ 0

HPSOVSF

Assets	
Cash and equivalents	$ 58
Receivable for investment securities sold	0
Receivable for member loans	0
Receivable for accrued interest and dividends	0
Other receivables	0
Receivables from QPP to VSFs (excluding COVSF)	1,274
Receivables from QPP to COVSF	0
Investments at fair value	0
Securities lending collateral	0
Other assets	0
Total assets	$1,332
Liabilities	
Accounts payable	$ 0
Payable for investment securities purchased	0
Accrued benefits payable	1,332
Payable from QPP to VSFs (excluding COVSF)	0
Payable from QPP to COVSF	0
Due to other retirement systems	0
Payable for securities lending transactions	0
Total liabilities	$1,332
Fiduciary net position (total assets minus total liabilities)	$ 0

TPOVSF

Assets	
Cash and equivalents	$ 45
Receivable for investment securities sold	0
Receivable for member loans	0
Receivable for accrued interest and dividends	0
Other receivables	0
Receivables from QPP to VSFs (excluding COVSF)	1,886
Receivables from QPP to COVSF	0
Investments at fair value	0
Securities lending collateral	0
Other assets	0
Total assets	$1,931
Liabilities	
Accounts payable	$ 21
Payable for investment securities purchased	0
Accrued benefits payable	1,910
Payable from QPP to VSFs (excluding COVSF)	0
Payable from QPP to COVSF	0
Due to other retirement systems	0
Payable for securities lending transactions	0
Total liabilities	$1,931
Fiduciary net position (total assets minus total liabilities)	$ 0

TPSOVSF

Assets	
Cash and equivalents	$ 70
Receivable for investment securities sold	0
Receivable for member loans	0
Receivable for accrued interest and dividends	0
Other receivables	0
Receivables from QPP to VSFs (excluding COVSF)	1,432
Receivables from QPP to COVSF	0
Investments at fair value	0
Securities lending collateral	0
Other assets	0
Total assets	$1,502
Liabilities	
Accounts payable	$ 0
Payable for investment securities purchased	0
Accrued benefits payable	1,502
Payable from QPP to VSFs (excluding COVSF)	0
Payable from QPP to COVSF	0
Due to other retirement systems	0
Payable for securities lending transactions	0
Total liabilities	$1,502
Fiduciary net position (total assets minus total liabilities)	$ 0

C. Statement of Changes in Fiduciary Net Position for the Examination Period ended June 30, 2017 (In thousands) QPP

	2013	2014	2015	2016	2017
Contributions					
Member contributions	$ 437,775	$ 447,689	$ 467,129	$ 485,508	$ $ 513,514
Employer contribution	3,046,845	3,114,068	3,160,258	3,365,454	3,328,193
Total contribution	$ 3,484,620	$ 3,561,757	$ 3,627,387	$ 3,850,962	$ 3,841,707
Investment earnings:					
Interest and dividend income	1,321,394	1,397,834	1,431,006	1,529,263	1,685,269
Net appreciation (depreciation)	3,801,091	6,688,980	(50,658)	(174,204)	5,489,457
Net securities lending income	27,785	8,801	26,511	29,657	31,334
Investment expenses	(183,252)	(184,611)	(231,760)	(212,996)	(223,756)
Net investment (loss) income	$ 4,967,018	$ 7,911,004	$ 1,175,099	$ 1,171,720	$ 6,982,304
Other income	5,072	4,648	4,140	2,928	3,266
Reimburse benefit payments from QPP	0	0	`0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Total additions	$ 8,456,710	$11,477,409	$ 4,806,626	$ 5,025,610	$10,827,277
Benefits payments and withdrawals	3,851,217	3,990,306	4,235,565	4,402,506	4,635,020
Payments to other retirement System	5,250	7,228	7,142	7,440	8,087
Transfers from QPP to VSFs	12,274	202,125	41,918	(41,199)	297,221
Administrative expenses	48,666	50,431	54,635	56,683	59,671
Total deductions	$ 3,917,407	$ 4,250,090	$ 4,339,260	$ 4,425,430	$ 4,999,999
Net (decrease) increase	$ 4,539,303	$ 7,227,319	$ 467,366	$ 600,180	$ 5,827,278
Net position restricted for benefits					
Beginning of year	42,655,336	47,194,639	54,421,958	54,889,324	55,489,504
End of Year	$47,194,639	$54,421,958	$54,889,324	$55,489,504	$61,316,782

COVSF

	2013	2014	2015	2016	2017
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	38	20	10	184	300
Net appreciation (depreciation)	0	0	0	0	(452)
Net securities lending income	0	0	0	0	0
Investment expenses	0	0	0	0	0
Net investment (loss) income	$ 38	$ 20	$ 10	$ 184	$ (152)
Other income	0	0	0	0	0
Reimburse benefit payments from QPP	0	0	12	0	0
Transfers from QPP to VSFs	0	190,000	30,000	(52,724)	285,924
Total additions	$ 38	$190,020	$30,022	$ (52,540)	$285,772
Benefits payments and withdrawals	0	38,014	78,285	82,149	2,624
Payments to other retirement System	0	0	0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Administrative expenses	0	0	0	0	0
Total deductions	$ 0	38,014	$ 78,285	$ 82,149	$ 2,624
Net (decrease) increase	$ 38	$152,006	$(48,263)	$(134,689)	$283,148
Net position restricted for benefits					
Beginning of year	35,925	35,963	187,969	139,706	5,017
End of Year	$35,963	$187,969	$139,706	$ 5,017	$288,165

HPOVSF

	2013	2014	2015	2016	2017
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	0	0	0	0	0
Net appreciation (depreciation)	0	0	0	0	0
Net securities lending income	0	0	0	0	0
Investment expenses	0	0	0	0	0
Net investment (loss) income	$ 0	$ 0	$ 0	$ 0	$ 0
Other income	0	0	0	0	0
Reimburse benefit payments from QPP	2,188	2,168	2,100	1,968	0
Transfers from QPP to VSFs	0	0	0	0	1,889
Total additions	$2,188	$2,168	$2,100	$1,968	$1,889
Benefits payments and withdrawals	2,188	2,168	2,100	1,968	1,889
Payments to other retirement System	0	0	0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Administrative expenses	0	0	0	0	0
Total deductions	$2,188	$2,168	$2,100	$1,968	$1,889
Net (decrease) increase	$ 0	$ 0	$ 0	$ 0	$ 0
Net position restricted for benefits					
Beginning of year	0	0	0	0	0
End of Year	$ 0	$ 0	$ 0	$ 0	$ 0

