UTAH RETIREMENT SYSTEMS

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

as of January 1, 2017

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, 2017).

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 left.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS *(Continued)*

as of January 1, 2017

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

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. 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 commingled 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, 2017

		Percent Retiring Within Next Year Among Active Members Eligible for Retirement						
		Male			Female			
		State and School Division			State and School Division			
	Retirement Age	Educators	Public Employees	Local Government Division	Educators	Public Employees	Local Government Division	Governors and Legislators Retirement Plan
Tier 1	50	20.00%	15.00%	15.00%	30.00%	17.00%	20.00%	0.00%
Noncontributory	51	20.00	15.00	15.00	30.00	16.00	20.00	0.00
and Contributory	52	20.00	15.00	15.00	30.00	16.00	20.00	0.00
Retirement Systems	53	20.00	15.00	15.00	14.00	16.00	20.00	0.00
Adopted January 1, 2017	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	
Tier 1	45	15.00%	50	15.00%	55	15.00%	59	20.00%	63	35.00%	67	50.00%
Public Safety	46	15.00	51	15.00	56	15.00	60	20.00	64	35.00	68	50.00
Retirement System	47	15.00	52	15.00	57	15.00	61	20.00	65	50.00	69	50.00
Adopted January 1, 2017	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	
Tier 1	45	15.00%	50	15.00%	55	15.00%	59	20.00%	63	25.00%	67	50.00%
Firefighters	46	15.00	51	15.00	56	15.00	60	20.00	64	25.00	68	50.00
Retirement System	47	15.00	52	15.00	57	15.00	61	20.00	65	50.00	69	50.00
Adopted January 1, 2017	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	
Judges	45	10.00%	50	10.00%	55	10.00%	59	10.00%	63	20.00%	67	20.00%
Retirement System	46	10.00	51	10.00	56	10.00	60	10.00	64	20.00	68	20.00
Adopted January 1, 2014	47	10.00	52	10.00	57	10.00	61	10.00	65	20.00	69	20.00
	48	10.00	53	10.00	58	10.00	62	20.00	66	20.00	70	100.00
	49	10.00	54	10.00								

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS *(Continued)*

as of January 1, 2017

		Percent Retiring Within Next Year Among Active Members Eligible for Retirement						
		Male			Female			
		State and School Division			State and School Division			
	Retirement Age	Educators	Public Employees	Local Government Division	Educators	Public Employees	Local Government Division	Governors and Legislators Retirement Plan
Tier 2 Public Employees Retirement System *Adopted January 1, 2014*	50	20.00%	15.00%	15.00%	30.00%	17.00%	20.00%	0.00%
	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	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%.

Tier 2 Public Safety and Firefighter Retirement System

Public Safety
Adopted January 1, 2014

Percent Retiring Within Next Year Among Active Members Eligible for Retirement												
Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age		
45	12.00%	50	12.00%	55	12.00%	59	12.00%	63	35.00%	67	50.00%
46	12.00	51	12.00	56	12.00	60	25.00	64	35.00	68	50.00
47	12.00	52	12.00	57	12.00	61	30.00	65	50.00	69	50.00
48	12.00	53	12.00	58	12.00	62	35.00	66	50.00	70	100.00
49	12.00	54	12.00								

Firefighters
Adopted January 1, 2014

Percent Retiring Within Next Year Among Active Members Eligible for Retirement											
Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age		Retirement Age	
45	9.00%	50	9.00%	55	12.00%	59	12.00%	63	40.00%	67	60.00%
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, 2017

		Other Termination of Employment Percent of Active Members Separating Within Next Year						
		Male			Female			Governors and Legislators Retirement Plan
		State and School Division		Local Government Division	State and School Division		Local Government Division	
	Years of Service	Educators	Public Employees		Educators	Public Employees		
Noncontributory and Contributory Retirement Systems *Adopted January 1, 2017*	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 *Adopted January 1, 2010*	0	12.00%	5	4.50%	9	3.25%	13	2.25%	17	1.50%
	1	8.00	6	4.25	10	3.00	14	1.50	18	1.50
	2	6.50	7	4.00	11	2.75	15	1.50	19	1.50
	3	6.00	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 *Adopted January 1, 2010*	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 *Adopted January 1,1993*	None assumed.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS *(Concluded)*

as of January 1, 2017

Total Annual Increase in Salary (Male and Female)

	Years of Service	State and School Division: Educators	State and School Division: Public Employees	Local Government Division	Public Safety Retirement System	Firefighters Retirement System	Years of Service	State and School Division: Educators	State and School Division: Public Employees	Local Government Division	Public Safety Retirement System	Firefighters Retirement System
All Retirement Systems *Adopted January 1, 2017*	0	9.75%	8.50%	8.75%	7.25%	8.75%	13	4.75%	4.25%	4.00%	4.50%	4.50%
	1	9.00	7.75	7.25	6.25	8.25	14	4.00	4.00	4.00	4.25	4.50
	2	8.00	6.75	6.50	6.00	8.00	15	4.00	3.75	4.00	4.25	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	7.25	5.75	5.50	5.75	7.50	17	3.75	3.75	3.75	4.00	4.25
	5	7.00	5.25	5.25	5.75	7.25	18	3.75	3.75	3.75	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
	7	6.75	4.75	4.75	5.50	6.75	20	3.75	3.50	3.50	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
	9	6.50	4.50	4.50	5.25	6.25	22	3.75	3.50	3.50	3.75	3.50
	10	6.00	4.50	4.25	5.00	5.75	23	3.75	3.50	3.25	3.50	3.50
	11	5.50	4.25	4.05	4.75	5.00	24	3.50	3.25	3.25	3.50	3.50
	12	5.25	4.25	4.05	4.50	5.00	25+	3.25	3.25	3.25	3.25	3.25

Probability of Mortality Within the Next Year for Active Members

	Age	Male: Educators	Male: Local Government and Public Employees	Female: Educators	Female: Local Government and Public Employees	Age	Male: Educators	Male: Local Government and Public Employees	Female: Educators	Female: Local Government and Public Employees
Noncontributory and Contributory Retirement Systems *Adopted January 1, 2017*	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	0.1230
	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: Educators	Male: Public Employees	Male: Local Government Division	Female: Educators	Female: Public Employees	Female: Local Government Division
Noncontributory and Contributory Retirement Systems *Adopted January 1, 1993*	0-3	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	
Public Safety Retirement System and Firefighters Retirement System *Adopted January 1, 2008*	20	0.0276%	35	0.0618%	50	0.1710%	65	0.6058%
	25	0.0301	40	0.0863	55	0.2423	70	0.7938
	30	0.0355	45	0.1206	60	0.3902		

Percent Electing a Refund of Contributions Upon Termination While Vested

	Public Safety and Firefighters Retirement Employees			
	Years of Service		Years of Service	
Public Safety Retirement System and Firefighters Retirement System *Adopted January 1, 1993*	0-3	100%	15	35%
	4	76	19	15
	5	74	20	0
	10	57		