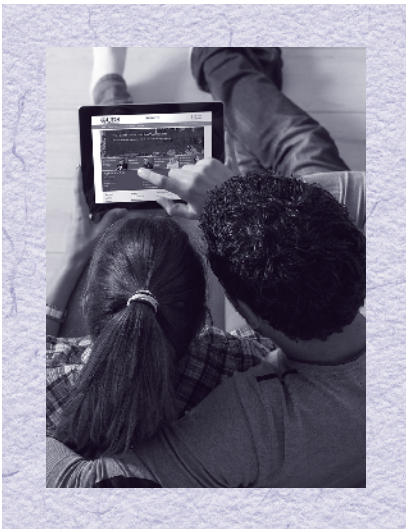


Summary of Actuarial Assumptions and Methods

as of January 1, 2018



Actuarial Assumptions and Methods

- a)** The actuarial valuation was prepared using the entry age actuarial cost method. As described in the certification letter, the contribution rates are set based on the board's funding policy, which states the contribution rate will not be less than the amount needed to amortize the unfunded actuarial accrued liability of each System over a 20-year period from the valuation date (January 1, 2018).

In calculating this minimum, amortization payments are designed to remain level as a percent of payroll, and payroll is assumed to increase 3.00% per year. Under this method, actuarial gains and losses are identified and amortized as part of the unfunded actuarial accrued liability over a period that does not exceed 20 years.

- b)** The future investment earnings of the assets of the Systems are assumed to accrue at an annual rate of 6.95%, compounded annually. This rate is made up of a 2.50% assumed inflation rate and a 4.45% assumed real rate of return. This assumption was adopted January 1, 2017.
- c)** The total rates of assumed annual salary increase are shown on the actuarial schedule on page 163. The rates include increases due to promotion and longevity and a 3.25% per annum rate of increase in the general wage level of the membership. Salaries of judges are assumed to increase at 3.25%. All of these assumptions were adopted January 1, 2017.

d) Post-retirement benefit increases are based on the consumer price index (CPI), limited by the provisions of each System. The increases are assumed to be 2.5% for all Systems. Increases are based on the member's original retirement allowance except in the Judges Retirement System where increases are compounded. For current retirees who have received cumulative COLAs less than the total of annual CPI increases since retirement, higher COLAs are assumed, subject to the annual maximum (2.5% or 4% for Public Safety and 4% for all other Systems), as long as the member has "banked" CPI increases remaining.

e) Tables of mortality rates for male members retired for service and beneficiaries were developed from actual experience of URS retirees. Mortality rates for female members retired for service and beneficiaries were developed from actual experience of the URS retirees.

Summary of Actuarial Assumptions and Methods *(Continued)*

as of January 1, 2018

RETIRED MEMBER MORTALITY

Class of Member

Educators and Judges

Men	2017URSM (90%)
Women	2017URSF (90%)

Public Safety and Firefighters

Men	2017URSM (110%)
Women	2017URSF (110%)

Local Government, Public Employees

Men	2017URSM (110%)
Women	2017URSF (110%)

2017URSM = Constructed mortality table based on actual experience of male URS retirees multiplied by given percentage

2017URSF = Constructed mortality table based on actual experience of female URS retirees multiplied by given percentage

The mortality basis is adjusted based upon the member's class and gender as shown above. These base rates are adjusted for future improvement in mortality using published Scale AA projected from the year 2017. All of these rates were adopted January 1, 2017. Mortality rates for active members use the RP2014 employees mortality tables with white collar adjustment as the underlying assumption with scaling factors applied based on employee group and gender. The assumptions were adopted effective January 1, 2017.

f) Mortality among disabled members is based on 110% of the RP2014 disabled mortality table for males, and 120% of the RP2014 disabled mortality table for females. The rates for males and females are also adjusted for future improvement in mortality using published Scale AA projected from the year 2006.

g) Other demographic assumptions regarding retirement, mortality, disablement, and termination from employment are illustrated in the following actuarial schedules.

The retirement assumptions illustrated are for members of the Systems who are eligible to retire with 30 years of service (35 years of service for Tier 2). For public employees the rates vary by age and eligibility for reduced or unreduced retirement. For Public Safety, Firefighters, and Judges the rates vary by age and service groupings.

