The City of Bismarck
Employees' Pension Plan

Actuarial Valuation

January 1, 2018

Arthur J. Gallagher & Co.

The City of Bismarck Employees' Pension Plan

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ACTUARIAL CERTIFICATION
January 1, 2018 to December 31, 2018

In our opinion, the following report presents fairly the actuarial position of the plan in accordance with Generally Accepted Actuarial Principles and Practices. The purpose of this report is to develop a funding recommendation. Determinations for other purposes may be different; the results in this report should not be used for other purposes.

Our Actuarial Valuation has been completed with reliance upon participant and financial information provided to us by the City of Bismarck. We have reviewed the data provided to us for general reasonableness but did not audit the data. The accuracy of the information in this report is dependent on the quality and completeness of the data provided to us. Each assumption not specified by statute or regulations is reasonable taking into account the experience of the Plan, Plan-specific features, the purpose of the measurement and reasonable expectations.

The actuarial assumptions used in this report were selected by the City of Bismarck, in consultation with Gallagher Benefit Services, Inc. Based on a review of historic experience, Plan-specific features, and anticipated future outlook, the actuarial assumptions not specified by statute or regulation, each and in the aggregate, are reasonably related to the experience of the Plan and reflect a reasonable estimate of anticipated experience under the Plan.

Effective with this valuation, the mortality assumption was updated to RP-2014 Generational Mortality projected using scale MP-2017. There were no other changes in Plan provisions, assumptions, cost allocation procedures or contribution allocation procedures from the previous measurement. There were no adjustments of prior measurements or use of approximations which would materially impact the results. The accrued benefits valued in this report reflect the benefit attribution pattern described by the plan provisions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status); and changes in Plan provisions or applicable law. Due to the limited scope of this engagement, we did not complete an analysis of the potential range of such future measurements.

To the best of our knowledge, the information contained in this report is complete, accurate and in accordance with generally accepted actuarial principles as recommended by the American Academy of Actuaries. The actuaries indicated below are each an Enrolled Actuary and are qualified to render the actuarial opinion contained in this report.

Ben Holle

Benjamin M. Holle, EA
Enrollment Number 17-07400

4/26/2018
Date

Jesse Millner

Jesse K. Millner, EA, ASA
Enrollment Number 17-08190

4/26/2018
Date

COMMENTARY

In this report we present the results of the January 1, 2018 Actuarial Valuation of the City of Bismarck Employees' Pension Plan. Effective with this valuation, the mortality assumption was updated to use RP-2014 Generational Mortality projected with Scale MP-2017. There were no other changes in actuarial assumptions or plan provisions since the January 1, 2017 report.

Annual Recommended Contribution

We recommend that the City contribution be at least equal to the annual recommended contribution developed under the Entry Age Normal actuarial cost method. On this basis, a contribution of $2,730,172 (10.1% of covered payroll) is recommended for the 2018 plan year. The calculation of this contribution is illustrated in Exhibit 12.

Expected City Contribution

The City commission has approved that the City contribution will be 10.4% of salary. The expected contribution for 2018 on this basis is $2,805,069.

Contribution Requirements

The valuation results are shown on page 3 in a comparison between 2017 and 2018. The 2017 calculation, developed in the first column, shows an UAAL of $9,793,856 and, with an actual City payment of $2,800,226 in 2017 and expected payment of $2,805,069 in 2018 plus future contributions of 10.4% of covered payroll, an amortization period of 14 years.

The calculation for 2018 shows an UAAL of $8,838,475 and, with an expected City payment of $2,805,069 for 2018, an amortization period of 19 years.

Reasons for the decreased UAAL include an increase due to assumption changes offset by asset returns greater than expected (2017 return of 15.0% vs. 7.5% assumption). Please see Exhibit 10 for a further breakdown.

Funding Ratio

Plan assets cover 113% of the Present Value of Accumulated Plan Benefits. More detail is contained in Exhibit 14. Last year plan assets covered 113% of the Present Value of Accumulated Plan Benefits. The Present Value of Accumulated Plan benefits is the value of benefits based only on salaries and service as of the valuation date and does not reflect the value of any future benefit accruals.

GASB No. 67 and No. 68

Gallagher will provide the required information for GASB No. 67 and No. 68 separately.

SUMMARY OF RESULTS

		1/1/17		1/1/18	Percent Change
1.	Number of Participants				
	(a) Active	469		470	0.2%
	(b) Terminated vested	56		60	7.1%
	(c) Retired	204		212	3.9%
	(d) Total Participants = (a)+(b)+(c)	729		742	1.8%
2.	Annual covered salaries for Participants under the assumed retirement age	$ 26,587,289		$ 26,971,817	1.4%
3.	Actuarial Accrued Liability				
	(a) Active Participants	$ 53,052,199		$ 59,089,417	11.4%
	(b) Terminated vested Participants	2,721,076		3,529,455	29.7%
	(c) Retired Participants	40,767,337		44,885,541	10.1%
	(d) Total Actuarial Accrued Liability = (a)+(b)+(c)	$ 96,540,612		$ 107,504,413	11.4%
4.	Actuarial Value of Assets	$ 86,746,756		$ 98,665,938	13.7%
5.	Unfunded Actuarial Accrued Liability = (3)(d)-(4)	$ 9,793,856		$ 8,838,475	(9.8%)
6.	Actual 2017/Expected 2018 annual financial support by City	$ 2,800,226		$ 2,805,069	0.2%
7.	Annual Recommended Contribution	$ 2,454,235		$ 2,730,172	11.2%
8.	Amortization period at expected level of funding	14 years[1]		19 years[2]	

[1] Amortization period based on City Contributions of $2,800,226 in 2017, $2,805,069 in 2018, and increasing due to total salary growth at the rate of 3.0% annually thereafter.

