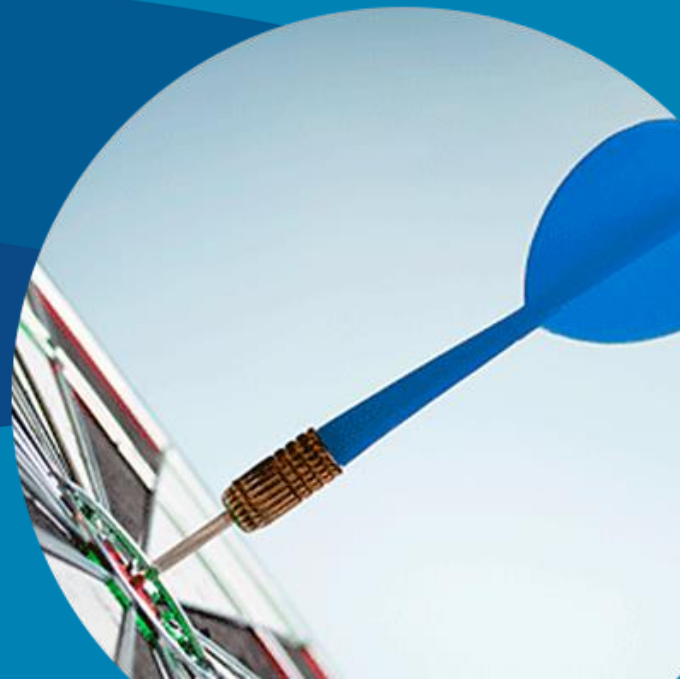


City of Sioux Falls Pension Plans Projection Study

Based Upon Data as of December 31, 2016

August 9, 2017



Purpose: Address the Following Questions

- Is the current investment return assumption (7.50%) achievable over the next 20 years based on the current asset mix?
- What does the projected pension plan population look like over the next 25 years?
- What are the projected City contributions over the next 25 years if all actuarial assumptions are met?
- What level of investment loss can be covered by the Unallocated Income Reserve (UIR)?
- What do the pension plan projections look like if the assumed investment return is 6.5% per year?

Sioux Falls Retirement Systems

Current Asset Mix

<u>Asset Class</u>	<u>Target Allocation</u>
US Large Cap Equity	35%
US Small Cap Equity	15%
International Equity	20%
US Bonds	25%
Real Estate	5%
Total	100%

The Process

- Generate investment returns for a 20 year period (on average)
 - Using capital market assumptions from the GRS survey & the Plan's target asset allocation
 - Mathematical techniques (probability distribution function)
 - Simulate investment returns
 - Develop percentile rankings & probabilities of achieving different rates of return

