



City of Houston
HMEPS
Proposed Risk Sharing
Valuation Study
As of July 1, 2017

November 27, 2017



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Ms. Tantri Emo
Interim Director, Finance Department
City of Houston
611 Walker
Houston, TX 77002

Re: HMEPS Proposed Risk Sharing Valuation Study as of July 1, 2017

Dear Tantri:

Texas Revised Statutes article 6243h (the Article) sets forth requirements for a Risk Sharing Valuation Study (RSVS) of the Houston Municipal Employees Pension System (HMEPS). The purpose of this study is to determine the City Contribution Rate for the following fiscal year. Retirement Horizons Inc. (RHI) was engaged by the City of Houston to perform this proposed Risk Sharing Valuation Study as of July 1, 2017 as the municipal actuary. This report provides the results of the Study and is organized as follows:

- Section 1 – Comparison to Corridor Midpoint
- Section 2 – Actuarial Exhibits
- Section 3 – Summary of Plan Provisions
- Section 4 – Actuarial Methods and Assumptions
- Section 5 – Summary of Valuation Data

RHI received Actuarial Data as defined in Section 1 of the Article and required by Section 8B(a) of the Article. RHI conducted our proposed RSVS using the Actuarial Data provided and plan provisions as summarized in this report. The analysis presented in this report is based on the interest rate assumption and actuarial cost and asset methods prescribed by the Article. All other actuarial methods and assumptions summarized in this report were adopted by the City of Houston Finance Department based on existing assumptions used in the July 1, 2016 Risk Sharing Valuation Study.

Please note, the HMEPS actuary's draft proposed RSVS dated November 16, 2017 was provided to RHI on November 20, 2017, and it included an estimated liability and cost for 170 employees of HFC, HFF, and CCSI. Inclusion of these 170 people does not constitute acceptance by the City as to their eligibility for HMEPS, and no estimate of their liability was included in our analysis. The City objects to HMEPS' actuary's inclusion of any estimated liability and cost for HFC, HFF, and CCSI employees in the RSVS calculation. The City does not concede that HMEPS or its actuary have acted within the scope of their lawful authority.

As described in the Article, results of the Risk Sharing Valuation Study performed by the HMEPS actuary will be compared to the results in this report. If the results are greater than two percentage points different, then we will attempt to reconcile the results with the HMEPS actuary, or a mathematical average will be used. If the results are within two percentage points, then the HMEPS actuary's results will be used.

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The actual costs, City Contribution Rates, and other results could be materially different from those described in this report in the future if actual plan experience differs significantly from the underlying valuation basis. Differences could occur for a number of reasons such as plan experience differing from the underlying demographic and economic assumptions or changes in plan provisions. Due to the limited scope of this report, analysis of the potential range of such future measurements has not been performed.

The results in this report and any measures of funded status are predicated on the notion of the Fund's ongoing operation and should not be relied upon for assessing the sufficiency of plan assets for settlement of plan termination liabilities.

The information contained in this report was prepared as requested by the City of Houston and solely for the purpose of satisfying the RSVS requirements of the Article, and should not be used for any other purpose. As significantly different results from those contained in this report may be needed for other purposes, this report should only be provided to other parties in its entirety.

The signing actuary for this report is a member of the Society of Actuaries and other professional actuarial organizations and meets the "Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion." The undersigned is available to answer questions regarding the information contained in this report or to provide further explanations or details as needed.

Respectfully submitted by Retirement Horizons Inc.



David A. Sawyer, FSA EA MAAA
Senior Consultant

Comparison to Corridor Midpoint

Corridor Midpoint

The table below contains the Corridor Midpoint, along with the corresponding Minimum and Maximum Contribution Rates using a 5% Corridor Margin as specified in the Article. Based on RHI's July 1, 2017 RSVS results, the City Contribution Rate for FY 2019 would be 8.27% of pensionable payroll, which is within the Corridor. The City Contribution Rate is equal to the sum of the Employer Normal Cost Rate and the Amortization Rate from any Liability Layers established subsequent to the Legacy Liability.