[2] Amortization period based on $2,805,069 contribution for 2018, and increasing due to total salary growth at the rate of 3.0% annually thereafter.

Input Information

EXHIBIT 1
Summary of Plan Provisions

The following summary has been prepared for valuation purposes only. It outlines the Provisions found in Chapter 9-07 (City Employees' Pension) necessary to perform the Actuarial Valuation, as interpreted by Gallagher Benefit Services Inc.

Definitions

Actuarial Equivalence Factors: In calculating the actuarial equivalence of one form of benefit to another, the interest rate to be used shall be 7.0% and the mortality table to be used shall be the "applicable mortality table" as defined by Section 417(e)(3) of the Code (9-07-10).

Average Basic Monthly Compensation: The average of the monthly base compensation of a Participant over the highest 36 month period of employment. Monthly base compensation excludes overtime, bonuses, severance payments, and other remuneration in excess of base compensation (9-07-15(1)).

Effective Date of the Plan: January 1, 1966.

Early Retirement Date: Participants who have completed 60 consecutive months of contributing service and have attained age 50 are eligible for a monthly pension benefit (9-07-15(2)).

Membership Fee: Every full-time employee of the City of Bismarck except police officers and fire fighters shall be assessed and required to pay an amount of 5.0% of their basic salary (9-07-01).

Normal Form of Benefit: Married Participants receive a Joint & Two-Thirds to Survivor annuity. Single Participants receive a Life Only annuity.

Normal Retirement Date: Participants who have attained age 62 are eligible for a monthly pension benefit (9-07-15(1)).

Plan Year: January 1st through December 31st (9-07-08).

Recognized Service: Full and fractional years of contributing service during which the employee contributed to the fund (9-07-23). Military service will be included as part of the period of service with the City provided that the period does not exceed 5 years and the employee pays into the fund 5.0% of the lesser of the last full year's salary paid by the City or military salary for each year of military service (9-07-05).

EXHIBIT 1 (Continued)
Summary of Plan Provisions

Plan Provisions

Eligibility: Every full-time employee, other than members of the Police Department who are sworn officers, members of the firefighter's relief association, and employees who perform fire suppression duties. (9-07-11).

Normal Retirement Benefit: Participants serving until the Normal Retirement Date are eligible for a monthly pension benefit computed by multiplying his or her highest 36 months of Average Basic Monthly Compensation times 1.75% times his or her number of full and fractional years of Recognized Service prior to January 1, 2005 plus 2.25% times his or her number of full and fractional years of Recognized Service after December 31, 2004. (9-07-15(1)).

Early Retirement Benefit: The monthly pension benefit shall be equal to the Normal Retirement Benefit actuarially reduced for payments commencing prior to age 62 (9-07-15(2)). The reduction factors are as follows:

Age	Factor	Age	Factor
50	.4287	57	.6841
51	.4567	58	.7353
52	.4870	59	.7918
53	.5199	60	.8542
54	.5557	61	.9233
55	.5947	62	1.000
56	.6373		

Termination Benefit: After 60 consecutive months of contributing service and termination of employment, a Participant may elect a deferred retirement benefit to commence at an elected age 50 to 62. The Participant's deferred benefit shall equal the Normal Retirement Benefit (based on service and compensation to the date of termination) actuarially reduced for early commencement (9-07-15(3)).

EXHIBIT 1 (Continued)
Summary of Plan Provisions

Death Benefit:

The surviving spouse (while unmarried) receives 2/3 of the actuarially reduced pension to which the Participant would have been entitled, but not less than $65 per month provided the Participant served at least 60 consecutive months of contributing service (9-07-15(4)).

The surviving spouse has the option to elect a refund of contributions in lieu of the above-mentioned benefit (9-07-15(5)).

If there is no surviving spouse, the Participant's contributions are paid to the Participant's estate (9-07-15(6)).

Refund of Contributions:

Any Participant who has contributed to the plan and terminates employment before being entitled to a pension shall be entitled to a refund of all contributions made by him to the pension system with accumulated interest. Interest of 5% per year will be credited on such contributions made after July 1, 1972. Interest of 2.5% per year will be credited on such contributions made prior to July 1, 1972.

Any Participant electing a refund of contributions forfeits all rights to any other form of benefit under this plan (9-07-14).

Cost of Living Adjustments:

Persons receiving pension payments shall be eligible for cost of living adjustments in an amount determined by the Board of Trustees. The adjustment may not exceed the lesser of the City employees' salary adjustment or 3% (9-07-16).

