



Fiscal Year 2018
Actuarial Valuation Report
for the
New York City
Board of Education
Retirement System

JUNE 30, 2016 (LAG) ACTUARIAL VALUATION

prepared by the
New York City
Office of the Actuary

2018



OFFICE OF THE ACTUARY

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SHERRY S. CHAN
CHIEF ACTUARY

December 12, 2018

Board of Trustees
New York City Board of Education Retirement System
65 Court Street, Room 1602
Brooklyn, NY 11201-4965

Re: Fiscal Year 2018 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2016 actuarial valuation of the benefits under both the New York City Board of Education Retirement System (BERS) Qualified Pension Plan and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2016 (Lag) valuation, forms the basis for determining the actuarially-required contribution (Actuarial Contribution) of \$318,643,334 for Fiscal Year 2018 (i.e. for the period beginning July 1, 2017 and ending June 30, 2018). It is not intended, nor necessarily suitable, for other purposes. Calculations made for other purposes may differ significantly from those shown herein. This report does not present GASB results. The Office of the Actuary published Fiscal Year 2017 GASB67 and GASB68 results in a Report dated September 29, 2017, which is available on the website of the Office of the Actuary (www.nyc.gov/actuary).

Results of the June 30, 2015 (Lag) actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2016 (Lag) and June 30, 2015 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by BERS and the Office of the Comptroller as of June 30, 2016 and June 30, 2015.

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

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

A summary of the actuarial methods and assumptions are shown in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS. A cost associated with providing a guaranteed 8.25% return on the TDA Fixed Fund for non-UFT members is added to the Normal Cost beginning with the June 30, 2016 valuation. All other actuarial assumptions and methods are unchanged from the prior year.

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

Best Regards,



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

SSC/eh

cc: Mr. Michael Hunter - New York City Office of the Actuary
Ms. Marlene Markoe-Boyd - New York City Office of the Actuary
Mr. Sanford Rich - New York City Board of Education Retirement System
Mr. Sam Rumley - New York City Office of the Actuary
Mr. Michael Samet - New York City Office of the Actuary
Keith Snow, Esq. - New York City Office of the Actuary

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SECTION I – EXECUTIVE SUMMARY

This report presents the results of the June 30, 2016 (Lag) actuarial valuation of the New York City Board of Education Retirement System (BERS) and Group Life Insurance Plan (collectively, the Plan).

The purposes of the valuation are:

- To determine the actuarially-required contribution (Actuarial Contribution) for Fiscal Year 2018 (i.e. July 1, 2017 to June 30, 2018),
- To measure the funding progress of the Plan,
- To disclose the census data and financial information used in the valuation, and
- To disclose the actuarial assumptions and actuarial methods used to determine the Actuarial Contribution.

The statutorily-required contribution (Statutory Contribution) is also shown, and it has equaled the Actuarial Contribution in all historical years.

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

Future measurements of this information may differ from current measurements for many reasons including, but not limited to, experience differing from economic or demographic assumptions, changes in actuarial assumptions and methods, and changes in applicable statute and plan provisions. The actuary's scope of work did not include an analysis of the range of such deviations.

Additional risks may be present for the Plan and are presented in SECTION VII-RISK AND UNCERTAINTY for consideration.

Table I-1 Executive Summary

Presented in **Table I-1** are the principal results of the June 30, 2016 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2015 (Lag) actuarial valuation.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2016 (Lag)	June 30, 2015 (Lag)
Fiscal Year	2018	2017
Funded Status		
1. Accrued Liability	\$ 4,767,760,226	\$ 4,585,780,524
2. Actuarial Value of Assets (AVA) ¹	<u>2,858,737,000</u>	<u>2,772,466,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 1,909,023,226	\$ 1,813,314,524
4. Funded Ratio (AVA Basis) (2. / 1.)	60.0%	60.5%
5. Market Value of Assets (MVA) ¹	3,416,433,000	3,454,009,000
6. Unfunded Accrued Liability (MVA Basis) (1. - 5.)	\$ 1,351,327,226	\$ 1,131,771,524
7. Funded Ratio (MVA Basis) (5. / 1.)	71.7%	75.3%
Contribution		
1. Normal Cost	\$ 137,982,408	\$ 125,944,833
2. Unfunded Accrued Liability	165,985,598	149,744,860
3. Administrative Expenses	<u>14,675,328</u>	<u>12,543,524</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 318,643,334	\$ 288,233,217
5. Statutory Contribution	\$ 318,643,334	\$ 288,233,217
Participant Data		
1. Active Members		
a. Number	25,864	24,903
b. Annual Salary	\$ 1,149,019,892	\$ 1,093,962,316
c. Average Salary	\$ 44,425	\$ 43,929
2. Active/Inactive Members ²	2,629	3,972
3. Terminated Vested Members	851	237
4. Retirees and Beneficiaries		
a. Number	16,937	16,438
b. Total Annual Benefits	\$ 227,068,574	\$ 218,432,263
c. Average Benefit	\$ 13,407	\$ 13,288

¹ Actuarial Value of Assets and Market Value of Assets are rounded to the nearest thousand.

² Represents members no longer on payroll, but not otherwise classified.

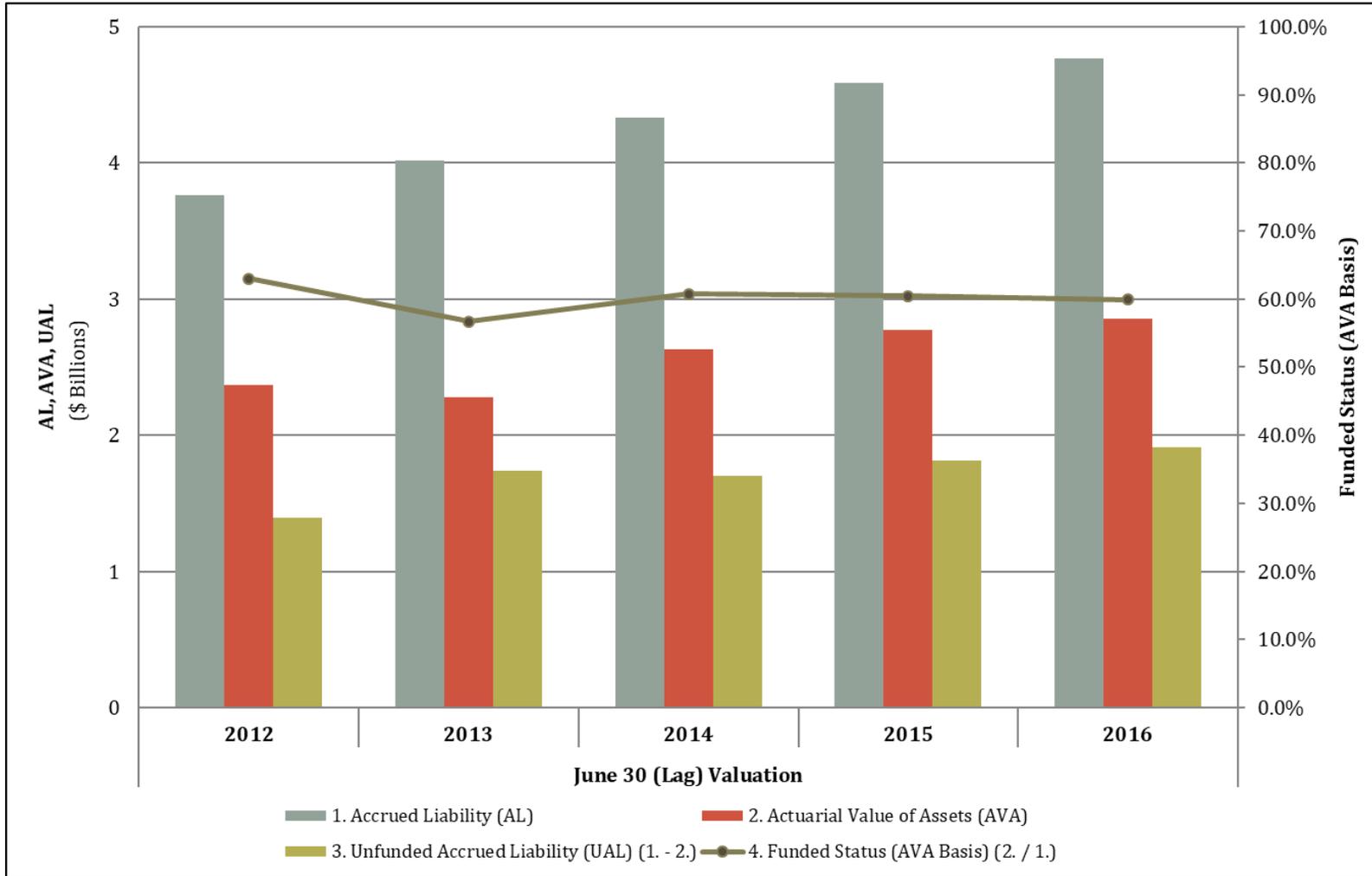
Table I-2
Actuarial Liabilities

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2016 (Lag)	June 30, 2015 (Lag)
Fiscal Year	2018	2017
Accrued Liability		
1. Active Members	\$ 2,380,352,597	\$ 2,255,195,925
2. Active/Inactive Members ¹	45,594,094	90,758,471
3. Terminated Vested Members	43,038,655	14,865,191
4. Retirees and Beneficiaries	<u>2,273,411,493</u>	<u>2,200,281,213</u>
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 4,742,396,839	\$ 4,561,100,800
6. Actuarial Adjustments ²	<u>25,363,387</u>	<u>24,679,724</u>
7. Total Accrued Liability (AL) (5. + 6.)	\$ 4,767,760,226	\$ 4,585,780,524
Present Value of Benefits		
1. Active Members	\$ 3,745,180,435	\$ 3,569,140,468
2. Active/Inactive Members ¹	45,594,094	90,758,471
3. Terminated Vested Members	43,038,655	14,865,191
4. Retirees and Beneficiaries	<u>2,273,411,493</u>	<u>2,200,281,213</u>
5. Present Value of Benefits (1. to 4.)	\$ 6,107,224,677	\$ 5,875,045,343
6. Actuarial Adjustments ²	<u>25,363,387</u>	<u>24,679,724</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 6,132,588,064	\$ 5,899,725,067

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

² Related to actuarial loading adjustments.

Graph I-3
Historical Funded Status



SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS

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

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

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

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

Table II-1
Statement of Plan Net Assets as of June 30, 2016 and June 30, 2015

(\$ Thousands)		
	June 30, 2016	June 30, 2015
ASSETS		
Cash	\$ 327	\$ 16,143
Receivables		
Investment Securities Sold	\$ 119,062	\$ 50,839
Member Loans	46,748	44,675
Accrued Interest and Dividends	247	239
Other	<u>3</u>	<u>3</u>
Total Receivables	\$ 166,060	\$ 95,756
INVESTMENTS AT FAIR VALUE		
Fixed return funds		
Short-Term Investments		
Commercial Paper	\$ 71,888	\$ 148,449
Short-term Investment Fund	35,933	35,597
U.S. Treasury Bills	0	0
Discount Notes	0	25,996
Debt Securities	879,762	851,577
Equity Securities	291,144	334,325
Alternative Investments	506,922	385,819
Collective Trust Funds		
Fixed Income	106,684	85,942
Domestic Equity	1,401,665	1,432,065
International Equity	942,911	969,838
Mortgage Debt Security	28,956	23,862
Treasury Inflation Protected Securities	218,608	139,367
Promissory Notes	0	0
Collateral From Securities Lending	476,001	298,872
Variable return funds		
Short-Term Investments	571	553
Debt Securities	976	1,024
Equities	40,953	44,666
Collateral From Securities Lending	<u>1,622</u>	<u>3,263</u>
Total Investments	\$ 5,004,596	\$ 4,781,215
TDA Program's interest in the fixed return fund	0	0
OTHER ASSETS	<u>124,031</u>	<u>106,254</u>
TOTAL ASSETS	\$ 5,295,014	\$ 4,999,368
LIABILITIES		
Accounts Payable	\$ 6,907	\$ 6,199
Payable for Investment Securities Purchased	103,213	86,747
Accrued Benefits Payable	7,357	5,461
TDA Program's interest in the fixed return fund	1,283,481	1,144,817
Other Liabilities	0	0
Security Lending	<u>477,623</u>	<u>302,135</u>
TOTAL LIABILITIES	\$ 1,878,581	\$ 1,545,359
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	\$ 3,416,433	\$ 3,454,009

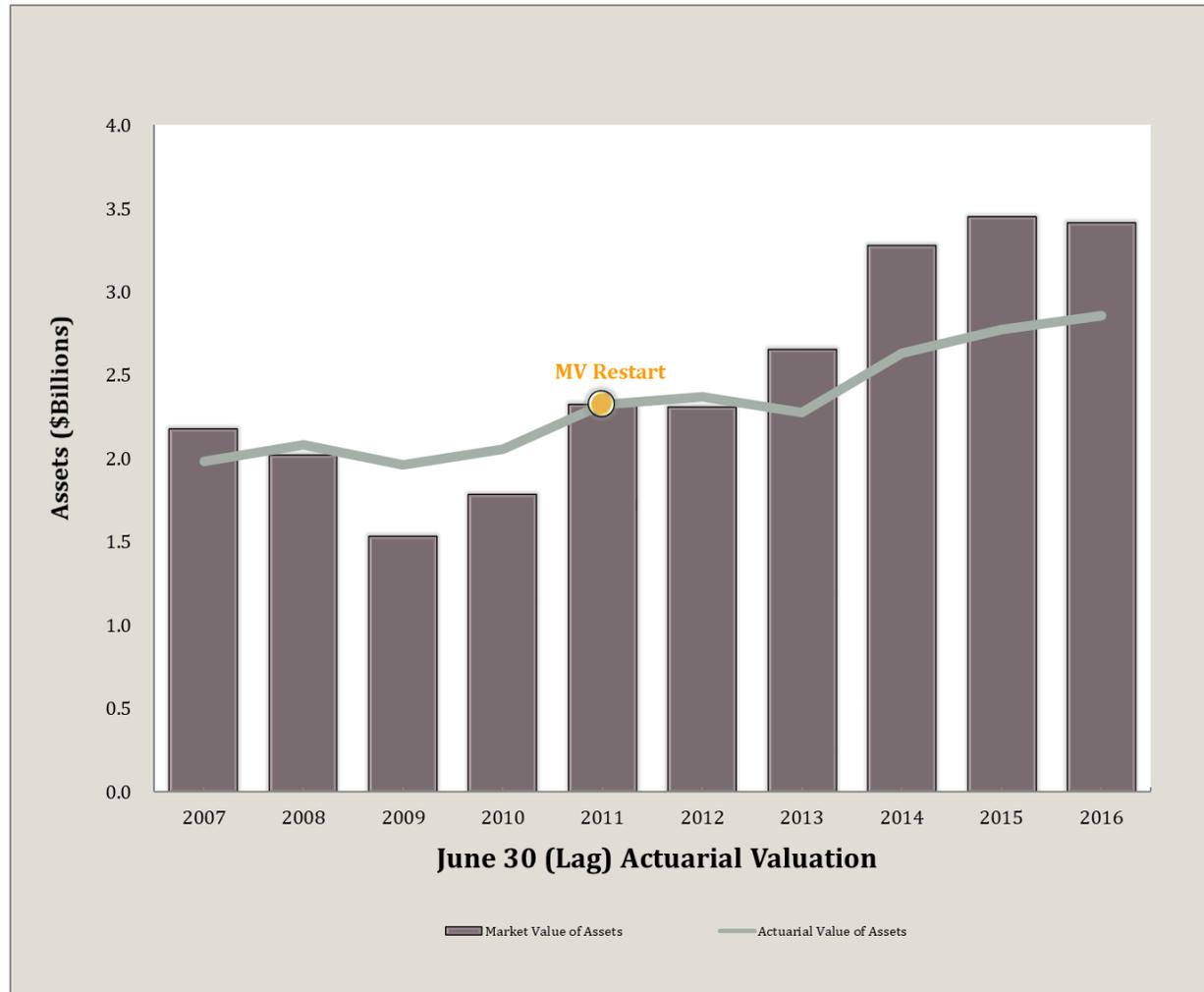
Table II-2
Statement of Changes in Plan Net Assets

(\$ Thousands)		
	June 30, 2016	June 30, 2015
ADDITIONS		
Contributions		
Member Contributions	\$ 38,581	\$ 39,564
Employer Contributions	<u>265,532</u>	<u>258,099</u>
Total Contributions	\$ 304,113	\$ 297,663
Investment Income (Loss)		
Interest Income	\$ 44,782	\$ 36,898
Dividend Income	51,328	46,207
Net Appreciation (Depreciation) in Fair Value	<u>79,014</u>	<u>101,496</u>
Total Investment Income (Loss)	\$ 175,124	\$ 184,601
Less Investment Expenses	14,296	10,098
Net Income (Loss)	\$ 160,828	\$ 174,503
Securities Lending Transactions		
Securities Lending Income	\$ 3,547	\$ 2,849
Securities Lending Fees	<u>(231)</u>	<u>(186)</u>
Net Securities Lending Income (Loss)	\$ 3,316	\$ 2,663
Net Investment Income (Loss)	\$ 164,144	\$ 177,166
Other		
Payments to Other Retirement Systems & Other Revenues/Expenses	\$ (157,499)	\$ (52,021)
TDA Program's Interest Income in the Fixed Return Fund	\$ (94,789)	\$ (85,104)
TOTAL ADDITIONS	\$ 215,969	\$ 337,704
DEDUCTIONS		
Benefit Payments and Withdrawals	\$ 240,727	\$ 223,244
Administrative Expenses	<u>12,818</u>	<u>10,956</u>
TOTAL DEDUCTIONS	\$ 253,545	\$ 234,200
NET INCREASE (DECREASE) IN PLAN NET ASSETS	\$ (37,576)	\$ 103,504
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	\$ 3,454,009	\$ 3,279,265
Prior Year Adjustments	<u>0</u>	<u>71,240</u>
Beginning of Year Balance Restated	<u>3,454,009</u>	<u>3,350,505</u>
End of Year	\$ 3,416,433	\$ 3,454,009