FY	Corridor Midpoint	Corridor Minimum	Corridor Maximum	Calculated City Contribution Rate (Before Adjustment)	Adjusted City Contribution Rate
2018	8.17%	3.17%	13.17%	8.05%	8.17%
2019	8.27%	3.27%	13.27%	8.27%	
2020	8.32%	3.32%	13.32%		
2021	8.36%	3.36%	13.36%		
2022	8.41%	3.41%	13.41%		
2023	8.44%	3.44%	13.44%		
2024	8.48%	3.48%	13.48%		
2025	8.51%	3.51%	13.51%		
2026	8.54%	3.54%	13.54%		
2027	8.57%	3.57%	13.57%		
2028	8.59%	3.59%	13.59%		
2029	8.61%	3.61%	13.61%		
2030	8.63%	3.63%	13.63%		
2031	8.65%	3.65%	13.65%		
2032	8.67%	3.67%	13.67%		
2033	8.69%	3.69%	13.69%		
2034	8.70%	3.70%	13.70%		
2035	8.71%	3.71%	13.71%		
2036	8.72%	3.72%	13.72%		
2037	8.73%	3.73%	13.73%		
2038	8.74%	3.74%	13.74%		
2039	8.74%	3.74%	13.74%		
2040	8.75%	3.75%	13.75%		
2041	8.76%	3.76%	13.76%		
2042	8.77%	3.77%	13.77%		
2043	8.78%	3.78%	13.78%		
2044	8.79%	3.79%	13.79%		
2045	8.79%	3.79%	13.79%		
2046	8.80%	3.80%	13.80%		
2047	8.81%	3.81%	13.81%		

Comparison to Corridor Midpoint

City Contribution Amount

The table below contains the City Contribution Amount values as specified in the Article. The City Contribution Amount is added to the product of the City Contribution Rate times pensionable payroll to determine the Total City Contribution for a Fiscal Year. The City Contribution Amount values were set by the initial Risk Sharing Valuation Study and do not depend on the results of subsequent studies.

The Fund Actuary's City Contribution Amounts shown below include an estimate of the Actuarial Liability for HFC, HFF, and CCSI employees. As previously mentioned, the City objects to the inclusion of any estimated liability and cost associated with these employees. The Municipal Actuary's City Contribution Amounts are based on our measurement of the Legacy Liability from the Initial RSVS that does not include these employees. However, most of difference in the two sets of numbers exists from variables in the two actuarial measurements other than the additional 170 employees, so we recommend the City contact HMEPS for more information on the impact of these employees.

	City Contribution Amount	
FY	Municipal Actuary	Fund Actuary
2018	\$119,353,985	\$ 124,030,357
2019	\$122,636,219	\$ 127,441,192
2020	\$126,008,716	\$ 130,945,824
2021	\$129,473,955	\$ 134,546,835
2022	\$133,034,489	\$ 138,246,872
2023	\$136,692,937	\$ 142,048,661
2024	\$140,451,993	\$ 145,955,000
2025	\$144,314,423	\$ 149,968,762
2026	\$148,283,069	\$ 154,092,903
2027	\$152,360,854	\$ 158,330,458
2028	\$156,550,777	\$ 162,684,546
2029	\$160,855,924	\$ 167,158,371
2030	\$165,279,462	\$ 171,755,226
2031	\$169,824,647	\$ 176,478,494
2032	\$174,494,825	\$ 181,331,653
2033	\$179,293,432	\$ 186,318,273
2034	\$184,224,002	\$ 191,442,026
2035	\$189,290,162	\$ 196,706,682
2036	\$194,495,641	\$ 202,116,115
2037	\$199,844,272	\$ 207,674,309
2038	\$205,339,989	\$ 213,385,352
2039	\$210,986,839	\$ 219,253,449
2040	\$216,788,977	\$ 225,282,919
2041	\$222,750,674	\$ 231,478,199
2042	\$228,876,317	\$ 237,843,850
2043	\$235,170,416	\$ 244,384,556
2044	\$241,637,603	\$ 251,105,131
2045	\$248,282,637	\$ 258,010,522
2046	\$255,110,409	\$ 265,105,812
2047	\$262,125,945	\$ 272,393,221

