



INDEPENDENT FISCAL OFFICE

TO: Governor Josh Shapiro
All Members of the General Assembly

FROM: Matthew Knittel, Director
Independent Fiscal Office

DATE: October 4, 2024

RE: Actuarial Note for House Bill 1379, Printer's Number 1539 Amendment A05600

The Independent Fiscal Office (IFO) submits an actuarial note for **Amendment A05600 to House Bill 1379, Printer's Number 1539** in accordance with section 615-B of the Administrative Code of 1929. Due to the material impact of the legislation to both state and local pension systems, the IFO submitted formal requests to its contracted actuaries (Milliman and Foster & Foster) for actuarial notes. Copies of those notes are attached, along with responses prepared by the State Employees' Retirement System (SERS) and Public School Employees' Retirement System (PSERS) in response to a data request made by the IFO on September 16, 2024.

Summary of Provisions

The legislation would amend Title 24 (Education) and Title 71 (State Government) to provide supplemental annuities to individuals who retired prior to July 2, 2001 for SERS and PSERS. The legislation also amends the act of December 14, 1988 (P.L. 1192, No. 147) known as the Special Ad Hoc Municipal Police and Firefighter Postretirement Adjustment Act to provide for ad hoc cost-of-living adjustments (COLAs) for qualified local police and firefighter annuitants.

Provisions for SERS and PSERS annuitants:

- Supplemental annuities would begin on January 1, 2025 for eligible SERS annuitants, and on July 1, 2025 for eligible PSERS annuitants.
- Eligible annuitants must (1) receive an annuity by January 1, 2025 (SERS) or July 1, 2025 (PSERS); (2) be retired prior to July 2, 2001; and (3) have no credited service that qualifies as Class T-D, Class D-4, or Class AA.
- Beneficiaries and survivor annuitants of members who die prior to January 1, 2025 (SERS) or July 1, 2025 (PSERS) would not be eligible.
- The unfunded actuarial liability due to the benefit increase would be amortized through level dollar payments over a period of 10 years beginning July 1, 2025.
- The amount of the supplemental annuity is based on the most recent date of retirement for the individual.

The full schedule is as follows:

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Retirement Effective Date	Annuity Increase (%)	Retirement Effective Date	Annuity Increase (%)
7/2/2000 - 7/1/2001	15.0	7/2/1990 - 7/1/1991	20.0
7/2/1999 - 7/1/2000	15.5	7/2/1989 - 7/1/1990	20.5
7/2/1998 - 7/1/1999	16.0	7/2/1988 - 7/1/1989	21.0
7/2/1997 - 7/1/1998	16.5	7/2/1987 - 7/1/1988	21.5
7/2/1996 - 7/1/1997	17.0	7/2/1986 - 7/1/1987	22.0
7/2/1995 - 7/1/1996	17.5	7/2/1985 - 7/1/1986	22.5
7/2/1994 - 7/1/1995	18.0	7/2/1984 - 7/1/1985	23.0
7/2/1993 - 7/1/1994	18.5	7/2/1983 - 7/1/1984	23.5
7/2/1992 - 7/1/1993	19.0	7/2/1982 - 7/1/1983	24.0
7/2/1991 - 7/1/1992	19.5	Prior to 7/2/1982	24.5

Provisions for municipal police officer and firefighter annuitants:

- Provisions would apply to all local municipal pension systems in the Commonwealth and would provide ad hoc COLAs beginning with the first annuity payment made after January 1, 2025.
- Cost-of-living adjustments would be partially offset for any COLA received by the annuitant after January 1, 2002 and before December 31, 2024.
- To qualify, annuitants must have received annuity payments prior to January 1, 2019.
- The Office of the Auditor General would provide partial reimbursement to local pension systems impacted by these COLAs using funds from the General Municipal Pension System State Aid Program.
- Cost-of-living adjustments would be based on length of retirement, not prior salary or current annuity value. The full schedule is as follows:

Years of Retirement as of Jan. 1, 2025	Monthly Annuity Increase	Annualized Value
5 Years to < 10 Years	\$75	\$900
10 Years to < 20 Years	\$150	\$1,800
20+ Years	\$300	\$3,600

Review of Findings: SERS and PSERS

The legislation would enact supplemental annuities for individuals who retired prior to July 2, 2001 for SERS and PSERS. Valuations for SERS occur on a calendar year (CY) basis, while PSERS occur on a fiscal year (FY) basis. Initial changes in the employer contribution rates for both systems would first occur in FY 2025-26. The projected impacts are as follows:

Impact on SERS:

- Individuals impacted: 23,542
- Average age of eligible retiree: 80.2
- Average increase in annuity for first year: \$2,200 (\$184 monthly)¹
- Total projected benefit increases paid over lifetime: \$502.1 million
- Initial change in unfunded actuarial liability (UAL): \$332.4 million
- Initial change in funded ratio: -0.41% (70.50% to 70.09%)
- Initial change in employer contribution rate: 0.63% (32.39% to 33.01%)
- Annual amortized cost (10 years): \$47.1 million

Impact on PSERS:

- Individuals impacted: 40,021
- Average age of eligible retiree: 83.3
- Average increase in annuity for first year: \$2,800 (\$233 monthly)¹
- Total projected benefit increases paid over lifetime: \$952.8 million
- Initial change in unfunded actuarial liability (UAL): \$614.3 million
- Initial change in funded ratio: -0.33% (64.82% to 64.49%)
- Initial change in employer contribution rate: 0.60% (34.72% to 35.32%)
- Annual amortized cost (10 years): \$93.6 million

The Milliman analysis notes the following issues:

- There are different commencement dates for SERS and PSERS retirees, while past supplemental annuities commenced on the same date.
- The amendment would have a negative cash flow impact until FY 2030-31 for PSERS and calendar year 2031 for SERS. The COLA benefits initially exceed the additional contributions that would be paid to the systems, reducing the systems' assets in the short-term.
- The cost of the bill was determined independently of any other bill or amendment that may impact benefits paid to current retirees. To the extent that the increases proposed in this bill apply to benefits provided in other bills, additional costs for these changes may apply.
- The bill provides that the cost of the supplemental annuities would be funded in equal dollar installments over a period of 10 years in §8348.8(f). However, §8328(d)(2) in the PSERS code indicates that increases in benefits due to supplemental annuities shall be funded as a level percentage of compensation over a period of 10 years from the July 1 second succeeding the date such legislation is enacted.

¹ Based on estimates of the number of initial beneficiaries and first year payments as provided by the systems.

Review of Findings: Municipal Police Officers and Firefighters

The legislation provides guidelines by which municipal systems would provide ad hoc COLAs for police and firefighter annuitants who received benefits prior to 2019.² The bill also provides two adjustments for special circumstances that may pertain to certain annuitants that could reduce costs:

1. If an annuitant is eligible to receive a COLA from more than one participating system, then the total COLA would be reduced so that the sum of all COLAs paid does not exceed the amount stated in the legislation based on years of retirement.
2. If an annuitant received a COLA after January 1, 2002, then the COLA from this bill would be reduced by 65% of the COLA paid in the previous year.

To determine the actuarial impact of the bill, the IFO directed its contracted actuary (Foster & Foster) to run a simulation using data submitted by the Pennsylvania Office of the Auditor General.³ The projected impacts (attached to this note) are as follows:

- Eligible annuitants: 26,181
- Total increase in unfunded actuarial accrued liability (UAAL): \$388.4 million
- Annual amortized cost (10 years)⁴: \$51.7 million
- Average increase in annual benefit: \$1,845
- Average UAAL per eligible annuitant: \$14,834
- Average annual amortization cost per eligible annuitant: \$1,974

Actual costs will vary by system based on experience, actuarial assumptions and populations served.

The projections from Foster & Foster are not adjusted for reduced benefit annuities (e.g., survivor beneficiaries). Based on conversations with the Auditor General, those individuals would receive the ad hoc COLA on a prorated basis consistent with their benefit proration rate (i.e., if a spouse of a deceased officer or firefighter received an annuity at 50% of the initial pension benefit, then the COLA would be 50% of the calculated amount). Based on annuitant data provided by the Auditor General, the IFO assumes that 35% of recipients are benefit annuitants who receive 50% of the former pension benefit.

Using these assumptions, **the IFO projects a net increase in total UAAL of \$320.4 million, and an annual amortization cost of \$42.6 million.** Data for COLAs administered at the discretion of the municipal systems were not available, therefore these projections represent an upward bound. Costs could be further reduced by an unknown amount equal to 65% of any prior municipal COLA.

The legislation provides a mechanism to reimburse municipal pension systems for a portion of the amortized costs of the COLAs. Municipal pension systems would be eligible for cost reimbursement prorated by the amount of state aid as a share of municipal pension contributions. For example, if a municipality pays \$10 million in annual

² Because the COLA is only available for individuals who received benefits prior to 2019, annuitants who retired in 2019 and would be retired for five years prior to the commencement of the proposed COLAs (and would otherwise be eligible for a \$75/month COLA) do not qualify.

³ The Auditor General informed the IFO that two notable municipalities were not included in the annuitant data due to reporting issues: the City of Easton and the City of York. Additional smaller municipalities may also be excluded due to reporting issues. No adjustments were made for these municipalities and eligible annuitants for these systems would increase the cost of the legislation.

⁴ A 10-year amortization schedule is required by statute.

contributions, but \$2 million (20%) was aid received from the state, then it would be reimbursed 80% of the annual amortized cost. To project the amount and share of state reimbursement, the IFO requested data from the Auditor General. Results are shown in the table below.

Projected State Reimbursement Share (HB 1379, A05600)						
Municipal Contributions	State Pension Aid	State Share	State Reimb. Rate	Annual System Costs	Annual State Reimb. Cost	10-Year State Reimb. Costs
\$1,750.0	\$411.2	23.5%	76.5%	\$42.6	\$32.6	\$326.2
Note: Dollars in millions.						
Sources: Pennsylvania Office of the Auditor General, Foster & Foster Actuaries and Consultants, calculations by the IFO.						