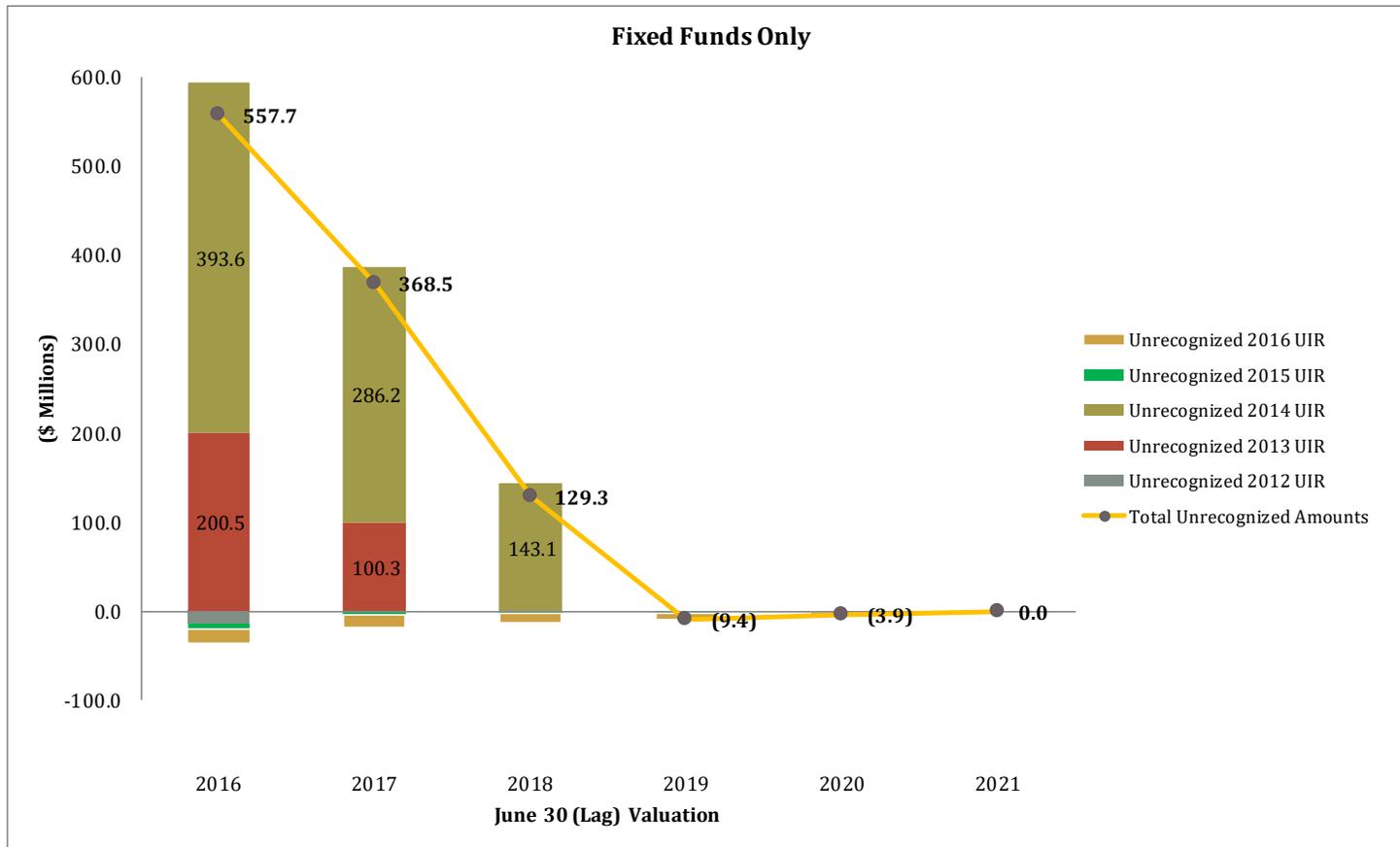
Table II-3
Development of Actuarial Value of Assets as of June 30, 2016

(\$ Thousands)		
Valuation Date	June 30, 2016	June 30, 2015
Fixed Fund		
Market Value of Assets (MVA)		
Beginning of Year (BOY)	\$ 3,407,717	\$ 3,302,951
End of Year (EOY)	\$ 3,373,846	\$ 3,407,717
1. Contributions		
a. Employee	\$ 38,563	\$ 39,542
b. Employer	265,532	258,099
c. Total Contributions	\$ 304,095	\$ 297,641
2. Net Investment Income		
a. Investment Income	\$ 178,642	\$ 184,874
b. Investment Expenses	(14,296)	(10,098)
c. Total Net Investment Income	\$ 164,346	\$ 174,776
3. Cash Flow (Other)	\$ (502,312)	\$ (367,651)
4. Net Cash Flow (1.c. + 3.)	\$ (198,217)	\$ (70,010)
5. Average invested assets		
a. AVA @ BOY	\$ 2,726,174	\$ 2,642,361
b. 1/2 Net Cash Flow ((1.c. + 3.) / 2)	(99,109)	(35,005)
c. Total	\$ 2,627,065	\$ 2,607,356
6. Expected Rate of Return (AIR)	7.00%	7.00%
7. Expected Investment Return (EIR) (5.c. x 6.)	\$ 183,895	\$ 182,515
8. Unexpected Investment Return (UIR) (2.c. - 7.)	\$ (19,549)	\$ (7,739)
9. AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 2,666,391	\$ 2,383,284
b. Net Cash Flow (4.)	(198,217)	(70,010)
c. Expected Investment Return (7.)	183,895	182,515
d. Phase in of UIR		
15% * UIR for prior year	(2,932)	(1,161)
15% * UIR for second prior year	(1,161)	107,336
15% * UIR for third prior year	107,336	75,195
15% * UIR for fourth prior year	75,195	(10,768)
20% * UIR for fifth prior year	(14,357)	N/A
20% * UIR for sixth prior year	N/A	N/A
Total	\$ 164,081	\$ 170,602
e. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d.)	\$ 2,816,150	\$ 2,666,391
10. Corridor		
a. 80% of MVA	\$ 2,699,077	\$ 2,726,174
b. 120% of MVA	\$ 4,048,615	\$ 4,089,260
11. Final AVA of EOY (9e. bounded by 10)	\$ 2,816,150	\$ 2,726,174
12. Variable Assets	\$ 42,587	\$ 46,292
13. Total AVA @ EOY (11. + 12.)	\$ 2,858,737	\$ 2,772,466

Graph II-4
Historical Market and Actuarial Value of Assets



Graph II-5
Future Recognition of UIR as of June 30, 2016



SECTION III - CONTRIBUTION DEVELOPMENT AND HISTORY

Table III-1
Statutory Contributions

Table III-1 shows the components of the Fiscal Year 2018 and the Fiscal Year 2017 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2016 (Lag)	June 30, 2015 (Lag)
Fiscal Year	2018	2017
Normal Cost ¹	\$ 137,982,408 ²	\$ 125,944,833 ³
Amortization of Unfunded Accrued Liability		
-Initial UAL	117,707,714	114,279,334
-2011 (Gain)/Loss	(21,558,572)	(21,558,572)
-2012 (Gain)/Loss	4,365,823	4,365,823
-2013 (Gain)/Loss	38,526,274	38,526,274
-2014 (Gain)/Loss	9,952,845	9,952,845
-2014 Assumption Changes	16,568,028	16,568,028
-2014 Method Changes	(27,567,113)	(27,567,113)
-2015 (Gain)/Loss	15,178,241	15,178,241
-2016 (Gain)/Loss	12,812,358	NA
Total	165,985,598	149,744,860
Administrative Expenses	14,675,328	12,543,524
Total Contribution to the New York City Board of Education Retirement System	\$ 318,643,334	\$ 288,233,217

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

² Includes \$1,593,365 for Group Life Insurance Plan.

³ Includes \$1,553,913 for Group Life Insurance Plan.

Table III-2
Schedule of Unfunded Accrued Liability Bases

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

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

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

Table III-2 shows the Summary of Unfunded Accrued Liability (UAL) Bases as of June 30, 2016.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES (\$ Thousands)						
Amortization Base	Date Established	Original Amount	Amortization Period/Method	Amortization Payment	Years/ Payments Remaining	OYLM UAL June 30, 2016
Initial UAL	6/30/10	\$ 1,312,068 ¹	22 Years Closed/IDP - 3%	\$ 117,708	16/16	\$ 1,348,883
(Gain)/Loss	6/30/11	\$ (182,268)	15 Years Closed/LDP	\$ (21,559)	10/10	\$ (156,628)
(Gain)/Loss	6/30/12	\$ 36,911	15 Years Closed/LDP	\$ 4,366	11/11	\$ 33,864
(Gain)/Loss	6/30/13	\$ 325,723	15 Years Closed/LDP	\$ 38,526	12/12	\$ 316,531
(Gain)/Loss	6/30/14	\$ 84,147	15 Years Closed/LDP	\$ 9,952	13/13	\$ 86,044
Assumption Change	6/30/14	\$ 165,544	20 Years Closed/LDP	\$ 16,568	18/18	\$ 172,394
Asset Method Change	6/30/14	\$ (275,445)	20 Years Closed/LDP	\$ (27,567)	18/18	\$ (286,841)
(Gain)/Loss	6/30/15	\$ 128,325	15 Years Closed/LDP	\$ 15,178	14/14	\$ 137,308
(Gain)/Loss	6/30/16	\$ 108,323	15 Years Closed/LDP	\$ 12,812	15/14	\$ 108,323

¹ Initial UAL as of June 30, 2010 after adjustments under OYLM. The amount prior to adjustments under OYLM was \$1,501,798,520.

Graph III-3
Remaining UAL Base Amortizations as of June 30, 2016

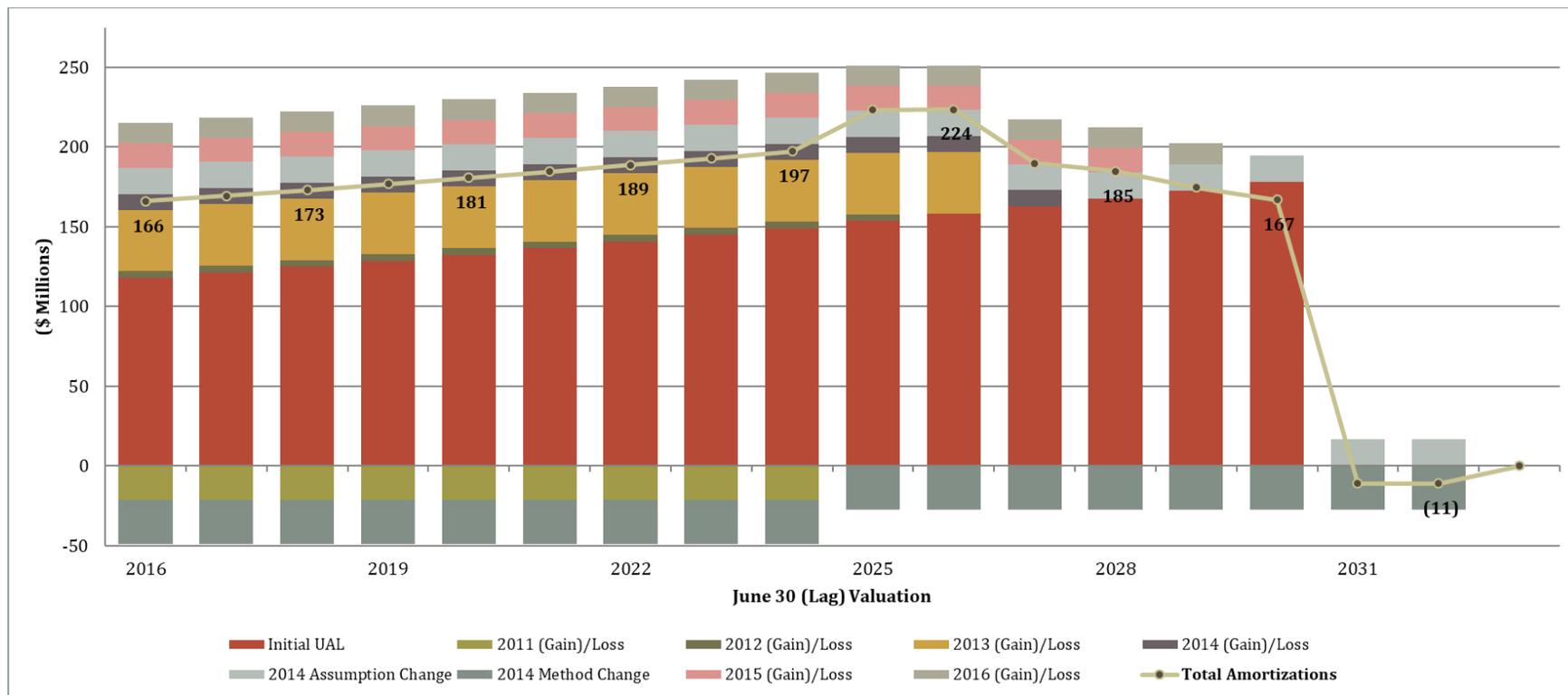


Table III-4
Reconciliation of Outstanding UAL Bases

June 30 (Lag) Valuation Date	Amounts (\$ Thousands) Remaining to be Amortized, as of						
	2010	2011	2012	2013	2014	2015	2016
Initial UAL Amortization Base	\$ 1,312,068	\$ 1,403,912	\$ 1,400,216	\$ 1,393,202	\$ 1,382,546	\$ 1,367,898	\$ 1,348,883
2010-2011 (Gain)/Loss		(182,268)	(195,027)	(186,379)	(177,125)	(167,223)	(156,628)
ERI		148	159	123	85	44	0
2011-2012 (Gain)/Loss			36,911	39,495	37,744	35,870	33,864
2012-2013 (Gain)/Loss				325,723	348,523	333,068	316,531
2013-2014 (Gain)/Loss					84,147	90,038	86,044
Assumption Change at June 30, 2014					165,544	177,132	172,394
AVA Change at June 30, 2014					(275,445)	(294,726)	(286,841)
2014-2015 (Gain)/Loss						128,325	137,308
2015-2016 (Gain)/Loss							108,323
Sum of Outstanding Amortization Amounts	\$ 1,312,068	\$ 1,221,792	\$ 1,242,259	\$ 1,572,164	\$ 1,566,019	\$ 1,670,426	\$ 1,759,878

June 30 (Lag) Valuation Date	2010	2011	2012	2013	2014	2015	2016
1. Accrued Liability (AL)	\$ 3,558,251	\$ 3,681,694	\$ 3,763,130	\$ 4,015,080	\$ 4,335,746	\$ 4,585,781	\$ 4,767,760
2. Actuarial Value of Assets (AVA)	2,056,452	2,323,629	2,371,613	2,277,791	2,632,922	2,772,466	2,858,737
3. Due To/From TDA	15,533	15,830	27,915	32,966	1,982	1,773	2,005
4. Unfunded Accrued Liability (UAL) (1. - 2. - 3.)	1,486,266	1,342,235	1,363,602	1,704,323	1,700,842	1,811,542	1,907,018
5. PV 1-year Adjusted Employer Contribution	174,198	102,338	102,516	113,311	114,830	118,963	121,755
6. PV Future Administrative Expense Reimbursement	0	18,105	18,828	18,849	19,993	22,153	25,385
7. Adjusted UAL (4. - 5. - 6.)	\$ 1,312,068	\$ 1,221,792	\$ 1,242,258	\$ 1,572,163	\$ 1,566,019	\$ 1,670,426	\$ 1,759,878

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2009 through 2018.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
2009	134,225	134,225	100.0%
2010	147,349	147,349	100.0%
2011	180,191	180,191	100.0%
2012	213,651	213,651	100.0%
2013	196,246	196,246	100.0%
2014	214,590	214,590	100.0%
2015	258,099	258,099	100.0%
2016	265,532	265,532	100.0%
2017	288,233	288,233	100.0%
2018	318,643	318,643	100.0%

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

Table III-6 shows the City Rates defined to be the contributions as a percentage of salary for the Fiscal Years 2009 through 2018, inclusive.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution	Salary ¹ at Time = 1.0	City Rate
2009	134,225	755,497	17.766%
2010	147,349	826,795	17.822%
2011	180,191	880,648	20.461%
2012	213,651	879,472	24.293%
2013	196,246	886,178	22.145%
2014	214,590	989,160	21.694%
2015	258,099	1,016,822	25.383%
2016	265,532	1,008,056	26.341%
2017	288,233	1,052,171	27.394%
2018	318,643	1,102,184	28.910%

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

SECTION IV - RESULTS BY CONTRIBUTING ENTITY

**Table IV-1
Employer Contributions by Obligor**

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
EMPLOYER CONTRIBUTION BY OBLIGOR						
Valuation Date	June 30, 2016 (Lag)					
Fiscal Year	2018					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education ¹	Total
Contribution						
1. Normal Cost	\$ 71,752	\$ 0	\$ 71,752	\$ 6,127,598	\$ 131,783,058	\$ 137,982,408
2. Amortization of Unfunded Accrued Liability	9,650	617	10,267	7,208,810	158,766,521	165,985,598
3. Administrative Expenses	5,391	317	5,708	282,212	14,387,408	14,675,328
4. Actuarial Contribution (1. + 2. + 3.)	\$ 86,793	\$ 934	\$ 87,727	\$ 13,618,620	\$ 304,936,987	\$ 318,643,334
5. Statutory Contribution (4.)	\$ 86,793	\$ 934	\$ 87,727	\$ 13,618,620	\$ 304,936,987	\$ 318,643,334

¹ Includes \$15,180 previously allocated to Beginning with Children Charter School prior to its closure in 2016.

Table IV-2
Actuarial Liabilities by Obligor

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
ACCRUED LIABILITIES BY OBLIGOR						
Valuation Date	June 30, 2016 (Lag)					
Fiscal Year	2018					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education ¹	Total
Accrued Liability						
1. Active Members	\$ 758,303	\$ 0	\$ 758,303	\$ 130,814,638	\$ 2,248,779,656	\$ 2,380,352,597
2. Active/Inactive Members ²	12,869	0	12,869	1,573,561	44,007,664	45,594,094
3. Terminated Vested Members	0	14,686	14,686	1,889,097	41,134,872	43,038,655
4. Retirees and Beneficiaries	0	0	0	74,533,911	2,198,877,582	2,273,411,493
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 771,172	\$ 14,686	\$ 785,858	\$ 208,811,207	\$ 4,532,799,774	\$ 4,742,396,839
6. Actuarial Adjustments ³	10,909	0	10,909	1,320,493	24,031,985	25,363,387
7. Total Accrued Liability (AL) (5. + 6.)	\$ 782,081	\$ 14,686	\$ 796,767	\$ 210,131,700	\$ 4,556,831,759	\$ 4,767,760,226
Present Value of Benefits						
1. Active Members	\$ 1,430,693	\$ 0	\$ 1,430,693	\$ 191,059,549	\$ 3,552,690,193	\$ 3,745,180,435
2. Active/Inactive Members ²	12,869	0	12,869	1,573,561	44,007,664	45,594,094
3. Terminated Vested Members	0	14,686	14,686	1,889,097	41,134,872	43,038,655
4. Retirees and Beneficiaries	0	0	0	74,533,911	2,198,877,582	2,273,411,493
5. Present Value of Benefits (1. to 4.)	\$ 1,443,562	\$ 14,686	\$ 1,458,248	\$ 269,056,118	\$ 5,836,710,311	\$ 6,107,224,677
6. Actuarial Adjustments ³	10,909	0	10,909	1,320,493	24,031,985	25,363,387
7. Total Present Value of Benefits (5. + 6.)	\$ 1,454,471	\$ 14,686	\$ 1,469,157	\$ 270,376,611	\$ 5,860,742,296	\$ 6,132,588,064

¹ Includes results for Beginning with Children Charter School which closed in 2016.

² Represents members no longer on payroll, but not otherwise classified.

³ Includes actuarial loading adjustments.