Actuarial Exhibits

3.1. Actuarial Value of Assets

1. Actuarial Value of Assets, beginning of prior year	\$ 2,625,896,251
2. Net Cash Flow	
a. Contributions	\$ 198,459,429
b. Benefit Disbursements	(281,173,779)
c. Administrative Expenses	(6,826,559)
d. Net Cash Flow [2.a. + 2.b. + 2.c.]	<u>\$ (89,540,909)</u>
3. Expected Investment Return [1. x 0.07] + [2.d. x ((1.07)^.5-1)]	\$ 180,731,810
4. Expected Actuarial Value of Assets at end of year [1. + 2.d. + 3.]	\$ 2,717,087,152
5. Market Value of Assets at end of year	\$ 2,844,348,840
6. Difference [5. - 4.]	\$ 127,261,688

7. Development of Actuarial Value of Assets, end of year

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for This Valuation	Remaining after This Valuation
2013	N/A	N/A	N/A	1	N/A	N/A
2014	N/A	N/A	N/A	2	N/A	N/A
2015	N/A	N/A	N/A	3	N/A	N/A
2016	-	-	-	4	-	-
2017	127,261,688	-	127,261,688	5	25,452,338	101,809,350
Total	\$ 127,261,688	\$ -	\$ 127,261,688		\$ 25,452,338	\$ 101,809,350

8. Actuarial Value of Assets as of July 1, 2017 (5. - 7.)	\$ 2,742,539,490
9. Rate of Return on Actuarial Value of Assets	7.7%

Actuarial Exhibits

3.2. Actuarial Accrued Liability

	<u>July 1, 2016</u>	<u>July 1, 2017</u>
A. Discount Rate	7.0%	7.0%
B. Actuarial Accrued Liability		
1. Active	\$1,787,427,842	\$1,831,112,046
2. Terminated Vested or NonVested	\$179,794,872	\$167,823,726
3. Disabled	\$37,740,189	\$36,759,751
4. Retired ¹	<u>\$2,657,232,166</u>	<u>\$2,766,997,841</u>
5. Total	<u>\$4,662,195,069</u>	<u>\$4,802,693,364</u>
C. Change in Actuarial Accrued Liability		<u>2017 Fiscal Year</u>
1. Benefits Accumulated		\$61,600,616
2. Benefits Paid		(\$281,173,779)
3. Decrease in Discount Period		\$318,798,572
4. Plan Experience		\$41,272,886
5. Actuarial Assumptions		\$0
6. Actuarial Methods		\$0
7. Plan Amendments		\$0
8. Net Change		<u>\$140,498,295</u>
D. Actuarial Value of Assets	<u>\$ 2,625,896,251</u>	<u>\$2,742,539,490</u>
E. Unfunded Actuarial Liability	<u>\$2,036,298,818</u>	<u>\$2,060,153,874</u>
F. Total Normal Cost % of Payroll ²	11.05%	11.12%
G. Member Contribution % of Payroll ³	3.00%	3.00%
H. Employer Normal Cost Rate [F - G]	8.05%	8.12%