Data from the Auditor General show that the state share of total municipal contributions was 23.5%. Therefore, municipal systems would receive reimbursement for 76.5% of their amortized costs over 10 years, a total nominal cost of \$326.2 million. The state share will vary across systems in a similar fashion to increases in system UAAL.

State reimbursements are provided through the General Municipal Pension System State Aid Program, which is administered by the Auditor General. The program is funded by tax revenues generated from the Insurance Premiums Tax via transfers from the General Fund. For FY 2023-24, \$411.2 million in aid to municipal pension systems was allocated through the program. The funds needed to reimburse the amortized COLA costs would be assessed prior to regular distribution calculations. Using the table above, this implies that annual pension aid would be reduced by \$32.6 million (7.9% based on 2024 levels) for each of the 10 years that reimbursements would be paid but would vary based on the annual state share of pension aid. The net change in state revenue would not be uniform across systems as COLA reimbursements would be paid to municipalities that have more police and firefighter annuitants (and thus higher costs), but general aid would be reduced on a pro-rata basis for all systems based on current program guidelines. Certain municipal systems could experience funding gaps and may need to increase funding, likely through employer contributions, to fund the shortfall. Municipal system stress will depend on current funding levels and sources and the net change in state aid after taking into account COLA reimbursements.

The IFO previously requested feedback on similar legislation (House Bill 1379, Printer’s Number 1539) from the Auditor General and the Pennsylvania Municipal Retirement System. Notes from those conversations are as follows:

- The Auditor General confirmed an expected reduction in revenues available for the General Municipal Pension System State Aid Program.
- The Auditor General noted that programs currently used for municipal pension oversight and aid delivery would not be able to identify annuitants who would receive COLAs from more than one system. This would effectively eliminate the safeguard from annuitants “double dipping” on COLAs provided by the bill. Programs would need to be enhanced to provide that capability and coordinated with the Department of Community and Economic Development. No cost estimates or timeline for implementation were provided.
- PMRS noted that there would likely be negligible actuarial costs for its managed plans overall.



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October 4, 2024

Mr. Matthew Knittel
Director
Pennsylvania Independent Fiscal Office
Second Floor
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17105

Re: Amendment A05600 to House Bill 1379, Printer's Number 1539

Dear Mr. Knittel:

As you requested, we have prepared an actuarial note on sections 1 and 3 of Amendment A05600 to House Bill 1379, Printer's Number 1539. Sections 1 and 3 of the Amendment would amend both the Public School Employees' Retirement Code and the State Employees' Retirement Code to provide for an ad hoc cost-of-living-adjustment (COLA) (e.g. supplemental annuities) commencing July 1, 2025 and January 1, 2025, respectively, to retirees of both systems with an effective date of retirement prior to July 2, 2001. As directed by the IFO, section 2 of the Amendment is not included in this actuarial note.

This actuarial note is based on the September 26, 2024 estimate by Gallagher Benefits Services, Inc. (Gallagher) for PSERS and the September 25, 2024 estimate by Korn Ferry for SERS of the impact of this Amendment, provided to us by the IFO. In addition, Gallagher and Korn Ferry have provided us with additional details regarding their cost estimates. We appreciate their cooperation in providing this information on a timely basis.

After a brief summary of the Amendment and the estimated actuarial cost, the section "Discussion of the Amendment" discusses items the legislators may wish to consider prior to enactment, such as making the commencement date the same for PSERS and SERS and mitigating the negative cash flow impact of this Amendment. This section starts on page 3.

Summary of the Amendment

This Amendment would provide a benefit increase to retirees with an effective date of retirement prior to July 2, 2001 in the Public School Employees' Retirement System (PSERS) and the State Employees' Retirement System (SERS) ranging from 15% to 24.5% of the member's benefit at the effective date based on the member's date of retirement. The effective date is July 1, 2025 for PSERS and January 1, 2025 for SERS.

This analysis was prepared solely for the Pennsylvania Independent Fiscal Office and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.



The unfunded actuarial accrued liability resulting from the benefit increase would be amortized through level dollar payments over a period of 10 years beginning July 1, 2025.

We have confirmed the Amendment's provisions summarized in the estimates for both PSERS and SERS. Please refer to the Amendment and the Systems' estimates for more information on the potential changes.

Review of Estimated Actuarial Cost Prepared by System Actuaries

The cost estimates prepared by Gallagher and Korn Ferry contain the estimated increase in the actuarial accrued liability and the corresponding 10-year amortization beginning July 1, 2025. We have reviewed the estimates for both PSERS and SERS and found that they appear to be reasonable.

Gallagher and Korn Ferry indicated that the number of eligible retirees is 40,021 in PSERS based on data as of June 30, 2023 and 23,542 in SERS based on data as of December 31, 2023, respectively. The actual number of eligible retirees who would receive the increased benefits if the Amendment were enacted would depend on how many remain in pay status as of July 1, 2025 or January 1, 2025, respectively. We have not been provided with the underlying data files to review the accuracy of these calculations and have relied upon them in our analysis.