Results

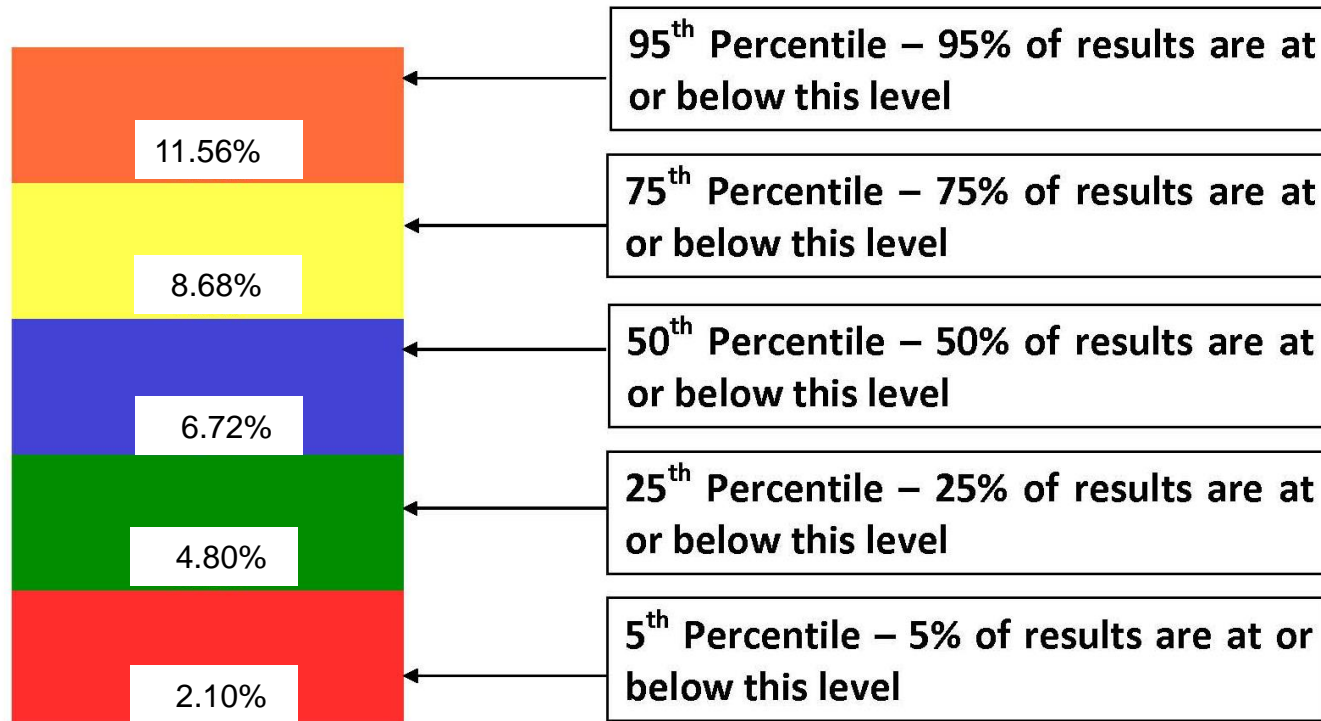
20 Year Average Returns

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Administrative Expenses	Expected Nominal Return Net of Expenses (6)-(7)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	6.53%	2.50%	4.03%	2.75%	6.78%	0.06%	6.72%	13.09%
2	6.54%	2.26%	4.28%	2.75%	7.03%	0.06%	6.97%	11.40%
3	6.37%	2.00%	4.37%	2.75%	7.12%	0.06%	7.06%	12.07%
4	7.24%	2.21%	5.03%	2.75%	7.78%	0.06%	7.72%	13.26%
5	7.04%	2.00%	5.04%	2.75%	7.79%	0.06%	7.73%	13.95%
6	7.29%	2.20%	5.09%	2.75%	7.84%	0.06%	7.78%	13.43%
7	7.52%	2.25%	5.27%	2.75%	8.02%	0.06%	7.96%	13.26%
8	8.16%	2.75%	5.41%	2.75%	8.16%	0.06%	8.10%	13.58%
Average	7.09%	2.27%	4.81%	2.75%	7.56%	0.06%	7.50%	13.00%

Results

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of Exceeding 7.50%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	5.20%	5.93%	6.66%	29.50%
2	5.73%	6.37%	7.01%	32.82%
3	5.71%	6.38%	7.06%	33.90%
4	6.18%	6.92%	7.66%	42.13%
5	6.06%	6.83%	7.62%	41.47%
6	6.20%	6.95%	7.70%	42.64%
7	6.41%	7.15%	7.90%	45.32%
8	6.50%	7.25%	8.02%	46.73%
Average	6.00%	6.72%	7.45%	39.31%