Rates of assumed termination from employment are assumed to vary by years of service. All terminating members who are not eligible for vested benefits are assumed to withdraw their contributions immediately. Vested members are assumed to withdraw their contributions and forfeit the right to further benefits at the rates illustrated.

h) The Retirement Board uses the expected rate of return method for calculating the actuarial value of assets. This method is based on the total earnings of the co-mingled investments and spreads the excess/shortfall of actual investment returns over or under the expected return over five years. One-fifth of the excess/shortfall is recognized each year. The actuarial values of assets under this method were calculated and reported to us by the Systems' staff.

i) All of the actuarial assumptions were renewed or adopted by the Retirement Board in 2017, as recommended by the actuary. The assumptions for Tier 2 members are the same as the Tier 1 members, except for retirement rates.



Summary of Actuarial Assumptions and Methods (Continued)

as of January 1, 2018

	Retirement Age	Percent Retiring Within Next Year Among Active Members Eligible for Retirement							Governors and Legislators Retirement Plan
		Male			Female				
		State and School Division		Local Government Division	State and School Division		Local Government Division		
		Educators	Public Employees		Educators	Public Employees			
Tier 1 Noncontributory and Contributory Retirement Systems	50	20.00%	15.00%	15.00%	30.00%	17.00%	20.00%	0.00%	
<i>Adopted January 1, 2017</i>	51	20.00	15.00	15.00	30.00	16.00	20.00	0.00	
	52	20.00	15.00	15.00	30.00	16.00	20.00	0.00	
	53	20.00	15.00	15.00	14.00	16.00	20.00	0.00	
	54	15.00	15.00	15.00	14.00	16.00	20.00	0.00	
	55	15.00	16.00	15.00	14.00	16.00	25.00	0.00	
	56	15.00	16.00	15.00	18.00	16.00	25.00	0.00	
	57	15.00	16.00	15.00	18.00	16.00	25.00	0.00	
	58	15.00	16.00	15.00	18.00	20.00	25.00	0.00	
	59	15.00	16.00	15.00	18.00	20.00	25.00	0.00	
	60	23.00	20.00	20.00	30.00	25.00	30.00	0.00	
	61	23.00	20.00	20.00	30.00	25.00	30.00	0.00	
	62	33.00	30.00	23.00	35.00	33.00	30.00	100.00	
	63	33.00	30.00	23.00	35.00	33.00	30.00	100.00	
	64	33.00	30.00	23.00	35.00	33.00	30.00	100.00	
	65	33.00	22.00	23.00	35.00	28.00	25.00	100.00	
	66	33.00	22.00	30.00	35.00	28.00	25.00	100.00	
	67	30.00	22.00	22.00	35.00	28.00	25.00	100.00	
	68	30.00	22.00	22.00	23.00	22.00	25.00	100.00	
	69	25.00	22.00	22.00	23.00	22.00	25.00	100.00	
	70	20.00	22.00	22.00	23.00	22.00	20.00	100.00	
	71	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	72	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	73	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	74	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	75	100.00	100.00	100.00	100.00	100.00	100.00	100.00	

	Percent Retiring Within Next Year Among Active Members Eligible for Retirement											
	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age
Tier 1 Public Safety Retirement System	45	15.00%	50	15.00%	55	15.00%	59	20.00%	63	35.00%	67	50.00%
<i>Adopted January 1, 2017</i>	46	15.00	51	15.00	56	15.00	60	20.00	64	35.00	68	50.00
	47	15.00	52	15.00	57	15.00	61	20.00	65	35.00	69	50.00
	48	15.00	53	15.00	58	15.00	62	35.00	66	50.00	70	100.00
	49	15.00	54	15.00								

	Percent Retiring Within Next Year Among Active Members Eligible for Retirement											
	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age
Tier 1 Firefighters Retirement System	45	15.00%	50	15.00%	55	15.00%	59	20.00%	63	25.00%	67	50.00%
<i>Adopted January 1, 2017</i>	46	15.00	51	15.00	56	15.00	60	20.00	64	25.00	68	50.00
	47	15.00	52	15.00	57	15.00	61	20.00	65	50.00	69	50.00
	48	15.00	53	15.00	58	20.00	62	25.00	66	50.00	70	100.00
	49	15.00	54	15.00								