HPSOVSF

	2013	2014	2015	2016	2017
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	0	0	0	0	0
Net appreciation (depreciation)	0	0	0	0	0
Net securities lending income	0	0	0	0	0
Investment expenses	0	0	0	0	0
Net investment (loss) income	$ 0	$ 0	$ 0	$ 0	$ 0
Other income	0	0	0	0	0
Reimburse benefit payments from QPP	2,823	2,797	2,686	2,648	0
Transfers from QPP to VSFs	0	0	0	0	2,595
Total additions	$2,823	$2,797	$2,686	$2,648	$2,595
Benefits payments and withdrawals	2,823	2,797	2,686	2,648	2,595
Payments to other retirement System	0	0	0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Administrative expenses	0	0	0	0	0
Total deductions	$2,823	$2,797	$2,686	$2,648	$2,595
Net (decrease) increase	$ 0	$ 0	$ 0	$ 0	$ 0
Net position restricted for benefits					
Beginning of year	0	0	0	0	0
End of Year	$ 0	$ 0	$ 0	$ 0	$ 0

TPOVSF

	2013	2014	2015	2016	2017
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	0	0	0	0	0
Net appreciation (depreciation)	0	0	0	0	0
Net securities lending income	0	0	0	0	0
Investment expenses	0	0	0	0	0
Net investment (loss) income	$ 0	$ 0	$ 0	$ 0	$ 0
Other income	0	0	0	0	0
Reimburse benefit payments from QPP	4,142	4,070	4,040	3,945	0
Transfers from QPP to VSFs	0	0	0	0	3,830
Total additions	$4,142	$4,070	$4,040	$3,945	$3,830
Benefits payments and withdrawals	4,142	4,070	4,040	3,945	3,830
Payments to other retirement System	0	0	0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Administrative expenses	0	0	0	0	0
Total deductions	$4,142	$4,070	$4,040	$3,945	$3,830
Net (decrease) increase	$ 0	$ 0	$ 0	$ 0	$ 0
Net position restricted for benefits					
Beginning of year	0	0	0	0	0
End of Year	$ 0	$ 0	$ 0	$ 0	$ 0

TPSOVSF

	2013	2014	2015	2016	2017
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	0	0	0	0	0
Net appreciation (depreciation)	0	0	0	0	0
Net securities lending income	0	0	0	0	0
Investment expenses	0	0	0	0	0
Net investment (loss) income	$ 0	$ 0	$ 0	$ 0	$ 0
Other income	0	0	0	0	0
Reimburse benefit payments from QPP	3,121	3,090	3,080	2,964	0
Transfers from QPP to VSFs	0	0	0	0	2,983
Total additions	$3,121	$3,090	$3,080	$2,964	$2,983
Benefits payments and withdrawals	3,121	3,090	3,080	2,964	2,983
Payments to other retirement System	0	0	0	0	0
Transfers from QPP to VSFs	0	0	0	0	0
Administrative expenses	0	0	0	0	0
Total deductions	$3,121	$3,090	$3,080	$2,964	$2,983
Net (decrease) increase	$ 0	$ 0	$ 0	$ 0	$ 0
Net position restricted for benefits					
Beginning of year	0	0	0	0	0
End of Year	$ 0	$ 0	$ 0	$ 0	$ 0

D. GLIP and EBP Financial Reporting

The fiduciary net position and the change in fiduciary net position for each year during the examination period was 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. EBP and GLIP are reflected in the QPP assets.

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, no significant findings were noted.

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, 2016 actuarial valuation were used to determine the annual required employer contribution for the fiscal year July 1, 2017 to June 30, 2018. 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[1] ("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 estimate the System's funded status and annual required employer contribution. This 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.

[1] 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 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 the EAN and the resulting normal contribution, NYCAC Section 13-127(b)(2)(d) provides:

> (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 retirement system 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 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.

(vi) (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 between the age a member enters the plan 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, 2013 to June 30, 2016 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,	2013	2014	2015	2016
Present Value of Future Benefits (PVFB)	$ 85,682,667	$ 90,534,076	$ 92,924,601	$ 95,755,445
Present Value of Future Normal Costs (PVFNC)	15,614,483	16,179,094	16,246,381	16,674,262
Actuarial Accrued Liability (AL): [AL = PVFB – PVFNC]	70,068,184	74,354,982	76,678,220	79,081,183

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:

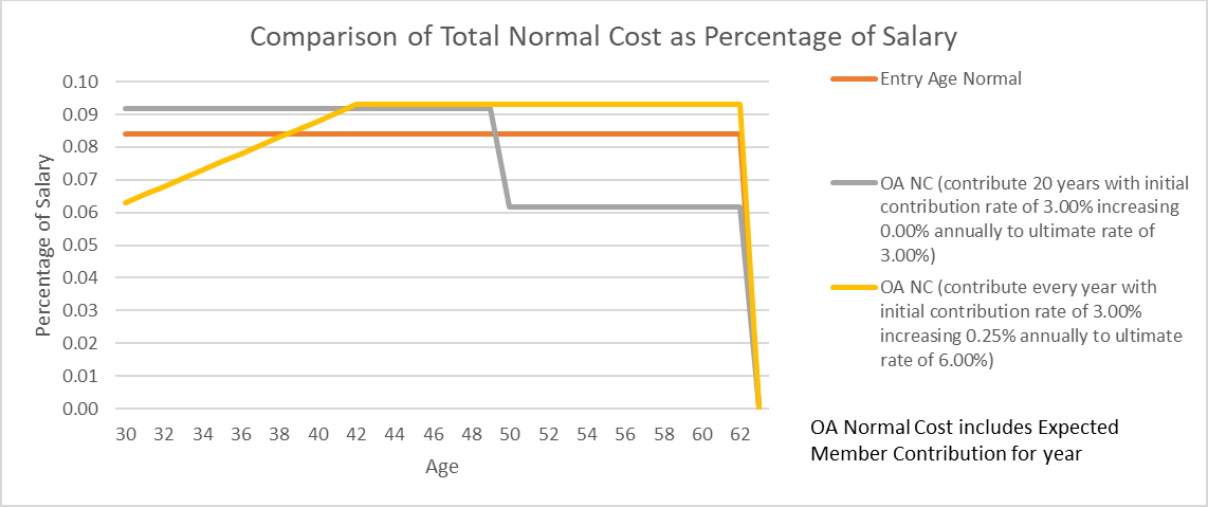
The EAN actuarial cost method used by OA does not appear to follow the EAN actuarial cost method as defined under NYCAC Section 13-127(b)(2)(d) or by the ASB. The ASB defines the EAN actuarial cost method as:

> "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 13-127) 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 allocated on a level basis as NCs. 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 13-127(b)(2)(d).

