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January 22, 2018

Ms. Ronda Stegmann
Legislative and Policy Coordinator
Missouri State Employees' Retirement System
907 Wildwood Drive
Jefferson City, MO 65109

Re: Senate Bill 747

Dear Ronda:

Senate Bill 747 (SB 747) modifies the retirement benefits provided to members of the Missouri General Assembly (Legislators) and any statewide elected officials who first serve in those positions on or after January 1, 2019. Currently, retirement benefits for these members would be provided through the Missouri State Employees' Retirement System (MOSERS). SB 747 provides that retirement benefits for these members will be provided instead through a defined contribution plan with equal contributions by the employer and the member of 4.0% of the member's pay each.

This cost study presents the impact of SB 747 over time on the estimated employer contribution rates and amounts, as well as the funded status of MOSERS. No statement in this letter is intended to be interpreted as a recommendation in favor of the changes or in opposition to them.

Our understanding is that the State is currently paying the appropriate employer contribution rate, i.e. the full actuarial employer contribution rate. If the actuarial employer contributions, as determined each year in the actuarial valuation, are made each year (subject to normal year-to-year experience fluctuations), then the System will be able to pay all promised benefits, when due.

Data

The total active group size, including the subset of actives that are Legislators and Elected Officials, is assumed to remain constant in the baseline scenario. For purposes of the cost study, the active group of Legislators and Elected Officials covered by the defined benefit plan is assumed to decline based on the assumptions disclosed in Appendix A of this letter. The active group of Legislators and Elected Officials who are covered by the proposed defined contribution plan is assumed to increase by the same number of members as the defined benefit membership of Legislators and Elected Officials declines.

A brief summary of the data used in this cost study follows:

			Averages		
Group	Number	Payroll	Salary	Age	Service
Elected Officials	6	$ 659,985	$109,998	44.0 years	1.3 years
Legislators	193	6,941,688	35,967	51.7	4.8
Total MOSERS	48,910	$1,941,969,786	$ 39,705	45.4 years	11.0 years

Cost Impact

Under SB 747, members of the General Assembly (Legislators) or Elected Officials hired on or after January 1, 2019, who have not previously been employed in a position covered by MOSERS, will not participate in the defined benefit plan. Instead, they will participate in a defined contribution plan, in which both the member and the employer each contribute 4.0% of the members' payroll.

Eliminating coverage in the defined benefit plan for new hires has no effect on the current benefit obligation for the active members currently covered under the Missouri State Employees' Retirement System (MSEP plan, MSEP 2000 plan, and MSEP 2011 plan). As new members of the General Assembly or Elected Officials take office on or after January 1, 2019, there would be an associated reduction in employer contributions.

Attached to this letter are two exhibits that provide a comparison of the key valuation results for the baseline scenario (no change in current provisions) and the proposed changes in SB 747. Exhibit 1 shows a 14-year projection of the estimated contribution rates and dollar amounts under the baseline scenario and SB 747. The impact is minimal, mainly because the group potentially affected by the legislation (Legislators and Elected Officials) is very small, representing only 0.4% of the total active membership.

Exhibit 2 shows a 14-year projection of key funding measures including actuarial accrued liabilities, actuarial value of assets and market value of assets along with the funded ratios and unfunded actuarial accrued liabilities for the baseline scenario and SB 747.

The projections that comprise this study assume that all actuarial assumptions, including the 7.50% investment return assumption, are met each year in the future. The cost projections are sensitive to the assumptions used, particularly the investment return assumption. To the extent the 7.50% investment return assumption is not met in the future or the assumption is changed, the cost projections in this study are expected to change. Further analysis can be provided upon request if it is deemed to be necessary or helpful.

Disclaimers, Caveats, and Limitations

The numerical tables that comprise this cost study are based primarily upon the June 30, 2017 valuation results, the actuarial assumptions and methods used in that report, and a projection model prepared by the System's actuary, Cavanaugh Macdonald Consulting, LLC. Significant items are noted below with additional detail provided in Appendix A. We believe the assumptions and methods are individually, and in aggregate, consistent and reasonable (taking into account the experience of each Plan and reasonable expectations).