Results: Percentile Rankings of 20 Year Net Investment Returns



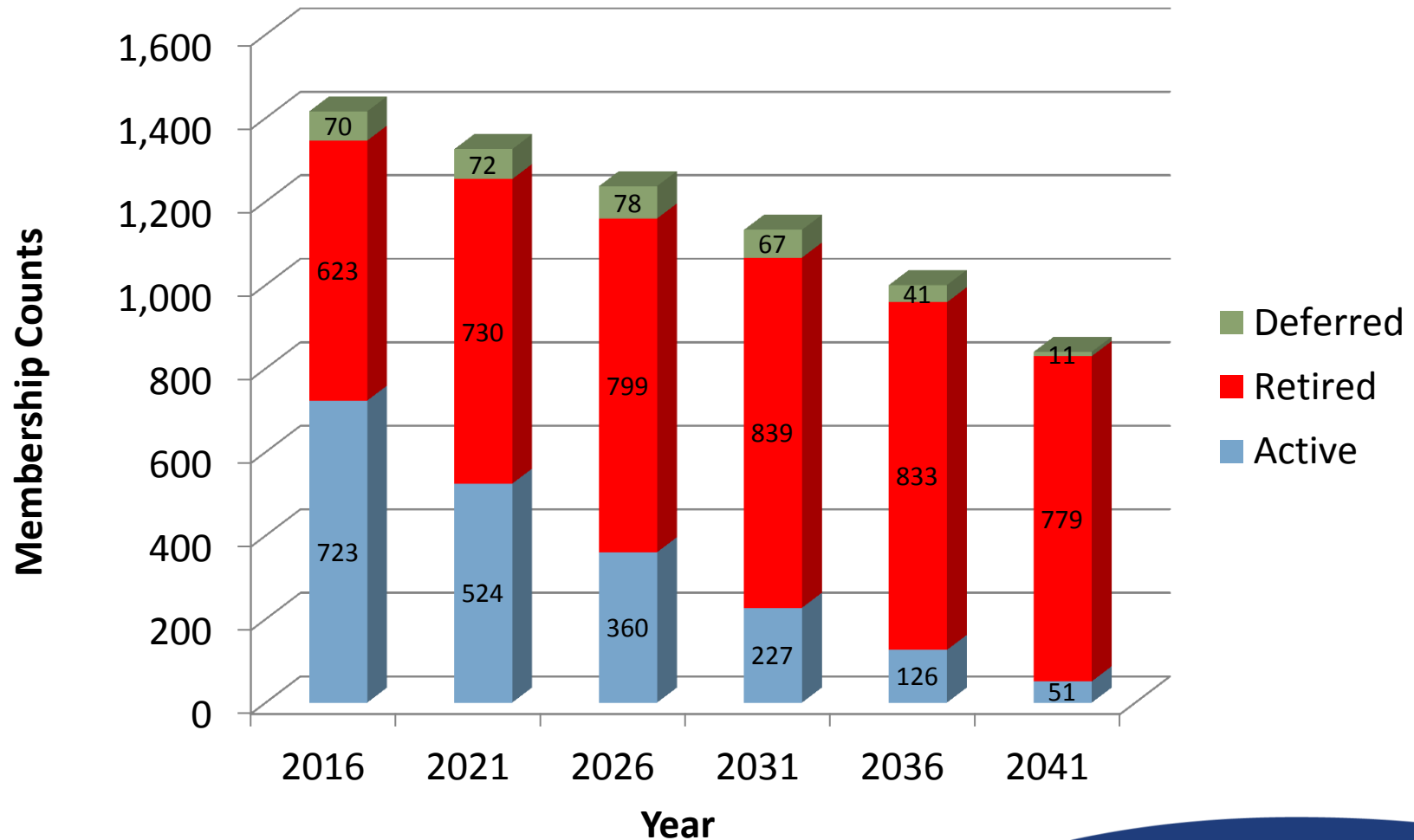
Results

- The percentile ranking of 7.5% (the assumed net rate of return) was approximately 61%
- Over the next 20 years
 - Probability of earning less than the actuarial assumption is 61%
 - Probability of exceeding the actuarial investment return assumption is 39%