¹ Liability for inactive DROP balances is allocated to Retired members

² Includes administrative expense load

³ For Group D members

Actuarial Exhibits

3.3. Gain/Loss Analysis

	Liability	Assets	Unfunded
A. Values at Prior Year Beginning	\$4,662,195,069	\$ (2,625,896,251)	\$ 2,036,298,818
B. Expected Changes During Year			
1. Normal Cost	\$ 61,600,616	N/A	\$ 61,600,616
2. Contributions	N/A	(198,459,429)	(198,459,429)
3. Benefits Paid	(281,173,779)	281,173,779	0
4. Plan Expenses	N/A	6,826,559	6,826,559
5. Interest on			
a. Item A	326,353,655	(183,812,738)	142,540,917
b. Item B.1	2,119,557	N/A	2,119,557
c. Item B.2	N/A	(6,828,601)	(6,828,601)
d. Item B.3	(9,674,640)	9,674,640	0
e. Item B.4	N/A	234,889	234,889
6. Total Expected Changes	\$ 99,225,409	(\$91,190,901)	\$ 8,034,508
C. Expected Values at Prior Year End	\$4,761,420,478	\$ (2,717,087,152)	\$ 2,044,333,326
D. Other Changes			
1. Plan Experience	\$41,272,886	(\$25,452,338)	\$15,820,548
2. Actuarial Assumptions	0	0	0
3. Actuarial Methods	0	0	0
4. Plan Amendments	0	0	0
5. Total Other Changes	\$41,272,886	(\$25,452,338)	\$15,820,548
E. Actual Values as of Current Year Beginning	\$4,802,693,364	\$ (2,742,539,490)	\$2,060,153,874

Actuarial Exhibits

3.4. Amortization Rate for Liability Layers

This exhibit develops the Amortization Rate that is included in the calculation of the City Contribution Rate. As the July 1, 2016 Legacy Liability is excluded from the calculation of the City Contribution Rate, no Liability Layer is shown for fiscal year 2016.

Fiscal Year	Initial Amount of Liability Layer (BOY)	Liability Layer to be Amortized at the Valuation Date	Remaining Amortization Period as of 7/1/2018	Payoff Year	Amortization Amount for FY 2019	Level Percent of Payroll Amortization Rate
2016	N/A					N/A
2017	\$15,845,107	\$15,845,107	30	2048	\$ 963,596	0.15%
Total						0.15%

Summary of Plan Provisions

Eligibility and Participation

Group A: Hired after September 1, 1981 and prior to September 1, 1999 and opted into Group A, or hired after September 1, 1999 and prior to January 1, 2008. Group C participants receive the same benefits as Group A participants for service after December 31, 2004.

Group B: Hired after September 1, 1981 and prior to September 1, 1999 and did not opt into Group A.

Group D: Hired after January 1, 2008.

Final Average Pay (FAP)

The average of the highest 78 bi-weekly payroll periods of salary, including base pay, longevity pay, and shift differential.

Credited Service

Elapsed time from date of hire, for all periods of service classified as full-time, fully paid, employment with the City of Houston.

Retirement Benefit

Eligibility

➤ Groups A and B

The earliest of:

1. Age 62 with 5 years of Credited Service
2. 5 years of Credited Service and age plus Credited Service of 70 or more, with at least 5 years of Credited Service and age plus Credited Service of 68 or more as of January 1, 2005
3. 5 years of Credited Service and age plus Credited Service of 75 or more and age at least age 50

➤ Group D

Age 62 with 5 years of Credited Service. Early retirement benefits are available at age 55 with at least 10 years of Credited Service or at 75 Points with at least 5 years of Credited Service.

Summary of Plan Provisions

Amount

➤ Group A

FAP multiplied by the following service-based percentages:

Service	Pre-2005	Post-2004
0 - 10	3.25%	2.5%
11 - 20	3.5%	2.5%
Over 20	4.25%	3.25%

➤ Group B

FAP multiplied by the following service-based percentages:

Service	Pre-2005	Post-2004
0 - 10	1.75%	1.75%
11 - 20	2.0%	2.0%
Over 20	2.75%	2.5%

➤ Group D

FAP multiplied by the following service-based percentages. The benefit is reduced by 0.25% for each month retirement precedes age 62:

Service	Percentage
0 - 25	1.8%
Over 25	1.0%

In addition, beginning January 1, 2018, Group D members will accrue a cash balance account based on member contributions of 1% of pay. This account will be credited with the same interest rate as DROP accounts.

Maximum benefit is 90% of FAP for all groups.

Summary of Plan Provisions

Termination Benefit

Eligibility	5 years of Credited Service.
Amount	Accrued normal retirement benefit payable at the normal retirement eligibility date. Members have the option to receive a refund of contributions without interest. Non-vested members may receive a refund of contributions without interest.