EXHIBIT 2
Census Summary and Reconciliation

	1/1/17	1/1/18	Percent Change
Active Participants			
▪ Number of Participants			
– Fully vested	255	267	4.7%
– Non-vested	214	203	(5.1%)
– Total	469	470	0.2%
▪ Average age	46.5	46.9	0.9%
▪ Average service	10.9	11.1	1.8%
▪ Average salary	$ 54,219	$ 54,895	1.2%
Terminated Vested Participants			
▪ Number of Participants	56	60	7.1%
▪ Average age	48.3	48.8	1.0%
▪ Average years since termination	6.4	6.1	(4.7%)
▪ Average monthly benefit at Normal Retirement	$ 768	$ 849	10.5%
Retired Participants			
▪ Number of Participants	204	212	3.9%
▪ Average age	72.8	73.1	0.4%
▪ Average years since retirement	9.5	9.5	0.0%
▪ Average monthly benefit	$ 1,808	$ 1,854	2.5%

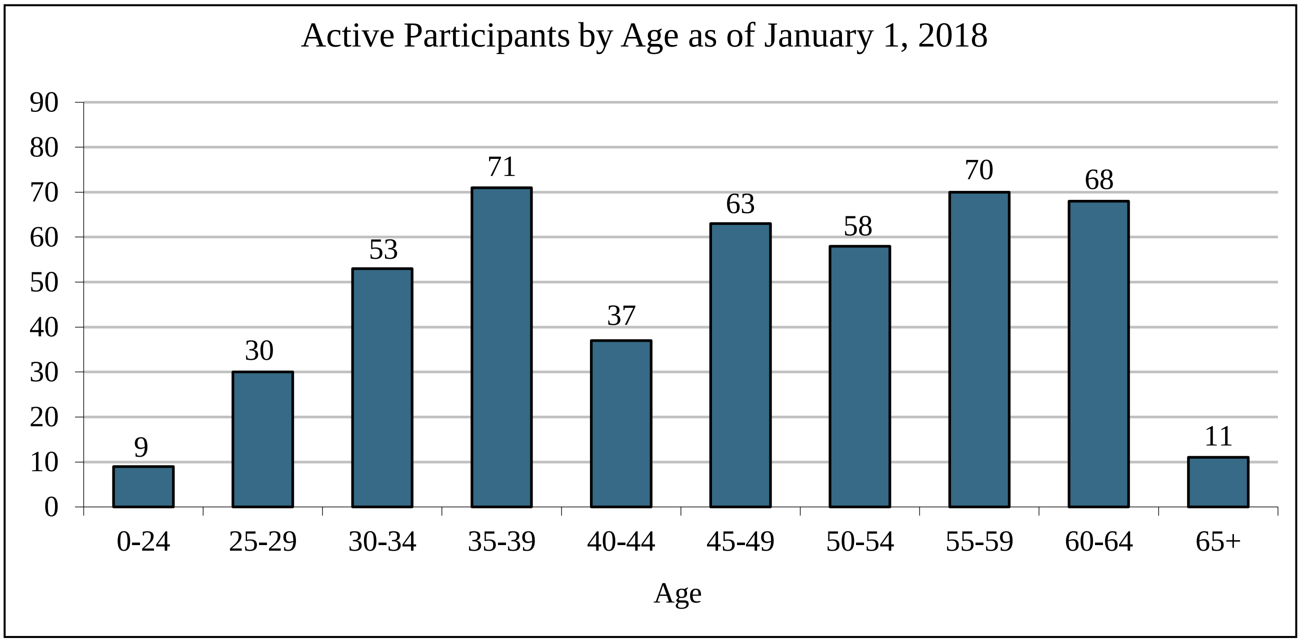
EXHIBIT 3
Participant Reconciliation

The following information provides the reconciliation from January 1, 2017 to January 1, 2018 of Plan Participants.

	Active	Terminated Vested	Retired	Disabled	Beneficiary	Total
1/1/2017 Participants	469	56	171	0	33	729
New Participants	42	-	-	-	-	42
Rehired	2	(1)	-	-	-	1
Terminated vested	(9)	9	-	-	-	-
Terminated non-vested	(23)	-	-	-	-	(23)
Retired	(9)	(2)	11	-	-	-
Disabled	-	-	-	-	-	-
Died with beneficiary	(2)	1	(4)	-	5	-
Died without beneficiary	-	-	(1)	-	(3)	(4)
Benefit stopped	-	-	-	-	-	-
Paid-out lump sum	-	-	-	-	-	-
Data corrections	-	(3)	-	-	-	(3)
1/1/2018 Participants	470	60	177	0	35	742

During 2017, the total Participant count increased by 13 due to 42 new Participants and 1 Participant that was rehired offset by 23 Participants that terminated employment and received a return of their employee contributions, 4 Participant deaths with no beneficiary and 3 Participant corrections (subtractions). There were 11 Participants that retired, 9 Participants that moved from active to terminated vested status, 5 Participant deaths with immediate benefits to a beneficiary and 1 Participant death with deferred benefits due to a beneficiary.