Table IV-3
Participant Data by Obligor

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
PARTICIPANT DATA BY OBLIGOR						
Valuation Date	June 30, 2016 (Lag)					
Fiscal Year	2018					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education ¹	Total
Participant Data						
1. Active Members						
a. Number	16	0	16	595	25,253	25,864
b. Annual Salary ²	\$ 597,048	\$ 0	\$ 597,048	\$ 60,061,504	\$ 1,088,361,340	\$ 1,149,019,892
c. Average Salary	\$ 37,316	\$ 0	\$ 37,316	\$ 100,944	\$ 43,098	\$ 44,425
2. Active/Inactive Members ³	1	0	1	35	2,593	2,629
3. Terminated Vested Members	0	1	1	20	830	851
4. Retirees and Beneficiaries						
a. Number	0	0	0	240	16,697	16,937
b. Total Annual Benefits	\$ 0	\$ 0	\$ 0	\$ 7,166,582	\$ 219,901,991	\$ 227,068,573
c. Average Annual Benefit	\$ 0	\$ 0	\$ 0	\$ 29,861	\$ 13,170	\$ 13,407

¹ Includes information for Beginning with Children Charter School which closed in 2016.

² Salaries shown reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

³ Represents members no longer on payroll, but not otherwise classified.

SECTION V - (GAIN)/LOSS ANALYSIS

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

Table V-1 develops the asset and liability (Gain)/Loss between the June 30, 2015 (Lag) actuarial valuation and the June 30, 2016 (Lag) actuarial valuation.

DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS	
June 30, 2016	
(\$ Thousands)	
1.	Expected Accrued Liability (AL)
a.	AL at June 30, 2015
	\$ 4,585,781
b.	Total Normal Cost and Administrative Expenses at June 30, 2015
	163,479
c.	Interest on 1.a. and 1.b. to June 30, 2016
	332,448
d.	Fiscal Year 2016 Benefit Payments with Interest to June 30, 2016
	<u>(249,010)</u>
e.	Expected AL at June 30, 2016
	\$ 4,832,698
2.	Actual AL at June 30, 2016
	\$ 4,767,760
3.	Expected Total Actuarial Value of Assets (AVA)
a.	Total at June 30, 2015
	\$ 2,774,239
b.	Interest on 3.a. to June 30, 2016
	194,197
c.	Total Contributions Paid in Fiscal Year 2016
	304,113
d.	Interest on 3.c. to June 30, 2016
	10,464
e.	Fiscal Year 2016 Benefit Payments with Interest to June 30, 2016 (1.d.)
	<u>(249,010)</u>
f.	Expected Total at June 30, 2016
	\$ 3,034,003
4.	Actual Total AVA at June 30, 2016
	\$ 2,860,742
5.	Accrued Liability (Gain) / Loss (2. - 1.e.)
	\$ (64,938)
6.	Actuarial Asset (Gain) / Loss (3.f. - 4.)
	\$ 173,261
7.	Total Actuarial (Gain) / Loss (5. + 6.)
	\$ 108,323

SECTION VI - SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB 25, which has been superseded by GASB 67, and is provided for historical context. These liability and asset measures are used to develop the Actuarial Contribution and are not suitable for other purposes including, but not limited to, settlement of plan obligations. For more information, see SECTION II - MARKET AND ACTUARIAL VALUES OF ASSETS.

Table VI-1
Schedule of Funding Progress

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM (\$ Thousands)						
June 30 (Lag) Valuation Date	(1) Actuarial Value of Assets (AVA)	(2) Accrued Liability (AL)	(3) Unfunded AL (UAL) (2) - (1)	(4) Funded Ratio (1) / (2)	(5) Covered Payroll	(6) UAL as a % of Covered Payroll (3) / (5)
2010	2,056,452	3,558,251	1,501,799	57.8%	912,290	164.6%
2011	2,323,629	3,681,694	1,358,065	63.1%	920,369	147.6%
2012	2,371,613	3,763,130	1,391,517	63.0%	1,018,895	136.6%
2013	2,277,791	4,015,080	1,737,289	56.7%	1,051,571	165.2%
2014	2,632,922	4,335,746	1,702,824	60.7%	1,045,188	162.9%
2015	2,772,466	4,585,781	1,813,315	60.5%	1,093,962	165.8%
2016	2,858,737	4,767,760	1,909,023	60.0%	1,149,020	166.1%

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

SECTION VII - RISK AND UNCERTAINTY

The Fiscal Year 2018 employer contribution is based on the census data reported as of June 30, 2016 and on actuarial assumptions and methods adopted by the Board of Trustees during Fiscal Year 2012 and enacted by the New York State Legislature as Chapter 3 of the Laws of 2013 (the 2012 A&M), with revisions made to the post-retirement mortality assumptions and to the AAVM during Fiscal Year 2016 (the 2016 A&M).

The funded status of BERS depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Many of the risks faced by the Plan are described in fuller detail below; quantifying these risks for the Plan is beyond the scope of this valuation but may be undertaken in future years.

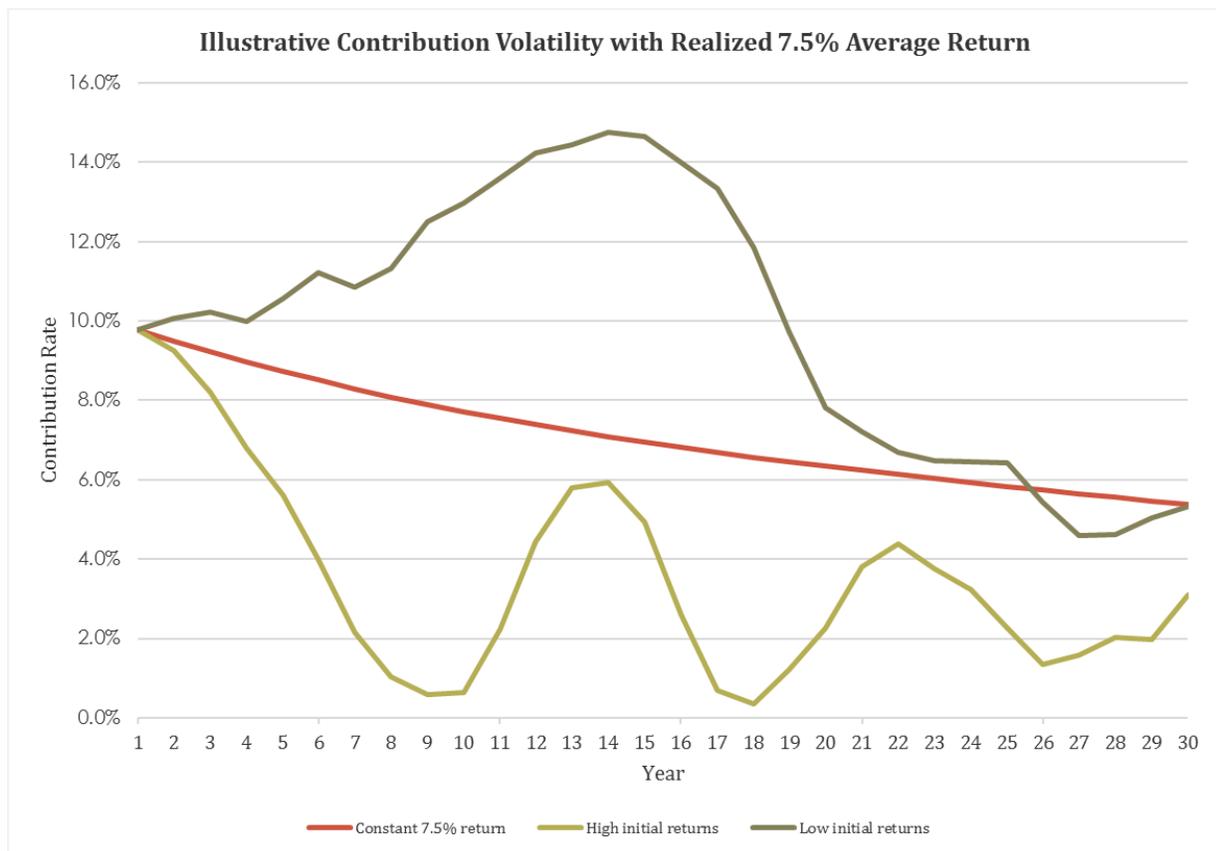
These risks have been separated, based on the Actuary's professional judgement, into high, medium, and low risks.

High Risk Types

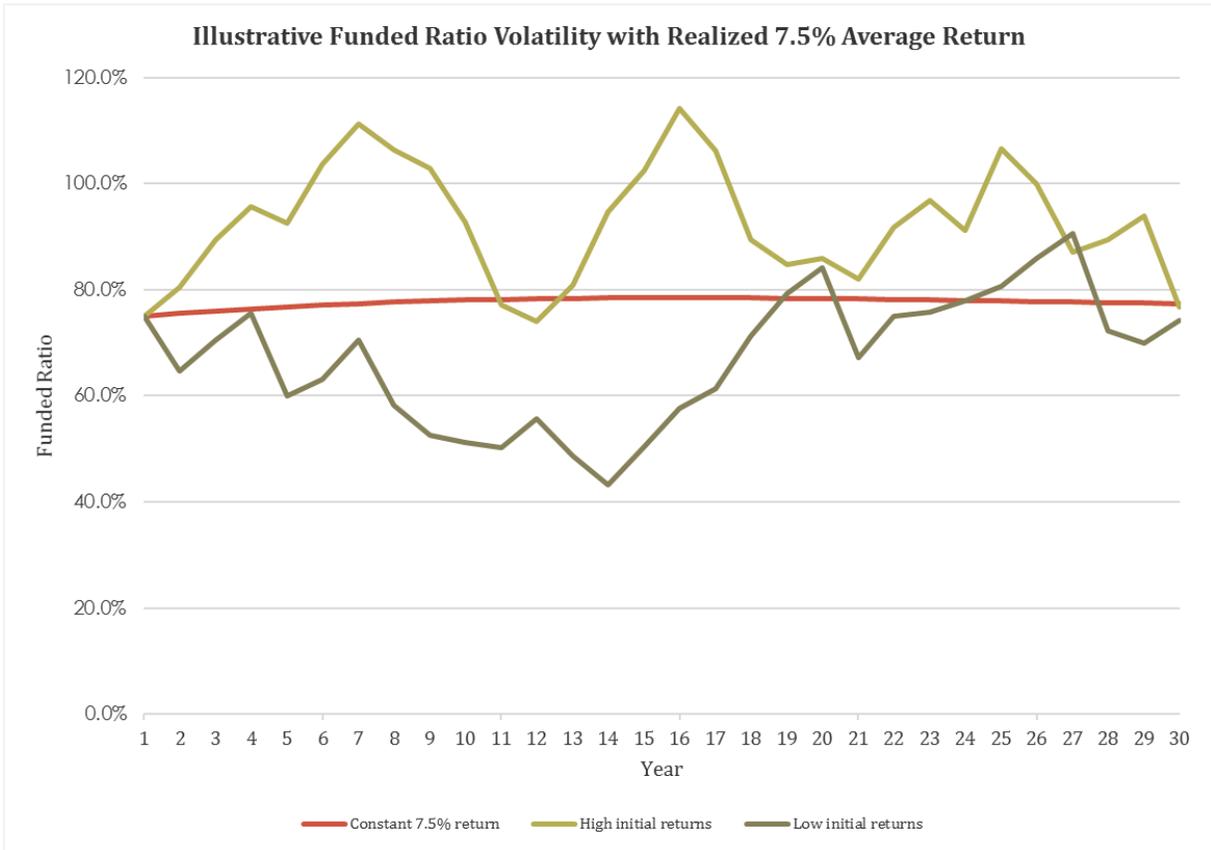
Investment Risk

The most substantial risk for BERS is the investment risk that investment returns may be different than assumed. As risk-free investment return rates have fallen in recent decades, more aggressive asset allocations have become necessary to achieve long-term rates of return commensurate with the actuarial assumption of 7.0%.

This investment return volatility can contribute substantially to contribution and funded status volatility, even if the long-term investment return assumption of 7.0% is realized. While not available specifically for the Plan at this time, recent research demonstrates this volatility based on a sample public plan with typical characteristics, a typical contribution policy, and a long-term return assumption of 7.5%, which can be realized in different patterns.¹ Similar scenario analysis could be done for BERS.



¹ Yin, Yimeng; Boyd, Don. Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government*.



Note these illustrations show volatility even if long-term expected rates of return are realized. Further risk exists that long-term expected rates of return may not be realized.

Medium Risk Types

Maturity Risk

With respect to future fiscal years, it should be noted that BERS is not a fully mature retirement system. A mature retirement system has a significant ratio of retirees to active members and, usually, of assets to active member payroll and of Accrued Liability (AL) to active member payroll. These ratios, sometimes known as volatility ratios, for the Plan can be found in the chart below.

Valuation Date	June 30, 2016 (Lag)	June 30, 2015 (Lag)
Fiscal Year	2018	2017
Volatility Ratios		
1. Market Value of Assets (MVA)	\$ 3,416,433,000	\$ 3,454,009,000
2. Actuarial Value of Assets (AVA)	2,858,737,000	2,772,466,000
3. Accrued Liability	4,767,760,226	4,585,780,524
4. Active Salary	1,149,019,892	1,093,962,316
5. Asset Volatility Ratio (MVA basis) (1. / 4.)	3.0	3.2
6. Asset Volatility Ratio (AVA basis) (2. / 4.)	2.5	2.5
7. Liability Volatility Ratio (3. / 4.)	4.1	4.2

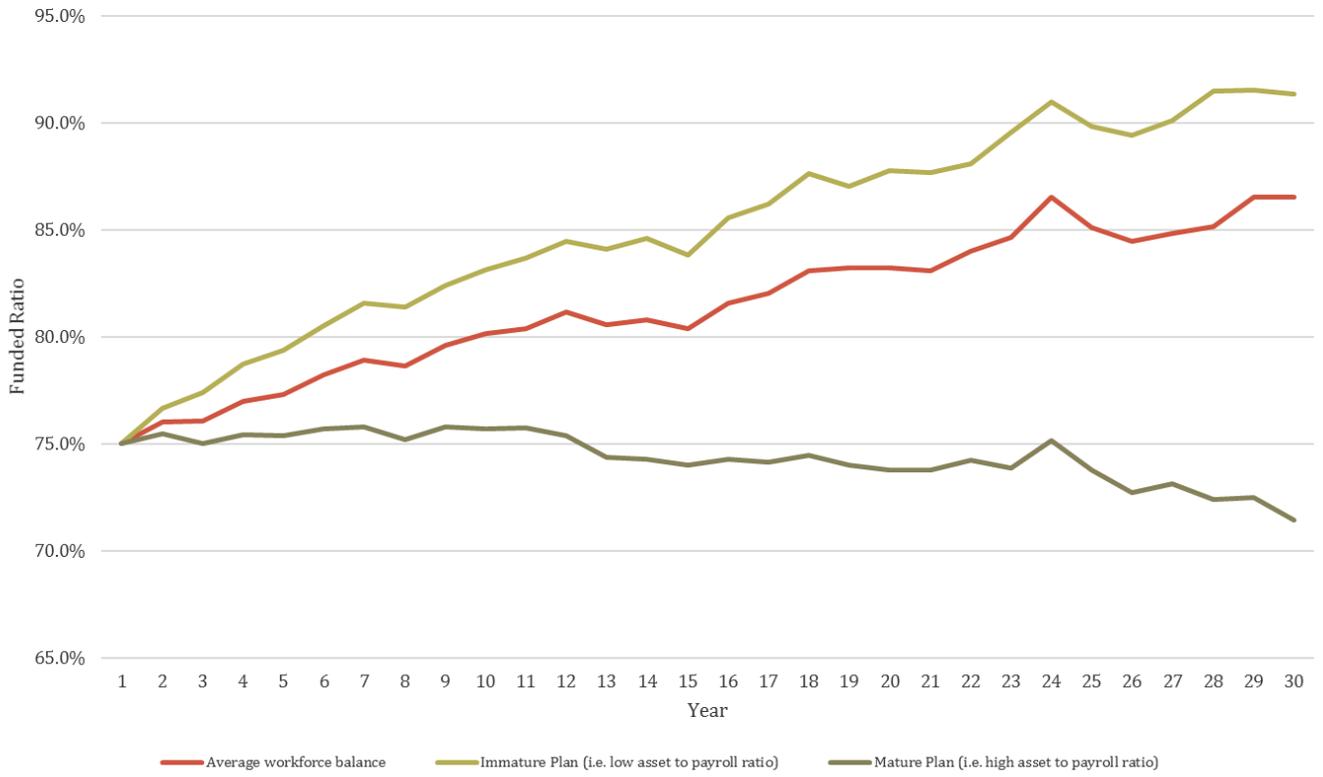
A plan's Support Ratio (i.e. the ratio of inactive participants to active participants) is a measure of maturity risk. A low Support Ratio implies that contributions are potentially low as a percentage of active payroll and support the benefit payments of few inactive participants. A high Support Ratio implies that contributions are potentially high as a percentage of active payroll and support the benefit payments of many inactive participants. Because the Plan's Support Ratio is low, contributions for active members form a larger proportion of the total actuarial contribution than in more mature pension funds (see Page 59).

As a plan approaches maturity, Asset Volatility and Liability Volatility Ratios increase, and the plan becomes more sensitive to investment losses. In a mature plan, an investment loss could increase contributions as a percentage of payroll compared to the same loss suffered by a less mature plan. Generally, mature plans will need to consider more conservative investment strategies. These ratios for the Plan are not yet overly high.

While not available specifically for the Plan, illustrative forecasts of sample plans of various maturities can demonstrate this effect.¹

¹ Boyd, Donald J. and Yin, Yimeng. "How Public Pension Plan Demographic Characteristics Affect Funding and Contribution Risk." Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government*.

Median Simulated Funded Ratio



Interest Rate Risk

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

If market conditions or the allocation of Plan assets no longer justifies a long-term rate of return assumption of 7.0%, a reduction in the Actuarial Interest Rate (AIR) may significantly increase the Accrued Liability and Unfunded Accrued Liability of the Plan, as well as the Normal Cost and resulting contribution. While not on a funding basis, the sensitivity could be expected to be generally similar to the sensitivity reported for GASB 67/68 purposes.¹

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM	
GASB 67/68 SENSITIVITY ANALYSIS AS OF JUNE 30, 2016	
Valuation Date	June 30, 2016
Results at 7.0%	
1. Total Pension Liability	\$ 4,800,698,288
2. Plan Fiduciary Net Position	<u>3,416,433,000</u>
3. Net Pension Liability (1. - 2.)	\$ 1,384,265,288
4. Funded Ratio (GASB Basis) (2. / 1.)	71.2%
Results at 6.0%	
1. Total Pension Liability	\$ 5,364,981,421
2. Plan Fiduciary Net Position	<u>3,416,433,000</u>
3. Net Pension Liability (1. - 2.)	\$ 1,948,548,421
4. Funded Ratio (GASB Basis) (2. / 1.)	63.7%
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Total Pension Liability	11.8%
2. Increase in Net Pension Liability	40.8%
3. Decrease in Funded Ratio	7.5%

¹ As disclosed in the fiscal year 2016 report for GASB 67/68, dated October 11, 2016.

