January 28, 2015

Mrs. Maria Walden
Director of Legislation and Policy
PSRS and PEERS of Missouri
3210 West Truman Blvd.
Jefferson City, MO 65109

Re: Public School Retirement System of Missouri ("PSRS") – Fiscal Impact of Proposed Benefit Change Pursuant to Senate Bill No. 219 and House Bill No. 478

Dear Maria:

This letter has been prepared pursuant to the engagement letter dated June 9, 2014, between PricewaterhouseCoopers LLP ("PwC") and the Public School and Public Education Retirement Systems of Missouri ("PSRS and PEERS of Missouri"). As requested, we have estimated the fiscal impact as of June 30, 2014 of the following proposed benefit change to the Public School Retirement System ("PSRS") included in both Senate Bill No. 219 ("SB 219") and House Bill No. 478 ("HB 478"):

- **Permanent extension of the 2.55% benefit accrual factor that is applied to all years of service for members who retire with 31 or more years of service.**
  - **Assumed to be effective July 1, 2015 under SB 219**
  - **Assumed to be effective August 28, 2015 under HB 478**

This is a change from the current plan provisions in which the 2.55% benefit formula is no longer available after July 1, 2014.

SB 219 contains an emergency provision which would result in the change being effective immediately upon the passage and approval of SB 219. Pursuant to discussions with PSRS and PEERS of Missouri, the change was assumed to become effective on July 1, 2015 for purposes of this analysis such that qualifying members who commence a benefit on or after July 1, 2015 would receive the enhanced benefit. As a result, the enhanced benefit would not be available only to members who retire after July 1, 2014 and before July 1, 2015. It is anticipated that this would impact very few, if any, retiring members since a large portion of PSRS member retirements occur on July 1 each year. Therefore, the fiscal impact of SB 219 is estimated to be the same as the fiscal analysis previously delivered on December 3, 2014, in which we assumed the 2.55% benefit would be permanently extended immediately upon its expiry resulting in no window of time in which it was not available.

HB 478 does not contain an emergency provision accelerating the effective date of the change. Pursuant to discussions with PSRS and PEERS of Missouri, it is anticipated that the change would become effective on August 28, 2015 such that qualifying members who commence a benefit on or after August 28, 2015 would receive the enhanced benefit. As a result, the enhanced benefit would not be available to members who retire after July 1, 2014 and before August 28, 2015. Since this would include the group of members retiring on July 1, 2015, it is anticipated that the fiscal impact of HB 478 would be slightly less than SB 219. However, we expect the impact of HB 478 to be within 1 basis point (0.01%) of the impact of SB 219 both in terms of the impact on the actuarially determined contribution rate and the funded status of the plan. Therefore, we have not prepared a separate analysis for HB 478.

Please note that 987 of the 75,168 active members at June 30, 2014 have more than 30 years of service and would not receive the enhanced benefit if they retire prior to a permanent extension becoming effective.

Based on the assumptions and methods selected by PSRS and PEERS of Missouri for the June 30, 2014 actuarial valuation of PSRS and applying the retirement assumption that was in effect through July 1, 2014 for the period after the 2.55% is assumed to be reinstated, we estimate that this change would result in a reduction to the Present Value of Future Benefits ("PVFB") of approximately $0.5 million and a corresponding reduction in the Actuarially Determined Contribution Rate ("ADC Rate") of approximately 0.18%. Enclosed are the following exhibits presenting the results of our analysis:

- Exhibit I – Summary impact on the Actuarially Determined Contribution Rate
- Exhibit II – Detailed impact to the Funded Status and Actuarially Determined Contribution Rate
- Exhibit III – Actuarial Assumptions and Methods used in our analysis
- Exhibit IV – Disclosures relating to our analysis

The PVFB of the system is equal to the present value of all benefits expected to be paid to current members of the system based on projected service and final average salary at retirement. When the 2.55% benefit formula is available, a larger percentage of active members are assumed to delay retirement until they earn 31 years of service or more. Although delaying retirement results in a higher monthly benefit for the member, the present value of the delayed higher monthly benefit is less than the present value of the unreduced benefit that could be taken after 30 years of service under the current 2.50% formula multiplier for the active population as a whole. The reasons being that delaying retirement results in the member forgoing receipt of benefit payments, delaying future cost-of-living adjustments, and reducing the period of time that they will receive pension payments. As such, the PVFB is estimated to decrease when the 2.55% benefit formula is available because a larger percentage of members are assumed to delay retirement until they earn 31 years of service or more. To the extent members do not delay retirement, the impact of the benefit change would be a small increase in PVFB compared to the "BASELINE" results shown in the enclosed exhibits.