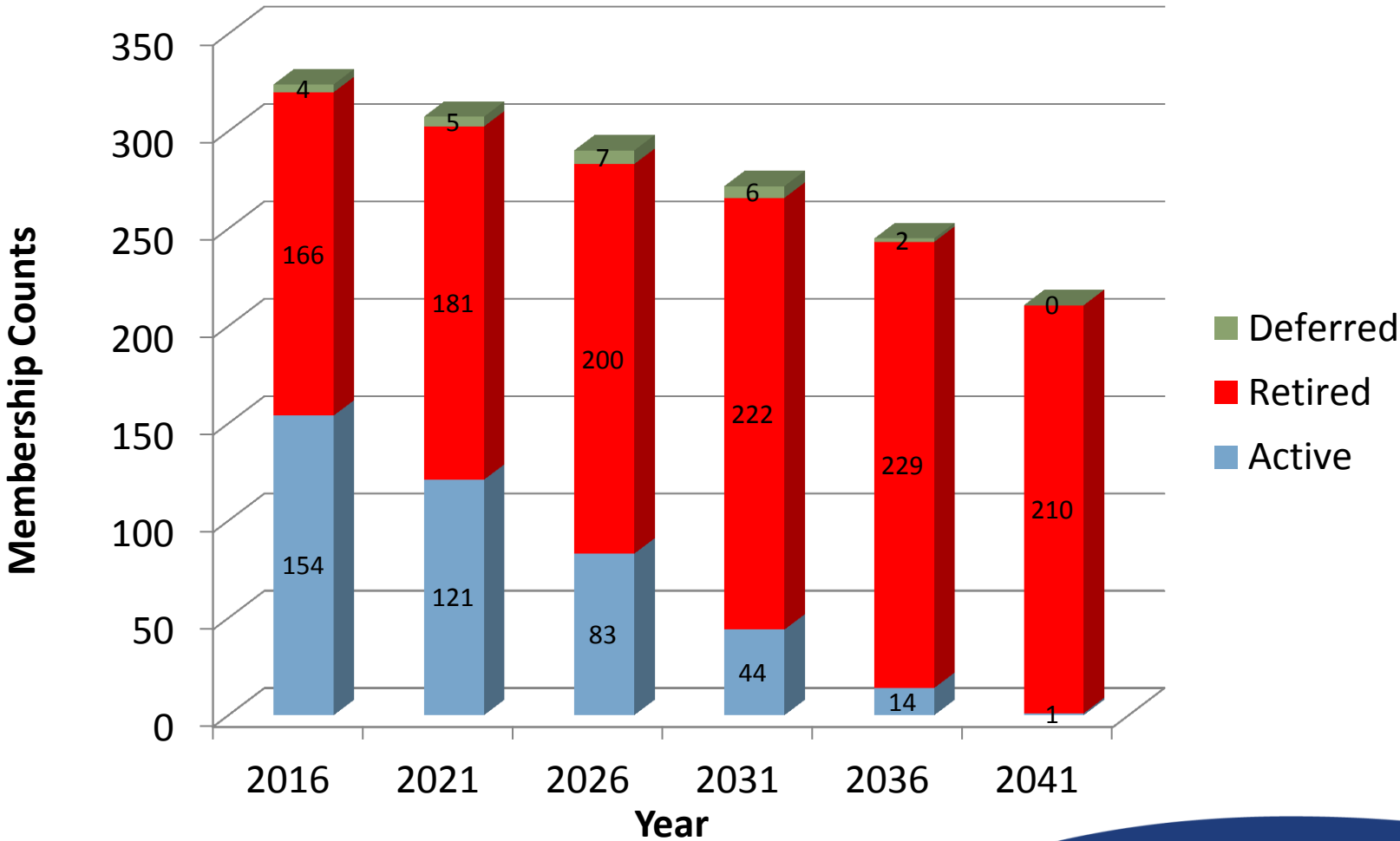
Why Projections?

- Annual valuations determine plan contributions needed to meet cash flow requirements
- Projections demonstrate how the plan for meeting cash flow is expected to work
- Projections are not predictions

Projected ERS Pension Plan Membership As of December 31st



Projected Firefighter Pension Plan Membership As of December 31st



Retirement System Funding Percentages As of December 31, 2016

Funding Percent		Funding Percent	
<u>Before Transfer from UIR</u>		<u>After Transfer from UIR</u>	
Fire Pension	85.7%	Fire Pension	88.8%
ERS Pension	87.2%	ERS Pension	92.1%
Fire Health	316.1%	Fire Health	100.0%
ERS Health	658.8%	ERS Health	100.0%

If all actuarial assumptions are met, what are the projected City contributions and pension plan assets during the projection period?

ERS Pension Plan Projection (7.5%)

Year		Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Investment Earnings, 7.50%	Projected Ending Plan Net Position
No.	Calendar	(a)	(b)	(c)	(d)	(a)+(b)-(c)-(d)
1	2017	\$ 385,457,253	\$ 14,798,706	\$ 21,256,715	\$ 28,671,497	\$ 407,670,740
2	2018	407,670,740	13,782,071	22,524,984	30,253,373	429,181,201
3	2019	429,181,201	13,399,361	24,011,746	31,797,820	450,366,637
4	2020	450,366,637	13,728,426	25,589,454	33,340,750	471,846,359
5	2021	471,846,359	14,090,828	27,316,852	34,901,467	493,521,803
6	2022	493,521,803	13,797,604	29,049,485	36,452,529	514,722,452
7	2023	514,722,452	13,598,435	30,727,064	37,973,472	535,567,295
8	2024	535,567,295	13,372,620	32,446,205	39,465,218	555,958,928
9	2025	555,958,928	13,117,755	34,241,780	40,919,089	575,753,992
10	2026	575,753,992	12,832,252	36,119,628	42,324,060	594,790,675
11	2027	594,790,675	12,543,275	37,960,671	43,673,380	613,046,658
12	2028	613,046,658	12,236,484	39,864,813	44,961,167	630,379,497
13	2029	630,379,497	11,855,696	42,018,084	46,167,821	646,384,929
15	2031	660,941,484	11,086,812	46,379,214	48,271,072	673,920,154
17	2033	685,267,397	10,323,662	50,685,681	49,908,842	694,814,219
19	2035	702,595,588	9,551,986	54,544,145	51,037,965	708,641,393
21	2037	712,753,490	8,829,875	58,368,982	51,632,379	714,846,763
23	2039	714,891,384	2,227,912	61,766,663	51,424,514	706,777,148
25	2041	696,103,525	1,555,326	64,401,743	49,893,629	683,150,737