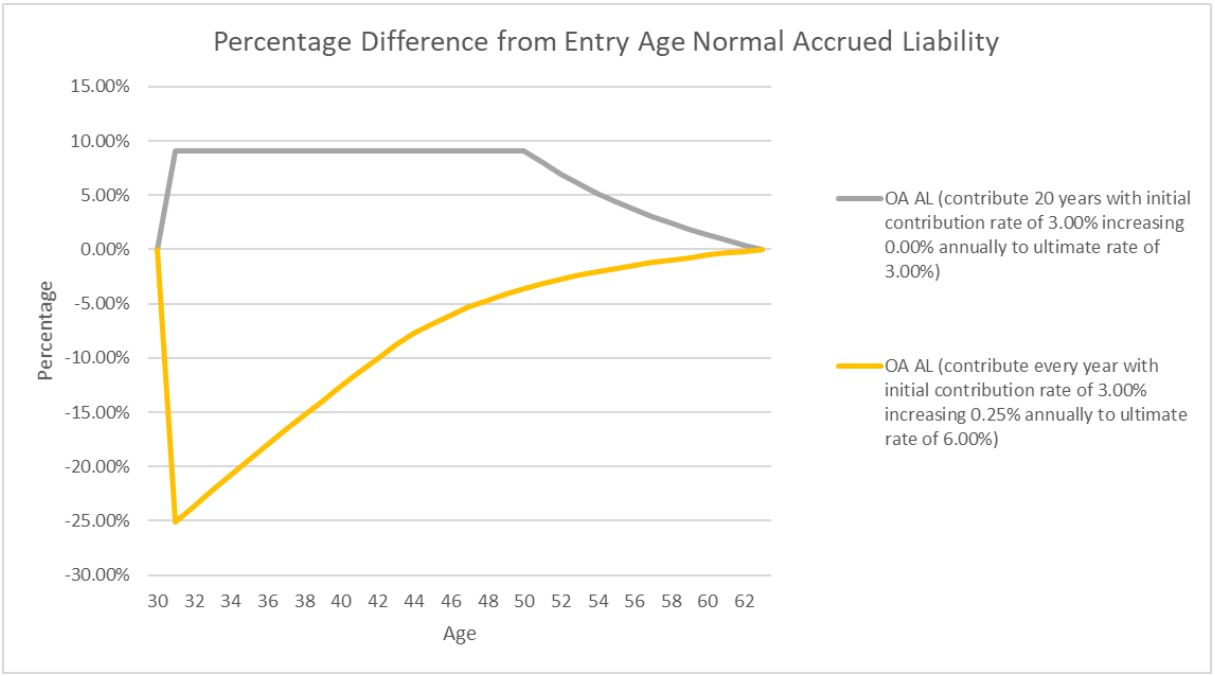
This is illustrated in the following example for an individual entering the QPP at age 30 with a starting salary of $40,000, receives 3% annual salary increases, and retires at age 63 with a retirement benefit valued (present value) at $600,000 at retirement. The example also assumes an interest rate 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 as 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[2] or NYCAC Section 13-127(b)(2)(d).

Recommendations:

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 13-127(b)(2)(d).

[2] 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 4 years and 20% for the last 2 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, 2013 to June 30, 2016 is provided in Table 2 below.

Table 2: Actuarial Value of Assets (Results in $ Thousands)					
Valuation Date (VD) June 30,		2013	2014	2015	2016
(1)	MVA as of the VD	$ 47,194,639	$ 54,421,958	$ 54,889,324	$ 55,489,504
(2)	Actual Investment Return on MVA for fiscal year ending on the VD	4,967,018	7,911,004	1,175,099	1,171,720
(3)	Expected Investment Return on AVA for fiscal year ending on the VD	3,112,400	3,292,523	3,511,697	3,728,309
(4)	Unexpected Investment Return (UIR): [(2) – (3)]	1,854,618	4,618,481	(2,336,598)	(2,556,589)
(5)	Phase-in of current year and 5 prior year's UIR	(88,245)	3,915,987	1,315,630	(1,002,325)
(6)	Preliminary AVA: [(1) – (5)]	47,282,884	50,505,971	53,573,694	56,491,829
(7)	Minimum AVA: [80% x (1)]	37,755,711	43,537,566	43,911,459	44,391,603
(8)	Maximum AVA: [120% x (1)]	56,633,566	65,306,350	65,867,189	66,587,405
(9)	Final AVA as of the VD: [(6), but not less than (7) and not greater than (8)]	47,282,884	50,505,971	53,573,694	56,491,829

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.

Recommendations:

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.

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 (2007-2016) is shown in Table 3[3] below.

[3] Results from Table VI-1 of the June 30, 2016 (lag) actuarial valuation report dated July 11, 2019.

Table 3: Unfunded Actuarial Accrued Liability and Funded Ratio (Results in $ Thousands)				
Valuation Date June 30	AVA	AL	UAL	Funded Ratio
2007	$ 38,925,725	$ 49,253,216	$ 10,327,491	79.0%
2008	40,722,228	51,114,399	10,392,171	79.7%
2009	41,710,159	53,052,658	11,342,499	78.6%
2010	40,433,344	62,935,267	22,501,923	64.2%
2011	42,409,059	65,269,251	22,860,192	65.0%
2012	44,676,721	67,417,018	22,740,297	66.3%
2013	47,282,884	70,028,252	22,745,368	67.5%
2014	50,505,971	74,123,437	23,617,466	68.1%
2015	53,573,694	76,678,220	23,104,526	69.9%
2016	56,491,829	79,081,183	22,589,354	71.4%

While the funded ratio has improved each year after 2010 the System has yet to regain its level of funded status prior to 2010 and was under 80% funded as of June 30, 2016.