Because the PVFB is estimated to decrease, the ongoing cost of the system, represented by the ADC Rate, is also expected to decrease. Note that the ADC Rate is the sum of two components:

1. The Normal Cost Rate
2. The Unfunded Actuarial Accrued Liability Rate

These components are determined by applying the Entry Age Normal (level percent) cost method to allocate the PVFB to past service and future service, which provides for orderly funding of the benefits over the working careers of the members. The portion of the PVFB allocated to past service is known as the Actuarial Accrued Liability ("AAL"), and the portion allocated to future service is known as the Present Value of Future Normal Costs. The portion allocated to the one-year period following the measurement date is referred to as the Normal Cost.

Since the assumed retirement rates are changed (see Exhibit III) when the 2.55% benefit formula is available, the expected service period over which the PVFB is allocated also changes. In this case, the expected service period gets longer since employees are expected to remain in active service longer in order to get the 2.55% benefit formula. This results in a larger portion of the PVFB being attributable to future service (since past service is fixed) and a reduction in the amount attributable to past service, or AAL. The increase in the expected future service period also results in a reduction in the Normal Cost since the change in the PVFB (on a percentage basis) was less than the change in the expected service period.

The overall result is a reduction in the ADC Rate of 0.18% as a result of smaller reduction in both the Normal Cost Rate (0.08%) and Unfunded Actuarial Accrued Liability Rate (0.10%)

Please note the following when reviewing the results:

- Our analysis was performed by measuring the impact of the change at June 30, 2014, using census data collected from PSRS and PEERS of Missouri as of June 30, 2014. Our estimates do not incorporate the impact of future employees who may become members of PSRS. Please refer to our actuarial valuation report dated October 20, 2014 for a summary of the census data.

- The BASELINE results shown in Exhibits I and II equal the results of our June 30, 2014 valuation of the system.

- Our analysis was performed based on our understanding of the current PSRS benefit provisions as set forth in Chapter 169 of the Missouri Revised Statutes, as well as the modification to those statutes to affect the change described above.

- Our analysis illustrates the estimated change in the Actuarially Determined Contribution Rate, which may or may not affect the actual contribution rates set by the Board.

- Our analysis does not include any additional administrative cost that may be incurred by PSRS and PEERS of Missouri to implement this change.

- Our analysis was completed using assumptions and methods that are consistent with the funding policy adopted by the Board of Trustees of PSRS and PEERS of Missouri. The results do not reflect application of Governmental Accounting Standards applicable to pension plans.

- The result of our analysis is heavily dependent on the assumptions. The actual cost of the proposed benefit change will depend on the actual future experience of plan members.

To the best of our knowledge this actuarial statement is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practice and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations are also consistent with our understanding of Missouri state law. The undersigned actuaries are members of the Society of Actuaries and other professional organizations, including the American Academy of Actuaries, and meet the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States relating to pension plans. There is no relationship between the PwC practitioners involved in this engagement and PSRS and PEERS of Missouri that may impair our objectivity.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose. This document has been prepared pursuant to an engagement letter between PSRS and PEERS of Missouri and PwC, and is intended solely for the use and benefits of PSRS and PEERS of Missouri and not for reliance by any other person.

Please call with any questions or if you require additional information.

Sincerely,

Cindy Fraterrigo

Cindy Fraterrigo, FSA, EA, MAAA

Brandon A. Robertson

Brandon Robertson, ASA, EA, MAAA

Exhibit I

Public School Retirement System of Missouri

Permanent Extension of 2.55% Benefit Formula For Members With 31 Years of Service
Analysis of Senate Bill No. 219 and House Bill No. 478

Summary Cost Analysis as of June 30, 2014

	BASELINE	Permanent Extension of 2.55% Benefit (SB 219 and HB 478)
Actuarially Determined Contribution Rate		
Normal Cost Rate	18.89%	18.81%
Unfunded Actuarial Accrued Liability Amortization Rate	9.53%	9.43%
Actuarially Determined Contribution Rate	**28.42%**	**28.24%**
Change in Actuarially Determined Contribution Rate		**-0.18%**

Exhibit II

Public School Retirement System of Missouri

Permanent Extension of 2.55% Benefit Formula For Members With 31 Years of Service
Analysis of Senate Bill No. 219 and House Bill No. 478