- The investment return in all future years is assumed to be 7.50% on a market value basis, unless otherwise indicated.
- All demographic assumptions regarding mortality, disability, retirement, salary increases, and termination of employment that are used in the valuation are assumed to be met in the future. Term limits may result in turnover in the short term that is different than the assumption, which is a long-term assumption.
- The same demographic assumptions used for the Legislators and Elected Officials in the defined benefit plan are also used for future members in the defined contribution plan. Given the nature of their employment, the change in the benefit structure is not expected to significantly modify the termination and retirement rates.
- The number of total active members in the future is assumed to remain level (neither growth nor decline in the active membership count) in the baseline scenario (current provisions). In the projections under SB 747, the number of active members covered by MOSERS is declining as Legislators and Elected Officials with a membership date after January 1, 2019 are covered by a different retirement plan. As active members leave covered employment, they are assumed to be replaced by new employees who have a similar demographic profile as recent new hires. To the extent the actual demographics of new hires are different than assumed, it will also impact the cost savings shown in this study.
- The funding methods, including the entry age normal cost method, the asset smoothing method, and the amortization method and period, are consistent between scenarios.
- We relied upon the membership data provided by MOSERS for the actuarial valuation. The numerical results depend on the integrity of this information. If there are material inaccuracies in the data, the results presented herein may be different and the projections may need to be revised.

Models are designed to identify anticipated trends and to compare various scenarios rather than predicting some future state of events. The projections are based on the System's estimated financial status on June 30, 2017, and project future events using one set of assumptions out of a range of many possibilities. A different set of assumptions would lead to different results. The projections do not predict the System's financial condition or its ability to pay benefits in the future and do not provide any guarantee of future financial soundness of the System. Over time, a defined benefit plan's total cost will depend on a number of factors, including the amount of benefits paid, the number of people paid benefits, the duration of the benefit payments, plan expenses, and the amount of earnings on assets invested to pay benefits. These amounts and other variables are uncertain and unknowable at the time the projections were prepared. Because not all of the assumptions will unfold exactly as expected, actual results will differ from the projections. To the extent that actual experience deviates significantly from the assumptions, results could be significantly better or significantly worse than indicated in this study.

Please note that in the event that more than one plan change is considered, it is very important to remember that the results of separate actuarial studies cannot generally be added together to produce an accurate estimate of the combined effect of all of the changes. The total cost impact can be considerably different than the sum of the parts due to the interaction of various plan provisions and assumptions used in the studies.

We, Patrice A. Beckham F.S.A. and Bryan K. Hoge, F.S.A., are consulting actuaries with Cavanaugh Macdonald Consulting, LLC. We are also members of the American Academy of Actuaries and Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. We are available to answer any questions on the material contained in this study or to provide explanations or further details upon request.

If you have questions or need additional analysis, please let us know.

Sincerely,

Patrice Beckham

Patrice A. Beckham, FSA, FCA, EA, MAAA
Principal and Consulting Actuary

Bryan K. Hoge, FSA, FCA, EA, MAAA
Senior Actuary

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

Exhibit 1

ACTUARIAL COST IMPACT STATEMENT
COMPARISON OF BASELINE (NO CHANGE) VERSUS SENATE BILL 747
Investment Return Assumption: 7.50%

	Rates Set in	Estimated Payroll			Baseline - Current Provisions		SB 747: New General Assembly and Elected Officials to DC Plan				Change
Fiscal	6/30 Val				Employer	Employer	DB Employer	DB Employer	DC Employer	Total Employer	Employer
Year	in Year	DB Plan	DC Plan	Total	Contribution Rate	Contribution Dollars	Contribution Rate	Contribution Dollars	Contribution Dollars	Contribution Dollars	Contribution Dollars
2018	2016	2,030,854,231	-	2,030,854,231	19.45%	395,001,148	19.45%	395,001,148	-	395,001,148	-
2019	2017	2,040,340,229	558,828	2,040,899,057	20.21%	412,465,699	20.21%	412,352,760	22,353	412,375,113	(90,586)
2020	2018	2,062,065,552	2,341,486	2,064,407,038	20.83%	430,015,986	20.83%	429,528,255	93,659	429,621,914	(394,072)
2021	2019	2,091,173,142	3,697,517	2,094,870,659	21.37%	447,673,860	21.36%	446,674,583	147,901	446,822,484	(851,376)
2022	2020	2,120,498,159	4,927,148	2,125,425,307	21.80%	463,342,717	21.79%	462,056,549	197,086	462,253,635	(1,089,082)
2023	2021	2,153,491,416	6,077,038	2,159,568,454	22.16%	478,560,369	22.15%	476,998,349	243,082	477,241,431	(1,318,938)
2024	2022	2,187,980,871	7,143,626	2,195,124,497	22.46%	493,024,962	22.46%	491,420,504	285,745	491,706,249	(1,318,713)
2025	2023	2,228,043,242	8,144,579	2,236,187,821	22.74%	508,509,110	22.74%	506,657,033	325,783	506,982,816	(1,526,294)
2026	2024	2,273,877,480	9,152,757	2,283,030,237	22.99%	524,868,651	22.98%	522,537,045	366,110	522,903,155	(1,965,496)
2027	2025	2,315,808,996	9,965,981	2,325,774,977	23.15%	538,416,907	23.15%	536,109,783	398,639	536,508,422	(1,908,485)
2028	2026	2,364,662,749	10,618,697	2,375,281,446	23.31%	553,678,105	23.31%	551,202,887	424,748	551,627,635	(2,050,470)
2029	2027	2,416,202,210	11,189,929	2,427,392,139	23.44%	568,980,717	23.43%	566,116,178	447,597	566,563,775	(2,416,942)
2030	2028	2,473,070,049	11,704,546	2,484,774,595	23.51%	584,170,507	23.51%	581,418,768	468,182	581,886,950	(2,283,557)
2031	2029	2,534,189,920	12,187,275	2,546,377,195	23.55%	599,671,829	23.56%	597,055,145	487,491	597,542,636	(2,129,193)
						6,998,380,567		6,975,128,987	3,908,376	6,979,037,363	(19,343,204)