Inflation Risk

BERS faces risk in the event that inflation is higher than expected. Inflation is a key driver of the salary increase assumptions (affecting active members) and COLA assumptions (affecting both active members and pensioners/beneficiaries). This risk is not currently quantified but should be considered in future years.

Longevity Risk

BERS faces risk in its assumption of future mortality rates. Actuarial experience studies were used to develop the “base” mortality rates assumed in the valuation; Society of Actuaries mortality improvement scale MP-2015 was subsequently applied to these base rates.¹

This scale MP-2015 is an assumption regarding the *improvement* of future mortality rates as compared to mortality when the experience studies were completed. The scale was developed using large amounts of historical data from the Social Security Administration. Risk therefore exists that the mortality improvement inherent in the Plan population is higher than the improvement seen in the population provided by the Social Security Administration.

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

This longevity risk is not currently quantified but should be considered in future years.

¹ Retirement Plans Experience Committee. “Mortality Improvement Scale MP-2015 Report” and “Mortality Improvement Scale MP-2014 report.” *Society of Actuaries*.

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

Low Risk Types

Credit/Solvency Risk

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

Contribution Risk

Many public pension systems suffer from high contribution risk, wherein sponsoring governmental entities fail to make contributions as determined by the actuary under their funding policies. A recent study found that in 2010, the Annual Required Contribution¹ was not made for over 35% of the 110 public plans in the study.²

The New York City Retirement Systems and Pension Funds face low contribution risk. City benefits are constitutionally protected, and participating employers have historically contributed to the actuarial contribution as certified by the Actuary. The Actuary believes the City will continue to do so in future years. See Table III-6 ACTUARIAL AND STATUTORY CONTRIBUTION HISTORY.

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

Agency Risk

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

In future years of higher funded status, this may become a higher risk to the Plan, as current taxpayers and plan members may receive preferential treatment over future taxpayers and plan members when considering changes in statute and plan provisions.

¹ As defined at the time in GASB 25/27.

² Shnitser, Natalya. "Funding Discipline for U.S. Public Pension Plans: An Empirical Analysis of Institutional Design." *Iowa Law Review*, Vol. 100 (2015).

SECTION VIII - SUMMARY OF PLAN PROVISIONS

A. Covered Employment

Membership in BERS is open to all employees of the Department of Education who are not eligible to participate in the New York City Teachers' Retirement System. In addition, employees of the New York City School Construction Authority, employees of the Office of the Special Commissioner of Investigation, School Crossing Guards employed by the New York City Police Department, and employees of NYC charter schools that have elected and approved to participate in the plan may also be eligible for membership. Membership in BERS may be voluntary or mandated.

B. Tier Membership

Tier membership is based on the date that the member joined BERS. The tier status of earlier membership in BERS or another New York City or New York State public employee retirement system is reflected, but only if the service associated with that membership is purchased and included in Credited Service.

Tier 1: Prior to July 1, 1973

Tier 2: July 1, 1973 through July 26, 1976

Tier 4: July 27, 1976 through March 31, 2012

Tier 6: April 1, 2012

Tier 4 members who joined BERS before September 1, 1983 may elect a Tier 3 benefit. Unless otherwise noted, Tier 1 and Tier 2 provisions are hereafter omitted for brevity.¹ For more information about plan provisions, see the applicable Summary Plan Descriptions at www.nycbers.org. In the event of a conflict between this summary and applicable law, the applicable laws will govern.

C. Basic Member Contributions (BMC)

Basic Member Contributions earn 5% per year interest compounded annually.

Tier 4: The contribution rate is 3% of Salary. Tier 4 members contribute BMCs for the first 10 years of Service except that members of the Chapter 504 55/27 plan contribute BMCs for the first 27 years of Credited Service.

¹ Less than 0.3% of active members as of June 30, 2016 are members of Tier 1 and Tier 2.

Tier 6: BMC are made for all years of Credited Service according to the following schedule:

Lookback Wages	BMC Contribution Rate
Less than \$45,000	3.00%
\$45,000 up to \$55,000	3.50%
\$55,000 up to \$75,000	4.50%
\$75,000 up to \$100,000	5.75%
Greater than \$100,000	6.00%

The lookback wages used for determining the Tier 6 BMC contribution rate for a plan year are the actual wages earned two plan years prior to the plan year. A projected salary is used during the first 3 years of Credited Service. The BMC contribution rate was limited to 3% from April 1, 2012 through March 31, 2013.

D. Additional Member Contributions (AMC)

Additional Member Contributions including Additional Member Contributions for work in physically taxing employment (AMC-PT) earn 5% interest per year, compounded annually.

Tier 4: Members of the Basic 62/5 plan do not make AMC. For other Tier 4 members, the AMC contribution rate as a percentage of Salary varies by plan in accordance with the following schedule:

Plan Description	AMC Contribution Rate	Years Required
Chapter 96 55/25	1.85% ¹	30
Chapter 96 57/5		
Chapter 19 55/25	1.85%	25
Chapter 19 55/27	1.85%	27
Special Officers 25-yr plan	6.25%	30
Chapter 504 55/27 plan	1.85%	All years

Tier 6: Members of the 63/10 plan do not make Additional Member Contributions. For members of the Special Officers 25-yr plan, the AMC contribution rate is 6.25% of Salary and AMC contributions are required for 30 years of Credited Service.

E. Credited Service

Credited Service is comprised of Membership Service, Previous Service, Transferred Service, Part-time Service, and Military Service:

- Membership Service is service earned while a member of BERS.

¹ Members of Chapter 96 55/25 and 57/5 who work in physically taxing employment contribute 1.98% more.

- Previous Service is service earned prior to membership while employed by the Department of Education, the City of New York, the State of New York, or any of its political subdivisions, or by another covered employer.
- Transferred Service is service earned as a member of another public retirement system in the City or State of New York.
- Part-time Service is service that is prorated based on the number of hours or days worked in the year.
- Military Service is service for qualified time served in one of the armed forces of the United States.

Previous Service, Transferred Service, and Military Service must be purchased to count as Credited Service. Payments made for purchasing Military Service are considered Employer contributions.

F. Salary

Salary is based on the annual wages earned in covered employment including overtime pay. Some limitations apply for the Salary used to determine Final Average Salary.

Tier 4: Wages greater than 110% of the average of the previous two years are excluded for purposes of determining Final Average Salary.

Tier 6: Wages greater than 110% of the average of the previous four years are excluded for purposes of determining Final Average Salary. In addition, the following payments are also excluded from wages for purposes of determining Final Average Salary:

1. Wages greater than the annual salary paid to the Governor of the State of New York;
2. Lump sum payments for deferred compensation, sick leave, accumulated vacation or other credits for time not worked;
3. Overtime greater than the overtime ceiling of \$15,000, effective April 1, 2012 and indexed annually by the Consumer Price Index (CPI-U);
4. Any form of termination pay;
5. Any additional compensation paid in anticipation of retirement; and
6. In the case of employees who receive wages from three or more employers in a twelve-month period, the wages paid by the third and each successive employer.

G. Final Average Salary (FAS)

Service retirement, early retirement, disability retirement, and vested retirement benefits are based on FAS.

Tier 4: FAS is the highest average Salary earned in any three consecutive years or in the final 36 months of employment if greater.

Tier 6: FAS is the highest average Salary earned in any five consecutive years or in the final 60 months of employment if greater.

H. Service Retirement

1. Eligibility: The eligibility requirements for an unreduced service retirement are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	Basic 62/5 plan	62	5
4	Chapter 96 55/25 plan	55	25
4	Chapter 96 55/25 plan Physically-Taxing	50	25
4	Chapter 96 57/5 plan	57	5
4	Chapter 96 57/5 plan Physically-Taxing	50	25
4	Chapter 19 55/25	55	25
4	Chapter 19 55/27	55	27
4	Special Officers 25-yr plan	N/A	25
4	Chapter 504 55/27 plan	55	27
6	Basic 63/10 Plan	63	10
6	Special Officers 25-yr plan	N/A	25

2. Benefits:

- a. Tier 4 Plans except for the Special Officers 25-year plan:

- i. Less than 20 years of Credited Service: 1/60 times FAS times Credited Service
- ii. 20 or more years of Credited Service: Sum of 2.0% times FAS times Credited Service up to 30 years plus 1.5% times FAS times Credited Service in excess of 30 years.

- b. Tier 4 Special Officers 25-year plan:

- i. 2.0% times FAS times Credited Service up to 30 years.

- c. Basic Tier 6 63/10 Plan:
 - i. Less than 20 years of Credited Service: 1/60 times FAS times Credited Service;
 - ii. 20 or more years of Credited Service: Sum of 35% times FAS plus 2.0% times FAS times Credited Service in excess of 20 years.
- d. Tier 6 Special Officers 25-year plan:
 - i. 2.0% times FAS times Credited Service up to 30 years.

I. Early Retirement

1. Eligibility: Not all plans provide for early retirement. However, certain participants may be eligible to elect early retirement under the Tier 4 or Tier 6 Basic plan. The eligibility requirements for early retirement plans are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	Basic 62/5 plan	55	5
4	Chapter 504 55/27 plan	55	10
6	Basic 63/10 plan	55	10

2. Benefits:

The service retirement benefit is reduced for early retirement based on the age at commencement.

- a. Tier 4 Basic 62/5 Plan:

The service retirement benefit is reduced by 0.50% for each of the first 24 months that the age at commencement precedes age 62, and further reduced 0.25% for each of the next 60 months that the age of commencement precedes age 60.

- b. Tier 6 Basic 63/10 Plan:

The service retirement benefit is reduced by 13/2400 for each month (i.e. 6.5% per year) that the age of commencement precedes age 63.

J. Disability Retirement

1. Accidental Disability (ADR)

- a. Eligibility: Accident in the performance of duties while a member.
- b. Benefits: Greater of $1/60$ times FAS times Credited Service or $1/3$ times FAS. The member may elect a service retirement benefit, if eligible.

2. Ordinary Disability (ODR)

- a. Eligibility: 10 years of Credited Service.
- b. Benefits: Greater of $1/60$ times FAS times Credited Service or $1/3$ times FAS. The member may elect a service retirement benefit, if eligible.

K. Death Benefits

1. Accidental Death Benefits – Active Members

- a. Eligibility: Death due to the performance of duties while an active member.
- b. Benefits: A monthly pension is payable to the beneficiary equal to 50% of annual wages earned during the year prior to death. The benefit is based on 50% of the annual wage rate if the member had less than one year of Credited Service.

2. Ordinary Death Benefit – Active and Terminated Vested Members

- a. Eligibility for active members: Death while not in the performance of duties.
- b. Eligibility for terminated vested members: 10 years of Credited Service.
- c. Death benefit for active members and members who retired from active service: Refund of BMC and the employee portion of AMC with interest plus a salary-based death benefit. The salary-based death benefit is equal to one year’s wages times completed years of Credited Service up to 3 years times an Adjustment Factor described in the table below:

Year of Death	Adjustment Factor
Pre-retirement	100%
Post-retirement - 1 st year	50%
Post-retirement - 2 nd year	25%
Post-retirement - after	10% times the benefit in effect at age 60 or at retirement if earlier

The pre-retirement death benefit and post-retirement death benefit for the first two years of retirement are also reduced by another adjustment factor that is equal to 100% minus 5% times the lesser of 10 years and the number of years by which the age at commencement exceeds 60.

- d. Death benefit for terminated vested members and members who retired from terminated vested status:

Refund of BMC and the employee portion of AMC, if any, plus one half of the salary-based death benefit applicable to active and retired members described above.

- e. Form of Payment: Lump sum.

L. Vested Retirement After Termination

1. Eligibility:

- a. Tier 4 Chapter 504 55/27 plan: 10 years of Credited Service.
- b. All other Tier 4 plans: 5 years of Credited Service.
- c. Tier 6 plans: 10 years of Credited Service.

2. Benefits:

- a. Tier 4 Special Officers 25-year plan: The service retirement benefit is payable when the member would have earned 25 years of Credited Service if he or she had continued working in covered employment.
- b. All other Tier 4 plans: The service retirement benefit is payable at age 62.
- c. Tier 6 Plans: The service retirement benefit is payable at age 63, but in no case can be less than the annuity equivalent of the BMC.

M. Forms of Payment

- 1. Normal Form of Payment: Single Life Annuity
- 2. Optional Forms of Payment: Joint and Survivor Annuities, Certain and Life Annuities, and Pop-up annuities.

Optional forms of payment are subject to actuarial reduction. The unreduced amount of the Normal Form is known as the maximum retirement allowance.

N. Cost of Living Adjustments (COLA)

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

1. Eligibility Thresholds:
 - a. Service Retirement and Vested Retirement: The earlier of (i) and (ii):
 - i. Attainment of age 62 and 5 years since commencement
 - ii. Attainment of age 55 and 10 years since commencement
 - b. Disability Retirement: 5 years since commencement
 - c. Beneficiaries of an Accidental Death benefit: 5 years since commencement
2. Eligible beneficiaries: Spouses receiving a joint & survivor annuity. All others are non-eligible.
3. Base Benefit: The lesser of \$18,000 and the maximum retirement allowance plus the sum of prior years' COLA increases.
4. COLA percentage: 50% of the Consumer Price Index (CPI-U), not less than 1.0% and not greater than 3.0%.

O. Refund of Member Contributions

Basic Member Contributions (BMC) and Additional Member Contributions (AMC): Refunded with interest under some circumstances. AMC include Additional Member Contributions for work in physically taxing employment (AMC-PT). Only the employee portion of AMC is refunded.

1. Non-vested termination: BMC and AMC are refunded with interest.
2. Vested termination: A member may elect a refund of BMC and AMC with interest in lieu of a pension benefit, but only if he has less than 10 years of Credited Service. A member of one of the Special Officers 25-year plans may elect a refund of AMC in lieu of remaining in the Special Officers 25-year plan if he terminates prior to earning 15 years of Credited Service as a special officer.
3. Ordinary death: BMC and the employee portion of AMC are refunded with interest.
4. Accidental death: The employee portion of AMC are refunded with interest.
5. Disability Retirement: The employee portion of AMC are refunded with interest.
6. Service Retirement: The employee portion of AMC including AMC-PT are refunded with interest if the member retires on or after age 62. For retirement prior to age 62, employee portion of AMC-PT are refunded if a member of the Chapter 96 55/25 plan retires on or after age 55 with 25 years of Credited Service or if a member of the Chapter 96 57/5 plan retires on or after age 57 with 25 years of Credited Service.

7. A member of one of the Special Officer plans may elect a refund of AMC in lieu of remaining in the Special Officers 25-year plan if he retires prior to earning 15 years of Credited Service as a special officer.
8. Employee Portion of AMC: The employee portion of AMC is 50% for all plans that require AMC except that the employee portion is 100% for the Special Officers plans.

P. Service and Early Retirement for Tier 1 and Tier 2 Members

1. Eligibility:

- a. Tier 1: Age 55
- b. Tier 2: Age 55 and 5 years of Credited Service

2. Benefits:

- a. 55% times FAS, plus 1.70% times FAS times Credited Service greater than 25 years plus the annuity equivalent of employee contributions in excess of required contributions for 25 or more years of Credited Service; or
- b. 1.20% times FAS times Credited earned prior to 7/1/1968 plus 1.53% times FAS times Credited Service earned from 7/1/1968 plus the annuity equivalent of employee contributions for less than 25 years of Credited Service.

FAS is 1-year final average salary for Tier 1 members and 3-year final average salary for Tier 2 members. Tier 2 benefits are reduced for early commencement prior to age 62 based on the same factors applicable to the Basic Tier 4 62/5 plan. Retirement benefits are increased by the same COLA applicable to Tier 4 retirement benefits.

Q. Service and Early Retirement for Tier 4 Members with Tier 3 Rights

Eligibility: Age 55 and 5 years of Credited Service.

Benefits: Tier 4 members with Tier 3 rights may elect a Tier 3 benefit instead of a Tier 4 benefit. The benefit formula for Tier 3 is the same as the benefit formula for the Tier 4 Basic 62/5 plan except that (1) Credited Service under the Tier 3 benefit formula is capped at 30 years, (2) the Tier 3 benefit formula includes an offset starting at age 62 equal to 50% of the Primary Social Security benefit, and (3) the Tier 3 reduction factors for early commencement are less than the factors applicable to the Basic Tier 4 62/5 plan. The COLA provisions applicable to Tier 4 retirement benefits are also not applicable to Tier 3 retirement benefits.

Tier 3 retirement benefits may be adjusted annually by escalation. Benefits commencing on or after age 65 are eligible for full escalation. Full escalation is equal to the lesser of 3% and the Consumer Price Index (CPI-U) for increases in the CPI-U and the greater of -3% and the Consumer Price Index (CPI-U) for decreases in the CPI-U. Partial escalation is applicable for benefits commencing after age 62. Partial escalation is equal to full escalation reduced by 1/36 times the number of months that the age at commencement precedes age 65. A Tier 3 retirement benefit cannot be less than the Tier 3 retirement benefit without escalation.

R. Loans

A member may borrow up to 75% of the accumulated Basic Member Contributions with interest. A member's unpaid loan balance will reduce his retirement benefit.

S. Tax-deferred Annuity Program (TDA)

Members may elect to make voluntary employee contributions to the BERS TDA. A member's contributions to a TDA account are capped by the dollar limitations under §402(g)(1) of the Internal Revenue Code on the exclusion for elective deferrals described in §402(g)(3) and the dollar limitation under §414(v)(2)(B)(i) of the Internal Revenue Code for catch-up contributions for members who have attained aged 50.

A member may withdraw his or her TDA account balance as a lump sum or convert a portion of the accumulated balance into an annuity upon retirement.

T. Changes Since the Prior Valuation

None.

SECTION IX – CHAPTER AMENDMENTS

The June 30, 2016 (Lag) actuarial valuation results reflect the following Chapter amendments from the prior five years.

- Chapter 41 of the Laws of 2016 (Chapter 41/16) provides up to three years of service credit to members of public retirement systems of the State of New York for military service. Chapter 41/16 removes the requirement that such military service occur during specified periods of hostilities. This law will be reflected in future valuations as participants request military service credit.
- Chapter 438 of the Laws of 2016 (Chapter 438/16), enacted on November 14, 2016, amended Retirement and Social Security Law Section 43 to eliminate restrictions upon transferring between public retirement systems.
- Chapter 510 of the Laws of 2015 (Chapter 510/15), clarifies for Tier 6 the definition of multiple employers for the purpose of exclusion of wages and changes the plan year for contributions from plan year April 1 to March 31 to plan year January 1 to December 31.
- Chapter 427 of the Laws of 2014 (Chapter 427/14), amended Military Law Section 243-d, effective November 4, 2014, to provide non-contributory retirement service credit for members of the New York City Retirement Systems called to active military duty on or after September 11, 2001 and prior to January 1, 2006 who did not receive his or her full salary from a participating employer and is otherwise eligible to receive retirement service credit for such service.
- Chapter 489 of the Laws of 2013 (Chapter 489/13) addressed limitations in existing disability provisions intended to protect public employees who suffered injuries or illnesses in WTC rescue, recovery, and cleanup operations.
- Chapter 3 of the Laws of 2013 (Chapter 3/13), effective retroactive to July 1, 2011, enacted those 2012 A&M that require State legislation.
- Chapter 18 of the Laws of 2012 (Chapter 18/12), placed certain limitations on the Tier 3 and Tier 4 benefits available to participants hired on and after April 1, 2012 in most New York State Public Employee Retirement Systems, including BERS, and is generally referred to as Tier 6.