EXHIBIT 4
Active Participant Data



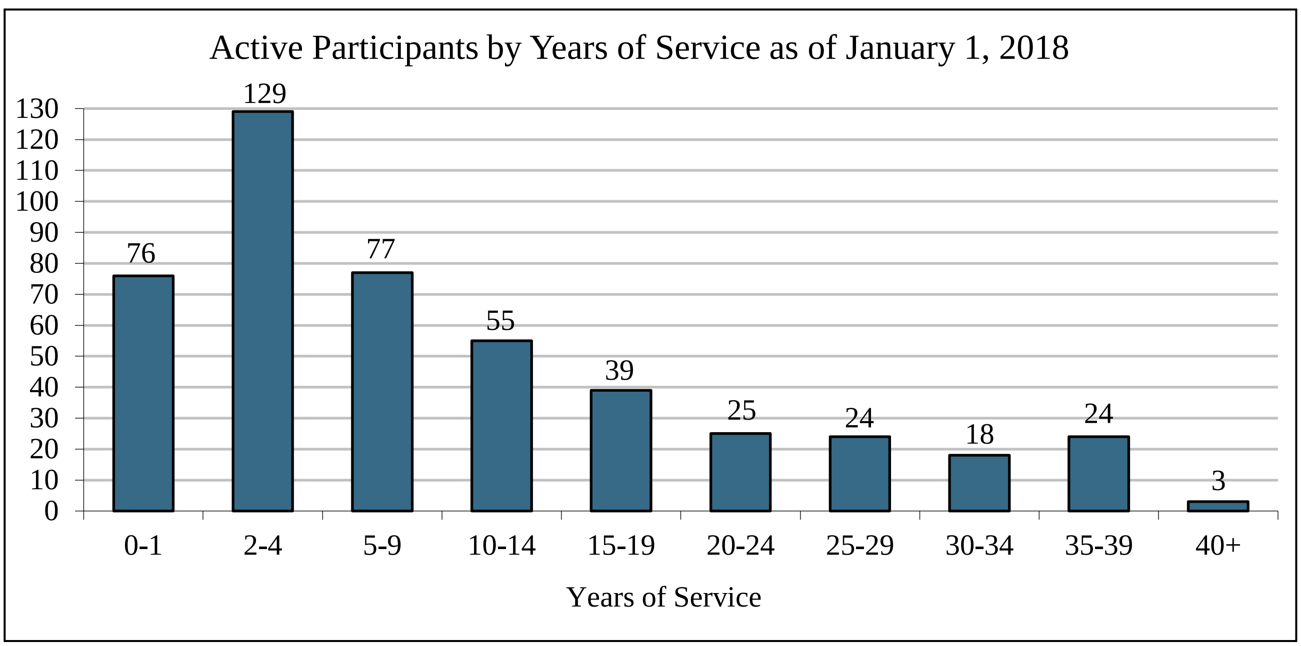
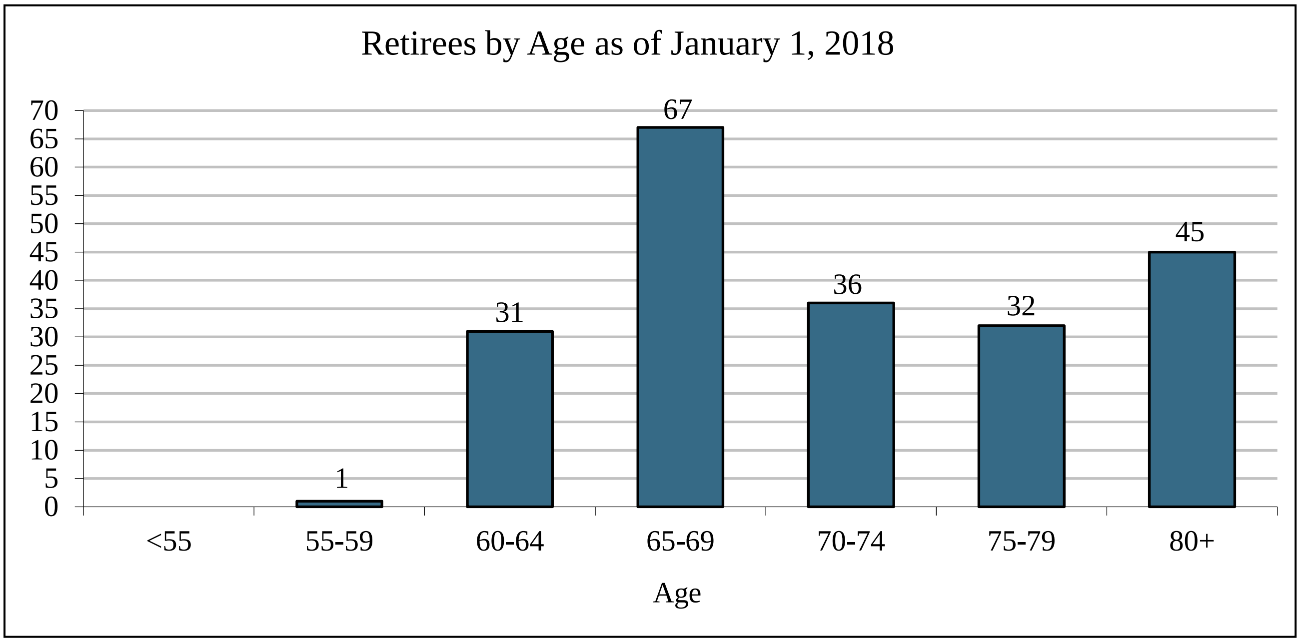


EXHIBIT 5
Retired Participant Data



Retirees include those on service retirement, disability retirement and beneficiaries with survivor benefits.