	Rates Set in	Baseline - Current Provisions					SB 747 - DB Plan Only					Change
Fiscal	6/30 Val	Contribution Rates					Contribution Rates					Employer
Year	in Year	Normal Cost	UAAL	Total	Member	Employer	Normal Cost	UAAL	Total	Member	Employer	Rate
2018	2016	8.60%	12.26%	20.86%	1.41%	19.45%	8.60%	12.26%	20.86%	1.41%	19.45%	0.00%
2019	2017	8.39%	13.16%	21.55%	1.34%	20.21%	8.39%	13.16%	21.55%	1.34%	20.21%	0.00%
2020	2018	8.21%	14.16%	22.37%	1.54%	20.83%	8.21%	14.17%	22.38%	1.55%	20.83%	0.00%
2021	2019	8.09%	15.01%	23.10%	1.73%	21.37%	8.07%	15.02%	23.09%	1.73%	21.36%	(0.01%)
2022	2020	7.96%	15.74%	23.70%	1.90%	21.80%	7.93%	15.76%	23.69%	1.90%	21.79%	(0.01%)
2023	2021	7.82%	16.41%	24.23%	2.07%	22.16%	7.79%	16.44%	24.23%	2.08%	22.15%	(0.01%)
2024	2022	7.70%	17.01%	24.71%	2.25%	22.46%	7.66%	17.05%	24.71%	2.25%	22.46%	0.00%
2025	2023	7.59%	17.57%	25.16%	2.42%	22.74%	7.54%	17.62%	25.16%	2.42%	22.74%	0.00%
2026	2024	7.52%	18.04%	25.56%	2.57%	22.99%	7.46%	18.10%	25.56%	2.58%	22.98%	(0.01%)
2027	2025	7.43%	18.43%	25.86%	2.71%	23.15%	7.36%	18.51%	25.87%	2.72%	23.15%	0.00%
2028	2026	7.32%	18.84%	26.16%	2.85%	23.31%	7.25%	18.92%	26.17%	2.86%	23.31%	0.00%
2029	2027	7.25%	19.17%	26.42%	2.98%	23.44%	7.17%	19.25%	26.42%	2.99%	23.43%	(0.01%)
2030	2028	7.16%	19.46%	26.62%	3.11%	23.51%	7.08%	19.55%	26.63%	3.12%	23.51%	0.00%
2031	2029	7.08%	19.69%	26.77%	3.22%	23.55%	7.00%	19.79%	26.79%	3.23%	23.56%	0.01%

Projections are based on the June 30, 2017 actuarial valuation and assume that all assumptions are met in the future, including the 7.50% assumed rate of return. To the extent actual experience differs from that assumed, the actual valuation results and employer contributions in future years will also differ from the projections shown here.

The Baseline scenario is based on the plan provisions used in the June 30, 2017 valuation. The alternate scenario is based on Senate Bill 747 (SB 747) that would place newly elected members of the General Assembly and statewide elected officials in a defined contribution plan with an employer contribution rate of 4%, beginning January 1, 2019.

Please see the June 30, 2017 actuarial valuation report or Appendix A to this letter for details on the actuarial methods and assumptions used in these projections. Also, note that the one-year lag between the valuation date and the effective date of the contribution rate is reflected in this exhibit.

This exhibit is an attachment to a letter that contains important information and explanations regarding the numbers shown. Therefore, it should only be considered with the accompanying letter from Cavanaugh Macdonald dated January 5, 2018.