SECTION X - SUBSEQUENT EVENTS

In February 2017, the City engaged Bolton to perform an actuarial audit of the five New York City Retirement Systems and Pensions Funds, serving as the Independent Actuary under Section 96 of the New York City Charter. The engagement includes, but is not limited to, contribution audits, experience studies, and administrative reviews of each system. Bolton released their reports for the First Engagement on March 12, 2018. Further experience studies are being conducted and changes to actuarial assumptions in future actuarial valuations are anticipated; the first year in which changes to actuarial assumptions will impact the employer contribution is expected to be Fiscal Year 2019.

SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The February 10, 2012 report entitled, “Proposed Changes in Actuarial Assumptions and Methods For Determining Employer Contributions For Fiscal Years Beginning on and After July 1, 2011 For the New York City Board of Education Retirement System” contains the 2012 A&M.

A memorandum dated December 4, 2015 to the Board of Trustees of BERS contains the revised probabilities of post-retirement mortality beginning with the June 30, 2014 (Lag) actuarial valuation.

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

The 2012 A&M, including the above changes to the probabilities of post-retirement mortality and the introduction of the AVA corridor, are referred to as the 2016 A&M.

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

Table XI-1
Active Retirement Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM							
PROBABILITIES OF SERVICE RETIREMENT							
Age	Reduced Service Retirement	Unreduced Service Retirement Probabilities For Members Who Did Not Elect an Improved Retirement Program			Unreduced Service Retirement Probabilities For Members Who Did Elect an Improved Retirement Program		
		Year 1	Year 2	Ultimate	Year 1	Year 2	Ultimate
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
21	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
22	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
23	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
26	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
27	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
28	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
29	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
31	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
32	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
35	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
36	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
37	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
38	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
39	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
40	0.00%	20.00%	0.00%	0.00%	40.00%	0.00%	0.00%
41	0.00%	20.00%	15.00%	0.00%	40.00%	20.00%	0.00%
42	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
43	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
44	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
45	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
46	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
47	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
48	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
49	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
50	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
51	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
52	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
53	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
54	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
55	2.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
56	2.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
57	2.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
58	2.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
59	3.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
60	4.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
61	5.00%	20.00%	15.00%	15.00%	40.00%	20.00%	15.00%
62	0.00%	30.00%	25.00%	20.00%	60.00%	25.00%	25.00%
63	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
64	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
65	0.00%	30.00%	25.00%	20.00%	60.00%	25.00%	25.00%
66	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
67	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
68	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
69	0.00%	20.00%	15.00%	15.00%	40.00%	20.00%	20.00%
70+	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table XI-2
Active Withdrawal Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
PROBABILITIES OF WITHDRAWAL FOR CAUSES OTHER THAN DEATH, DISABILITY, OR RETIREMENT		
	Withdrawal	
Years of Service	Males	Females
0	6.00%	4.00%
1	5.60%	3.80%
2	5.20%	3.60%
3	4.80%	3.40%
4	4.40%	3.20%
5	4.00%	3.00%
6	3.70%	2.80%
7	3.40%	2.60%
8	3.10%	2.40%
9	2.80%	2.20%
10	2.50%	2.00%
11	2.30%	1.90%
12	2.10%	1.80%
13	1.90%	1.70%
14	1.70%	1.60%
15	1.50%	1.50%
16	1.40%	1.40%
17	1.30%	1.30%
18	1.20%	1.20%
19	1.10%	1.10%
20 or greater	1.00%	1.00%

Table XI-3
Active Disability Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM				
PROBABILITIES OF DISABILITY RETIREMENT				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
19	0.20%	0.20%	0.04%	0.02%
20	0.20%	0.20%	0.04%	0.02%
21	0.20%	0.20%	0.04%	0.02%
22	0.20%	0.20%	0.04%	0.02%
23	0.20%	0.20%	0.04%	0.02%
24	0.20%	0.20%	0.04%	0.02%
25	0.20%	0.20%	0.04%	0.02%
26	0.20%	0.20%	0.04%	0.02%
27	0.20%	0.20%	0.04%	0.02%
28	0.20%	0.20%	0.04%	0.02%
29	0.20%	0.20%	0.04%	0.02%
30	0.20%	0.20%	0.04%	0.02%
31	0.22%	0.20%	0.04%	0.02%
32	0.24%	0.20%	0.04%	0.02%
33	0.26%	0.20%	0.04%	0.02%
34	0.28%	0.20%	0.04%	0.02%
35	0.30%	0.20%	0.04%	0.02%
36	0.32%	0.21%	0.04%	0.02%
37	0.34%	0.22%	0.04%	0.02%
38	0.36%	0.23%	0.04%	0.02%
39	0.38%	0.24%	0.04%	0.02%
40	0.40%	0.25%	0.04%	0.02%
41	0.42%	0.26%	0.04%	0.02%
42	0.44%	0.27%	0.04%	0.02%
43	0.46%	0.28%	0.04%	0.02%
44	0.48%	0.29%	0.04%	0.02%
45	0.50%	0.30%	0.04%	0.02%
46	0.52%	0.34%	0.04%	0.02%
47	0.54%	0.38%	0.04%	0.02%
48	0.56%	0.42%	0.04%	0.02%
49	0.58%	0.46%	0.04%	0.02%
50	0.60%	0.50%	0.04%	0.02%
51	0.62%	0.54%	0.04%	0.02%
52	0.64%	0.58%	0.04%	0.02%
53	0.66%	0.62%	0.04%	0.02%
54	0.68%	0.66%	0.04%	0.02%
55	0.70%	0.70%	0.04%	0.02%
56	0.70%	0.70%	0.04%	0.02%
57	0.70%	0.70%	0.04%	0.02%
58	0.70%	0.70%	0.04%	0.02%
59	0.70%	0.70%	0.04%	0.02%
60	0.70%	0.70%	0.04%	0.02%
61	0.70%	0.70%	0.04%	0.02%
62	0.70%	0.70%	0.04%	0.02%
63	0.70%	0.70%	0.04%	0.02%
64	0.70%	0.70%	0.04%	0.02%
65	0.70%	0.70%	0.04%	0.02%
66	0.70%	0.70%	0.04%	0.02%
67	0.70%	0.70%	0.04%	0.02%
68	0.70%	0.70%	0.04%	0.02%
69	0.70%	0.70%	0.04%	0.02%
70+	NA	NA	NA	NA

Table XI-4
Active Mortality Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM			
PROBABILITIES OF ACTIVE MEMBER MORTALITY			
Age	Ordinary Death		Accidental Death
	Males	Females	
19	0.040%	0.030%	0.00%
20	0.040%	0.030%	0.00%
21	0.040%	0.030%	0.00%
22	0.040%	0.030%	0.00%
23	0.040%	0.030%	0.00%
24	0.040%	0.030%	0.00%
25	0.040%	0.030%	0.00%
26	0.044%	0.032%	0.00%
27	0.048%	0.034%	0.00%
28	0.052%	0.036%	0.00%
29	0.056%	0.038%	0.00%
30	0.060%	0.040%	0.00%
31	0.064%	0.042%	0.00%
32	0.068%	0.044%	0.00%
33	0.072%	0.046%	0.00%
34	0.076%	0.048%	0.00%
35	0.080%	0.050%	0.00%
36	0.084%	0.052%	0.00%
37	0.088%	0.054%	0.00%
38	0.092%	0.056%	0.00%
39	0.096%	0.058%	0.00%
40	0.100%	0.060%	0.00%
41	0.110%	0.068%	0.00%
42	0.120%	0.076%	0.00%
43	0.130%	0.084%	0.00%
44	0.140%	0.092%	0.00%
45	0.150%	0.100%	0.00%
46	0.160%	0.110%	0.00%
47	0.170%	0.120%	0.00%
48	0.180%	0.130%	0.00%
49	0.190%	0.140%	0.00%
50	0.200%	0.150%	0.00%
51	0.220%	0.160%	0.00%
52	0.240%	0.170%	0.00%
53	0.260%	0.180%	0.00%
54	0.280%	0.190%	0.00%
55	0.300%	0.200%	0.00%
56	0.320%	0.210%	0.00%
57	0.340%	0.220%	0.00%
58	0.360%	0.230%	0.00%
59	0.380%	0.240%	0.00%
60	0.400%	0.250%	0.00%
61	0.420%	0.260%	0.00%
62	0.440%	0.270%	0.00%
63	0.460%	0.280%	0.00%
64	0.480%	0.290%	0.00%
65	0.500%	0.300%	0.00%
66	0.540%	0.320%	0.00%
67	0.580%	0.340%	0.00%
68	0.620%	0.360%	0.00%
69	0.660%	0.380%	0.00%
70+	NA	NA	NA

Table XI-5a
Service Retiree Mortality, Base Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES					
BASE TABLE					
Age	Males	Females	Age	Males	Females
19	0.0306%	0.0175%	65	1.5379%	0.8154%
20	0.0320%	0.0177%	66	1.6889%	0.9045%
21	0.0332%	0.0180%	67	1.8435%	1.0064%
22	0.0341%	0.0181%	68	2.0017%	1.1181%
23	0.0351%	0.0185%	69	2.1635%	1.2120%
24	0.0357%	0.0189%	70	2.3290%	1.3062%
25	0.0361%	0.0196%	71	2.5062%	1.4651%
26	0.0369%	0.0204%	72	2.6834%	1.6240%
27	0.0374%	0.0213%	73	2.8607%	1.7829%
28	0.0385%	0.0224%	74	3.0379%	1.9418%
29	0.0404%	0.0237%	75	3.2151%	2.1007%
30	0.0435%	0.0254%	76	3.6634%	2.3726%
31	0.0504%	0.0304%	77	4.1116%	2.6445%
32	0.0575%	0.0350%	78	4.5598%	2.9165%
33	0.0648%	0.0393%	79	5.0080%	3.1884%
34	0.0719%	0.0431%	80	5.4562%	3.4604%
35	0.0799%	0.0470%	81	6.0796%	3.9012%
36	0.0860%	0.0502%	82	6.7176%	4.3526%
37	0.0926%	0.0540%	83	7.3699%	4.8142%
38	0.1000%	0.0580%	84	8.0368%	5.2863%
39	0.1091%	0.0626%	85	8.7182%	5.7688%
40	0.1209%	0.0677%	86	9.6259%	6.5787%
41	0.1751%	0.0736%	87	10.5337%	7.3886%
42	0.2295%	0.0817%	88	11.4414%	8.1985%
43	0.2838%	0.0918%	89	12.3492%	9.0084%
44	0.3381%	0.1039%	90	13.2570%	9.8183%
45	0.3925%	0.1185%	91	15.1174%	11.2988%
46	0.4468%	0.1356%	92	17.0204%	12.7929%
47	0.5011%	0.1544%	93	18.9641%	14.3318%
48	0.5554%	0.1752%	94	20.9868%	15.8633%
49	0.6097%	0.1973%	95	23.1353%	17.4336%
50	0.6640%	0.2205%	96	25.2995%	19.3262%
51	0.7235%	0.2436%	97	27.5025%	21.0339%
52	0.7799%	0.2676%	98	29.8326%	22.3715%
53	0.8334%	0.2926%	99	32.0866%	23.2890%
54	0.8840%	0.3186%	100	34.3180%	23.6519%
55	0.9316%	0.3456%	101	35.8628%	24.4834%
56	0.9729%	0.3887%	102	37.1685%	25.4498%
57	1.0112%	0.4334%	103	38.3040%	26.6044%
58	1.0466%	0.4792%	104	39.2003%	27.9055%
59	1.0794%	0.5254%	105	39.7886%	29.3116%
60	1.1093%	0.5714%	106	40.0000%	30.7811%
61	1.2080%	0.6292%	107	40.0000%	32.2725%
62	1.3002%	0.6760%	108	40.0000%	33.7441%
63	1.3859%	0.7205%	109	40.0000%	35.1544%
64	1.4653%	0.7671%	110	100.0000%	100.0000%

Table XI-5b
Service Retiree Mortality, Valuation Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY IN THE NEXT YEAR FOR SERVICE RETIREES IN THE JUNE 30, 2016 (LAG) VALUATION					
Age	Males	Females	Age	Males	Females
19	0.0201%	0.0121%	68	1.5685%	0.8682%
20	0.0211%	0.0122%	69	1.6835%	0.9454%
21	0.0227%	0.0130%	70	1.8046%	1.0245%
22	0.0241%	0.0138%	71	1.9375%	1.1564%
23	0.0258%	0.0149%	72	2.0731%	1.2906%
24	0.0272%	0.0160%	73	2.2114%	1.4264%
25	0.0284%	0.0174%	74	2.3517%	1.5647%
26	0.0300%	0.0189%	75	2.4945%	1.7046%
27	0.0314%	0.0204%	76	2.8514%	1.9381%
28	0.0333%	0.0223%	77	3.2124%	2.1738%
29	0.0357%	0.0242%	78	3.5772%	2.4111%
30	0.0391%	0.0263%	79	3.9481%	2.6498%
31	0.0456%	0.0325%	80	4.3235%	2.8882%
32	0.0521%	0.0381%	81	4.8421%	3.2686%
33	0.0582%	0.0430%	82	5.3798%	3.6576%
34	0.0638%	0.0469%	83	5.9354%	4.0549%
35	0.0696%	0.0507%	84	6.5082%	4.4598%
36	0.0730%	0.0535%	85	7.0982%	4.8743%
37	0.0762%	0.0566%	86	7.8805%	5.5665%
38	0.0796%	0.0597%	87	8.6694%	6.2575%
39	0.0840%	0.0634%	88	9.4673%	6.9540%
40	0.0904%	0.0674%	89	10.2726%	7.6518%
41	0.1253%	0.0716%	90	11.0906%	8.3524%
42	0.1580%	0.0783%	91	12.7190%	9.6332%
43	0.1896%	0.0873%	92	14.4073%	10.9357%
44	0.2207%	0.0994%	93	16.1520%	12.2958%
45	0.2524%	0.1151%	94	17.9943%	13.6634%
46	0.2813%	0.1343%	95	19.9770%	15.0888%
47	0.3105%	0.1569%	96	22.0057%	16.8493%
48	0.3396%	0.1825%	97	24.0970%	18.4723%
49	0.3686%	0.2116%	98	26.3296%	19.7886%
50	0.3971%	0.2431%	99	28.5374%	20.7527%
51	0.4672%	0.2806%	100	30.7448%	21.2257%
52	0.5435%	0.3201%	101	32.3665%	22.1344%
53	0.6253%	0.3608%	102	33.7861%	23.1735%
54	0.7119%	0.4018%	103	35.0826%	24.4013%
55	0.8014%	0.4420%	104	36.1722%	25.7784%
56	0.8681%	0.5009%	105	36.9822%	27.2744%
57	0.9299%	0.5593%	106	37.4491%	28.8471%
58	0.9847%	0.6169%	107	37.7175%	30.4676%
59	1.0316%	0.6732%	108	38.0028%	32.0883%
60	1.0706%	0.7296%	109	38.2863%	33.6686%
61	1.1588%	0.7888%	110	96.4196%	96.4583%
62	1.2363%	0.8354%	111	97.1087%	97.1672%
63	1.3067%	0.8825%	112	97.8219%	97.8611%
64	1.3714%	0.9360%	113	98.5792%	98.5792%
65	1.2541%	0.6344%	114	99.2823%	99.2823%
66	1.3548%	0.7010%	115	100.0000%	100.0000%
67	1.4590%	0.7795%			

Mortality Improvement Scale MP-2015 has been applied to these rates to estimate future mortality improvement.

Table XI-6a
Disabled Retiree Mortality, Base Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES					
BASE TABLE					
Age	Males	Females	Age	Males	Females
19	0.9679%	0.8759%	65	3.1055%	2.6455%
20	0.9876%	0.9033%	66	3.2170%	2.7155%
21	1.0123%	0.9310%	67	3.3377%	2.7765%
22	1.0378%	0.9562%	68	3.4685%	2.8508%
23	1.0636%	0.9696%	69	3.6106%	2.9397%
24	1.0903%	0.9940%	70	3.7651%	3.0447%
25	1.1174%	1.0190%	71	3.9337%	3.1675%
26	1.1453%	1.0444%	72	4.1177%	3.3095%
27	1.1739%	1.0837%	73	4.3181%	3.4721%
28	1.2031%	1.1310%	74	4.5355%	3.6560%
29	1.2331%	1.1877%	75	4.7705%	3.8621%
30	1.2636%	1.2099%	76	5.0464%	4.0915%
31	1.2951%	1.2251%	77	5.3434%	4.3206%
32	1.3272%	1.2557%	78	5.6617%	4.5722%
33	1.3601%	1.2946%	79	6.0019%	4.8367%
34	1.3938%	1.3348%	80	6.3648%	5.1526%
35	1.4284%	1.3763%	81	6.7503%	5.4928%
36	1.4638%	1.4189%	82	7.1588%	5.8583%
37	1.5000%	1.4630%	83	7.5935%	6.2503%
38	1.5370%	1.5085%	84	8.0565%	6.6600%
39	1.5749%	1.5552%	85	8.7359%	7.4782%
40	1.6139%	1.5938%	86	9.6438%	8.2481%
41	1.6467%	1.6232%	87	10.5517%	9.0628%
42	1.6804%	1.6532%	88	11.4595%	9.8776%
43	1.7147%	1.6840%	89	12.3675%	11.2988%
44	1.7497%	1.7079%	90	13.2754%	12.7929%
45	1.7854%	1.7429%	91	15.1361%	14.4183%
46	1.8063%	1.7785%	92	17.0391%	15.9590%
47	1.8276%	1.8148%	93	18.9830%	17.4336%
48	1.8534%	1.8407%	94	21.0060%	19.3262%
49	1.8941%	1.8516%	95	23.1546%	21.1607%
50	1.9347%	1.8525%	96	25.3189%	22.5063%
51	1.9928%	1.8534%	97	27.5221%	23.2890%
52	2.0519%	1.8598%	98	29.8524%	23.6519%
53	2.1139%	1.8652%	99	32.1066%	24.6308%
54	2.1770%	1.8865%	100	34.3180%	24.6509%
55	2.2408%	1.9074%	101	35.8628%	25.0504%
56	2.3160%	1.9415%	102	37.1685%	25.4498%
57	2.3927%	1.9874%	103	38.3040%	26.6044%
58	2.4714%	2.0582%	104	39.2003%	27.9055%
59	2.5523%	2.1403%	105	39.7886%	29.3116%
60	2.6354%	2.2247%	106	40.0000%	30.7811%
61	2.7215%	2.3119%	107	40.0000%	32.2725%
62	2.8108%	2.3876%	108	40.0000%	33.7441%
63	2.9038%	2.4653%	109	40.0000%	35.1544%
64	3.0016%	2.5615%	110	100.0000%	100.0000%