End of year values shown above may differ slightly from formula results due to rounding
22 year amortization period beginning in 2017

Firefighter Pension Plan Projection (7.5%)

No.	Year	Projected				
		Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Investment Earnings at 7.50%	Projected Ending Plan Net Position
	Calendar	(a)	(b)	(c)	(d)	(a)+(b)-(c)- (d)
1	2017	\$ 137,822,572	\$ 5,833,709	\$ 7,738,361	\$ 10,266,560	\$ 146,184,480
2	2018	146,184,480	5,439,322	8,281,299	10,859,189	154,201,692
3	2019	154,201,692	5,282,179	8,749,355	11,437,458	162,171,974
4	2020	162,171,974	5,461,330	9,194,486	12,025,436	170,464,254
5	2021	170,464,254	5,618,437	9,776,821	12,631,699	178,937,569
6	2022	178,937,569	5,510,311	10,497,299	13,236,686	187,187,266
7	2023	187,187,266	5,415,806	11,207,965	13,825,766	195,220,873
8	2024	195,220,873	5,307,930	11,883,952	14,399,423	203,044,274
9	2025	203,044,274	5,187,507	12,558,439	14,956,908	210,630,250
10	2026	210,630,250	5,059,528	13,238,958	15,496,085	217,946,905
11	2027	217,946,905	4,945,390	13,826,933	16,018,981	225,084,343
12	2028	225,084,343	4,834,695	14,459,551	16,526,919	231,986,406
13	2029	231,986,406	4,648,586	15,399,568	17,003,107	238,238,531
15	2031	243,692,600	4,169,546	17,416,699	17,789,157	248,234,605
17	2033	251,584,040	3,613,927	19,725,564	18,275,539	253,747,941
19	2035	254,952,227	3,202,086	21,334,290	18,453,752	255,273,774
21	2037	254,699,030	2,872,028	22,746,136	18,370,621	253,195,543
23	2039	250,773,964	248,357	23,778,345	17,941,625	245,185,601
25	2041	238,875,414	95,492	24,032,933	17,034,230	231,972,203

End of year values shown above may differ slightly from formula amounts due to rounding
22 year amortization period beginning in 2017

7.5% Pension Plan Projections - Observations

- City Contributions to the pension plans are expected to decrease over time
 - Current ERS and Firefighter employee members will leave City employment
 - New City employees hired after June 2013 join SDRS
 - Contributions to SDRS will increase over time
- The pension benefit payouts are expected to increase
- Projections are based on assumptions, which may or may not occur

What level of investment loss can be covered by the Unallocated Income Reserve?

ERS Pension Plan Asset Projection

	Return for the Year	Year	Beginning of Year (a)	Total Projected Contributions (b)	Projected Benefit Payments (c)	Transfer from UIR (d)	Investment Earnings (e)	End of Year a + b- c+ d+ e
2017	7.50%	1	\$ 385,457,253	\$ 14,798,706	\$ 21,256,715	\$ -	\$ 28,671,497	\$ 407,670,740
2018	7.50%	2	407,670,740	13,782,071	22,524,984	-	30,253,373	429,181,201
2019	7.50%	3	429,181,201	13,399,361	24,011,746	-	31,797,820	450,366,637
2020	7.50%	4	450,366,637	13,728,426	25,589,454	-	33,340,750	471,846,359
2021	7.50%	5	471,846,359	14,090,828	27,316,852	-	34,901,467	493,521,803
2022	0.95%	6	493,521,803	13,797,604	29,049,485	-	4,616,182	482,886,104
2023	7.50%	7	482,886,104	13,598,435	30,727,064	-	35,585,746	501,343,221
2024	7.50%	8	501,343,221	13,372,620	32,446,205	747,891	36,925,952	519,943,479
2025	7.50%	9	519,943,479	13,117,755	34,241,780	1,583,882	38,276,252	538,679,588
2026	7.50%	10	538,679,588	12,832,252	36,119,628	2,522,754	39,636,373	557,551,338
2027	7.50%	11	557,551,338	12,543,275	37,960,671	3,583,000	41,012,363	576,729,304
2029	7.50%	13	596,302,832	11,855,696	42,018,084	4,788,180	43,788,382	614,717,005
2031	7.50%	15	631,862,956	11,086,812	46,379,214	4,788,180	46,266,493	647,625,227
2033	7.50%	17	661,964,841	10,323,662	50,685,681	4,788,180	48,337,461	674,728,462
2035	7.50%	19	685,967,889	9,551,986	54,544,145	4,788,180	49,967,198	695,731,107
2037	7.50%	21	703,839,424	8,829,875	58,368,982	4,788,180	51,140,135	710,228,632
2039	7.50%	23	714,891,384	2,227,912	61,766,663	-	51,424,514	706,777,148
2041	7.50%	25	696,103,525	1,555,326	64,401,743	-	49,893,629	683,150,737