Cost Analysis as of June 30, 2014

	BASELINE	Permanent Extension of 2.55% Benefit (SB 219 and HB 478)
Funded Status		
Present Value of Future Benefits ("PVFB")		
Member Contribution Balances	$6,985,665,067	$6,985,665,067
Active Members	15,611,874,950	15,611,357,266
Inactive Members	101,926,552	101,926,552
Pay Status Members	23,579,997,567	23,579,997,567
Total PVFB	$46,279,464,136	$46,278,946,452
% Change		0.00%
Actuarial Accrued Liability ("AAL")		
Member Contribution Balances	$6,985,665,067	$6,985,665,067
Active Members	7,815,594,746	7,745,641,775
Inactive Members	101,926,552	101,926,552
Pay Status Members	23,579,997,567	23,579,997,567
Total Actuarial Accrued Liability ("AAL")	$38,483,183,932	$38,413,230,961
% Change		-0.18%
Actuarial Value of Assets ("AVA")	31,846,599,387	31,846,599,387
Unfunded Actuarial Accrued Liability (AAL - AVA)	$6,636,584,545	$6,566,631,574
Funded Percentage (AVA / AAL)	**82.75%**	**82.91%**
Change in Funded Percentage		
Actuarially Determined Contribution Rate		
Expected Payroll	$4,425,567,630	$4,425,567,630
Normal Cost (Mid-Year)	$836,085,151	$832,591,131
Normal Cost Rate	18.89%	18.81%
Unfunded Actuarial Accrued Liability Amortization [1]	$421,555,305	$417,351,410
Unfunded Actuarial Accrued Liability Amortization Rate	9.53%	9.43%
Actuarially Determined Contribution	$1,257,640,456	$1,249,942,542
Actuarially Determined Contribution Rate	**28.42%**	**28.24%**
Change in Actuarially Determined Contribution Rate		**-0.18%**

[1] Reduction in AAL is amortized over 30 years in the development of the Actuarially Determined Contribution Rate.

Exhibit III

ACTUARIAL ASSUMPTIONS

Inflation

2.50% per annum.

Payroll Growth

3.50% per annum, consisting of 2.50% inflation, 0.50% additional inflation due to the inclusion of health care costs in pension earnings, and 0.50% of real wage growth.

Individual Salary Growth

Service	Inflation	Inflation	Longevity	Total Increase
0	2.50%	0.50%	7.00%	10.00%
1 - 4	2.50%	0.50%	4.00%	7.00%
5	2.50%	0.50%	3.80%	6.80%
6	2.50%	0.50%	3.60%	6.60%
7	2.50%	0.50%	3.40%	6.40%
8	2.50%	0.50%	3.20%	6.20%
9	2.50%	0.50%	3.00%	6.00%
10	2.50%	0.50%	2.80%	5.80%
11	2.50%	0.50%	2.60%	5.60%
12	2.50%	0.50%	2.40%	5.40%
13	2.50%	0.50%	2.20%	5.20%
14	2.50%	0.50%	2.00%	5.00%
15	2.50%	0.50%	2.00%	5.00%
16	2.50%	0.50%	1.90%	4.90%
17	2.50%	0.50%	1.90%	4.90%
18	2.50%	0.50%	1.80%	4.80%
19	2.50%	0.50%	1.80%	4.80%
20	2.50%	0.50%	1.70%	4.70%
21	2.50%	0.50%	1.70%	4.70%
22	2.50%	0.50%	1.60%	4.60%
23	2.50%	0.50%	1.60%	4.60%
24	2.50%	0.50%	1.50%	4.50%
25	2.50%	0.50%	1.50%	4.50%
26	2.50%	0.50%	1.40%	4.40%
27	2.50%	0.50%	1.30%	4.30%
28	2.50%	0.50%	1.20%	4.20%
29	2.50%	0.50%	1.10%	4.10%
30+	2.50%	0.50%	1.00%	4.00%

Investment Return

8.00% per annum, net of system expenses (investment and administrative).

Cost of Living Adjustments

2.00% per year and compounded, based on the current policy of the Board to grant a 2.00% COLA whenever annual inflation, as measured by the CPI-U index for a fiscal year, increases between 0.00% and 5.00%.

Cost of Living Adjustments (Cont.)

The COLA assumption applies to service retirees and their beneficiaries. The COLA does not apply to the benefits for in-service death payable to spouses (where the spouse is over age 60), and does not apply to the spouse with children pre-retirement death benefit, the dependent children pre-retirement death benefit, or the dependent parent death benefit. The total lifetime COLA cannot exceed 80% of the original benefit. Future COLAs for current benefit recipients reflect actual cumulative adjustments granted at the time of valuation.