	Percent Retiring Within Next Year Among Active Members Eligible for Retirement											
	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age	Retirement Age
Judges Retirement System	45	10.00%	50	10.00%	55	10.00%	59	10.00%	63	10.00%	67	20.00%
<i>Adopted January 1, 2017</i>	46	10.00	51	10.00	56	10.00	60	10.00	64	15.00	68	20.00
	47	10.00	52	10.00	57	10.00	61	10.00	65	15.00	69	20.00
	48	10.00	53	10.00	58	10.00	62	10.00	66	20.00	70	100.00
	49	10.00	54	10.00								

Summary of Actuarial Assumptions and Methods (Continued)

as of January 1, 2018

		Percent Retiring Within Next Year Among Active Members Eligible for Retirement							Governors and Legislators Retirement Plan
		Male			Female				
Retirement Age	State and School Division		Local Government Division	State and School Division		Local Government Division			
	Educators	Public Employees		Educators	Public Employees				
Tier 2	50	20.00%	15.00%	15.00%	30.00%	17.00%	20.00%	0.00%	
Public Employees Retirement System	51	20.00	15.00	15.00	30.00	16.00	20.00	0.00	
<i>Adopted January 1, 2014</i>	52	20.00	15.00	15.00	30.00	16.00	20.00	0.00	
	53	20.00	15.00	15.00	14.00	16.00	20.00	0.00	
	54	12.00	15.00	15.00	14.00	16.00	20.00	0.00	
	55	12.00	16.00	15.00	14.00	16.00	25.00	0.00	
	56	12.00	16.00	15.00	18.00	16.00	25.00	0.00	
	57	12.00	16.00	15.00	18.00	16.00	25.00	0.00	
	58	12.00	16.00	15.00	18.00	20.00	25.00	0.00	
	59	12.00	16.00	15.00	18.00	20.00	25.00	0.00	
	60	23.00	20.00	20.00	30.00	30.00	30.00	0.00	
	61	23.00	20.00	20.00	30.00	30.00	30.00	0.00	
	62	30.00	33.00	23.00	35.00	30.00	30.00	100.00	
	63	30.00	33.00	23.00	35.00	30.00	30.00	100.00	
	64	30.00	30.00	23.00	30.00	30.00	30.00	100.00	
	65	30.00	22.00	23.00	30.00	26.00	25.00	100.00	
	66	30.00	22.00	30.00	30.00	26.00	25.00	100.00	
	67	30.00	22.00	22.00	30.00	22.00	25.00	100.00	
	68	30.00	22.00	22.00	23.00	22.00	25.00	100.00	
	69	25.00	22.00	22.00	23.00	22.00	25.00	100.00	
	70	20.00	22.00	22.00	23.00	22.00	20.00	100.00	
	71	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	72	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	73	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	74	20.00	22.00	18.00	23.00	22.00	15.00	100.00	
	75	100.00	100.00	100.00	100.00	100.00	100.00	100.00	

Retirement rates at the age the member is first eligible for an unreduced retirement benefit prior to age 65 is increased by 30%.

		Percent Retiring Within Next Year Among Active Members Eligible for Retirement										
Retirement Age	Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age			
	Tier 2	45	12.00%	50	12.00%	55	12.00%	59	12.00%	63	35.00%	67
Public Safety and Firefighter Retirement System	46	12.00	51	12.00	56	12.00	60	25.00	64	35.00	68	50.00
Public Safety	47	12.00	52	12.00	57	12.00	61	30.00	65	50.00	69	50.00
<i>Adopted January 1, 2014</i>	48	12.00	53	12.00	58	12.00	62	35.00	66	50.00	70	100.00
	49	12.00	54	12.00								

		Percent Retiring Within Next Year Among Active Members Eligible for Retirement										
Retirement Age	Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age			
	Firefighters	45	9.00%	50	9.00%	55	12.00%	59	12.00%	63	40.00%	67
<i>Adopted January 1, 2014</i>	46	9.00	51	9.00	56	12.00	60	40.00	64	40.00	68	60.00
	47	9.00	52	9.00	57	12.00	61	40.00	65	60.00	69	60.00
	48	9.00	53	9.00	58	12.00	62	40.00	66	60.00	70	100.00
	49	9.00	54	9.00								