Table XI-6b
Disabled Retiree Mortality, Valuation Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY IN THE NEXT YEAR FOR DISABLED RETIREES IN THE JUNE 30, 2016 (LAG) VALUATION					
Age	Males	Females	Age	Males	Females
19	0.6369%	0.6035%	68	2.7178%	2.2136%
20	0.6499%	0.6224%	69	2.8096%	2.2929%
21	0.6908%	0.6747%	70	2.9173%	2.3880%
22	0.7346%	0.7304%	71	3.0411%	2.5001%
23	0.7806%	0.7803%	72	3.1811%	2.6300%
24	0.8293%	0.8412%	73	3.3380%	2.7779%
25	0.8800%	0.9034%	74	3.5111%	2.9460%
26	0.9322%	0.9657%	75	3.7013%	3.1340%
27	0.9860%	1.0394%	76	3.9279%	3.3421%
28	1.0395%	1.1269%	77	4.1748%	3.5516%
29	1.0899%	1.2113%	78	4.4416%	3.7799%
30	1.1345%	1.2530%	79	4.7317%	4.0197%
31	1.1725%	1.2766%	80	5.0435%	4.3005%
32	1.2019%	1.3055%	81	5.3763%	4.6022%
33	1.2211%	1.3303%	82	5.7331%	4.9229%
34	1.2368%	1.3422%	83	6.1155%	5.2646%
35	1.2438%	1.3481%	84	6.5242%	5.6188%
36	1.2419%	1.3491%	85	7.1126%	6.3187%
37	1.2342%	1.3431%	86	7.8951%	6.9791%
38	1.2234%	1.3359%	87	8.6842%	7.6754%
39	1.2129%	1.3311%	88	9.4823%	8.3782%
40	1.2066%	1.3234%	89	10.2878%	9.5973%
41	1.2016%	1.3165%	90	11.1060%	10.8829%
42	1.2052%	1.3205%	91	12.7347%	12.2929%
43	1.2183%	1.3371%	92	14.4232%	13.6422%
44	1.2414%	1.3618%	93	16.1681%	14.9570%
45	1.2754%	1.4104%	94	18.0108%	16.6461%
46	1.3074%	1.4688%	95	19.9937%	18.3147%
47	1.3483%	1.5359%	96	22.0226%	19.6218%
48	1.3990%	1.5985%	97	24.1141%	20.4527%
49	1.4679%	1.6553%	98	26.3471%	20.9212%
50	1.5428%	1.7023%	99	28.5552%	21.9484%
51	1.6382%	1.7435%	100	30.7448%	22.1222%
52	1.7376%	1.7791%	101	32.3665%	22.6470%
53	1.8406%	1.8011%	102	33.7861%	23.1735%
54	1.9434%	1.8237%	103	35.0826%	24.4013%
55	2.0415%	1.8296%	104	36.1722%	25.7784%
56	2.1398%	1.8349%	105	36.9822%	27.2744%
57	2.2266%	1.8380%	106	37.4491%	28.8471%
58	2.2978%	1.8547%	107	37.7175%	30.4676%
59	2.3532%	1.8742%	108	38.0028%	32.0883%
60	2.3940%	1.8935%	109	38.2863%	33.6686%
61	2.4242%	1.9157%	110	36.4196%	36.4583%
62	2.4472%	1.9332%	111	37.1087%	37.1672%
63	2.4706%	1.9601%	112	37.8219%	37.8611%
64	2.4972%	2.0095%	113	38.5792%	38.5792%
65	2.5325%	2.0583%	114	39.2823%	39.2823%
66	2.5805%	2.1044%	115	100.0000%	100.0000%
67	2.6416%	2.1506%			

Mortality Improvement Scale MP-2015 has been applied to these rates to estimate future mortality improvement.

Table XI-7a
Beneficiary Mortality, Base Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF BENEFICIARY MORTALITY					
BASE TABLE					
Age	Males	Females	Age	Males	Females
19	0.0306%	0.0175%	65	1.7577%	1.2814%
20	0.0320%	0.0177%	66	1.9030%	1.3758%
21	0.0332%	0.0180%	67	2.0483%	1.4817%
22	0.0341%	0.0181%	68	2.1936%	1.5930%
23	0.0351%	0.0185%	69	2.3389%	1.6707%
24	0.0357%	0.0189%	70	2.4842%	1.7416%
25	0.0361%	0.0196%	71	2.7068%	1.9340%
26	0.0369%	0.0204%	72	2.9339%	2.1220%
27	0.0374%	0.0213%	73	3.1659%	2.3059%
28	0.0385%	0.0224%	74	3.4024%	2.4854%
29	0.0404%	0.0237%	75	3.6438%	2.6609%
30	0.0435%	0.0254%	76	4.2007%	3.0053%
31	0.0504%	0.0312%	77	4.7694%	3.3498%
32	0.0575%	0.0366%	78	5.3501%	3.6942%
33	0.0648%	0.0418%	79	5.9428%	4.0386%
34	0.0719%	0.0466%	80	6.5473%	4.3831%
35	0.0799%	0.0518%	81	7.1996%	4.9279%
36	0.0860%	0.0563%	82	7.8517%	5.4831%
37	0.0926%	0.0617%	83	8.5037%	6.0487%
38	0.1000%	0.0674%	84	9.1559%	6.6246%
39	0.1091%	0.0741%	85	9.8079%	7.2110%
40	0.1209%	0.0812%	86	11.0698%	8.2234%
41	0.1717%	0.0883%	87	12.3771%	9.2358%
42	0.2203%	0.0980%	88	13.7297%	10.2481%
43	0.2668%	0.1100%	89	15.1278%	11.2605%
44	0.3111%	0.1247%	90	16.5712%	12.2729%
45	0.3533%	0.1422%	91	18.4052%	14.0131%
46	0.3887%	0.1626%	92	20.2054%	15.6962%
47	0.4209%	0.1854%	93	21.9737%	17.3412%
48	0.4499%	0.2102%	94	23.7565%	18.8767%
49	0.4756%	0.2367%	95	25.7255%	20.3531%
50	0.4980%	0.2646%	96	27.6098%	21.5243%
51	0.5684%	0.2983%	97	29.4231%	22.5407%
52	0.6418%	0.3346%	98	31.2455%	23.2572%
53	0.7182%	0.3736%	99	32.8638%	23.6605%
54	0.7975%	0.4156%	100	34.3180%	23.6704%
55	0.8797%	0.4608%	101	35.8628%	24.4834%
56	0.9396%	0.5300%	102	37.1685%	25.4498%
57	0.9993%	0.6048%	103	38.3040%	26.6044%
58	1.0591%	0.6846%	104	39.2003%	27.9055%
59	1.1189%	0.7688%	105	39.7886%	29.3116%
60	1.1786%	0.8572%	106	40.0000%	30.7811%
61	1.3009%	0.9519%	107	40.0000%	32.2725%
62	1.4200%	1.0318%	108	40.0000%	33.7441%
63	1.5358%	1.1100%	109	40.0000%	35.1544%
64	1.6484%	1.1932%	110	100.0000%	100.0000%

Table XI-7b
Beneficiary Mortality, Valuation Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF BENEFICIARY MORTALITY IN THE NEXT YEAR IN THE JUNE 30, 2016 (LAG) VALUATION					
Age	Males	Females	Age	Males	Females
19	0.0201%	0.0121%	68	1.7189%	1.2370%
20	0.0211%	0.0122%	69	1.8200%	1.3031%
21	0.0227%	0.0130%	70	1.9248%	1.3660%
22	0.0241%	0.0138%	71	2.0926%	1.5265%
23	0.0258%	0.0149%	72	2.2666%	1.6863%
24	0.0272%	0.0160%	73	2.4473%	1.8449%
25	0.0284%	0.0174%	74	2.6339%	2.0027%
26	0.0300%	0.0189%	75	2.8272%	2.1592%
27	0.0314%	0.0204%	76	3.2696%	2.4549%
28	0.0333%	0.0223%	77	3.7263%	2.7536%
29	0.0357%	0.0242%	78	4.1972%	3.0540%
30	0.0391%	0.0263%	79	4.6851%	3.3564%
31	0.0456%	0.0325%	80	5.1881%	3.6583%
32	0.0521%	0.0381%	81	5.7341%	4.1289%
33	0.0582%	0.0430%	82	6.2881%	4.6076%
34	0.0638%	0.0469%	83	6.8485%	5.0947%
35	0.0696%	0.0507%	84	7.4144%	5.5889%
36	0.0730%	0.0535%	85	7.9854%	6.0929%
37	0.0762%	0.0566%	86	9.0625%	6.9582%
38	0.0796%	0.0597%	87	10.1865%	7.8220%
39	0.0840%	0.0634%	88	11.3608%	8.6925%
40	0.0904%	0.0674%	89	12.5840%	9.5648%
41	0.1253%	0.0716%	90	13.8632%	10.4405%
42	0.1580%	0.0783%	91	15.4852%	11.9474%
43	0.1896%	0.0873%	92	17.1034%	13.4176%
44	0.2207%	0.0994%	93	18.7153%	14.8777%
45	0.2524%	0.1151%	94	20.3691%	16.2589%
46	0.2813%	0.1343%	95	22.2136%	17.6157%
47	0.3105%	0.1569%	96	24.0153%	18.7657%
48	0.3396%	0.1825%	97	25.7797%	19.7956%
49	0.3686%	0.2116%	98	27.5766%	20.5720%
50	0.3971%	0.2431%	99	29.2286%	21.0838%
51	0.4672%	0.2806%	100	30.7448%	21.2423%
52	0.5435%	0.3201%	101	32.3665%	22.1344%
53	0.6253%	0.3608%	102	33.7861%	23.1735%
54	0.7119%	0.4018%	103	35.0826%	24.4013%
55	0.8014%	0.4420%	104	36.1722%	25.7784%
56	0.8681%	0.5009%	105	36.9822%	27.2744%
57	0.9299%	0.5593%	106	37.4491%	28.8471%
58	0.9847%	0.6169%	107	37.7175%	30.4676%
59	1.0316%	0.6732%	108	38.0028%	32.0883%
60	1.0706%	0.7296%	109	38.2863%	33.6686%
61	1.1588%	0.7888%	110	96.4196%	96.4583%
62	1.2363%	0.8354%	111	97.1087%	97.1672%
63	1.3067%	0.8825%	112	97.8219%	97.8611%
64	1.3714%	0.9360%	113	98.5792%	98.5792%
65	1.4334%	0.9970%	114	99.2823%	99.2823%
66	1.5265%	1.0662%	115	100.0000%	100.0000%
67	1.6211%	1.1477%			

Mortality Improvement Scale MP-2015 has been applied to these rates to estimate future mortality improvement.

**Table XI-8
Salary Scale**

NEW YORK CITY BOARD OF EDUCATION		
ANNUAL RATES OF SALARY INCREASE		
Years of Service	Merit Increase	Salary Scale
0	6.00%	9.00%
1	5.00%	8.00%
2	4.00%	7.00%
3	3.00%	6.00%
4	2.50%	5.50%
5	2.00%	5.00%
6	1.90%	4.90%
7	1.80%	4.80%
8	1.70%	4.70%
9	1.60%	4.60%
10	1.50%	4.50%
11	1.50%	4.50%
12	1.50%	4.50%
13	1.50%	4.50%
14	1.50%	4.50%
15	1.50%	4.50%
16	1.45%	4.45%
17	1.40%	4.40%
18	1.35%	4.35%
19	1.30%	4.30%
20	1.25%	4.25%
21	1.20%	4.20%
22	1.15%	4.15%
23	1.10%	4.10%
24	1.05%	4.05%
25 or greater	1.00%	4.00%

Additional Assumptions and Methods

1. **Marital Assumption:** All active members are assumed to be married and females are assumed to be three years younger than their male spouses.
2. **Credited Service:** Calculated in whole year increments for valuation purposes.
3. **Actuarial Interest Rate:** 7.0% per annum, net of investment expenses.
4. **COLA:** Based on an assumed long-term Consumer Price Index Inflation rate of 2.5% per year. 1.5% per year for Auto COLA, 2.5% per year for Escalation.
5. **Actuarial Asset Valuation Method (AAVM):**

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

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

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

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

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

6. **Actuarial Cost Method:** Beginning with the June 30, 2010 (Lag) actuarial valuation, the Entry Age Normal (EAN) cost method of funding is used by the Actuary to calculate the contribution required of the employer under the 2016 A&M.

Under this method, the Present Value 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 a valuation date by the Present Value of Future Normal Costs or future member contributions is the Accrued Liability (AL).

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

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

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

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

Under EAN, the employer normal cost remains constant as a percentage of payroll and changes gradually over time for the entire Plan as the characteristics of the members change (e.g. more Tier 6 active members decrease the average employer normal cost).

7. **Lump Sum Death Benefits:** Liabilities for group life lump sum death benefits are calculated under the One-Year Term Cost method.
8. **Allowances for Administrative Expenses:** The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from BERS during the second prior fiscal year.
9. **WTC Disability and Death Benefits:** For actuarial valuations beginning June 30, 2014, obligations attributable to the WTC Disability Law and to the WTC Death Benefits Law are determined through the use of explicit assumptions in the 2016 A&M, and through estimation techniques for post-retirement reclassifications.
10. **One-Year Lag Methodology:** One-Year Lag methodology uses a June 30, XX-2 valuation date to determine Fiscal Year XX employer contributions.

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

Present Value of Future Salary (PVFS): The PVFS at June 30, XX-2 is reduced by the value of salary projected to be paid during Fiscal Year XX-1.

Salary for Determining Employer Normal Contributions: Salary used to determine the employer Normal Contribution is the salary projected to be paid during Fiscal Year XX to members on payroll at June 30, XX-2.

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

11. **Excess Benefit Plan:** The valuation includes liabilities and costs, if any, associated with the Excess Benefit Plan administered by the Board of Education in the case that members exceed Internal Revenue Code Section 415 limitations.
12. **Term Cost for TDA Fixed Fund:** Beginning with the June 30, 2016 (Lag) actuarial valuation, a cost is added to each year's Normal Cost for providing a guaranteed 8.25% return on the TDA Fixed Fund for non-UFT members.

SECTION XII - SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2016 (Lag) and June 30, 2015 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by the Office of the Comptroller as of June 30, 2016 and June 30, 2015.

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

Table XII-1
Status Reconciliation

CHANGES IN THE NUMBER OF ACTIVES AND PENSIONERS DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	(1) Active Members	(2) Active/ Inactive	(3) Deferred Vested	(4) Service Pension	(5) Ordinary Disability	(6) Accidental Disability	(7) Accidental Death	(8) Other Beneficiary	(9) Pensioners Subtotal (4) to (8)	(10) Grand Total (1) + (2) + (3) + (9)
Number at June 30, 2015	24,903	3,972	237	14,572	890	159	2	815	16,438	45,550
New Entrants	2,038	0	0	0	0	0	0	0	0	2,038
Rehires	950	(895)	(6)	0	0	0	0	0	0	49
Leaving Active Payroll	(959)	959	0	0	0	0	0	0	0	0
Vested Termination	(22)	(627)	649	0	0	0	0	0	0	0
Non-Vested Termination / Cashout	(256)	(549)	(12)	0	0	0	0	0	0	(817)
Accidental Death (from Active)	0	0	0	0	0	0	0	0	0	0
Ordinary Death (from Active)	(30)	(29)	(3)	0	0	0	0	0	0	(62)
Service Retirement	(693)	(177)	(14)	949	0	0	0	0	949	65
Ordinary Disability Retirement	(62)	(21)	0	0	83	0	0	0	83	0
Accidental Disability Retirement	(5)	(4)	0	0	0	9	0	0	9	0
Death with Beneficiary	0	0	0	(31)	(3)	0	0	40	6	6
Death without Beneficiary	0	0	0	(453)	(33)	0	0	(53)	(539)	(539)
Off Pension Payroll	0	0	0	(3)	0	0	0	(6)	(9)	(9)
Net Change	961	(1,343)	614	462	47	9	0	(19)	499	731
Number at June 30, 2016	25,864	2,629	851	15,034	937	168	2	796	16,937	46,281

Graph XII-2
Headcount Summary by Status

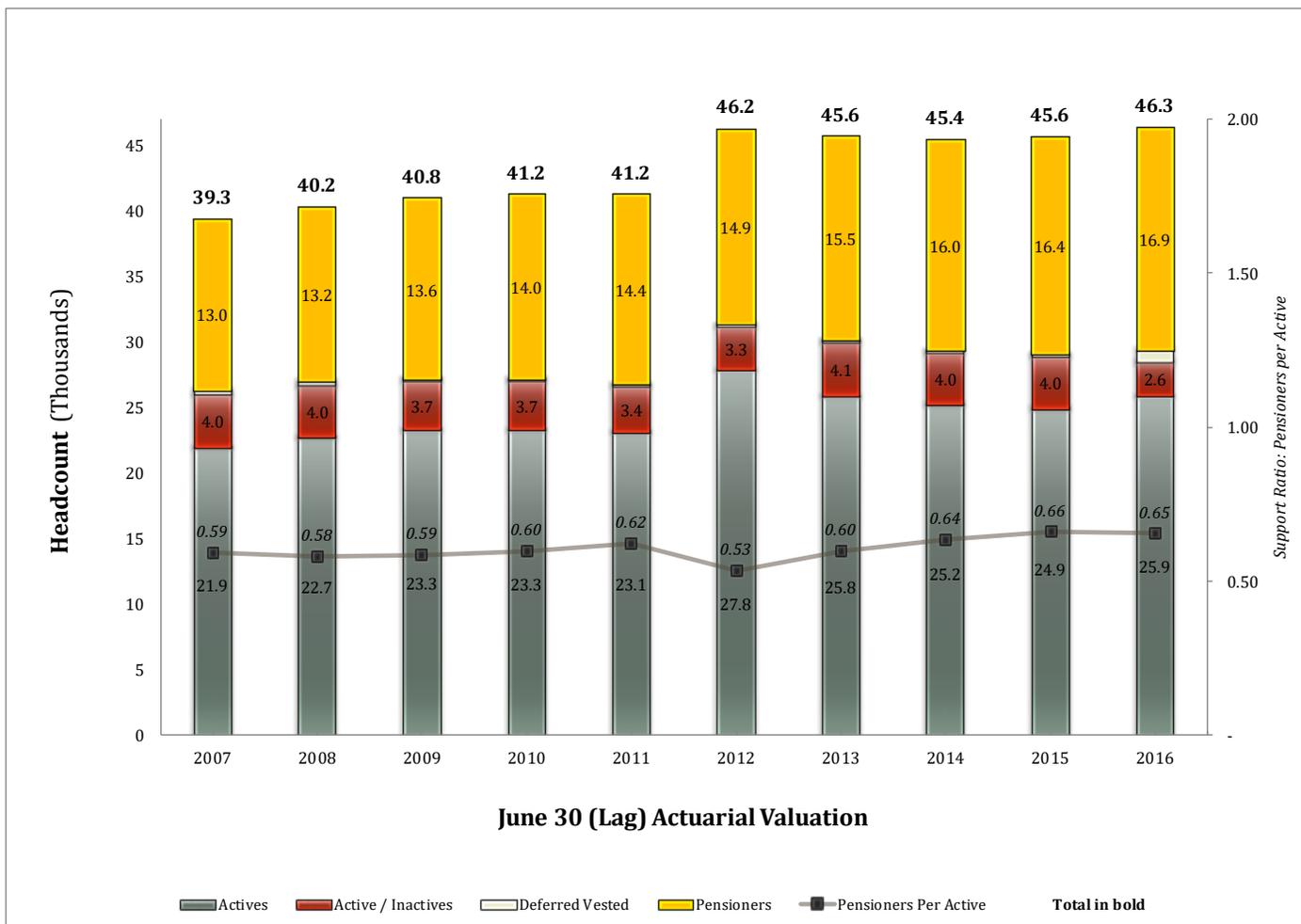


Table XII-3
Summary of Active Membership

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2016 (LAG) AND THE JUNE 30, 2015 (LAG) ACTUARIAL VALUATIONS		
	June 30, 2016 (Lag)	June 30, 2015 (Lag)
Number		
Males	6,301	6,136
Females	19,563	18,767
Total	25,864	24,903
Annual Salary ¹		
Males	\$ 393,227,215	\$ 373,629,854
Females	755,792,677	720,332,462
Total	\$ 1,149,019,892	\$ 1,093,962,316
Average Salary ¹		
Males	\$ 62,407	\$ 60,891
Females	38,634	38,383
Total Average	\$ 44,425	\$ 43,929
Average Age		
Males	49.1	48.8
Females	51.9	51.7
Total Average	51.2	51.0
Average Past Service		
Males	10.5	10.5
Females	10.3	10.3
Total Average	10.4	10.3