End of year asset values shown may differ slightly from formula results due to rounding
22 year amortization period beginning in 2017

ERS Pension Plan Asset Projection

Unallocated Income Reserve (Market Value)

	Return for the Year	Year	Beginning of Year (a)	Transfer Out (b)	Investment Earnings (c)	End of Year (a) - (b) +(c)
2017	7.50%	1	\$ 21,965,095	\$ -	\$ 1,647,382	\$ 23,612,477
2018	7.50%	2	23,612,477	-	1,770,936	25,383,413
2019	7.50%	3	25,383,413	-	1,903,756	27,287,169
2020	7.50%	4	27,287,169	-	2,046,538	29,333,707
2021	7.50%	5	29,333,707	-	2,200,028	31,533,735
2022	0.95%	6	31,533,735	-	299,570	31,833,305
2023	7.50%	7	31,833,305	-	2,387,498	34,220,803
2024	7.50%	8	34,220,803	747,891	2,539,021	36,011,933
2025	7.50%	9	36,011,933	1,583,882	2,642,573	37,070,624
2026	7.50%	10	37,070,624	2,522,754	2,687,404	37,235,274
2027	7.50%	11	37,235,274	3,583,000	2,660,712	36,312,986
2028	7.50%	12	36,312,986	4,788,180	2,547,163	34,071,970
2029	7.50%	13	34,071,970	4,788,180	2,379,087	31,662,877
2030	7.50%	14	31,662,877	4,788,180	2,198,405	29,073,102
2031	7.50%	15	29,073,102	4,788,180	2,004,172	26,289,094
2032	7.50%	16	26,289,094	4,788,180	1,795,371	23,296,286
2033	7.50%	17	23,296,286	4,788,180	1,570,911	20,079,016
2034	7.50%	18	20,079,016	4,788,180	1,329,616	16,620,452
2035	7.50%	19	16,620,452	4,788,180	1,070,223	12,902,496
2036	7.50%	20	12,902,496	4,788,180	791,376	8,905,692
2037	7.50%	21	8,905,692	4,788,180	491,616	4,609,128
2038	7.50%	22	4,609,128	4,778,846	169,718	0
2039	7.50%	23	0	-	0	0
2040	7.50%	24	0	-	0	0
2041	7.50%	25	0	-	0	0