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 $20,524,022,955 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 $1.517 billion to a projected final installment of roughly $2.740 billion 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)

- Enacted changes in benefits (per OA's valuation reports, if not defined by 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, 2016 for each amortization base listed in the June 30, 2016 (lag) actuarial valuation report is summarized in Table 4 below:

Table 4: Schedule of Unfunded Accrued Liability Bases as of June 30, 2016
(Amounts in $1,000s)

Amortization Base	Date Established	Outstanding Balance at 6/30/2016	Remaining Payments	Payment on 12/31/2016
Initial UAL	6/30/2010	$ 20,760,737	16	$1,758,880*
(Gain)/Loss	6/30/2011	(215,537)	10	(29,667)
(Gain)/Loss	6/30/2012	(57,276)	11	(7,384)
(Gain)/Loss	6/30/2013	80,834	12	9,839
Transit Refunds	6/30/2013	183	2	98
(Gain)/Loss	6/30/2014	(1,332,117)	13	(154,087)
Assumption Change	6/30/2014	2,425,291	18	233,085
(Gain)/Loss	6/30/2015	(455,878)	14	(50,393)
(Gain)/Loss	6/30/2016	(256,449)	14	0
Assumption Change	6/30/2016	19,238	19	0
SADB	6/30/2016	20,783	14	0
SADB Sanitation Retirees	6/30/2016	34,163	4	0
SADB Sanitation Actives	6/30/2016	4,530	10	0
	Total	$ 21,028,502		$1,760,370

* Payments to increase by 3% annually

The projected net amortization payments each year and their discounted value as of June 30, 2016 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, 2016 (Amounts in $1,000s)
2017	$ 1,760,370	$ 1,701,814
2018	1,798,287	1,624,738
2019	1,852,539	1,564,256
2020	1,908,519	1,506,098
2021	1,966,178	1,450,093
2022	2,015,134	1,388,971
2023	2,076,305	1,337,509
2024	2,139,311	1,287,940
2025	2,204,207	1,240,196
2026	2,271,050	1,194,210
2027	2,369,565	1,164,498
2028	2,447,195	1,123,971
2029	2,510,398	1,077,570
2030	2,739,717	1,099,068
2031	2,867,600	1,075,112
2032	2,975,288	1,042,511
2033	235,010	76,958
2034	235,010	71,923
2035	1,925	551
2036	1,925	515
	Total	$ 21,028,502

The discounted value of projected net amortization payments as of June 30, 2016 was approximately $21.028 billion. However, the UAL as of June 30, 2016 was approximately $22.589 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 and future administrative expense reimbursements as shown in Table 5 below:

Table 5: Development of Adjusted UAL / Outstanding Amortization Balance (Amounts in $1,000s)				
June 30 Valuation Date	2013	2014	2015	2016
1. Accrued Liability (AL)	$ 70,028,252	$ 74,123,437	$ 76,678,220	$79,081,183
2. Actuarial Value of Assets (AVA)	47,282,884	50,505,971	53,573,694	56,491,829
3. Unfunded Accrued Liability (UAL): [(1) - (2)]	22,745,368	23,617,466	23,104,526	22,589,354
4. PV 1-year Adjusted Employer Contribution	1,433,172	1,424,839	1,474,561	1,446,072
5. PV Future Administrative Expense Reimbursement	103,197	101,743	107,940	114,780
6. Adjusted UAL / Outstanding Amortization Balance: [(3) - (4) - (5)]	$ 21,208,999	$ 22,090,884	$ 21,522,025	$21,028,502

The adjustments under OYLM include using employer contributions (lines 4 and 5 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 and administrative expense components of the statutory employer contributions are not intended to fund the UAL but are 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 normal cost and administrative expenses 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. Similarly, administrative expense contributions for the year would fund administrative expenses incurred during 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 and administrative expense 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 and administrative expense contributions by applying them 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[4] (i.e., valuation date) or appropriately reflecting events after the measurement date.[5]

Table 4 also noted that 12 of the 13 amortization bases listed in the June 30, 2016 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 12 level dollar amortization bases was roughly $0.268 billion as of June 30, 2016, while the outstanding balance for the IUAL base was approximately $20.761 billion as of June 30, 2016. The IUAL amortization payment of $1,811,646,748 represents almost 54% of the entire statutory employer contribution of $3,377,024,173 for the fiscal year ended June 30, 2018.

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.[6] 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 payment doesn't appear to follow GFOA best practices and poses funding concerns for the participating employers since it represents roughly 54% of the entire statutory employer contribution for the fiscal year ended June 30, 2018 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."

[4] ASOP No. 4 (Doc. No. 205), Section 2.16
[5] ASOP No. 4 (Doc. No. 205), Section 3.4.2
[6] 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 may want to 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[7] 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

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

NC = Normal Cost

AI = Annual Installment (i.e., net amortization payment for the year)

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. To account for the one-year difference between the valuation date and the fiscal year required contribution the System adopted OYLM.

The calculation of the required employer contribution for the fiscal year ending June 30, 2018 based on the June 30, 2016 actuarial valuation is summarized in Table 6 below.

Table 6: Required Employer Contribution Using One Year Lag Methodology

For Fiscal Year Ending (FYE) June 30, 2018	($ in 1,000s)	How Derived	
Present Value of Future Benefits at June 30, 2016	$ 95,755,445	Actuarial Cost Method	1
Present Value of Future Employee Contributions at June 30, 2016	3,779,856	Actuarial Cost Method	2
Present Value of Future Employer Normal Costs at June 30, 2016	12,894,406	Actuarial Cost Method	3
Actuarial Accrued Liability at June 30, 2016	79,081,183	(1) - (2) - (3)	4
Actuarial Value of Assets at June 30, 2016	56,491,829	Asset Valuation Method	5
Unfunded Actuarial Accrued Liability at June 30, 2016	22,589,354	(4) - (5)	6
Present Value of Employer Normal Cost for FYE June 30, 2017	1,446,072	Normal Cost [A] ÷ sqrt(1.07)	7
Present Value of Reimbursed Expenses	114,780	See below [B]	8
Adjusted Unfunded Actuarial Accrued Liability	21,028,502	(6) - (7) - (8)	9
Net Remaining Unfunded Actuarial Accrued Liability Balance	21,028,502	Actuarial Valuation	10
Annual Installment for FYE June 30, 2018	1,798,287	Actuarial Valuation	11
Present Value of Future Salaries at June 30, 2016	122,086,487	Actuarial Valuation	12
Mid-year Value of Projected Salaries for FYE June 30, 2017	12,952,523	Projected by Actuary	13
Adjusted Present Value of Future Salaries at June 30, 2016	109,566,811	(12) - [(13) ÷ sqrt(1.07)]	14
Normal Cost Percent	11.7776%	(3) ÷ (14)	15
Mid-year Value of Projected Salaries for FYE June 30, 2018	12,715,736	Projected by Actuary	16
Employer Normal Cost for FYE June 30, 2018	1,497,609	(15) × (16)	17
Reimburse Administrative Expenses from FYE June 30, 2016	62,701	Expenses × (1.07)^(2)	18
Initial Required Employer Contribution for FYE June 30, 2018	3,358,598	(11) + (17) + (18)	19
Interest on Late Employer Contributions	18,426	Determined by Actuary	20
Total Required Employer Contribution for FYE June 30, 2018	3,377,024	(19) + (20)	21