Based on these estimates for PSERS and SERS, the table below contains the estimated increase in the unfunded actuarial accrued liability and the first year of increased amortization payments due to this Amendment. Since the Amendment would only affect retired members, there would be no change in the normal cost.

**Estimated Actuarial Cost of Amendment A05600
to House Bill 1379, Printer's Number 1539
(\$ amounts in millions)**

	PSERS	SERS
Increase in Unfunded Actuarial Accrued Liability as of June 30, 2024 for PSERS and December 31, 2024 for SERS	\$614.3	\$332.4
Increase in First Year Amortization Payment		
2025/2026 Contribution Amount	93.6	47.1
2025/2026 Contribution Rate	0.60%	0.63%

Based on the information provided for PSERS and SERS, the Amendment would result in a decrease in the funded ratio. The projected PSERS' funded ratio as of June 30, 2024 would decline by 0.3% from 64.8% to 64.5%. The projected SERS' funded ratio as of December 31, 2024 would decline by 0.4% from 70.5% to 70.1%.

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The cost of this Amendment was determined independently of any other bill or amendment that may impact benefits paid to current retirees. To the extent that the increases proposed in this Amendment apply to benefits provided in other bills or amendments, additional costs for these changes may apply.

Discussion of the Amendment

This Amendment would grant COLAs to retirees who retired prior to the 25% benefit increase under Act 9 of 2001. Such retirees last received a supplemental annuity effective July 1, 2002 if retired prior to July 2, 1990 and July 1, 2003 if retired after July 1, 1990.

Different commencement date

The Amendment would provide for COLAs starting July 1, 2025 for eligible PSERS retirees and January 1, 2025 for eligible SERS retirees. Past COLAs have generally commenced at the same date for both PSERS and SERS retirees.

Negative Cash Flow

If enacted as drafted, this Amendment would have a negative cash flow impact on both Systems until FY 2030-2031 for PSERS and calendar year 2031 for SERS. In other words, the additional benefits that would be paid due to this Amendment are initially more than the additional contributions that would be paid to the Systems, reducing the Systems' assets in the short-term. Prior to enactment, consideration should be given to revising the funding of the increased benefits to mitigate the negative cash flow impact.

One way to mitigate the impact is to shorten the 10-year amortization period used to determine the additional contributions. In addition, for SERS, delaying the effective commencement date from January 1, 2025 to the corresponding funding start date of July 1, 2025 would also help to mitigate the negative cash flow impact.

Amortization Period

In August 2024, the Conference of Consulting Actuaries Public Plans Community released a second edition of a white paper titled *Actuarial Funding Policies and Practices for Public Pension Plans* ("CCA White Paper"), which is available at <https://www.ccactuaries.org/docs/default-source/papers/CCA-Actuarial-Funding-Policies-for-Public-Plans-2-Final-8-2024.pdf>. This white paper provides "guidance to actuaries, policymakers, and other interested parties on the development of actuarial funding policies for public pension plans", which could be helpful to the legislature.

This Amendment would fund the increases due to these supplemental annuities in equal dollar installments over a 10-year period starting July 1, 2025. The CCA White Paper recommends that

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plan amendments impacting inactive member benefits (such as increases due to supplemental annuities) be amortized over a period no longer than retiree life expectancy. The CCA White Paper also recommends that the amortization period should control for negative cash flow where additional amortization payments are less than additional benefit payments.

While the estimated life expectancy of the eligible retirees is approximately 10 years as of June 30, 2023 for PSERS and 12 years as of December 31, 2023 for SERS as reported by the Systems' actuaries, this calculation does not take into account that older retirees would receive higher benefit increases under the Amendment, lost interest on the supplemental annuities, nor that the funding for this potential COLA would result in a projected negative cash flow. This Amendment is projected to result in lower asset values until the years ending June 30, 2031 for PSERS and December 31, 2031 for SERS.

To mitigate the impact of negative cash flow, we believe that it would be preferable to shorten the amortization period to 5 years for this Amendment.

Potential Conflict in type of amortization in PSERS

As the PSERS' actuary indicates in their cost estimate, the Amendment provides that the cost of these supplemental annuities would be funded in equal dollar installments over a period of 10 years in §8348.8(f). However, §8328(d)(2) in the PSERS code indicates that increases in benefits due to supplemental annuities shall be funded as a level percentage of compensation over a period of ten years from the July 1 second succeeding the date such legislation is enacted.

The cost estimate prepared by the System actuary reflects a 10-year level dollar amortization. We believe that the level dollar approach is more appropriate in this situation.

Potential Risks

Both Systems' actuaries included information on the potential risks in their cost estimates. We encourage the legislature to consider these risks prior to enactment. In particular, the PSERS actuary Gallagher notes that granting benefit improvements may increase the impact of longevity risk due to larger benefits being paid for longer than expected. The SERS actuary Korn Ferry indicated that if the assumed mortality rates were lowered by 10% for a ten-year period, thereby increasing life expectancy, then the increase in the liability for the increased benefits would be 3.8% higher.