On-Duty Disability

Eligibility	No age or service requirements.
Amount	Accrued benefit, not less than 20% of final monthly salary, plus a group A member may receive 1% per year of final monthly salary per year of Credited Service, up to a maximum of 40% of final monthly salary for a total disability pension.

Off-Duty Disability

Eligibility	5 years of Credited Service.
Benefit	Accrued benefit payable immediately.

On-Duty Death

Eligibility	No age or service requirements.
Benefit	80% of FAP.

Off-Duty Death

Eligibility	5 years of Credited Service.
Benefit	80% of the accrued benefit, payable to a surviving spouse who has been married to the participant for at least one year. Otherwise, 50% of the accrued benefit.

Summary of Plan Provisions

Retired Member Death

Eligibility	Retired and receiving monthly pension.
Amount	<p>Participants other than Option-Eligible Participants: 80% of monthly pension the retired member was receiving (50% if payable to a surviving spouse who has not been married to the participant for at least one year), except beneficiaries of members who commenced a deferred vested benefit will receive 50% of the monthly pension the retired member was receiving.</p> <p>Option-Eligible Participants: Based on member election at retirement.</p>
Allocation to Beneficiaries	The benefit amount above is payable to a surviving spouse, with 10% payable to each qualifying dependent other than the surviving spouse, with a maximum of 20% and the surviving spouse's benefit offset by this amount. If there is no surviving spouse, 50% is payable to each qualifying dependent, up to a maximum of 100% of the surviving spouse's benefit (does not apply to Option-Eligible Participants after retirement).

Cost of Living Adjustment

Five-year investment return (net of investment expenses), less an adjustment factor, with the result multiplied by 50%. The adjustment factor is the assumed interest rate less 2.0%. The COLA will be no less than 0% and no more than 2%. All members except Group D members who terminated employment prior to July 1, 2017 will be eligible.

DROP

Upon reaching retirement eligibility, Group A and B members may enter the Deferred Retirement Option Plan (DROP). The member's monthly annuity (with COLA beginning at age 62) is added to a notional account, along with Group A member contributions prior to 2005. Interest is credited on the account using the 50% of the Fund's five-year investment return (net of investment expenses), with a minimum of 2.5% and a maximum of 7.5%. Upon exiting the DROP for retirement, the member's monthly benefit is the current monthly annuity, including COLA increases.

Summary of Plan Provisions

Contribution Rates

Members

- Group A
8% of pensionable pay, phased in as 7% beginning July 1, 2017 and 8% beginning July 1, 2018.

- Group B
4% of pensionable pay, phased in as 2% beginning July 1, 2017 and 4% beginning July 1, 2018.

- Group D
3% of pensionable pay. One third of the contributions from Group D members will be used to provide a cash balance benefit payable upon termination of service, with interest credited at the same rate is credited on DROP accounts.

City

The City Contribution Rate from the RSVS applied to pensionable payroll. The result will be added to the Contribution Amount to obtain the Total City Contribution.

Actuarial Methods and Assumptions

Actuarial Cost Methods

Measurement Date	Census data as of July 1, 2017. Impact of plan changes measured on future accruals only; no impact to accruals through the valuation date.
Actuarial Value of Assets	Fair market value of assets as of June 30, 2017, less a five-year phase-in of the excess (shortfall) between expected investment return and actual income. The calculation is based on the difference between actual fair market value and the expected actuarial value of assets each year. The cumulative excess return (shortfall) is recognized at a minimum rate of 20% per year. Gains may be used to offset outstanding losses, and vice versa, to accelerate the amortization. Expected earnings are based on the assumed rate of return on investments and are net of investment expenses. The fair market value for June 30, 2017 includes \$250,000,000 of Pension Obligation Bonds discounted for half a year at 7.00% interest. The smoothing method was reset as of July 1, 2016.
Actuarial Cost Method	<u>The Ultimate Entry Age Normal Actuarial Cost Method</u> A method under which the actuarial present value of all potential future projected benefits of each individual included in the valuation is calculated, assuming continued service and pay increases. The <i>normal cost</i> is calculated as the average uniform percentage of payroll which, if applied to the compensation of each participant during the entire period of anticipated covered service, would meet the cost of all benefits payable based on benefits provisions for new hires. The portion of the actuarial present value of future benefits not provided for at the valuation date by the present value of future normal costs is called the <i>actuarial accrued liability</i> .