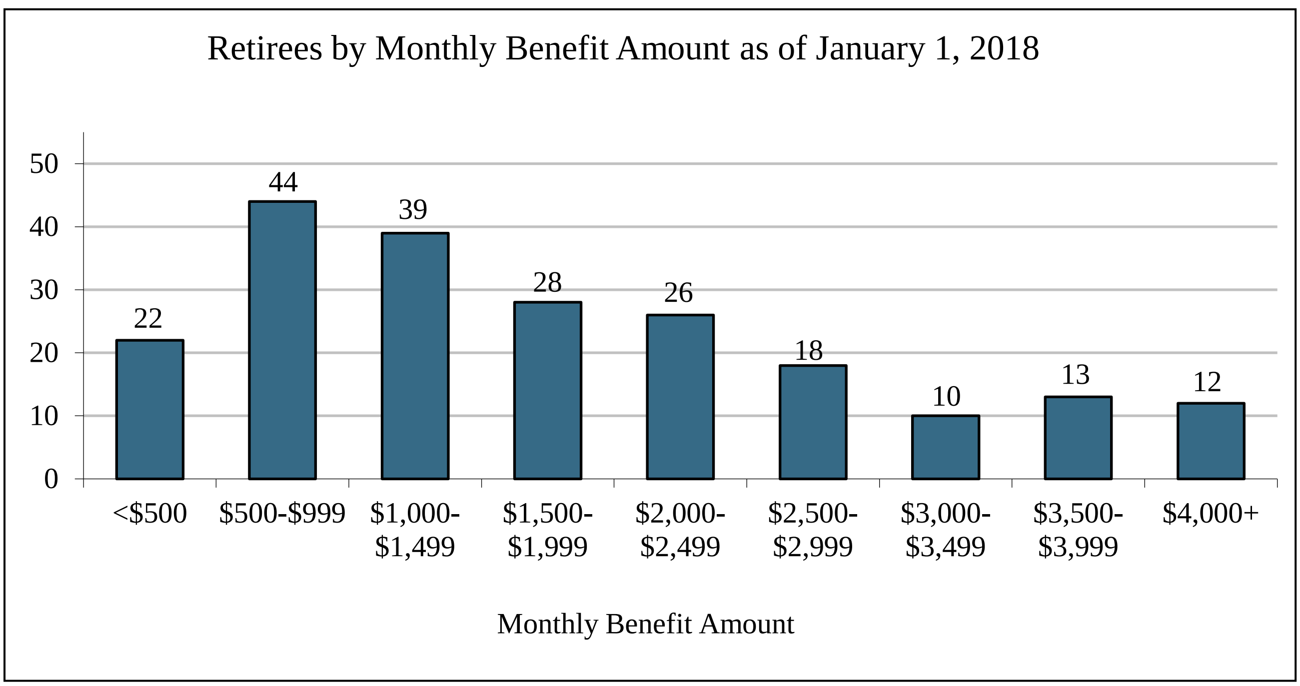
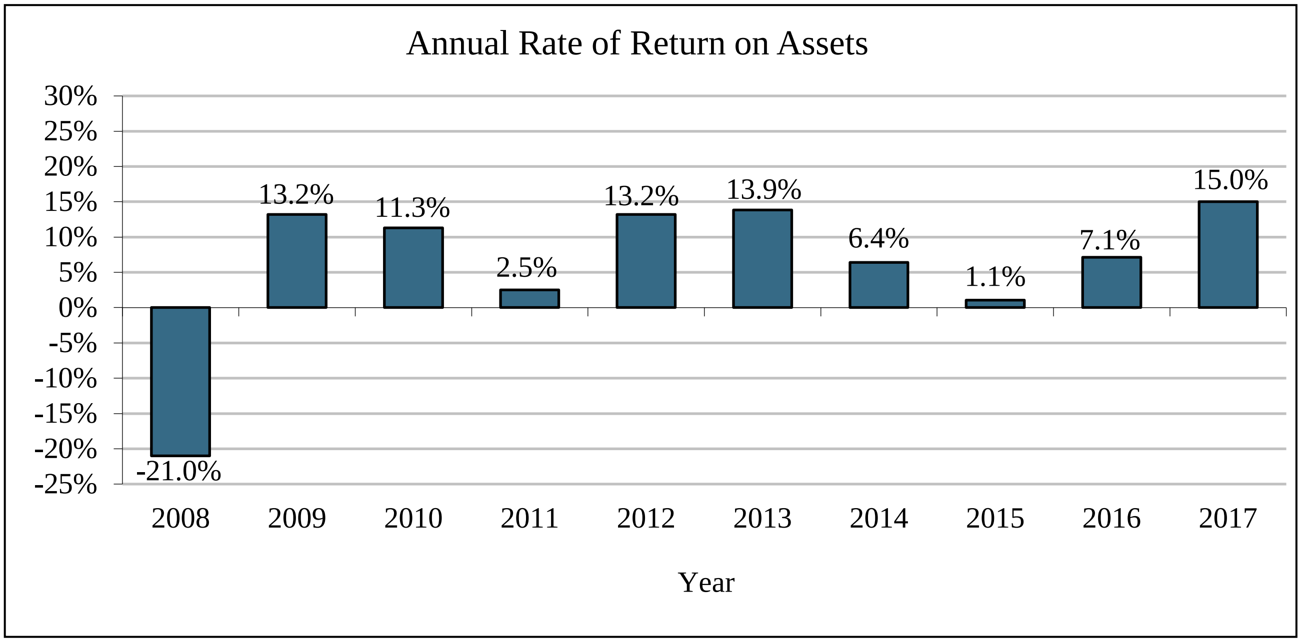


EXHIBIT 6
Reconciliation of Assets

1. Beginning Balance as of January 1, 2017			$	86,746,756
2. Revenue				
(a) Employer's Contribution				
(i) Park & Rec. Contribution	$	322,654		
(ii) Department Contribution		2,477,572		
(iii) Total City Contribution	$	2,800,226		
(b) Employee's Contribution		1,308,511		
(c) Investment Income (Loss)		12,938,266		
(d) Total Revenue			$	17,047,003
3. Expenditure				
(a) Pension Benefit Payments	$	4,601,125		
(b) Professional & Legal Fees		753		
(c) Management Consulting		29,500		
(d) Administration Fees		60,719		
(e) Investment Expense		253,375		
(f) Security Lending Expense		1,767		
(g) Pension Refund		179,054		
(h) Postage		1,528		
(i) Total Expenditure			$	5,127,821
4. Net Income (Loss)			$	11,919,182
5. Ending Balance as of December 31, 2017			$	98,665,938

Total assets increased $11,919,182 during 2017. This increase was from investment income of $12,938,266 offset by negative net cash flow (total contributions less expenditures) of ($1,019,084). Some components were rounded up or down to ensure that the totals would add correctly. The rate of return on plan assets was 15.0%.