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

Exhibit 2

ACTUARIAL COST IMPACT STATEMENT
COMPARISON OF BASELINE (NO CHANGE) VERSUS SENATE BILL 747
Investment Return Assumption: 7.50%

	Baseline - Current Provisions							SB 747: New General Assembly and Elected Officials to DC Plan						
Valuation Year (6/30)	Actuarial Liability	Actuarial Value of Assets	UAAL (AVA)	Funded Ratio (AVA)	Market Value of Assets	UAAL (MVA)	Funded Ratio (MVA)	Actuarial Liability	Actuarial Value of Assets	UAAL (AVA)	Funded Ratio (AVA)	Market Value of Assets	UAAL (MVA)	Funded Ratio (MVA)
2017	13,152,273,895	8,872,381,848	4,279,892,047	67.5%	7,945,358,298	5,206,915,597	60.4%	13,152,273,895	8,872,381,848	4,279,892,047	67.5%	7,945,358,298	5,206,915,597	60.4%
2018	13,449,162,093	8,907,741,144	4,541,420,949	66.2%	8,110,726,097	5,338,435,995	60.3%	13,449,162,093	8,907,741,144	4,541,420,949	66.2%	8,110,726,097	5,338,435,995	60.3%
2019	13,728,438,149	8,955,227,457	4,773,210,692	65.2%	8,270,029,383	5,458,408,766	60.2%	13,728,213,345	8,955,106,081	4,773,107,264	65.2%	8,269,908,070	5,458,305,275	60.2%
2020	13,988,752,551	9,015,598,716	4,973,153,835	64.4%	8,426,570,933	5,562,181,618	60.2%	13,988,044,175	9,015,281,802	4,972,762,373	64.4%	8,426,254,170	5,561,790,005	60.2%
2021	14,217,083,293	9,074,057,767	5,143,025,526	63.8%	8,567,750,610	5,649,332,683	60.3%	14,215,590,811	9,072,775,112	5,142,815,699	63.8%	8,566,468,577	5,649,122,234	60.3%
2022	14,434,477,234	9,148,775,555	5,285,701,679	63.4%	8,713,611,228	5,720,866,007	60.4%	14,431,907,359	9,146,147,604	5,285,759,755	63.4%	8,710,984,464	5,720,922,894	60.4%
2023	14,628,779,679	9,224,215,519	5,404,564,160	63.1%	8,850,244,574	5,778,535,105	60.5%	14,624,824,067	9,220,056,540	5,404,767,527	63.0%	8,846,087,313	5,778,736,754	60.5%
2024	14,801,434,476	9,303,589,785	5,497,844,691	62.9%	8,982,252,928	5,819,181,549	60.7%	14,795,775,091	9,297,491,523	5,498,283,568	62.8%	8,976,156,995	5,819,618,096	60.7%
2025	14,948,471,471	9,383,152,726	5,565,318,745	62.8%	9,107,090,114	5,841,381,357	60.9%	14,940,788,723	9,374,690,993	5,566,097,730	62.7%	9,098,631,381	5,842,157,342	60.9%
2026	15,054,092,365	9,447,383,179	5,606,709,186	62.8%	9,210,272,643	5,843,819,722	61.2%	15,044,067,695	9,436,110,091	5,607,957,604	62.7%	9,199,003,274	5,845,064,421	61.1%
2027	15,139,608,878	9,515,987,108	5,623,621,770	62.9%	9,312,379,968	5,827,228,910	61.5%	15,126,948,952	9,501,729,546	5,625,219,406	62.8%	9,298,126,723	5,828,822,229	61.5%
2028	15,204,517,051	9,589,298,767	5,615,218,284	63.1%	9,414,508,543	5,790,008,508	61.9%	15,188,949,235	9,571,687,587	5,617,261,648	63.0%	9,396,902,269	5,792,046,966	61.9%
2029	15,248,100,747	9,668,291,447	5,579,809,300	63.4%	9,518,286,914	5,729,813,833	62.4%	15,229,391,893	9,646,750,996	5,582,640,897	63.3%	9,496,752,045	5,732,639,848	62.4%
2030	15,268,878,306	9,751,877,600	5,517,000,706	63.9%	9,623,192,243	5,645,686,063	63.0%	15,246,805,624	9,726,329,356	5,520,476,268	63.8%	9,597,650,050	5,649,155,574	62.9%

Projections are based on the June 30, 2017 actuarial valuation and assume that all assumptions are met in the future, including the 7.50% assumed rate of return. To the extent actual experience differs from that assumed, the actual valuation results and employer contributions in future years will also differ from the projections shown here.

The Baseline scenario is based on the plan provisions used in the June 30, 2017 valuation. The alternate scenario is based on Senate Bill 747 (SB 747) that would place newly elected members of the General Assembly and statewide elected officials in a defined contribution plan with an employer contribution rate of 4%, beginning January 1, 2019.

Please see the June 30, 2017 actuarial valuation report or Appendix A to this letter for details on the actuarial methods and assumptions used in these projections. Also, note that the one-year lag between the valuation date and the effective date of the contribution rate is reflected in this exhibit.

This exhibit is an attachment to a letter that contains important information and explanations regarding the numbers shown. Therefore, it should only be considered with the accompanying letter from Cavanaugh Macdonald dated January 5, 2018.