Key Economic Assumptions

Interest Rate	7.00% as prescribed by the Article.
General Inflation	2.25%.
Wage Inflation	3.00%.
Payroll Growth	2.75%.

Actuarial Methods and Assumptions

Individual Pay Increase Rate

A service-related assumption:

Years of Credited Service	Rate
1	5.25%
2	5.25%
3	5.75%
4	5.25%
5	4.75%
6	4.50%
7	4.25%
8	4.00%
9	3.75%
10-24	3.50%
25+	3.00%

DROP Participation

65% of members are assumed to enter DROP. Members are assumed to enter at the earliest eligible date, but not before the valuation date.

DROP Interest Crediting Rate

4.00%. Due to the use of the Ultimate Entry Age cost method, regression of historical balances does not impact cost results, so historical balances were regressed at 4.00% as well.

COLA

1.00% per year, not compounded.

Actuarial Methods and Assumptions

Demographic Assumptions

Mortality Rates

- Active members The RP-2000 Combined Healthy Mortality, scaled by 90% for males and 80% for females.

90% of active member deaths are assumed to be Non-Service-Connected.
- Retired members and beneficiaries RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment, scaled by 125% for males and 112% for females, with generational mortality improvement projected based on Scale BB. Rates are set forward five years for Disabled Retirees.

Retirement Rates

	Expected Retirements Per 100 Lives			
	<i>Group A & B Members</i>		<i>Group D Members</i>	
<i>Age</i>	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
45 - 49	15	12	0	0
50 - 54	10	11	3	3
55	10	11	4	4
56	10	11	5	5
57	10	11	6	6
58	10	11	7	7
59	10	11	8	8
60	12	11	10	10
61	14	11	13	13
62	16	20	35	35
63	18	18	25	18
64	20	12	18	20
65	20	22	20	20
66 - 69	20	20	20	19
70 - 74	20	25	20	19
75+	100	100	100	100

Actuarial Methods and Assumptions

Disability Rates

Age	Males	Females
20	0.000004	0.000006
25	0.000010	0.000013
30	0.000078	0.000069
35	0.000340	0.000108
40	0.000695	0.000251
45	0.001346	0.000564
50	0.002346	0.001342
55	0.003390	0.002159
60	0.004477	0.002604

Rates of decrement are assumed to be zero once a member reaches retirement eligibility.

Rates of Service-Connected Disability are 93.5% of those shown above. Rates of Non-Service-Connected Disability are 6.5% of those shown above.

Termination Rates

Rates of termination are a function of age and service.

Sample Rates

Males

	Years of Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.3244	0.2682	0.2300	0.2060	0.1926	0.1824	0.1617	0.1507	0.1400	0.1278	0.0541
30	0.2585	0.2146	0.1808	0.1563	0.1396	0.1275	0.1143	0.1057	0.0985	0.0919	0.0449
40	0.2003	0.1645	0.1351	0.1124	0.0954	0.0832	0.0750	0.0683	0.0634	0.0603	0.0357
50	0.1559	0.1258	0.1013	0.0824	0.0681	0.0577	0.0510	0.0454	0.0411	0.0383	0.0265
60	0.1341	0.1083	0.0887	0.0740	0.0634	0.0557	0.0469	0.0407	0.0344	0.0277	0.0173