Mortality Rates

Mortality Rates for active members are based on the RP 2000 Mortality Table, set back one year for males and six years for females, then projected to 2016 using Scale AA. Illustrative rates per 1,000 members at various ages are as follows:

Active Member Mortality

Age	Male	Female
20	0.244	0.131
30	0.380	0.171
40	0.898	0.171
50	1.492	0.782
60	4.593	2.237
70	15.549	7.955

Mortality Rates for non-disabled retirees and beneficiaries are based on the RP 2000 Mortality Table, set back one year for both males and females, then projected to 2016 using Scale AA. Illustrative rates per 1,000 members at various ages are as follows:

Service Retiree, Beneficiary and Survivor Mortality

Age	Male	Female
40	0.898	0.509
50	1.492	1.178
60	4.593	4.099
70	15.549	13.715
80	49.322	37.094
90	156.083	113.562
100	324.963	227.712
110	400.000	351.544

Mortality Rates for disabled retirees are based on the RP 2000 Disabled Retiree Mortality Table. Illustrative rates per 1,000 members at various ages are as follows:

Disability Retiree Mortality

Age	Male	Female
40	22.571	7.450
50	28.975	11.535
60	42.042	21.839
70	62.583	37.635
80	109.372	72.312
90	183.408	140.049
100	344.556	237.467
110	400.000	364.617

Retirement Rates

When the 2.55% benefit formula is available, retirement is assumed in accordance with the following rates per 1,000 eligible members:

	Service											
Age	<= 20	21	22	23	24	25	26	27	28	29	30	>= 31
<= 50	0	0	0	0	0	50	50	50	50	50	200	400
51	0	0	0	0	0	50	50	50	50	200	200	400
52	0	0	0	0	0	50	50	50	200	200	200	400
53	0	0	0	0	0	50	50	300	200	200	200	400
54	0	0	0	0	0	50	300	200	200	200	200	400
55	50	50	50	50	50	400	200	200	200	200	200	400
56	50	50	50	50	400	200	200	200	200	200	200	400
57	50	50	50	400	200	200	200	200	200	200	200	400
58	50	50	400	200	200	200	200	200	200	200	200	400
59	50	400	200	200	200	200	200	200	200	200	200	400
60	150	150	150	150	150	200	200	200	200	200	200	400
61	150	150	150	150	150	200	200	200	200	200	200	400
62	150	150	150	150	150	200	200	200	200	200	200	400
63	150	150	150	150	150	200	200	200	200	200	200	400
64	150	150	150	150	150	200	200	200	200	200	200	400
65	250	250	250	250	250	400	400	400	400	400	400	400
66	250	250	250	250	250	300	300	300	300	300	300	400
67	250	250	250	250	250	300	300	300	300	300	300	400
68	250	250	250	250	250	300	300	300	300	300	300	400
69	250	250	250	250	250	300	300	300	300	300	300	400
>= 70	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

When the 2.55% benefit formula is not available, retirement is assumed in accordance with the following rates per 1,000 eligible members:

	Service											
Age	<= 20	21	22	23	24	25	26	27	28	29	30	>= 31
<= 50	0	0	0	0	0	50	50	50	50	50	450	450
51	0	0	0	0	0	50	50	50	50	200	450	450
52	0	0	0	0	0	50	50	50	200	200	450	450
53	0	0	0	0	0	50	50	300	200	200	450	450
54	0	0	0	0	0	50	300	200	200	200	450	450
55	50	50	50	50	50	400	200	200	200	200	450	450
56	50	50	50	50	400	200	200	200	200	200	450	450
57	50	50	50	400	200	200	200	200	200	200	450	450
58	50	50	400	200	200	200	200	200	200	200	450	450
59	50	400	200	200	200	200	200	200	200	200	450	450
60	150	150	150	150	150	200	200	200	200	200	450	450
61	150	150	150	150	150	200	200	200	200	200	450	450
62	150	150	150	150	150	200	200	200	200	200	450	450
63	150	150	150	150	150	200	200	200	200	200	450	450
64	150	150	150	150	150	200	200	200	200	200	450	450
65	250	250	250	250	250	400	400	400	400	400	450	450
66	250	250	250	250	250	300	300	300	300	300	450	450
67	250	250	250	250	250	300	300	300	300	300	450	450
68	250	250	250	250	250	300	300	300	300	300	450	450
69	250	250	250	250	250	300	300	300	300	300	450	450
>= 70	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

Withdrawal Rates

Termination of membership prior to eligibility for retirement from all causes other than death and disability is assumed in accordance with the following illustrative rates per 1,000 members:

Active Member Withdrawal

Years of Service	Rate
0	190
1	105
2	85
3	73
4	62
5	52
10	23
15	12
20	5
25+	0

Disability Rates

Retirement for disability prior to age 60 is assumed in accordance with the following illustrative rates per 1,000 eligible members:

Active Member Disability

Age	Rates
25	0.017
30	0.080
35	0.160
40	0.320
45	0.610
50	0.960
55	1.310

Refund of Contributions

88% of members leaving after earning 5 years of service are assumed to leave their contributions in the fund and receive a vested benefit. If the present value of the deferred benefit is less than the member account balance, the member's account balance is valued. The remaining 12% are assumed to take an immediate refund of their contributions, thus forfeiting their vested retirement benefit.