EXHIBIT 7
Historical Asset Information



Rates of return are determined after expenses.

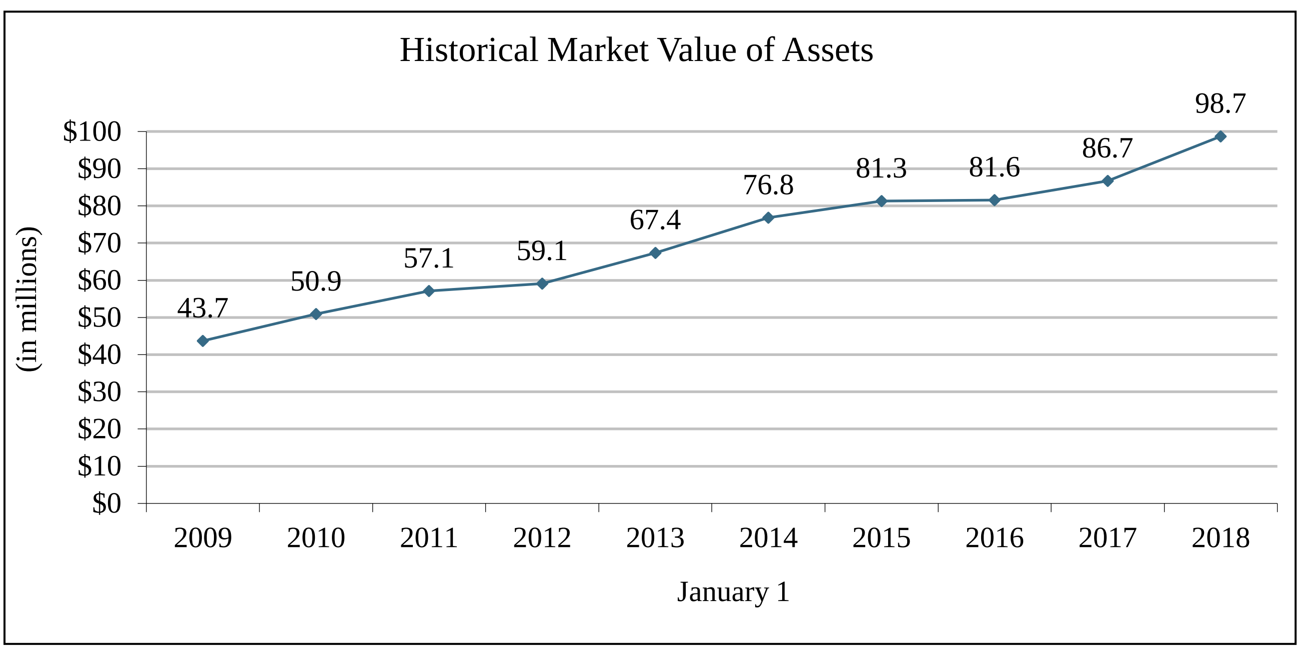


EXHIBIT 8
Actuarial Assumptions and Cost Methods

Economic Assumptions

Investment Return: The Fund is assumed to earn 7.5% per year.

Salary Scale: Active Participant Salaries are assumed to increase at rates according to the following table:

Years of Service	Rate
0-9	5.0%
10+	4.0%

Inflation: The amortization of the Unfunded Actuarial Accrued Liability is determined as a level percent of payroll using a 3% total payroll growth assumption.

Demographic Assumptions

Retirement: Active Participant retirement rates are based on plan experience between 1/1/05 and 12/31/11 (See Illustrations on Page 14).

Mortality: RP-2014 Generational Mortality projected with Scale MP-2017 (1/1/17 Actuarial Valuation was based on the 1994 Group Annuity Mortality Table).

Disability: None.

Withdrawal: Active Participant termination rates are based on plan experience between 1/1/05 and 12/31/11 (See Illustrations on Page 14).

Spouse Age: Male Participants are assumed to be 3 years older than female spouses. Female Participants are assumed to be 3 years younger than male spouses.

Marriage Rate: 85% of Participants are assumed to be married.

EXHIBIT 8 (Continued)
Actuarial Assumptions and Cost Methods

Cost Methods

Form of Benefit: Married Participants receive their benefit in the form of a Joint and Two Thirds to Survivor annuity. Single Participants receive their benefit in the form of a Life Only annuity.

Actuarial Asset Value: The Actuarial Value of Assets is equal to the Market Value of Assets reserved for employee pension benefits.

Expenses: Plan expenses are assumed to be 3.0% higher than the prior year and are added to the recommended contribution.

Funding Method: The contribution requirement is determined using the Entry Age Normal actuarial cost method.