Firefighter Pension Plan Asset Projection

	Return for the Year	Year	Beginning of Year	Total Projected Contributions	Projected Benefit Payments	Transfer from UIR	Investment Earnings	End of Year
			(a)	(b)	(c)	(d)	(e)	a+ b- c+ d+ e
2017	7.50%	1	\$ 137,822,572	\$ 5,833,709	\$ 7,738,361	\$ -	\$ 10,266,560	\$ 146,184,480
2018	7.50%	2	146,184,480	5,439,322	8,281,299	-	10,859,189	154,201,692
2019	7.50%	3	154,201,692	5,282,179	8,749,355	-	11,437,458	162,171,974
2020	7.50%	4	162,171,974	5,461,330	9,194,486	-	12,025,436	170,464,254
2021	7.50%	5	170,464,254	5,618,437	9,776,821	-	12,631,699	178,937,569
2022	3.34%	6	178,937,569	5,510,311	10,497,299	-	5,893,916	179,844,496
2023	7.50%	7	179,844,496	5,415,806	11,207,965	-	13,275,058	187,327,395
2024	7.50%	8	187,327,395	5,307,930	11,883,952	172,494	13,813,764	194,737,632
2025	7.50%	9	194,737,632	5,187,507	12,558,439	365,308	14,347,361	202,079,369
2026	7.50%	10	202,079,369	5,059,528	13,238,958	581,851	14,876,194	209,357,983
2027	7.50%	11	209,357,983	4,945,390	13,826,933	826,387	15,405,241	216,708,068
2028	7.50%	12	216,708,068	4,834,695	14,459,551	1,104,351	15,939,363	224,126,926
2029	7.50%	13	224,126,926	4,648,586	15,399,568	1,104,351	16,454,311	230,934,606
2031	7.50%	15	236,985,897	4,169,546	17,416,699	1,104,351	17,326,819	242,169,914
2033	7.50%	17	246,209,512	3,613,927	19,725,564	1,104,351	17,913,114	249,115,340
2035	7.50%	19	251,117,196	3,202,086	21,334,290	1,104,351	18,206,789	252,296,132
2037	7.50%	21	252,643,080	2,872,028	22,746,136	1,104,351	18,257,090	252,130,412
2039	7.50%	23	250,773,964	248,357	23,778,345	-	17,941,625	245,185,601
2041	7.50%	25	238,875,414	95,492	24,032,933	-	17,034,230	231,972,203

End of year asset values shown may differ slightly from formula results due to rounding

Firefighter Pension Plan Asset Projection

Unallocated Income Reserve (Market Value)

	Return for the Year	Year	Beginning of Year (a)	Transfer Out (b)	Investment Earnings (c)	End of Year (a) - (b) +(c)
2017	7.50%	1	\$ 4,947,396	\$ -	\$ 371,055	\$ 5,318,451
2018	7.50%	2	5,318,451	-	398,884	5,717,335
2019	7.50%	3	5,717,335	-	428,800	6,146,135
2020	7.50%	4	6,146,135	-	460,960	6,607,095
2021	7.50%	5	6,607,095	-	495,532	7,102,627
2022	3.34%	6	7,102,627	-	237,228	7,339,855
2023	7.50%	7	7,339,855	-	550,489	7,890,344
2024	7.50%	8	7,890,344	172,494	585,424	8,303,273
2025	7.50%	9	8,303,273	365,308	609,294	8,547,259
2026	7.50%	10	8,547,259	581,851	619,619	8,585,028
2027	7.50%	11	8,585,028	826,387	613,448	8,372,089
2028	7.50%	12	8,372,089	1,104,351	587,242	7,854,980
2029	7.50%	13	7,854,980	1,104,351	548,459	7,299,088
2030	7.50%	14	7,299,088	1,104,351	506,767	6,701,504
2031	7.50%	15	6,701,504	1,104,351	461,948	6,059,101
2032	7.50%	16	6,059,101	1,104,351	413,768	5,368,518
2033	7.50%	17	5,368,518	1,104,351	361,974	4,626,141
2034	7.50%	18	4,626,141	1,104,351	306,296	3,828,086
2035	7.50%	19	3,828,086	1,104,351	246,442	2,970,177
2036	7.50%	20	2,970,177	1,104,351	182,099	2,047,925
2037	7.50%	21	2,047,925	1,104,351	112,930	1,056,503
2038	7.50%	22	1,056,503	1,095,406	38,903	0
2039	7.50%	23	0	-	0	0
2040	7.50%	24	0	-	0	0
2041	7.50%	25	0	-	0	0

Excludes \$804,298 in assets held in the Unallocated Income Reserve (UIR)
22 year amortization period beginning in 2017

Pension Plan Projections-Observations

- The magnitude of the investment loss and the ability of the UIR to cover it depend upon
 - When the investment loss occurs
 - For example in the Fire plan the UIR is insufficient to cover a 3.34% return in 2019 and is more than sufficient to cover a 3.34% return in the year 2030
 - The actual investment experience of the plan
 - The 5th percentile return for 1 year was -12.5%
 - The use of UIR assets for other purposes

ERS Pension Plan Projection (6.5%)