Basis for Analysis

In performing this analysis, we have relied on the information provided by the IFO, PSERS, SERS, Gallagher, and Korn Ferry. We have not audited or verified this data and other information. If the data or information is inaccurate or incomplete, the results of this analysis may likewise be inaccurate or incomplete.

This analysis was prepared solely for the Pennsylvania Independent Fiscal Office and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

We performed a limited review of the cost estimates prepared by Gallagher and Korn Ferry as provided by the IFO, PSERS, and SERS for reasonableness and consistency and have not found material defects. If there are material defects, it is possible that they would be uncovered by a detailed, systematic review and comparison to search for values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to actual plan experience deviating from the actuarial assumptions, the natural operation of the plan's actuarial cost method, and changes in plan provisions, actuarial assumptions, actuarial methods, and applicable law. An assessment of the potential range and cost effect of such differences is beyond the scope of this analysis.

As the reviewing actuary, Milliman is not required to provide a risk disclosure under Actuarial Standard of Practice No. 51 *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions* nor the additional disclosures required for funding valuations under Actuarial Standard of Practice No. 4 *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*.

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- The IFO may provide a copy of Milliman's work, in its entirety, to its professional service providers who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to provide services to the IFO.
- The IFO may provide a copy of Milliman's work, in its entirety, any applicable regulatory or governmental agency, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are actuaries. We have not explored any legal issues with respect to the proposed changes. We are not attorneys and cannot give legal advice on such issues. We suggest that you review this proposal with counsel.

We are members of the American Academy of Actuaries and meet its Qualification Standards to render this actuarial opinion.

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Mr. Matthew Knittel
Pennsylvania Independent Fiscal Office
October 4, 2024
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Please let us know if we can provide any additional information regarding this Amendment.

Sincerely,

A handwritten signature in black ink, appearing to read "Tim J. Nugent".

Timothy J. Nugent

A handwritten signature in black ink, appearing to read "Scott F. Porter".

Scott F. Porter

A handwritten signature in blue ink, appearing to read "Katherine A. Warren".

Katherine A. Warren

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September 26, 2024

Mr. Mathieu Taylor, Fiscal Analyst II
Independent Fiscal Office
State of Pennsylvania

Re: *House Bill No. 1379 – Actuarial Analysis- update*

Dear Mathieu:

As you are aware, proposed House Bill No. 1379, with associated amendment A05600, would provide for a one-time cost-of-living adjustment (“Ad Hoc COLA”) to certain retired firefighters and police officers receiving pension benefits under municipal retirement systems in Pennsylvania. As requested, we have performed a special analysis to determine the potential actuarial impact. Below is a summary of the proposed provisions of the COLA.

- **Timing:** the COLA would be payable effective January 1, 2025.
- **Eligibility:** eligible recipients must have begun receiving a pension benefit prior to January 1, 2019.
- **Amount:** each eligible recipient would receive a one-time increase in benefits based on Years on Retirement as follows:
 - 5 to 10 years: \$75 per month.
 - 10 to 20 years: \$150 per month.
 - 20 or more years: \$300 per month.

The amount would be further reduced by 65% of any Ad Hoc COLAs provided to the retiree after January 1, 2002, and before December 31, 2024, and paid in the immediately preceding year.

Methodology

All methods and assumptions used in the analysis are the same as set forth in our July 25, 2023 analysis, except that in this analysis, retirees at ages 55 to 59 are assumed to have been retired for 6 years (previously 5) in order to ensure that this group was assumed eligible. In addition, data was updated based on more recent data provided by you.

The cost of an Ad Hoc COLA is usually measured by identifying each person that is eligible for the COLA, calculating the increase that the person is entitled to, and then measuring the liability associated with that person’s increase.

However, the data available for this analysis consisted of data grouped in 5-year age “buckets” and did not include Years of Service or Years on Retirement information. Absent this data, we have formed what we believe to be reasonable assumptions for Years of Service and Years on Retirement for each group, as follows.

All retirees were assumed to have 22 Years of Service on average. This represents an assumed service requirement of 20 Years of Service, consistent with the provisions of the firefighters' and police officers' pension plans of the City of Pittsburgh, with an additional two-year load to reflect the fact that not all participants retire at first eligibility.

It was also necessary to estimate the number of Years on Retirement for each age bucket. We used retirement rates from the valuation reports of the firefighters' and police officers' pension plans of the City of Pittsburgh to develop what we believe are reasonable assumptions for the number of years each age group has been retired. The first step was to apply the retirement rates for fire and police respectively to a hypothetical group of 1,000 people to determine at which age each of these 1,000 people would retire under these assumptions.

Retirement Age Distribution - Firefighters

Age	Retirement Rate	Actives Remaining ¹	Expected Retirements ¹	Percentage of Retirees Who Retire at Each Age ¹
50	25%	1,000	250	25%
51	7%	750	53	5%
52	7%	698	49	5%
53	7%	649	45	5%
54	7%	603	42	4%
55	15%	561	84	8%
56	15%	477	72	7%
57	15%	405	61	6%
58	15%	345	52	5%
59	15%	293	44	4%
60	15%	249	37	4%
61	15%	212	32	3%
62	15%	180	27	3%
63	30%	153	46	5%
64	50%	107	54	5%
65	100%	54	54	5%
Total			1,000	100%

¹ Results shown are rounded but unrounded numbers used in analysis.