¹Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Graph XII-4
Active Membership by Tier

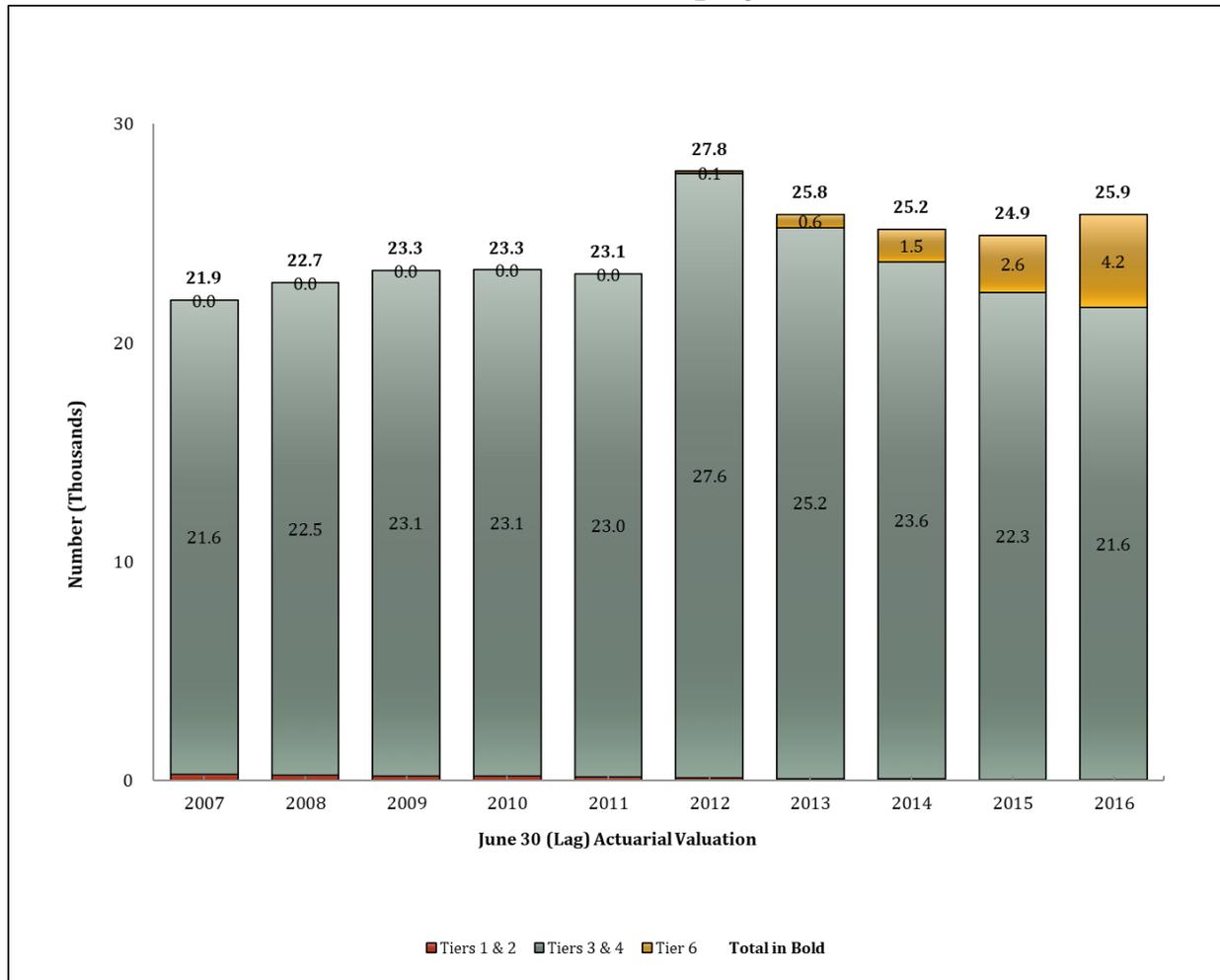


Table XII-5
Historical Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2007(Lag)	21,947	\$777,626,307	\$35,432	9.1%
2008(Lag)	22,729	852,105,791	37,490	5.8%
2009(Lag)	23,303	910,609,483	39,077	4.2%
2010(Lag)	23,324	912,290,136	39,114	0.1%
2011(Lag)	23,131	920,369,154	39,789	1.7%
2012(Lag)	27,840	1,018,895,365	36,598	- 8.0%
2013(Lag)	25,848	1,051,571,168	40,683	11.2%
2014(Lag)	25,182	1,045,187,738	41,505	2.0%
2015(Lag)	24,903	1,093,962,316	43,929	5.8%
2016(Lag)	25,864	1,149,019,892	44,425	1.1%

Annualized covered payrolls used for the Fiscal Year 2012 Employer Contributions and subsequent years are based on revised actuarial assumptions enacted by Chapter 3/13 (i.e. the 2012 A&M).

Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2016

		Male Total								
AGE \ SVC	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	64	0	0	0	0	0	0	0	0	64
25 TO 29	278	24	2	0	0	0	0	0	0	304
30 TO 34	382	114	13	1	0	0	0	0	0	510
35 TO 39	333	156	97	22	0	0	0	0	0	608
40 TO 44	274	205	190	80	14	0	0	0	0	763
45 TO 49	289	175	214	138	57	18	0	0	0	891
50 TO 54	310	172	198	149	87	91	13	2	0	1,022
55 TO 59	250	162	150	174	108	136	60	9	1	1,050
60 TO 64	131	104	107	103	58	88	53	24	5	673
65 TO 69	55	46	62	37	18	17	12	13	9	269
70 & UP	26	33	32	22	6	16	9	0	2	146
TOTAL	2,393	1,191	1,065	726	348	366	147	48	17	6,301

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	27	0	0	0	0	0	0	0	0	27
20 TO 24	2,163	0	0	0	0	0	0	0	0	2,163
25 TO 29	11,735	1,056	115	0	0	0	0	0	0	12,906
30 TO 34	17,948	6,404	738	27	0	0	0	0	0	25,117
35 TO 39	16,916	10,784	6,468	1,211	0	0	0	0	0	35,380
40 TO 44	14,022	14,837	14,796	5,484	861	0	0	0	0	50,000
45 TO 49	13,580	11,511	17,324	9,972	4,544	1,096	0	0	0	58,027
50 TO 54	14,428	11,601	14,522	11,234	6,819	7,916	1,009	159	0	67,688
55 TO 59	10,802	9,740	10,761	12,554	7,875	12,649	5,318	946	129	70,775
60 TO 64	6,228	6,368	7,471	7,077	4,574	7,680	4,888	2,466	461	47,214
65 TO 69	1,885	2,377	3,220	2,479	1,368	1,558	1,213	1,454	922	16,475
70 & UP	917	1,411	1,446	1,173	508	1,105	722	0	174	7,457
TOTAL *	110,651	76,089	76,861	51,211	26,550	32,003	13,149	5,025	1,686	393,227

<i>AVERAGE SALARIES: **</i>										
UNDER 20	26,711	0	0	0	0	0	0	0	0	26,711
20 TO 24	33,800	0	0	0	0	0	0	0	0	33,800
25 TO 29	42,213	44,003	57,271	0	0	0	0	0	0	42,453
30 TO 34	46,983	56,180	56,800	26,562	0	0	0	0	0	49,249
35 TO 39	50,799	69,131	66,681	55,060	0	0	0	0	0	58,190
40 TO 44	51,177	72,375	77,873	68,545	61,488	0	0	0	0	65,530
45 TO 49	46,989	65,777	80,953	72,264	79,713	60,879	0	0	0	65,125
50 TO 54	46,543	67,445	73,344	75,396	78,377	86,986	77,639	79,317	0	66,231
55 TO 59	43,209	60,121	71,741	72,149	72,921	93,009	88,628	105,160	129,350	67,405
60 TO 64	47,542	61,235	69,819	68,711	78,868	87,277	92,222	102,765	92,194	70,155
65 TO 69	34,266	51,673	51,937	67,003	76,022	91,625	101,059	111,837	102,394	61,245
70 & UP	35,256	42,760	45,202	53,326	84,725	69,039	80,222	0	87,159	51,073
TOTAL	46,239	63,887	72,170	70,539	76,293	87,441	89,452	104,694	99,187	62,407

Note: Age is last birthday. Service is completed years.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2016 (cont'd)

AGE \ SVC	Female Total									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	79	1	0	0	0	0	0	0	0	80
25 TO 29	555	33	0	0	0	0	0	0	0	588
30 TO 34	751	205	37	2	0	0	0	0	0	995
35 TO 39	778	398	229	33	1	0	0	0	0	1,439
40 TO 44	822	440	350	171	23	0	0	0	0	1,806
45 TO 49	1,061	588	473	328	81	28	3	0	0	2,562
50 TO 54	1,095	819	821	612	172	91	34	3	0	3,647
55 TO 59	832	717	815	906	305	150	82	19	0	3,826
60 TO 64	474	458	613	732	299	197	60	32	16	2,881
65 TO 69	170	156	234	301	178	118	27	13	11	1,208
70 & UP	63	55	84	114	95	88	21	4	6	530
TOTAL	6,681	3,870	3,656	3,199	1,154	672	227	71	33	19,563

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	49	0	0	0	0	0	0	0	0	49
20 TO 24	2,763	40	0	0	0	0	0	0	0	2,803
25 TO 29	26,620	1,626	0	0	0	0	0	0	0	28,247
30 TO 34	37,553	12,808	1,951	62	0	0	0	0	0	52,374
35 TO 39	34,706	23,665	14,337	1,574	91	0	0	0	0	74,373
40 TO 44	30,046	20,858	19,963	9,880	1,353	0	0	0	0	82,101
45 TO 49	34,096	23,214	19,702	14,341	4,744	1,552	260	0	0	97,909
50 TO 54	33,117	28,329	29,403	22,758	8,172	5,435	2,457	155	0	129,826
55 TO 59	24,245	24,980	27,908	31,085	11,642	7,173	5,835	1,383	0	134,251
60 TO 64	14,143	15,556	21,230	24,028	10,947	7,984	3,803	2,172	1,035	100,898
65 TO 69	4,342	4,554	7,741	9,012	5,840	4,280	1,324	653	775	38,521
70 & UP	1,530	1,545	2,071	3,106	2,322	2,561	729	257	319	14,440
TOTAL *	243,211	157,177	144,306	115,847	45,112	28,985	14,407	4,619	2,129	755,793

<i>AVERAGE SALARIES: **</i>										
UNDER 20	48,696	0	0	0	0	0	0	0	0	48,696
20 TO 24	34,975	40,322	0	0	0	0	0	0	0	35,041
25 TO 29	47,965	49,279	0	0	0	0	0	0	0	48,039
30 TO 34	50,004	62,479	52,718	31,121	0	0	0	0	0	52,637
35 TO 39	44,610	59,460	62,608	47,682	91,089	0	0	0	0	51,684
40 TO 44	36,552	47,404	57,038	57,777	58,841	0	0	0	0	45,460
45 TO 49	32,136	39,479	41,654	43,724	58,571	55,430	86,612	0	0	38,216
50 TO 54	30,244	34,590	35,813	37,186	47,511	59,724	72,267	51,523	0	35,598
55 TO 59	29,141	34,840	34,242	34,311	38,172	47,819	71,155	72,777	0	35,089
60 TO 64	29,837	33,965	34,633	32,826	36,611	40,529	63,377	67,862	64,716	35,022
65 TO 69	25,541	29,194	33,083	29,940	32,809	36,269	49,019	50,237	70,481	31,889
70 & UP	24,291	28,094	24,654	27,243	24,447	29,102	34,728	64,190	53,083	27,245
TOTAL	36,403	40,614	39,471	36,213	39,092	43,132	63,467	65,053	64,523	38,634

Note: Age is last birthday. Service is completed years.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2016 (cont'd)

AGE \ SVC	Total									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	2	0	0	0	0	0	0	0	0	2
20 TO 24	143	1	0	0	0	0	0	0	0	144
25 TO 29	833	57	2	0	0	0	0	0	0	892
30 TO 34	1,133	319	50	3	0	0	0	0	0	1,505
35 TO 39	1,111	554	326	55	1	0	0	0	0	2,047
40 TO 44	1,096	645	540	251	37	0	0	0	0	2,569
45 TO 49	1,350	763	687	466	138	46	3	0	0	3,453
50 TO 54	1,405	991	1,019	761	259	182	47	5	0	4,669
55 TO 59	1,082	879	965	1,080	413	286	142	28	1	4,876
60 TO 64	605	562	720	835	357	285	113	56	21	3,554
65 TO 69	225	202	296	338	196	135	39	26	20	1,477
70 & UP	89	88	116	136	101	104	30	4	8	676
TOTAL	9,074	5,061	4,721	3,925	1,502	1,038	374	119	50	25,864

SALARIES (IN THOUSANDS):

UNDER 20	75	0	0	0	0	0	0	0	0	75
20 TO 24	4,926	40	0	0	0	0	0	0	0	4,967
25 TO 29	38,356	2,682	115	0	0	0	0	0	0	41,152
30 TO 34	55,501	19,213	2,689	89	0	0	0	0	0	77,491
35 TO 39	51,622	34,449	20,805	2,785	91	0	0	0	0	109,753
40 TO 44	44,068	35,695	34,759	15,363	2,214	0	0	0	0	132,100
45 TO 49	47,676	34,725	37,026	24,314	9,288	2,648	260	0	0	155,936
50 TO 54	47,546	39,930	43,925	33,992	14,991	13,351	3,466	313	0	197,514
55 TO 59	35,047	34,720	38,669	43,639	19,518	19,822	11,152	2,329	129	205,026
60 TO 64	20,371	21,924	28,701	31,106	15,521	15,664	8,690	4,638	1,496	148,112
65 TO 69	6,227	6,931	10,961	11,491	7,208	5,837	2,536	2,107	1,697	54,996
70 & UP	2,447	2,956	3,517	4,279	2,831	3,666	1,451	257	493	21,897
TOTAL *	353,862	233,266	221,168	167,058	71,662	60,988	27,557	9,644	3,815	1,149,020

*AVERAGE SALARIES: ***

UNDER 20	37,704	0	0	0	0	0	0	0	0	37,704
20 TO 24	34,449	40,322	0	0	0	0	0	0	0	34,490
25 TO 29	46,045	47,058	57,271	0	0	0	0	0	0	46,135
30 TO 34	48,986	60,228	53,780	29,601	0	0	0	0	0	51,489
35 TO 39	46,465	62,183	63,820	50,633	91,089	0	0	0	0	53,617
40 TO 44	40,208	55,341	64,369	61,209	59,843	0	0	0	0	51,421
45 TO 49	35,315	45,511	53,895	52,176	67,304	57,562	86,612	0	0	45,160
50 TO 54	33,840	40,293	43,106	44,668	57,879	73,355	73,753	62,640	0	42,303
55 TO 59	32,391	39,499	40,071	40,407	47,259	69,308	78,538	83,186	129,350	42,048
60 TO 64	33,671	39,012	39,862	37,252	43,476	54,963	76,906	82,820	71,258	41,675
65 TO 69	27,674	34,313	37,032	33,997	36,778	43,240	65,031	81,037	84,842	37,235
70 & UP	27,494	33,594	30,322	31,463	28,028	35,246	48,376	64,190	61,602	32,392
TOTAL	38,997	46,091	46,848	42,563	47,711	58,755	73,681	81,042	76,309	44,425

Note: Age is last birthday. Service is completed years.