[A] = Employer normal cost ($1,495,829,299) for the fiscal year ending June 30, 2017 as determined in the June 30, 2015 actuarial valuation

[B] = Discounted value of previously paid administrative expenses with interest expected to be reimbursed in fiscal years ending June 30, 2017 [($60,129,380) ÷ (1.07)^(0.5)] and June 30, 2018 [($62,701,431) ÷ (1.07)^(1.5)]

The required employer contribution under OYLM in Table 6 used an aggregation method to approximate the employer normal cost by multiplying projected salaries for the employer

required contribution fiscal year times a single normal cost percentage of 11.7776%. This approach allocates employer normal cost contributions over the member's expected working lifetime (employer normal cost contributions are required in the same fiscal year that the employer normal costs are attributed to). However, the employer normal cost contribution will not equal the sum of the individually determined employer normal costs under OA's actuarial cost method due to the single normal cost percentage applied to all salaries.

The OYLM was revised starting with the June 30, 2017 actuarial valuation. 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. Based on the description in the June 30, 2017 actuarial valuation report, the new OYLM determined the required employer contribution for the fiscal year ended June 30, 2019 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 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 appear to have been 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 13-127(b)(2)(d) 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 which is designed to fund expected benefits on a level basis over the working lifetimes of members. As previously listed in section 8B, NYCAC Section 13-127(b)(2)(d) describes two methods under the actuary's discretion for calculating the entry age normal contribution:

1) On an individual member basis where the entry age normal contribution rate determined for each individual member is multiplied 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) On an aggregate basis where the entry age normal contribution rate determined for all members in aggregate is multiplied 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.

NYCAC Section 13-127(b)(2)(d) 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 13-127(b)(2)(d) 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 NYCAC Section 13-127(b)(2)(d) 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 13-127(b)(2)(d).
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. 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 13-127(b)(2)(d).

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 13-127(b)(2)(d).
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 13-127(b)(2)(d).

The required employer contribution determined under the old OYLM and new OYLM also includes an amount for reimbursement of previously paid administrative expenses. The System indicated that administrative expenses deducted from QPP assets are required to be reimbursed with the actuarial interest rate per state statute. However, no adjustment appears to have been made for administrative expenses to be paid in the future. Actuarial cost methods are often termed as "advance funding actuarial cost methods"[8] since the methods are intended to accumulate necessary assets before benefits are payable. Generally accepted actuarial principles and practices indicate that expenses borne or expected to be borne by the plan should be reflected in the actuarial cost method.[9] Often this is done by adding expected expenses for the year to the normal cost for the same year, but other adjustments may be appropriate.[10] The OYLM appears to only reflect the reimbursement of previously paid administrative expenses.

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

[8] 29 USC Section 1002(31)
[9] ASOP 4 (Doc. No. 205) Sections 2.1, 2.2, 2.10, and 2.17
[10] ASOP 4 (Doc. No. 205) Section 3.13(c)

determined contribution.[11] 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 employer normal cost contribution from the explicitly calculated plan NC based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-127(b)(2)(d). 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 adding an administrative expense assumption to the total employer required contribution for a fiscal year to fund future administrative expenses expected to be paid from plan assets in the same fiscal year.

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 actuarial valuation report would provide useful information to any interested parties.

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

G. Allocation of Employer Contribution to Other Benefit Plans

Besides the QPP, the System administers GLIP, EBP and five variable supplements funds ("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 variable supplement funds (COVSF, HPOVSF, HPSOVSF, TPOVSF, TPSOVSF) receive an additional payment of up to $12,000 annually.

According to the provisions governing each of these plans, each plan's and VSF's assets must be separate from the QPP and the plan's assets may only be used to provide benefits for that plan. 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, 2016 actuarial valuation report.

Table 7: Other Benefit Plan Results from June 30, 2016 Actuarial Valuation
(Results in $ Thousands)

Plan	AL	MVA	AVA	2018 Fiscal Year Contribution
QPP	$ 79,081,183	$ 55,489,504	$ 56,491,829	$ 3,377,024
GLIP	Not Disclosed [A]	Not Disclosed [A]	Not Disclosed [A]	12,089 [B]
EBP	Not Disclosed [A]	Not Disclosed [A]	Not Disclosed [A]	Not Disclosed [C]
COVSF	1,258,123 [D]	5,017	68,561	0
HPOVSF	16,006 [D]	0	0	0
HPSOVSF	22,301 [D]	0	0	0
TPOVSF	32,689 [D]	0	0	0
TPSOVSF	24,874 [D]	0	0	0

[A] – included in QPP

[B] – portion of QPP contribution to allocate for GLIP
[C] – Contribution for EBP issued in a separate report
[D] – unfunded portion (AL minus AVA) is included in QPP AL

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. 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. SADBs are required to be paid by the city, town, or village which employed the deceased member[12] 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 don't appear to follow the applicable provisions for each plan. 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.
iii) The SADB is part of the same defined benefit plan as the QPP.

GLIP

OA's June 30, 2016 actuarial valuation report (page 79) stated "liabilities for group life lump sum death benefits are calculated under the One-Year Term Cost method." This means GLIP

[12] New York State General Municipal Law Sections 208-f(b) and 208-f(e)

costs are determined for one-year of coverage only (i.e., $12,089,033 represents the present value of expected GLIP payments during the fiscal year ended June 30, 2018). However, the calculation of the fiscal year ended June 30, 2018 QPP contribution of $3,377,024,173 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 didn't 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 that none of the benefit plans (i.e., GLIP and EBP)are accounted for separately from other System assets and VSFs.