Summary of Actuarial Assumptions and Methods (Continued)

as of January 1, 2018

Other Termination of Employment Percent of Active Members Separating Within Next Year								
Years of Service	Male			Female			Governors and Legislators Retirement Plan	
	State and School Division		Local Government Division	State and School Division		Local Government Division		
	Educators	Public Employees		Educators	Public Employees			
Noncontributory and Contributory Retirement Systems <i>Adopted January 1, 2017</i>	0	14.00%	25.00%	17.00%	16.00%	28.00%	22.00%	10.00%
	1	11.00	20.00	13.00	15.00	23.00	18.00	10.00
	2	8.00	14.00	9.00	12.00	17.00	13.00	10.00
	3	7.00	10.00	8.00	10.00	13.00	11.00	10.00
	4	6.50	10.00	7.50	9.00	12.50	10.50	10.00
	5	6.00	10.00	7.00	8.00	11.00	10.00	10.00
	6	5.50	9.00	6.50	7.50	10.00	9.50	10.00
	7	4.00	7.50	6.00	6.00	7.50	9.00	10.00
	8	3.50	6.00	5.50	5.00	6.50	7.50	10.00
	9	3.00	5.50	4.75	4.50	6.00	7.00	10.00
	10	2.75	5.00	4.50	4.00	5.50	6.00	10.00
	11	2.50	4.50	4.00	3.50	4.75	5.50	10.00
	12	2.50	4.00	3.50	3.25	4.50	5.25	10.00
	13	2.25	3.75	3.00	3.00	4.25	5.00	10.00
	14	2.00	3.50	3.00	2.50	3.75	4.50	10.00
	15	2.00	3.00	2.75	2.25	3.50	4.00	10.00
	16	1.75	2.75	2.75	2.00	3.00	3.75	10.00
	17	1.75	2.50	2.75	1.75	2.75	3.50	10.00
	18	1.75	2.00	2.50	1.50	2.75	3.00	10.00
	19	1.50	2.00	2.50	1.25	2.75	3.00	10.00
	20	1.00	2.00	2.00	1.25	2.75	2.50	10.00
	21	1.00	2.00	2.00	1.25	2.50	2.50	10.00
	22	1.00	2.00	1.75	1.25	2.25	2.25	10.00
	23	1.00	1.50	1.50	1.25	2.00	2.00	10.00
	24	1.00	1.50	1.25	1.25	2.00	2.00	10.00
	25+	1.00	1.00	1.00	1.00	1.00	1.00	10.00

Other Termination of Employment of Active Members Separating Within Next Year										
	Years of Service		Years of Service		Years of Service		Years of Service		Years of Service	
Public Safety Retirement System <i>Adopted January 1, 2014</i>	0	12.00%	5	4.50%	9	3.25%	13	2.25%	17	1.50%
	1	6.50	6	4.25	10	3.00	14	1.50	18	1.50
	2	5.50	7	4.00	11	2.75	15	1.50	19	1.50
	3	5.25	8	3.50	12	2.50	16	1.50	20+	1.00
	4	5.00								

Other Termination of Employment of Active Members Separating Within Next Year										
	Years of Service		Years of Service		Years of Service		Years of Service		Years of Service	
Firefighters Retirement System <i>Adopted January 1, 2010</i>	0	6.00%	5	2.50%	9	1.50%	13	0.50%	17	0.50%
	1	5.00	6	2.25	10	1.50	14	0.50	18	0.50
	2	4.00	7	2.00	11	1.50	15	0.50	19	0.50
	3	3.50	8	1.75	12	0.50	16	0.50	20+	0.50
	4	3.00								

Other Termination of Employment of Active Members Separating Within Next Year	
Judges Retirement System <i>Adopted January 1, 1993</i>	None assumed.