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-7
Detailed Reconciliation of Active Membership

		TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2015					TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2016				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	11	962,871	87,534	66.0	31.8	10	937,276	93,728	67.0	35.7
1	F	25	1,554,205	62,168	68.6	35.5	21	1,436,731	68,416	69.2	35.7
		36	2,517,076	69,919	67.8	34.4	31	2,374,007	76,581	68.5	35.7
2	M	12	1,029,830	85,819	64.8	38.6	11	982,112	89,283	66.3	39.4
2	F	22	1,409,113	64,051	64.0	36.2	19	1,103,997	58,105	66.6	36.1
		34	2,438,943	71,734	64.3	37.0	30	2,086,109	69,537	66.5	37.3
4	M	5,487	338,824,416	61,750	49.6	11.5	5,220	335,702,072	64,311	50.5	12.3
4	F	16,775	643,356,160	38,352	52.7	11.3	16,346	631,678,613	38,644	53.5	12.0
		22,262	982,180,576	44,119	51.9	11.3	21,566	967,380,685	44,857	52.8	12.0
6	M	626	32,812,737	52,417	41.0	1.2	1,060	55,605,755	52,458	41.7	1.4
6	F	1,945	74,012,984	38,053	42.4	1.2	3,177	121,573,336	38,267	43.4	1.5
		2,571	106,825,721	41,550	42.1	1.2	4,237	177,179,091	41,817	43.0	1.5
ALL		24,903	1,093,962,316	43,929	51.0	10.3	25,864	1,149,019,892	44,425	51.2	10.4
		JUNE 30, 2015 MEMBERS ALSO PRESENT AS OF JUNE 30, 2016					JUNE 30, 2016 MEMBERS ALSO PRESENT AS OF JUNE 30, 2015				
1	M	10	894,896	89,490	66.0	34.7	10	937,276	93,728	67.0	35.7
1	F	20	1,218,781	60,939	68.0	34.0	20	1,241,985	62,099	69.0	35.0
		30	2,113,677	70,456	67.3	34.2	30	2,179,261	72,642	68.3	35.2
2	M	11	947,467	86,133	65.3	38.4	11	982,112	89,283	66.3	39.4
2	F	16	1,042,591	65,162	64.6	34.3	16	1,079,489	67,468	65.6	35.3
		27	1,990,058	73,706	64.9	36.0	27	2,061,601	76,356	65.9	37.0
4	M	5,055	315,462,507	62,406	49.5	11.4	5,055	330,381,098	65,357	50.5	12.4
4	F	15,390	595,094,454	38,668	52.5	11.2	15,390	612,673,628	39,810	53.5	12.2
		20,445	910,556,961	44,537	51.8	11.2	20,445	943,054,726	46,126	52.8	12.2
6	M	559	29,222,710	52,277	41.6	1.2	559	32,123,826	57,467	42.6	2.2
6	F	1,770	67,007,377	37,857	42.7	1.2	1,770	74,137,804	41,886	43.7	2.2
		2,329	96,230,087	41,318	42.4	1.2	2,329	106,261,630	45,625	43.4	2.2
ALL		22,831	1,010,890,783	44,277	50.9	10.3	22,831	1,053,557,218	46,146	51.9	11.3
		SEPARATIONS FROM MEMBERSHIP DURING THE YEAR *					ADDITIONS DURING THE YEAR *				
1	M	1	67,975	67,975	66.0	3.0	0	0	0	0.0	0.0
1	F	5	335,424	67,085	71.6	41.4	1	194,746	194,746	73.0	49.0
		6	403,399	67,233	70.7	35.0	1	194,746	194,746	73.0	49.0
2	M	1	82,363	82,363	60.0	41.0	0	0	0	0.0	0.0
2	F	6	366,522	61,087	62.5	41.2	3	24,508	8,169	71.7	40.3
		7	448,885	64,126	62.1	41.1	3	24,508	8,169	71.7	40.3
4	M	432	23,361,909	54,078	50.7	12.2	165	5,320,974	32,248	48.8	6.7
4	F	1,385	48,261,706	34,846	54.3	12.0	956	19,004,985	19,880	53.5	8.5
		1,817	71,623,615	39,419	53.5	12.0	1,121	24,325,959	21,700	52.8	8.3
6	M	67	3,590,027	53,582	36.6	1.2	501	23,481,929	46,870	40.7	0.6
6	F	175	7,005,607	40,032	39.7	1.1	1,407	47,435,532	33,714	43.0	0.7
		242	10,595,634	43,784	38.8	1.1	1,908	70,917,461	37,168	42.4	0.7
ALL		2,072	83,071,533	40,092	51.8	10.9	3,033	95,462,674	31,475	46.3	3.5

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

* Separations and additions do not include members who joined after June 30, 2015 and are no longer members on June 30, 2016.

Table XII-8
Summary of Non-Pensioner Membership as of June 30, 2016

STATUS	TIER 1		TIER 2		TIER 4		TIER 6		ALL TIERS	
	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY
<i>MALES:</i>										
ACTIVES	10	937,276	11	982,112	5,220	335,702,072	1,060	55,605,755	6,301	393,227,215
INACTIVES	0	0	1	68,294	638	27,120,285	79	3,833,591	718	31,022,170
VESTED	0	0	0	0	269	12,452,552	0	0	269	12,452,552
ALL STATUS	10	937,276	12	1,050,406	6,127	375,274,909	1,139	59,439,346	7,288	436,701,937
<i>FEMALES:</i>										
ACTIVES	21	1,436,731	19	1,103,997	16,346	631,678,613	3,177	121,573,336	19,563	755,792,677
INACTIVES	0	0	2	81,313	1,711	58,369,074	198	7,947,035	1,911	66,397,422
VESTED	1	5,000	2	32,666	579	21,548,981	0	0	582	21,586,647
ALL STATUS	22	1,441,731	23	1,217,976	18,636	711,596,668	3,375	129,520,371	22,056	843,776,746
<i>TOTAL:</i>										
ACTIVES	31	2,374,007	30	2,086,109	21,566	967,380,685	4,237	177,179,091	25,864	1,149,019,892
INACTIVES	0	0	3	149,607	2,349	85,489,359	277	11,780,626	2,629	97,419,592
VESTED	1	5,000	2	32,666	848	34,001,533	0	0	851	34,039,199
ALL STATUS	32	2,379,007	35	2,268,382	24,763	1,086,871,577	4,514	188,959,717	29,344	1,280,478,683

Table XII-9
Summary of Pensioner Membership

Group	June 30, 2016 (Lag)					June 30, 2015 (Lag)				
	Number	Annual Amounts Payable				Number	Annual Amounts Payable			
		Fixed	Variable	Supplement	Total		Fixed	Variable	Supplement	Total
Service Pensioners	15,034	\$ 187,479,625	\$ 1,978,095	\$ 12,294,144	\$ 201,751,864	14,572	\$ 179,450,981	\$ 2,210,907	\$ 12,185,148	\$ 193,847,036
Ordinary Disability Pensioners	937	10,586,528	8,447	609,029	11,204,004	890	10,263,433	18,363	583,344	10,865,140
Accidental Disability Pensioners	168	1,952,643	0	294,708	2,247,351	159	1,681,887	0	280,380	1,962,267
Accidental Death Pensioners	2	5,696	0	9,627	15,323	2	5,696	0	9,504	15,200
Other Beneficiaries	796	10,445,450	253,188	1,151,394	11,850,032	815	10,242,989	317,217	1,182,414	11,742,620
Total	16,937	\$ 210,469,942	\$ 2,239,730	\$ 14,358,902	\$ 227,068,574	16,438	\$ 201,644,986	\$ 2,546,487	\$ 14,240,790	\$ 218,432,263

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2016

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>SERVICE RETIREMENT:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	0	0	0	1	2,522	2,522	1	2,522	2,522
45 TO 49	0	0	0	1	25,226	25,226	1	25,226	25,226
50 TO 54	10	441,799	44,180	5	138,249	27,650	15	580,048	38,670
55 TO 59	90	2,569,776	28,553	273	3,068,902	11,241	363	5,638,678	15,534
60 TO 64	343	10,790,249	31,458	1,253	15,619,100	12,465	1,596	26,409,349	16,547
65 TO 69	631	18,273,986	28,960	2,606	28,730,135	11,025	3,237	47,004,121	14,521
70 TO 74	585	16,671,407	28,498	2,577	27,058,561	10,500	3,162	43,729,968	13,830
75 TO 79	465	13,131,583	28,240	1,997	17,882,844	8,955	2,462	31,014,427	12,597
80 TO 84	379	9,625,259	25,396	1,429	12,177,785	8,522	1,808	21,803,044	12,059
85 TO 89	258	6,409,436	24,843	1,149	9,188,386	7,997	1,407	15,597,822	11,086
90 & UP	143	3,395,338	23,744	839	6,551,321	7,808	982	9,946,659	10,129
TOTAL	2,904	81,308,833	27,999	12,130	120,443,031	9,929	15,034	201,751,864	13,420
<i>ORDINARY DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	0	0	0	5	82,196	16,439	5	82,196	16,439
45 TO 49	2	32,813	16,407	12	185,394	15,450	14	218,207	15,586
50 TO 54	22	435,242	19,784	37	465,770	12,588	59	901,012	15,271
55 TO 59	43	727,270	16,913	98	1,117,379	11,402	141	1,844,649	13,083
60 TO 64	57	944,426	16,569	151	1,692,378	11,208	208	2,636,804	12,677
65 TO 69	43	711,901	16,556	175	1,745,621	9,975	218	2,457,522	11,273
70 TO 74	33	502,867	15,238	131	1,262,910	9,641	164	1,765,777	10,767
75 TO 79	14	176,323	12,595	69	631,936	9,158	83	808,259	9,738
80 TO 84	7	100,897	14,414	18	150,954	8,386	25	251,851	10,074
85 TO 89	7	98,921	14,132	9	88,769	9,863	16	187,690	11,731
90 & UP	2	31,567	15,784	2	18,470	9,235	4	50,037	12,509
TOTAL	230	3,762,227	16,358	707	7,441,777	10,526	937	11,204,004	11,957
<i>ACCIDENTAL DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	1	9,123	9,123	1	9,123	9,123
40 TO 44	0	0	0	1	5,134	5,134	1	5,134	5,134
45 TO 49	0	0	0	1	8,493	8,493	1	8,493	8,493
50 TO 54	5	131,769	26,354	4	37,203	9,301	9	168,972	18,775
55 TO 59	9	142,892	15,877	15	168,502	11,233	24	311,394	12,975
60 TO 64	7	119,174	17,025	20	318,826	15,941	27	438,000	16,222
65 TO 69	9	138,124	15,347	25	236,039	9,442	34	374,163	11,005
70 TO 74	8	157,324	19,666	13	91,968	7,074	21	249,292	11,871
75 TO 79	8	209,133	26,142	14	99,196	7,085	22	308,329	14,015
80 TO 84	3	77,383	25,794	11	79,147	7,195	14	156,530	11,181
85 TO 89	3	104,581	34,860	4	25,470	6,368	7	130,051	18,579
90 & UP	3	59,878	19,959	4	27,992	6,998	7	87,870	12,553
TOTAL	55	1,140,258	20,732	113	1,107,093	9,797	168	2,247,351	13,377

Table XII-10

Distribution of Pension Benefits by Cause and Age as of June 30, 2016 (cont'd)

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>ACCIDENTAL DEATH:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	0	0	0	0	0	0	0	0	0
45 TO 49	0	0	0	0	0	0	0	0	0
50 TO 54	0	0	0	0	0	0	0	0	0
55 TO 59	1	6,028	6,028	0	0	0	1	6,028	6,028
60 TO 64	0	0	0	0	0	0	0	0	0
65 TO 69	0	0	0	0	0	0	0	0	0
70 TO 74	0	0	0	0	0	0	0	0	0
75 TO 79	0	0	0	0	0	0	0	0	0
80 TO 84	1	9,295	9,295	0	0	0	1	9,295	9,295
85 TO 89	0	0	0	0	0	0	0	0	0
90 & UP	0	0	0	0	0	0	0	0	0
TOTAL	2	15,323	7,662	0	0	0	2	15,323	7,662
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	6	30,114	5,019	1	1,881	1,881	7	31,995	4,571
30 TO 34	4	73,021	18,255	6	38,412	6,402	10	111,433	11,143
35 TO 39	4	19,394	4,849	11	234,452	21,314	15	253,846	16,923
40 TO 44	5	42,253	8,451	4	12,342	3,086	9	54,595	6,066
45 TO 49	5	20,331	4,066	20	110,641	5,532	25	130,972	5,239
50 TO 54	10	35,150	3,515	23	168,606	7,331	33	203,756	6,174
55 TO 59	12	41,642	3,470	20	225,291	11,265	32	266,933	8,342
60 TO 64	12	134,929	11,244	37	411,072	11,110	49	546,001	11,143
65 TO 69	21	176,460	8,403	59	947,489	16,059	80	1,123,949	14,049
70 TO 74	26	227,212	8,739	62	995,080	16,050	88	1,222,292	13,890
75 TO 79	22	182,184	8,281	95	2,123,854	22,356	117	2,306,038	19,710
80 TO 84	20	180,502	9,025	100	2,029,019	20,290	120	2,209,521	18,413
85 TO 89	22	258,364	11,744	92	1,536,120	16,697	114	1,794,484	15,741
90 & UP	11	143,718	13,065	86	1,450,499	16,866	97	1,594,217	16,435
TOTAL	180	1,565,274	8,696	616	10,284,758	16,696	796	11,850,032	14,887
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	6	30,114	5,019	1	1,881	1,881	7	31,995	4,571
30 TO 34	4	73,021	18,255	6	38,412	6,402	10	111,433	11,143
35 TO 39	4	19,394	4,849	12	243,575	20,298	16	262,969	16,436
40 TO 44	5	42,253	8,451	11	102,194	9,290	16	144,447	9,028
45 TO 49	7	53,144	7,592	34	329,754	9,699	41	382,898	9,339
50 TO 54	47	1,043,960	22,212	69	809,828	11,737	116	1,853,788	15,981
55 TO 59	155	3,487,608	22,501	406	4,580,074	11,281	561	8,067,682	14,381
60 TO 64	419	11,988,778	28,613	1,461	18,041,376	12,349	1,880	30,030,154	15,973
65 TO 69	704	19,300,471	27,415	2,865	31,659,284	11,050	3,569	50,959,755	14,278
70 TO 74	652	17,558,810	26,931	2,783	29,408,519	10,567	3,435	46,967,329	13,673
75 TO 79	509	13,699,223	26,914	2,175	20,737,830	9,535	2,684	34,437,053	12,830
80 TO 84	410	9,993,336	24,374	1,558	14,436,905	9,266	1,968	24,430,241	12,414
85 TO 89	290	6,871,302	23,694	1,254	10,838,745	8,643	1,544	17,710,047	11,470
90 & UP	159	3,630,501	22,833	931	8,048,282	8,645	1,090	11,678,783	10,714
TOTAL	3,371	87,791,915	26,043	13,566	139,276,659	10,267	16,937	227,068,574	13,407

Graph XII-11
Pensioner Average Benefits

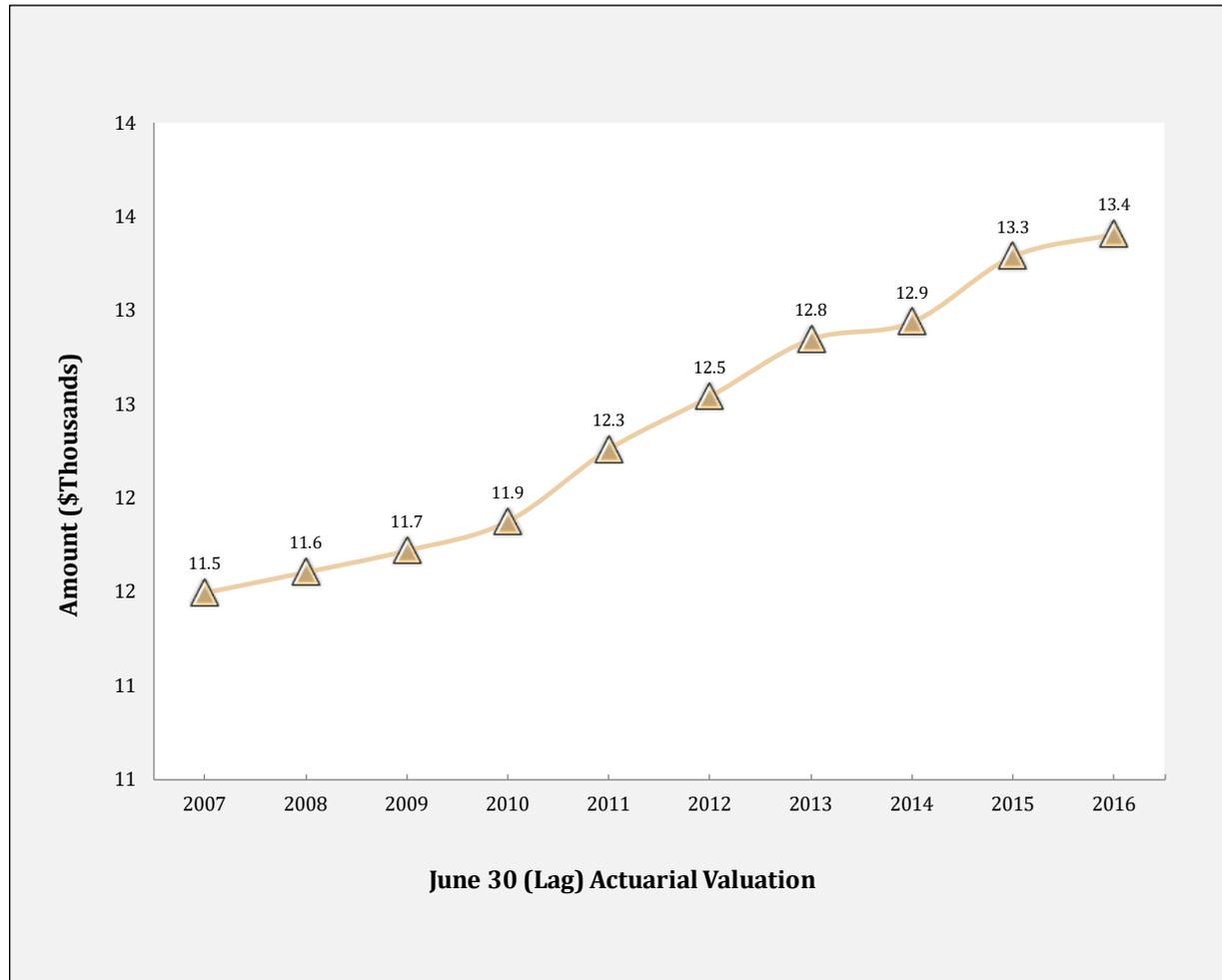


Table XII-12
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
(June 30 Lag) Actuarial Valuation	Added to Rolls		Removed from Rolls		End of Year Rolls		% Increase in Annual Allowances	Average Annual Allowances
	Number	Annual Allowances ¹	Number	Annual Allowances	Number	Annual Allowances		
2007	958	10,886,720	540	3,850,151	12,991	149,322,720	4.9%	11,494
2008	667	8,148,653	462	4,350,475	13,196	153,120,898	2.5%	11,604
2009	936	10,879,798	491	4,135,086	13,641	159,865,610	4.4%	11,719
2010	850	10,705,737	522	4,700,094	13,969	165,871,253	3.8%	11,874
2011	901	14,977,636	471	4,325,573	14,399	176,523,316	6.4%	12,259
2012	1,053	16,201,746	578	6,211,198	14,874	186,513,864	5.7%	12,540
2013	1,110	16,977,455	529	4,957,022	15,455	198,534,297	6.4%	12,846
2014	1,094	13,701,890	554	5,306,812	15,995	206,929,375	4.2%	12,937
2015	1,002	16,482,509	559	4,979,621	16,438	218,432,263	5.6%	13,288
2016	1,075	14,412,852	576	5,776,541	16,937	227,068,574	4.0%	13,407

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

APPENDIX: ACRONYMS AND ABBREVIATIONS

2012 A&M	Actuarial Assumptions and Methods enacted by Chapter 3/13
2016 A&M	2012 A&M with changes proposed by the Actuary and adopted by Board of Trustees during Fiscal Year 2016
AAVM	Actuarial Asset Valuation Method
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contribution(s)
AMC-PT	Additional Member Contribution(s) for Physically-Taxing employment
AVA	Actuarial Value of Assets
BERS	New York City Board of Education Retirement System
BMC	Basic Member Contribution(s)
CAFR	Comprehensive Annual Financial Report
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
EIR	Expected Investment Return
FAS	Final Average Salary
FS	Final Salary
GASB	Governmental Accounting Standards Board
GASB5	Governmental Accounting Standards Board Statement No. 5
GASB67	Governmental Accounting Standards Board Statement No. 67
GASB68	Governmental Accounting Standards Board Statement No. 68
IRC	Internal Revenue Code
MVA	Market Value of Assets
OYLM	One-Year Lag Methodology
PT	Physically-taxing Employment
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
PVFS	Present Value of Future Salary
TDA	Tax-deferred Annuity Program
UAL	Unfunded Accrued Liability
UIR	Unexpected Investment Return
WTC	World Trade Center