Illustrations

	Rate of Withdrawal (per 1,000)	
Age	Male	Female
20-24	80	200
25-29	80	150
30-34	80	150
35-39	80	80
40-44	25	80
45-49	20	60
50-54	10	30
55+	0	0

	Rate of Retirement (per 1,000)	
Age	Male	Female
62-65	200	200
66	400	400
67	600	600
68	800	800
69+	1,000	1,000

	Rate of Disability (per 1,000)	
Age	Male	Female
25	0.00	0.00
30	0.00	0.00
35	0.00	0.00
40	0.00	0.00
45	0.00	0.00
50	0.00	0.00
55	0.00	0.00

Contribution Information

Arthur J. Gallagher & Co.

EXHIBIT 9
Development of Unfunded Actuarial Accrued Liability

		1/1/18
1. Actuarial Accrued Liability		
(a) Participants receiving benefits	$	42,882,017
(b) Terminated vested Participants		3,355,131
(c) Active Participants		55,338,522
(d) Total Participants = (a)+(b)+(c)	$	101,575,670
2. Adjustment for cost of living adjustments		0
3. Adjustment for assumption changes		5,928,743
4. Actuarial Accrued Liability after adjustments = (1)(d)+(2)+(3), not less than zero	$	107,504,413
5. Actuarial Value of Assets		98,665,938
6. Unfunded Actuarial Accrued Liability as of January 1, 2018 = (4)-(5)	$	8,838,475

Under the Entry Age Normal actuarial cost method, the Unfunded Actuarial Accrued Liability is recalculated each year. The Actuarial Accrued Liability is valued using participant data, plan provisions and assumptions as of the valuation date. Past demographic or economic experience different than assumed is called an actuarial gain or loss and is reflected in the Unfunded Actuarial Accrued Liability. A breakdown of actuarial gains and losses from the past year is shown on the next page.

The Unfunded Actuarial Accrued Liability is amortized over a fixed period of time. The amortization period was reset at 30 years as of January 1, 2009. Therefore, there are 21 years remaining in the amortization period. The resulting amortization payment is a component of the recommended contribution.

The Unfunded Actuarial Accrued Liability is scheduled to be reduced to $0 over the amortization period. However, this schedule is met only if all assumptions are met and the actual employer contribution equals the recommended contribution each year. If assumptions are not met, an actuarial gain or loss will either decrease or increase the UAAL. Also, if the employer contribution exceeds the recommended contribution, the UAAL will be reduced more rapidly. Alternatively, if the employer contribution is less than the recommended contribution, the UAAL will reduce more slowly or even increase.

EXHIBIT 10
Development of Actuarial (Gain)/Loss

Development of Liability (Gain) or Loss

Actual Actuarial Liability as of January 1, 2017		$ 96,540,612
Expected changes		
▪ Normal cost	$ 2,731,493	
▪ Interest at 7.5%	7,445,408	
▪ Cost of living adjustment	0	
▪ Benefit payments with interest to year end	(4,959,435)	
▪ Total expected changes		$ 5,217,466
Expected Actuarial Liability as of January 1, 2018		$ 101,758,078
Actual Actuarial Liability as of January 1, 2018		107,504,413
Actuarial Liability (gain) or loss		$ 5,746,335

Breakdown of Actuarial Liability (gain) or loss by source	
▪ Participant experience different than assumed for death, retirement, termination, disability and other amounts	$ (325,506)
▪ Inactive mortality	583,304
▪ Salary increases different than expected	(467,151)
▪ New entrants	26,945
▪ Assumption changes	5,928,743
Actuarial Liability (gain) or loss	$ 5,746,335

Development of Asset (Gain) or Loss

Market Value of Assets as of January 1, 2017	$ 86,746,756
▪ Interest at 7.5%	6,506,007
▪ Actual contributions with interest to year-end	4,262,815
▪ Actual benefit payments with interest to year-end	(4,959,435)
▪ Actual expenses with interest to year-end	(360,679)
Expected value of assets as of January 1, 2018	$ 92,195,464
Actual value of assets as of January 1, 2018	98,665,938
Asset (gain) or loss	$ (6,470,474)

A (gain)/loss occurs when actual demographic or economic experience is different from the valuation assumptions. For example, if salary increases are greater (lower) than expected the liability will go up (down). During 2017, an actuarial liability loss of $5,746,335 and an asset gain of $6,470,474 resulted in a decrease in UAAL of $724,139 less than expected.

EXHIBIT 11
Recommended Amortization Schedule

Year	Unfunded Liability at Beginning of Year	Annual Amortization Payment	Unfunded Liability at End of Year
2018	$ 8,838,475	$ 624,322	$ 8,830,214
2019	8,830,214	643,052	8,801,199
2020	8,801,199	662,344	8,749,269
2021	8,749,269	682,214	8,672,084
2022	8,672,084	702,680	8,567,109
2023	8,567,109	723,760	8,431,600
2024	8,431,600	745,473	8,262,587
2025	8,262,587	767,837	8,056,856
2026	8,056,856	790,872	7,810,933
2027	7,810,933	814,598	7,521,060
2028	7,521,060	839,036	7,183,176
2029	7,183,176	864,207	6,792,892
2030	6,792,892	890,133	6,345,466
2031	6,345,466	916,837	5,835,776
2032	5,835,776	944,342	5,258,292
2033	5,258,292	972,672	4,607,042
2034	4,607,042	1,001,852	3,875,579
2035	3,875,579	1,031,908	3,056,946
2036	3,056,946	1,062,865	2,143,637
2037	2,143,637	1,094,751	1,127,552
2038	1,127,552	1,127,552	0

The Annual Amortization Payment is determined by amortizing the Unfunded Actuarial Accrued Liability (UAAL) over 21 years as a level percentage of total payroll. Total payroll is assumed to increase at 3% per year.