Actuarial Methods and Assumptions

Females

	Years of Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.2811	0.2574	0.2344	0.2123	0.1912	0.1711	0.1506	0.1282	0.1040	0.0784	0.1385
30	0.2155	0.1943	0.1736	0.1539	0.1356	0.1188	0.1032	0.0879	0.0730	0.0585	0.0795
40	0.1688	0.1460	0.1250	0.1063	0.0903	0.0770	0.0664	0.0581	0.0517	0.0472	0.0367
50	0.1510	0.1223	0.0984	0.0791	0.0645	0.0544	0.0481	0.0452	0.0453	0.0481	0.0339
60	0.1794	0.1373	0.1049	0.0812	0.0653	0.0570	0.0540	0.0552	0.0601	0.0682	0.0339

Members with a choice of terminated vested benefit or refund of contributions are assumed to elect the benefit with the larger present value. Those electing the terminated vested benefit are assumed to commence at age 62.

Percentage married

70% of participants are assumed to be married.

No beneficiaries other than the spouse assumed.

Age difference

Husbands assumed to be three years older than wives.

Benefit End Age for Children

Benefits are assumed to be paid to child beneficiaries until they reach age 21.

Development of Valuation Pay

Valuation pay is projected by increasing the prior year's pay with the nominal individual pay increase rate.

Payment of DROP Balances

Installments over 8 years. The value of the DROP balance is multiplied by a factor which reflects the difference between the assumed DROP interest crediting rate and the interest rate assumption (0.912).

Administrative Expenses

1.19% of payroll.

Actuarial Methods and Assumptions

Funding Policy

The City is assumed to contribute the City Contribution Rate from the prior year, plus the Contribution Amount. The actuarially determined City Contribution Rate is measured as the normal cost rate, plus the administrative expenses rate, plus the amortization rate of any subsequent Liability layers due to unexpected changes in the Unfunded Actuarial Accrued Liability (UAAL), less the member contribution rate for Group D, adjusted with interest to mid-year. The closed amortization rates for the Liability Layers are calculated as a level percent of pay. The initial amortization period for a Liability Loss Layer is 30 years. The initial amortization period for a Liability Gain Layer is equal to the remaining amortization period for the largest Liability Loss Layer. The projected payroll for amortization rates is based on the prior year pensionable pay, derived as the employer contribution (\$182,557,829 from the FY 2017 audited financial statements), divided by the prior year City Contribution Rate (29.36% for FY 2017), and adjusted by 26/27 in years with 27 pay periods. This result is then increased by the assumed payroll growth rate.

The City Contribution Amount was calculated based on a 30-year closed level percent of pay amortization rate applied to projected payroll for FY 2017. The schedule developed for FY 2017 will be used in all future years.

Pension Obligation Bonds

\$250,000,000 in Pension Obligation Bonds were assumed to be issued December 31, 2017. This amount was discounted to June 30, 2017 with a half year of interest to determined the UAAL.

Benefits Not Valued

A non-service-connected death benefit payable for a member married less than one year is a 50% survivor benefit.

Summary of Valuation Data

	<u>July 1, 2016</u>	<u>July 1, 2017</u>
A. Active Members		
1. Number	11,933	11,896
2. Valuation payroll	\$624,752,695	\$640,557,059
3. Average pay	\$52,355	\$53,846
4. Average age	47.3	47.4
5. Average service	11.2	11.2
B. Terminated Vested		
1. Number	3,432	3,409
2. Total benefits	\$24,273,643	\$23,476,623
3. Average Annual benefits	\$7,073	\$6,887
C. Disabled		
1. Number	336	323
2. Total benefits	\$3,608,866	\$3,533,622
3. Average Annual benefits	\$10,741	\$10,940
D. Retired		
1. Number	8,084	8,376
2. Total benefits	\$198,363,966	\$209,754,055
3. Average Annual benefits	\$24,538	\$25,042
E. Beneficiaries		
1. Number	1,869	1,902
2. Total benefits	\$29,012,963	\$30,766,682
3. Average Annual benefits	\$15,523	\$16,176

Notes:

Does not include 2,174 Non-Vested Participants with \$3,754,000 in liability for 2016 and 2,167 Non-Vested Participants with \$3,707,725 in liability for 2017.