Including GLIP assets and liabilities when calculating the QPP contribution appears to be inconsistent with Sections 2 and 4 from Rule 37 of the New York City Public Employees' Group Life Insurance Plan. Section 2 requires the GLIP to "be separate and independent of NYCERS and all NYCERS funds, and shall be held in trust by the Board of Trustees of NYCERS." Section 2 further states GLIP assets "shall consist of all premiums paid by the participating employers, and of the investment earnings upon such monies, and shall be used only to pay group term life insurance." Section 4 then defines the GLIP premium as follows:

> (a) The Actuary shall investigate the *Plan's* claim experience in accordance with the methods of investigation provide for by applicable statutory provisions. On the basis of such investigation and upon the recommendation of the Actuary, the Board of Trustees of NYCERS 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 NYCERS shall determine the premium which the participating employers are required to pay into the *Reserve Fund* to discharge the obligations of the *Plan* for each fiscal year.
> (c) (1) Each fiscal year, the procedure for payment of premiums by the participating employers into the Reserve Fund shall be prescribed in subparagraph (2) of this paragraph (c).
> (2) Within the period allotted for submission of estimates of contributions required to be paid by the participating employers to NYCERS, the Board of Trustees of NYCERS shall submit to the Director of Management and Budget a statement of the amount of the premium required to be paid by the participating employers into the *Reserve Fund* to discharge the obligations of the *Plan* for the subject fiscal year. Such amount shall be paid by each participating employer into the *Reserve Fund* in the same manner and at the same time or items (including monthly installments, if applicable) as such employer pays its employer contributions to NYCERS.

(d) In any case where a premium is paid by the participating employers into the *Reserve Fund* of the *Plan* in any fiscal year, the Contingent Reserve Fund of NYCERS shall thereupon be reimbursed from the *Reserve Fund* of the *Plan* for sums transferred to such *Reserve Fund* from such Contingent Reserve Fund, pursuant to these rules, to meet obligations of the *Plan* for which such premium was paid.

Rule 37, Sections 2 and 4, show the GLIP assets are intended for exclusively providing GLIP benefits with the GLIP funded by premium payments each year. However, the System's financial reporting and OA's calculations do not appear to follow these rules.

The System provided the Department additional information regarding the QPP assets of roughly $55.489 billion as of June 30, 2016. It was noted that the QPP asset amount of $55.489 billion included the GLIP Reserve Fund of almost $0.628 billion. The June 30, 2016 actuarial valuation report noted the total employer contribution for the fiscal year ended June 30, 2018 employer included approximately $0.012 billion for GLIP. Based on the accumulated GLIP reserve fund of $0.628 billion as of June 30, 2016, no GLIP employer contribution would be needed to cover roughly $0.012 billion in expected GLIP benefit payments for the fiscal year ended June 30, 2018 (and likely for many more years thereafter). Further, it appears that the $0.628 billion listed as the GLIP reserve fund was included in the QPP assets.

EBP

Similar to GLIP above, EBP assets are required to be separate from QPP assets and used exclusively for providing EBP benefits. Determining a QPP contribution on the combined QPP and EBP values will misstate the employer contribution necessary to fund each benefit plan separately. As the System has historically been paying EBP benefits, a residual EBP asset balance was expected. However, the System has stated EBP assets are not accounted for separately and there are no EBP assets. This does not appear to follow NYCAC Section 13-196(3) which states that contributions to the EBP "shall be held separate and apart from the assets held by the other funds of the retirement system, provided, however, that the assets of the excess benefit fund may be invested with other retirement system assets, but such excess benefit fund assets shall be accounted for separately from the other retirement system assets." NYCAC Section 13-196(6)(c) further notes:

> The benefit liabilities of the excess benefit plan shall be funded on a plan year to plan year basis, provided, however, that any employer contributions to the excess

> benefit fund, including any investment earnings on such contributions, which are not used to pay replacement benefits for the current plan year shall be used to pay replacement benefits in future plan years.

Not segregating or separately accounting for EBP assets and not funding on a plan year to plan year basis does not appear to follow NYCAC requirements.

VSFs

VSF benefits are not actuarially funded, but instead rely on assets transferred from the QPP. The SKIM calculation (COVSF) or pay-as-you-go transfer amounts (remaining VSFs) do 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, 2016 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 as of June 30, 2016, DFS estimates the fiscal year ended June 30, 2018 employer contribution attributed to VSFs to be approximately $173 million.[13] However, the average annual amount transferred to the VSFs over the seven-year period ended June 30, 2021, was roughly $229 million, roughly 32% higher than the estimated $173 million for the 2018 fiscal year. This indicates VSF benefits are effectively receiving preferred funding treatment over the QPP.

VSF benefits represented less than 2% of the present value of future benefits as of June 30, 2016, but VSFs received transfers from the QPP totaling roughly 6% of all contributions received by the QPP over the seven-year period ended June 30, 2021. This has resulted in the COVSF funded percentage as disclosed in the System's financial reports as increasing from 19.1% as of June 30, 2014 to 87.46% as of June 30, 2021, while over the same period the QPP increased from 76.36% to 93.30%. The VSF funded percentage increased by approximately four times the increase in the QPP funded percentage.

VSF membership accounts for less than 5% of System members, but appears to receive more favorable funding treatment than QPP benefits provided to all System members. As VSFs assets are restricted to provide VSF benefits only, but do not constitute a pension or retirement

[13] Employer normal cost of $20.6 million, plus $152.0 million gain/loss amortization payment for $1.286 billion in unfunded accrued liability

system[14], and may be repealed by the legislature, it raises the question if the use of QPP assets to fund VSF benefits at a faster rate than the QPP is appropriate and equitable to all System members.

SADB

The System's historical administrative practice illustrate 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 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 SADBs are appropriated as shown below:

> Section 208-f(e). 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.
>
> 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.

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[14] New York City Administrative Code Sections 13-191(2)(b), 13-192(2)(b), and 13-194(2)(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 IX K of the June 30, 2020 actuarial valuation report.

It appears that only due to a lack of full reimbursement to the QPP from the State were SADBs then first included in the QPP calculation. 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 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) retirement plan election (i.e., whether the member is participating in an improved retirement program). In addition, the System has found many of these assumptions to vary significantly among members in different employment categories and has adopted separate sets of assumptions in the actuarial valuation for the following employee groupings:

- Transit employees
- Triborough Bridge and Tunnel Authority (TBTA) employees
- Sanitation Department employees
- Department of Corrections employees
- General (i.e., all other employees, mainly office workers)

Pursuant to NYCAC Section 13-121, 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 $2.3 billion 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 $0.2 billion for the fiscal year ended June 30, 2016 through the fiscal year ending June 30, 2034.

Starting with the June 30, 2016 actuarial valuation, accidental rates assumed for Tier 6 Sanitation and Correction members were also changed. This assumption change resulted in a smaller increase in liability of approximately $0.02 billion as of June 30, 2016 with an annual

installment of less than $2 million for the fiscal year ended June 30, 2018 through the fiscal year ending June 30, 2036.