A similar profile was developed for police officers as follows.

Retirement Age Distribution - Police Officers

Age	Retirement Rate	Actives Remaining ¹	Expected Retirements ¹	Percentage of Retirees Who Retire at Each Age ¹
50	15%	1,000	150	15%
51	10%	850	85	9%
52	10%	765	77	8%
53	10%	689	69	7%
54	8%	620	50	5%
55	8%	570	46	5%
56	8%	524	42	4%
57	8%	483	39	4%
58	8%	444	36	4%
59	8%	408	33	3%
60	10%	376	38	4%
61	10%	338	34	3%
62	10%	304	30	3%
63	8%	274	22	2%
64	15%	252	38	4%
65	100%	214	214	21%
Total			1,000	100%

¹ Results shown are rounded but unrounded numbers used in analysis.

The preceding Retirement Age Distributions were used to calculate retirement age probabilities based on current age, and which were in turn used to assign probabilities to each possible number of Years on Retirement for every age group.

For example, consider a retired police officer who is currently age 51, which means that he or she began receiving benefits at age 50 or 51. According to the above assumptions, 235 out of every 1,000 police officers retire at ages 50 or 51, and 150 of these police officers retired at age 50. Therefore, the likelihood that the 51-year-old retired police officer originally retired at age 50 is 64% (150 / 235) and the probability that he or she retired at age 51 is 36% (85 / 235). This results in a 64% chance that a retired 51-year-old police officer has 1 Year on Retirement and a 36% chance that he or she has 0 Years on Retirement. A similar approach was used for all ages from age 50 to age 90 for fire and police, respectively.

An adjustment was made for the fact that the Ad Hoc COLA is reduced by 65% of the 2002 Ad Hoc COLA, which was based on Years of Service and Years on Retirement. A similar approach was used to estimate Years of Service and Years on Retirement as of July 1, 2002 in order to estimate the 2002 Ad Hoc COLA and associated reduction to the 2025 Ad Hoc COLA.

Our understanding is that survivor annuities may only be subject to 50% of the Ad Hoc COLA. No adjustment was made for this in absence of data identifying which benefits are for beneficiaries. Assumptions for investment return and mortality are consistent with the actuarial valuation reports for the firefighters' and police officers' pension plans of the City of Pittsburgh.

Summary of Results

The results of our analysis are below:

Summary of Results (in \$millions)	
Approximate Increase in Unfunded Actuarial Accrued Liability (UAAL)	388.4
Amortization of Increase in UAAL Over 10 Years	51.7

The Approximate Increase in UAAL per eligible retiree is \$14,834 and the Amortization of Increase in UAAL over 10 Years per retiree is \$1,974.

Additionally, below is a breakdown of results by age group and by employee group covered (fire or police).

Age	Employee Group	Number Assumed Eligible	Annual Increase in Benefits	Increase in Accrued Liability	Average Annual Increase in Benefits	Average Increase in Liability
< 60	Fire	478	430,200	5,365,133	900	11,224
60 to 64	Fire	764	687,600	8,025,611	900	10,505
65 to 69	Fire	952	1,713,600	18,293,471	1,800	19,216
70 to 74	Fire	1,318	2,372,400	22,440,753	1,800	17,026
75 to 79	Fire	1,094	3,842,696	30,916,472	3,513	28,260
80 to 84	Fire	793	2,690,137	17,564,046	3,392	22,149
85+	Fire	704	2,289,190	11,616,974	3,252	16,501
< 60	Police	2,726	2,453,400	30,250,839	900	11,097
60 to 64	Police	2,861	2,574,900	29,591,786	900	10,343
65 to 69	Police	3,421	3,078,900	32,194,435	900	9,411
70 to 74	Police	3,545	6,381,000	58,726,374	1,800	16,566
75 to 79	Police	3,339	5,752,185	44,654,063	1,723	13,373
80 to 84	Police	2,298	7,785,786	48,598,437	3,388	21,148
85+	Police	1,888	6,253,424	30,120,266	3,312	15,954
Total		26,181	48,305,417	388,358,659	1,845	14,834

As can be seen above, the average increase is greater at advanced ages because these retirees are assumed to have been retired for a longer period.

It should be noted that these results are based on available data which was incomplete; while we believe that reasonable assumptions were used in absence of complete data, the results would be different if actual data reflecting Years of Service and Years on Retirement were utilized.