This schedule is in accordance with Governmental Accounting Standards Board No. 27 guidelines. The City commission has approved that the City contribution will be 10.4% of salary. Please see Exhibit 13 for more details.

EXHIBIT 12
Development of Annual Recommended Contribution

Annual Recommended Contribution (Dollar Amounts)

		2017	2018
1.	Total Normal Cost	$ 2,731,493	$ 2,997,689
2.	Expected Administrative Expenses	290,944	358,071
3.	Expected employee contribution	(1,329,364)	(1,348,591)
4.	City Normal Cost	$ 1,693,073	$ 2,007,169
5.	Amortization of Unfunded Actuarial Accrued Liability	672,455	624,322
6.	Total annual recommended contribution	$ 2,365,528	$ 2,631,491
7.	Interest to mid-year at 7.5%	88,707	98,681
8.	Recommended contribution, mid-year = (6)+(7)	$ 2,454,235	$ 2,730,172

Annual Recommended Contribution (As a Percent of Payroll)

		2017	2018
1.	Total Normal Cost	10.3%	11.1%
2.	Expected Administrative Expenses	1.1%	1.3%
3.	Expected employee contribution	(5.0%)	(5.0%)
4.	City Normal Cost	6.4%	7.4%
5.	Amortization of Unfunded Actuarial Accrued Liability	2.5%	2.3%
6.	Total annual recommended contribution	8.9%	9.7%
7.	Interest to mid-year at 7.5%	0.3%	0.4%
8.	Recommended contribution, mid-year = (6)+(7)	9.2%	10.1%

Percent of Payroll results are based on total expected covered payroll of $26,587,289 in 2017 and $26,971,817 in 2018. The expected city contribution of 10.4% of covered payroll is greater than the 2018 annual recommended contribution of 10.1%.

EXHIBIT 13
10.4% of Payroll Funding Amortization Schedule

Year	Unfunded Liability B.O.Y.	Amortization Payment E.O.Y.	Unfunded Liability E.O.Y.
2018	$ 8,838,475	$ 712,835	$ 8,788,526
2019	8,788,526	739,995	8,707,670
2020	8,707,670	762,195	8,598,550
2021	8,598,550	785,062	8,458,379
2022	8,458,379	808,613	8,284,144
2023	8,284,144	832,871	8,072,584
2024	8,072,584	857,857	7,820,171
2025	7,820,171	883,593	7,523,091
2026	7,523,091	910,102	7,177,221
2027	7,177,221	937,403	6,778,110
2028	6,778,110	965,526	6,320,942
2029	6,320,942	994,493	5,800,520
2030	5,800,520	1,024,327	5,211,232
2031	5,211,232	1,055,057	4,547,017
2032	4,547,017	1,086,710	3,801,333
2033	3,801,333	1,119,311	2,967,122
2034	2,967,122	1,152,890	2,036,766
2035	2,036,766	1,187,475	1,002,048
2036	1,002,048	1,077,202	0

The City commission has approved that the City contribution will be 10.4% of salary. The expected contribution for 2018 on this basis is $2,805,069. The Annual Amortization Payment shown above represents the total expected City contribution available to reduce the UAAL at the end of that year after a reduction for payment of the annual City normal cost.

As shown above, a City contribution of 10.4% of salary per year will amortize the UAAL over 19 years.

Accounting Information

Arthur J. Gallagher & Co.

EXHIBIT 14
Statement of Accumulated Plan Benefits

A measure of the degree of progress made in funding any plan is a comparison between the Accumulated Benefit Liability and the assets accumulated to date. The Accumulated Benefit Liability measures the present value of future benefit payments. However, benefit payments are based only on service and salaries earned as of the valuation date. This liability amount is less than the Actuarial Accrued Liability used to determine the annual recommended contribution, because the AAL anticipates future salary increases for active participants. The liabilities are determined using the regular valuation assumptions. The table below shows the actuarial present value of the Accumulated Benefit Liability.

Actuarial Present Value of Accumulated Plan Benefits (PVAB)

	1/1/17	1/1/18
Vested accrued benefits		
▪ Participants currently receiving payments	$ 36,113,810	$ 44,885,541
▪ Other Participants	40,767,337	41,944,735
Total vested accrued benefits	$ 76,881,147	$ 86,830,276
Non-vested accrued benefits	227,019	309,113
Total accrued benefits	$ 77,108,166	$ 87,139,389

Statement of Changes in Accumulated Plan Benefits

Beginning value, January 1, 2017	$	77,108,166
Increases (Decreases)		
▪ Benefits earned	$	4,200,633
▪ Cost of living adjustment		0
▪ Change in actuarial assumptions		4,337,414
▪ Experience (gain)/loss		354,452
▪ Increase for interest due to decrease in discount period		5,918,903
▪ Benefits paid		(4,780,179)
▪ Net increase (decrease)	$	10,031,223
Ending Value, January 1, 2018	$	87,139,389

The ratio of assets to the above liabilities (known as the Funding Ratio) represents the degree to which Accumulated Benefit liability has been funded. As of January 1, 2018, the Market Value of Assets was $98,665,938. The table below outlines the funding ratios.

Funding Ratio (Assets/PVAB)	
Vested accrued benefits	114%
Total accrued benefits	113%