100% of those leaving prior to earning 5 years of service are assumed to take an immediate refund of their contributions.

Interest on Member Accounts

1.00% per annum.

Service Purchases

A 2.00% load is added to the Normal Cost to account for anticipated losses resulting from service purchases and reinstatements.

Provisions for Expenses

There is no specific provision for expenses. The implicit assumption is that expenses are paid from investment income in excess of 8.00% per annum.

Dependent Assumptions

80% of male members and 70% of female members are assumed to be married.

Beneficiaries are assumed to be of the opposite sex from the member.

Male and Female members are assumed to be 4 years older than their beneficiary.

Survivor Benefits

All active members under age 50 are assumed to have 2 dependent children. Each child is assumed to receive payments of $860 per month for 18 years if the member is under age 32, and grading down to 0 years if the member is age 50.

Return of Unused Member Account Balance

Under the single life annuity payment option, any unused balance of contributions and interest in the member account balance at the time of death is paid in a lump sum to a designated beneficiary. This benefit is approximated with a 5-year certain benefit.

Data Assumptions

Members without a date of birth provided are assumed to be 30 years old. Pensionable pay for members who did not earn service during the past year is assumed to be the greater of the current year's salary, the previous year's salary and $10,000. Pensionable pay for other active members is assumed to be the greater of annualized pay and $10,000.

ACTUARIAL METHODS

Acturial Cost Method

The actuarial cost method is Entry Age Normal - Level Percent of Payroll.

The normal cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The actuarial accrued liability on any valuation date is the accumulated value of such normal costs from entry age to the valuation date.

Asset Valuation Method

The Actuarial Value of Assets is a smoothed value of assets. The actuarial value at June 30 of the prior year is projected by increasing the amount by 8% interest, adding contributions with 8% interest for half the year, and subtracting benefit payments with 8% interest for half the year. 20% of the difference between the actual returns on market value for the year and the expected return from the projection of the prior year actuarial value, along with corresponding amounts from each of the prior four years, is added to the actuarial value.

Amortization of Unfunded Actuarial Accrued Liability

Gains and losses occurring from census experience different than assumed and assumption changes are amortized over a 30-year period as a level percent of payroll. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 30-year period. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities.

Increases in the Actuarial Accrued Liability caused by changes in the benefit provisions are amortized over 20 years, as determined in the 2007 session of the Legislature.

Exhibit IV

DISCLOSURES

This letter has been prepared pursuant to the engagement letter between PricewaterhouseCoopers LLP and PSRS and PEERS of Missouri, dated June 9, 2014.

In preparing the results presented in this letter, we have relied upon information provided to us by PSRS and PEERS of Missouri regarding plan provisions, plan participants, and benefit payments. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this letter is dependent upon the accuracy and completeness of the underlying information.

The results of our analysis presented herein were computed using assumptions and methods that are consistent with the funding policy adopted by the Board of Trustees of PSRS and PEERS of Missouri. The results do not reflect application of Governmental Accounting Standards applicable to pension plans.

To the best of our knowledge, the individuals involved in this engagement have no relationship that may impair or appear to impair the objectivity of our work.

No statement in this letter is intended as a recommendation in favor, or in opposition, of the proposed legislation. Except as otherwise noted, potential impacts on other benefit plans were not considered.

The calculations are based upon assumptions regarding future events. However, the plan's long term costs will be determined by actual future events, which may differ materially from the assumptions that were made. The calculations are also based upon present and proposed plan provisions that are outlined in the letter. If you have reason to believe that the assumptions that were used are described, or that conditions have changed since the calculations were made, you should contact PSRS and PEERS of Missouri.

In the event that more than one plan change is being considered, it should be noted that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater or less than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose. This document has been prepared pursuant to an engagement letter between PSRS and PEERS of Missouri and PwC, and is intended solely for the use and benefits of PSRS and PEERS of Missouri and not for reliance by any other person.