Actuarial Assumptions and Methods

Mortality Rates	PubS-2010 for Healthy Retirees (set forward one year for Police) projected generationally with Mortality Improvement Scale MP-2020. This is consistent with the rates used for healthy retirees in the January 1, 2023 actuarial valuation reports for the City of Pittsburgh Firemen's Relief and Pension Fund and the City of Pittsburgh Policemen's Relief and Pension Fund.
Net Investment Return	7.00% per year compounded annually, net of investment-related expenses. This is consistent with the rate used in the January 1, 2023 actuarial valuation reports for the City of Pittsburgh Firemen's Relief and Pension Fund and the City of Pittsburgh Policemen's Relief and Pension Fund.
Years of Service	22 Years of Service for all eligible participants. This reflects an assumed 20-year service requirement for benefit eligibility with consideration for those who do not retire at first eligibility.
Years On Retirement	Tables of probabilities by age consistent with the Retirement Age Distributions set forth earlier in this analysis. For example, the likelihood that the 51-year-old retired police officer originally retired at age 50 is 64% (150 / 235) and the probability that he or she retired at age 51 is 36% (85 / 235), resulting in a 64% likelihood that this police officer has been retired for 1 year and 36% likelihood that they have been retired for 0 years, absent actual retirement duration data. Retirees at ages 55 to 59 were assumed to have 6 Years on Retirement. Otherwise, this group (average age 57.5) would have an average Years on Retirement of less than 6 years under the other assumptions used, resulting in no assumed COLA eligibility under the proposed amendment.
Ages Within Buckets	For any 5-year age buckets, retirees were assumed to have ages equal to the middle of the age interval. For example, retirees between ages 60 to 65 were all assumed to be age 62.5. Retirees over age 84 were assumed to be age 87.5.
Gender	Assumed 80% male.
Marriage	Assumed 80% married with female spouses 2 years younger than husbands.

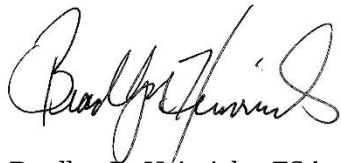
The undersigned is familiar with the immediate and long-term aspects of pension valuations, and meets the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein.

In performing the analysis, we used third-party software to model (calculate) the underlying liabilities and costs. These results are reviewed in the aggregate and for individual sample lives. The output from the software is either used directly or input into internally developed models to generate the costs. All internally developed models are reviewed as part of the process. As a result of this review, we believe that the models have produced reasonable results. We do not believe there are any material inconsistencies among assumptions or unreasonable output produced due to the aggregation of assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including: changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the analysis, we did not perform an analysis of the potential range of such future measurements.

If you have any questions, please let me know.

Sincerely,

A handwritten signature in black ink, appearing to read "Bradley R. Heinrichs". The signature is fluid and cursive, with a large initial "B" and a long, sweeping underline.

Bradley R. Heinrichs, FSA, EA, MAAA

A handwritten signature in black ink, appearing to read "Tyler A. Koftan". The signature is cursive, with a large initial "T" and a long, sweeping underline.

Tyler A. Koftan, EA, MAAA



Actuarial Cost Note Regarding H.B. 1379, P.N. 1539
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

September 25, 2024

The following is an actuarial cost note which describes and presents the estimated cost impact of proposed legislation (under House Bill 1379, Printer's Number 1539, as amended by A05600), that would provide a Cost-of-Living Adjustment (COLA) to certain retired members of the Pennsylvania State Employees' Retirement System (SERS), commencing with the first monthly annuity payment after January 1, 2025.

Design of the COLA

If this bill becomes law, retired members meeting all three (3) of these conditions would be eligible for the COLA:

- The retired member must be either a retiree who has reached superannuation age or a disabled retiree or an early retiree (who would become eligible for the COLA upon reaching superannuation age) receiving an annuity on January 1, 2025;
- The retired member's most recent effective date of retirement would have to be prior to July 2, 2001, and
- The retired member's credited service may not include any service credited as Class AA or Class D-4 (or Class T-D).

If enacted, the amount of the COLA increase, which would commence with the first monthly annuity payment after January 1, 2025, will be determined as a percentage of the amount of the monthly annuity payment on January 1, 2025, such percentage being specifically prescribed on the basis of the eligible member's most recent effective date of retirement. Table 1 on the following page provides the specific COLA increase percentages and effective dates of retirement proposed under this bill.

Other noteworthy provisions relating to the design of this proposed COLA include:

- Beneficiaries or survivors of members who die before January 1, 2025 are not eligible and
- The COLA will be payable under the same terms and conditions as provided under the option plan in effect as of January 1, 2025.

Funding of the COLA

The bill states that "... the additional liability for the increase in benefits provided under this section shall be funded in equal dollar installments over a period of 10 years beginning July 1, 2025."



Actuarial Cost Note Regarding H.B. 1379, P.N. 1539
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

September 25, 2024

Proposed COLA Increases

The proposed COLA increase percentages are presented in Table 1 below.