Year		Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Investment Earnings at 6.50%	Projected Ending Plan Net Position
No.	Calendar	(a)	(b)	(c)	(d)	(a)+(b)-(c)+(d)
1	2017	\$ 385,457,253	\$ 14,798,706	\$ 21,256,715	\$ 24,848,140	\$ 403,847,384
2	2018	403,847,384	13,782,071	22,524,984	25,970,408	421,074,880
3	2019	421,074,880	21,779,841	24,011,746	27,298,472	446,141,447
4	2020	446,141,447	22,016,322	25,589,454	28,884,895	471,453,211
5	2021	471,453,211	22,266,684	27,316,852	30,482,912	496,885,956
6	2022	496,885,956	21,919,531	29,049,485	32,069,511	521,825,513
7	2023	521,825,513	21,656,231	30,727,064	33,628,497	546,383,178
8	2024	546,383,178	21,361,588	32,446,205	35,160,328	570,458,889
9	2025	570,458,889	21,024,996	34,241,780	36,657,044	593,899,149
10	2026	593,899,149	20,650,955	36,119,628	38,108,627	616,539,102
11	2027	616,539,102	20,272,232	37,960,671	39,509,217	638,359,881
12	2028	638,359,881	19,867,189	39,864,813	40,853,701	659,215,957
13	2029	659,215,957	19,363,989	42,018,084	42,124,370	678,686,232
15	2031	696,650,394	18,343,676	46,379,214	44,385,464	713,000,320
17	2033	727,695,006	17,324,321	50,685,681	46,233,000	740,566,645
19	2035	751,666,218	16,290,627	54,544,145	47,634,636	761,047,336
21	2037	768,534,016	15,319,561	58,368,982	48,577,630	774,062,226
23	2039	777,620,990	3,039,348	61,766,663	48,666,773	767,560,449
25	2041	754,773,068	2,128,269	64,401,743	47,068,222	739,567,816

End of year asset values shown may differ slightly from formula results due to rounding

Firefighter Pension Plan Projection (6.5%)

No.	Year	Projected			Projected Benefit Payments	Projected Investment Earnings at 6.50%	Projected Ending Plan Net Position
		Beginning Plan Position	Net Projected Contributions	Total			
	Calendar	(a)	(b)	(c)	(d)	(a)+(b)-(c)+(d)	
1	2017	\$ 137,822,572	\$ 5,833,709	\$ 7,738,361	\$ 8,897,540	\$ 144,815,461	
2	2018	144,815,461	5,439,322	8,281,299	9,322,095	151,295,579	
3	2019	151,295,579	8,323,083	8,749,355	9,820,577	160,689,883	
4	2020	160,689,883	8,492,571	9,194,486	10,422,389	170,410,358	
5	2021	170,410,358	8,624,445	9,776,821	11,039,811	180,297,793	
6	2022	180,297,793	8,494,039	10,497,299	11,655,275	189,949,808	
7	2023	189,949,808	8,371,110	11,207,965	12,255,991	199,368,944	
8	2024	199,368,944	8,231,508	11,883,952	12,842,146	208,558,646	
9	2025	208,558,646	8,076,726	12,558,439	13,412,949	217,489,882	
10	2026	217,489,882	7,911,757	13,238,958	13,966,434	226,129,114	
11	2027	226,129,114	7,765,052	13,826,933	14,504,483	234,571,716	
12	2028	234,571,716	7,620,704	14,459,551	15,028,398	242,761,268	
13	2029	242,761,268	7,374,904	15,399,568	15,522,786	250,259,391	
15	2031	256,909,227	6,739,565	17,416,699	16,357,556	262,589,648	
17	2033	267,011,741	5,996,951	19,725,564	16,916,607	270,199,735	
19	2035	272,400,692	5,444,981	21,334,290	17,197,772	273,709,154	
21	2037	274,127,904	5,001,013	22,746,136	17,250,676	273,633,457	
23	2039	272,248,638	336,982	23,778,345	16,946,310	265,753,585	
25	2041	258,503,418	129,825	24,032,933	16,038,101	250,638,411	

End of year asset values shown may differ slightly from formula results due to rounding

6.5% Pension Plan Projections Observations

- Contribution requirements increase as the investment return assumption decreases
- Investment income decreases
- The UIR is insufficient to cover the entire increase in contributions

Disclosures

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- All data assumptions, plan provisions and actuarial methods are the same as disclosed on our 2016 actuarial valuation reports
- The actuaries responsible for this study are Louise M. Gates ASA,MAAA and James D. Anderson FSA,EA,MAAA who Members of the American Academy of Actuaries who meet qualification standards of the Academy to render the opinions contained herein.