Observations:

The examiner identified several assumptions not disclosed in the June 30, 2016 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 the actuarial assumptions such as actual pensionable earnings were not used, there was no projected mortality improvement for pre-retirement, application of first annual September cost-of-living-adjustment increase, and other applications.

Recommendations:

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 using a minimum salary for active or inactive members without salary information provided 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 as of June 30, 2016, and noted significant differences between the actual pensionable earnings for the year ended June 30, 2016 and the estimated salary.

Observations:

The results of the actuarial valuation are highly dependent on the data used. The New York State Comptroller's Review of the Financial Plan of the City of New York report dated March 2019 noted a calculation error estimated to increase the pension contribution by roughly $175 million annually.[16] OA stated this error was attributed to approximately 2,900 individuals miscoded by the System as transfers out of the System instead of transfers into the System. OA indicated the error was corrected for the June 30, 2017 actuarial valuation.

The examiner's review of the pensionable earnings reported by the System for a sample of active members as of June 30, 2016, noted significant differences between the actual pensionable earnings and the estimated annual salary used for the actuarial valuation. As most benefits provided by the 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 or salary, and checking the reasonableness of large changes in data values.

The System indicated that OA had started incorporating historical pensionable salary into the actuarial valuation with the June 30, 2017 actuarial valuation.

[16] https://osc.state.ny.us/osdc/report-10-2019.pdf

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, 2016 actuarial valuation report included the development of the actuarial gain or loss experience as summarized in Table 8 below:

Table 8: Development of Experience (Gain) / Loss at June 30, 2016		
1.	Expected Accrued Liability	(Results in $1,000s)
A	Accrued Liability at June 30, 2015	$ 76,873,488
B	Total Normal Cost and Administrative Expenses at June 30, 2015	1,899,538
C	Interest on 1a and 1b to June 30, 2016	5,514,111
D	Fiscal Year 2016 Benefit Payments with Interest to June 30, 2016	(4,650,884)
E	Expected Accrued Liability at June 30, 2016	$ 79,636,253
2.	Actual Accrued Liability at June 30, 2016 before changes	$ 79,074,823
3.	Expected Total Actuarial Value of Assets	
A	Total Actuarial Value of Assets at June 30, 2015	$ 53,768,962
B	Interest on 3a to June 30, 2016	3,763,827
C	Total Contribution Paid in Fiscal Year 2016	3,850,962
D	Interest on 3c to June 30, 2016	132,504
E	Fiscal Year 2016 Benefit Payments with Interest to June 30, 2016	(4,650,884)
F	Expected Total Actuarial Value of Assets at June 30, 2016	$ 56,865,371
4.	Actual Total Actuarial Value of Assets at June 30, 2016	$ 56,560,390
5.	Accrued Liability (Gain) / Loss [2. – 1.e]	$ (561,430)
6.	Actuarial Value of Asset (Gain) / Loss [3.f – 4.]	$ 304,981
7.	Total Actuarial (Gain) / Loss [5. + 6.]	$ (256,449)

The System experienced a lower than expected accrued liability resulting in a liability gain of approximately $561 million and a loss of roughly $305 million from a lower than expected actuarial value of assets resulting in a net gain of approximately $256 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 doesn't appear to appropriately measure plan experience as of the valuation date. OA provided the following clarification of the Total Normal Cost and Administrative Expenses at June 30, 2015 (item 1B above):

> "Item 1b is equal to the Normal Cost as of 1/1/2017 discounted 18 months to 6/30/2015 plus actual employee contributions (from the 6/30/2016 financial statements) discounted 6 months to 6/30/2015 plus administrative expenses (from the 6/30/2015 financial statements) adjusted with interest forward for 6 months plus an adjustment of approximately $22 million. This last adjustment is a balancing item which we believe is related to the fact that (for conservative funding purposes) the valuation assumes that Tier 4 employee contributions are made over the working lifetime of the member rather than only over the first ten years of employment."

Gain/loss experience is intended to measure expected versus actual values as of the valuation date. Determining expected AL as of June 30, 2016 using the employer NC for periods after June 30, 2016 and actual employee contributions for the fiscal year ended June 30, 2016 are not consistent with the purpose of the measurement. Only expected values attributed to the fiscal year ended June 30, 2016 would be used to determine the expected AL as of June 30, 2016.

In addition, the development of the experience gain/loss provided above appears to be 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 uses EAN as defined by the ASB) was approximately $78.0 billion. However, OA's AL as of June 30, 2016 as listed on Table I-2 of the June 30, 2016 actuarial valuation report, was roughly $79.1 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.[17]

[17] Enhancing Reliability of Actuarial Valuations for Pension Plans

9. SUMMARY AND CONCLUSIONS

Below are the recommendations contained in this report. Recommendations or 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.	29, 59
B	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 13-127(b)(2)(d).	38
C	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.	41
D	The System may want to 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.	47
E	The System should consider determining the employer normal cost contribution from the explicitly calculated plan NC based on expected salaries for the same fiscal year in accordance with NYCAC Section 13-127(b)(2)(d). The System should also consider using the EAN actuarial cost method defined by the ASB for determining the explicitly calculated plan normal cost.	52
F	The System should consider adding an administrative expense assumption to the total employer required contribution for a fiscal year to fund future administrative expenses expected to be paid from plan assets in the same fiscal year.	52
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.	52

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.	52
I	The System should consider ceasing asset transfers or benefit payments from the QPP for providing any non-QPP benefits.	59
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.	59
K	The System should consider following the requirements for SADBs in accordance with General Municipal Law.	59
L	The System should consider re-evaluating certain actuarial assumptions and disclosing all the relevant assumptions in the actuarial valuation report.	61
M	The System should consider reflecting actual historical pensionable earnings in the actuarial valuation and calculating final accrued benefits for members no longer working.	62
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.	62
O	The System should consider re-evaluating the calculation of the experience gain/loss as of the valuation date.	65
P	The System should also consider including a more detailed gain/loss analysis and a reconciliation of the total AL in future valuation reports.	65

Respectfully submitted,

/s/
Denise Saunders
Senior Insurance Examiner

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

Denise Saunders, being duly sworn, deposes and says that the foregoing report, subscribed by her, is true to the best of her knowledge and belief.