Summary of Actuarial Assumptions and Methods (Concluded)

as of January 1, 2018

	Total Annual Increase in Salary (Male and Female)													
	Years of Service	State and School Division			Local Government Division	Public Safety Retirement System	Firefighters Retirement System	Years of Service	State and School Division			Local Government Division	Public Safety Retirement System	Firefighters Retirement System
		Educators	Public Employees	Public Employees					Educators	Public Employees	Public Employees			
All Retirement Systems <i>Adopted January 1, 2017</i>	0	9.75%	8.50%	8.75%	7.25%	8.75%	13	4.75%	4.25%	4.00%	4.50%	4.50%	4.50%	
	1	9.00	7.75	7.25	6.25	8.25	14	4.50	4.00	4.00	4.25	4.50	4.50	
	2	8.00	6.75	6.50	6.00	8.00	15	4.25	3.75	4.00	4.25	4.50	4.50	
	3	7.50	6.00	6.00	5.75	7.75	16	4.00	3.75	3.75	4.25	4.50	4.50	
	4	7.25	5.75	5.50	5.75	7.50	17	3.75	3.75	3.75	4.00	4.25	4.25	
	5	7.00	5.25	5.25	5.75	7.25	18	3.75	3.75	3.75	4.00	4.00	4.00	
	6	7.00	5.00	5.00	5.75	7.25	19	3.75	3.75	3.75	4.00	4.00	4.00	
	7	6.75	4.75	4.75	5.50	6.75	20	3.75	3.50	3.50	4.00	4.00	4.00	
	8	6.75	4.75	4.50	5.25	6.50	21	3.75	3.50	3.50	3.75	3.75	3.75	
	9	6.50	4.50	4.50	5.25	6.25	22	3.75	3.50	3.50	3.75	3.50	3.50	
	10	6.00	4.50	4.25	5.00	5.75	23	3.75	3.50	3.25	3.50	3.50	3.50	
	11	5.50	4.25	4.00	4.75	5.00	24	3.50	3.25	3.25	3.50	3.50	3.50	
	12	5.25	4.25	4.00	4.50	5.00	25+	3.25	3.25	3.25	3.25	3.25	3.25	

	Probability of Mortality Within the Next Year for Active Members													
	Age	Male			Female			Age	Male			Female		
		Educators	Local Government and Public Employees	Local Government and Public Employees	Educators	Local Government and Public Employees	Local Government and Public Employees		Educators	Local Government and Public Employees	Local Government and Public Employees	Educators	Local Government and Public Employees	Local Government and Public Employees
Noncontributory and Contributory Retirement Systems <i>Adopted January 1, 2017</i>	20	0.0228%	0.0285%	0.0069%	0.0110%		50	0.0946%	0.1182%	0.0465%	0.0744%			
	25	0.0271	0.0339	0.0073	0.0117		55	0.1564	0.1955	0.0706	0.1130			
	30	0.0254	0.0317	0.0092	0.0147		60	0.2630	0.3288	0.1030	0.1648			
	35	0.0294	0.0367	0.0121	0.0193		65	0.4644	0.5805	0.1560	0.2495			
	40	0.0352	0.0440	0.0167	0.0267		70	0.8223	1.0279	0.2717	0.4346			
	45	0.0546	0.0682	0.0277	0.0443									

	Percent Electing a Refund of Contributions Upon Termination While Vested													
	Years of Service	Male			Female			Years of Service	Male			Female		
		Educators	Public Employees	Local Government Division	Educators	Public Employees	Local Government Division		Educators	Public Employees	Local Government Division	Educators	Public Employees	Local Government Division
Noncontributory and Contributory Retirement Systems <i>Adopted January 1, 1993</i>	0-3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	4	75	86	75	65	80	77							
	5	73	83	73	64	79	75							
	10	54	73	61	53	64	61							
	15	33	63	49	32	52	40							
	19	9	29	23	8	22	13							
	20	0	0	0	0	0	0							

	Probability of Mortality Within the Next Year for Active Members Public Safety and Firefighters Employees							
	Age		Age		Age		Age	
	Age	Age	Age	Age	Age	Age	Age	
Public Safety Retirement System and Firefighters Retirement System <i>Adopted January 1, 2017</i>	20	0.0285%	35	0.0367%	50	0.1182%	65	0.5805%
	25	0.0339	40	0.0440	55	0.1955	70	1.0279
	30	0.0317	45	0.0682	60	0.3288		

	Percent Electing a Refund of Contributions Upon Termination While Vested Public Safety and Firefighters Retirement Employees			
	Years of Service		Years of Service	
	Years of Service	Years of Service	Years of Service	Years of Service
Public Safety Retirement System and Firefighters Retirement System <i>Adopted January 1, 1993</i>	0-3	100%	15	35%
	4	76	19	15
	5	74	20	0
	10	57		