/s/
Denise Saunders

Subscribed and sworn to before me

this_____ day of _____

Jason Fesmire performed an actuarial review of the June 30, 2016, actuarial valuation report of the New York City Employees' Retirement System Qualified Pension Plan 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 Employees' Retirement System 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 September 2025

_____
Notary Public

APPOINTMENT NO. 31833

NEW YORK STATE

DEPARTMENT OF FINANCIAL SERVICES

*I, **MARIA T. VULLO**, 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:*

DENISE SAUNDERS

as a proper person to examine the affairs of the

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM

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

SYSTEM

with such other information as she 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 9th day of November, 2018

MARIA T. VULLO
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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September 5, 2025

Honorable Adrienne A. Harris
Superintendent of Financial Services
New York, New York 10004

Dear Adrienne A. Harris:

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 System's actuary 1) adopt an approach to forecasting inflation that is consistent with economic theory and practice; and 2) adopt 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.

Our interview with the Chief Actuary from the New York City Office of the Actuary in the spring of 2021 revealed an intent to reduce the system-wide inflation assumption from 2.5% to 2.3% and the system-wide return assumption (actuarial interest rate or "AIR") from 7% to 6.8%. The Chief Actuary argued for invariant 4.5% "real return" assumption. We discussed with the Chief Actuary that we see the inflation analysis as making little sense in the 2021 market environment in which we are seeing strong monetary accommodation in the face of potentially massive amounts of government spending. At the time of our interview the running CPI inflation rate was over 5% year over year – which would have been the appropriate time **not** to be lowering the inflation assumption. (The current rate as of July 2022 is 9.1%.) The Chief Actuary could provide no justification for this decision other than "it is art, not science". We also questioned the validity of the Chief Actuary's use of an invariant 4.5% "real return" assumption that results in a 6.8% expected return given the Chief Actuary's proposed[7] 2.3% inflation assumption; 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 independent of any inflation assumption. There is simply no single expected 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. The CIO indicated in our interview that despite the funds' target annual 7% expected return, the funds have generally fallen short of that target and the assumptions driving the model don't support that level of return. We disagree with both assertions. Our review of the data reveals that between the fiscal years ending 6/30/2012 and 6/30/2021, the fund returns were as follows:

[7] The Chief 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.

Annual Pension Returns

	Teachers	NYCERS	Police	Fire	BERS
FY ending 6/30/21	24.80%	26.63%	26.37%	24.86%	27.97%
FY ending 6/30/20	4.89%	3.58%	4.67%	4.81%	5.72%
FY ending 6/30/19	7.54%	7.13%	6.95%	7.11%	6.99%
FY ending 6/30/18	8.12%	8.56%	9.41%	9.30%	10.37%
FY ending 6/30/17	12.66%	12.99%	13.19%	12.82%	15.33%
FY ending 6/30/16	1.66%	1.52%	1.21%	1.41%	0.17%
FY ending 6/30/15	2.78%	3.11%	3.85%	3.29%	3.18%
FY ending 6/30/14	17.62%	17.03%	17.78%	17.40%	19.47%
FY ending 6/30/13	11.90%	12.24%	12.28%	11.90%	12.90%
FY ending 6/30/12	1.85%	1.32%	0.87%	1.10%	0.10%
Average (non-compounded)	**9.38%**	**9.41%**	**9.66%**	**9.40%**	**10.22%**
Average (Trim High Year and Low Year):	**8.40%**	**8.27%**	**8.67%**	**8.51%**	**9.27%**

The funds do not seem to be generally falling short of target. We also note that based on our independent analysis (see section H below) the 7% expected return is itself a function of those assumptions that drive the optimization models, i.e., the assumptions do indeed support that expected return and associated standard deviation.

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 as demonstrated above. This does not support the Chief Actuary's assumption that nominal investment returns tend to a level of "inflation + 4.5%". Further, as we update this report in July 2022, we note the Actuary's use of this guideline would have suggested nominal investment returns of 13.6% over the past year based on the realized 9.1% inflation.

We believe that the Pension Systems need to develop a consistent view about the nature of Expect Return and its dependence on asset allocation and risk preference. There needs to be a single agreed-upon understanding of why a particular asset allocation (i.e., expected return, standard deviation pair) is selected. The Systems' actuaries also need to pay more attention to the news about CPI inflation and be prepared to discuss their inflation forecasts intelligently in the context of current fiscal and monetary policy.

We recommend that the System's actuary 1) adopt an approach to forecasting inflation that is consistent with economic theory and practice; and 2) adopt 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 the system hired Milliman to conduct an independent actuarial review that was completed in November 2023. That review provided our recommended approach to determining an investment return assumption, i.e., mapping the system's target asset allocation to expected return estimates for each asset class. Milliman recommended that each of the systems should receive input from their investment advisors prior to a final decision being made about the investment return assumptions (we understand that each may have different asset allocations and each system's investment advisor may have unique expected return forecasts). We are encouraged that this is being considered, however, Milliman appears to have performed the investment return assumption analysis on a System basis only rather than determining separate investment return assumptions for each plan within the System. This is discussed further in item F below.

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.

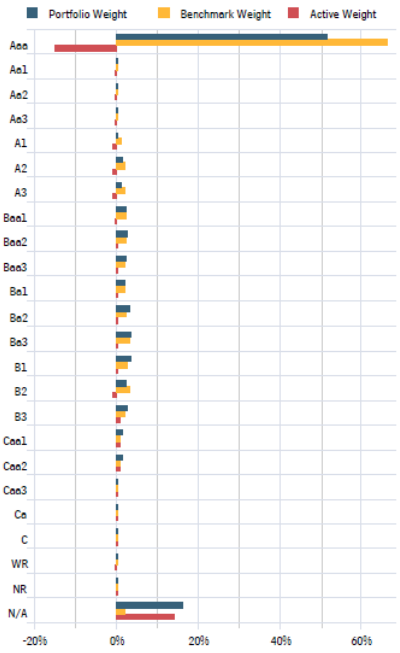
BarraOne Fixed Income Summary

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	Weight (%) 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[8] as does the New York State Teachers Retirement System Investment Policy Manual, page 13.[9]

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

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

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 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.

Funston Report	BAM Update
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-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[10]:

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.

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

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.

(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 System's actuary 1) adopt an approach to forecasting inflation that is consistent with economic theory and practice; and 2) adopt 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).	17
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~~ Westchester)

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 2nd day of September

EMILY GRACE MANCINI
Notary Public, State of New York
Westchester County #01MA6442445
Commission Expires Oct. 11, 2026