Table 1 Proposed COLA Increases Effective After January 1, 2025 & Payable to Eligible Retired Members Who Retired Prior to July 2, 2001	
Most Recent Effective Date of Retirement	Proposed COLA Increase
Prior to July 2, 1982	24.5%
July 2, 1982 - July 1, 1983	24.0%
July 2, 1983 - July 1, 1984	23.5%
July 2, 1984 - July 1, 1985	23.0%
July 2, 1985 - July 1, 1986	22.5%
July 2, 1986 - July 1, 1987	22.0%
July 2, 1987 - July 1, 1988	21.5%
July 2, 1988 - July 1, 1989	21.0%
July 2, 1989 - July 1, 1990	20.5%
July 2, 1990 - July 1, 1991	20.0%
July 2, 1991 - July 1, 1992	19.5%
July 2, 1992 - July 1, 1993	19.0%
July 2, 1993 - July 1, 1994	18.5%
July 2, 1994 - July 1, 1995	18.0%
July 2, 1995 - July 1, 1996	17.5%
July 2, 1996 - July 1, 1997	17.0%
July 2, 1997 - July 1, 1998	16.5%
July 2, 1998 - July 1, 1999	16.0%
July 2, 1999 - July 1, 2000	15.5%
July 2, 2000 - July 1, 2001	15.0%
July 2, 2001 and After	0.0%

Estimated COLA Impact and Costs

Table 2 on the following page presents some approximate statistics related to the impact if this proposed COLA were to become law, as well as the estimated additional liability and annual cost to SERS, based upon funding in equal dollar annual installments over a 10-year period beginning July 1, 2025.

The estimated number of retirees to receive the proposed COLA is based on the number eligible to receive the COLA as of December 31, 2023. The average increase is the overall average increase the eligible members (as of December 31, 2023) would receive.



Actuarial Cost Note Regarding H.B. 1379, P.N. 1539
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

September 25, 2024

Table 2 Impact & Estimated Cost of Proposed COLA Increase (dollars in millions)	
Effective date of first COLA payment	After January 1, 2025
Funding date	July 1, 2025
Estimated number of retirees to receive COLA	23,542
Average COLA increase	17.73%
Estimated payroll in fiscal year 2025/2026	\$7,492.7
Increase in liability	\$332.4
Level annual 10-year funding payment	\$47.1
As a percent of projected payroll	0.63%

Methods and Assumptions Underlying Table 2 Results

The data used for this cost estimate is based on a special run provided by SERS that included all retirements through December 31, 2023. The data included age, gender, date of retirement, and both the initial and current monthly benefit for the retired population as of December 31, 2023. The estimated number of retirees to receive the COLA is based on the number of retirees in payment status as of December 31, 2023.

The liability was determined by using the actuarial assumptions and methods underlying the December 31, 2023 actuarial valuation. The expected payroll figure shown above is as of the first fiscal year in which the COLA will be funded. It is the December 31, 2023 valuation funding payroll projected forward one year.

The valuation results were produced using a proprietary actuarial valuation system, Pension Valuation Language (PVL). PVL has been actively used for over 40 years to perform annual funding/accounting valuations, gain and loss analyses, and cost studies for a wide variety of retirement systems. PVL was created specifically to value pension plan liabilities and uses the applicable assumptions and methods along with the pension plan census data to produce appropriate results. Test lives are generated to review the accuracy of both the input and output, allowing the users to confirm with a high degree of accuracy how the programmed benefit is applied to an individual along with the proposed decrements and other assumptions. The actuarial team loads the participant data, programs the benefit provisions, enters the applicable assumptions into the model, and reviews sample life output and results under the supervision of a credentialed actuary or actuaries who are proficient users of the software. We are not aware of any material limitations in the model nor any material inconsistencies in the assumptions used within the model.



Actuarial Cost Note Regarding H.B. 1379, P.N. 1539
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

September 25, 2024

Potential Risks Related to the COLA

The liabilities and costs in this cost note are based upon actuarial assumptions utilized in the December 31, 2023 actuarial valuation of SERS. These measurements represent a single estimate of the future liabilities and costs of SERS. Since the actual liabilities and costs will be determined based upon (i) the future actuarial assumptions underlying such future measurements and (ii) the actual future experience of SERS, there is a risk that future measurements will differ from those presented in this cost note.

To provide readers of this cost note with a greater appreciation for the sensitivity of these results to potential future changes in both the underlying actuarial assumptions and future SERS experience, we have performed three additional liability calculations:

- One liability calculation, based upon a 5.875% underlying interest rate assumption (a full 1% lower than the 6.875% assumption currently applicable to SERS). This is for the purpose of showing the extent of increase that would occur in our liability result if a 1% lower interest rate assumption applied in the future. Our resulting liability (based on the 5.875% interest rate) was \$349.9 million, or 5.3% greater than the Table 2 liability increase of \$332.4 million.
- A second liability calculation, based upon the assumption that the actual future mortality rates experienced by the retirees eligible for the proposed COLA increases are 10% lower than those currently assumed for SERS annuitants for a 10-year period and then revert back to current mortality assumptions after. This is in order to show the extent of increase that would occur in our liability result if the COLA-eligible SERS retirees had favorable future longevity. Our resulting liability (based on the more favorable mortality rates) was \$345.2 million, or 3.8% greater than the Table 2 liability increase of \$332.4 million.
- A third liability calculation, based upon both of the two adjustments described above. Our resulting liability (based on the 5.875% interest rate and the 10% lower assumed mortality rates for 10 years) was \$363.7 million, or 9.4% greater than the Table 2 liability increase of \$332.4 million.

Again, we are presenting the above supplemental results to be responsive to ASOP 51, hoping to enhance understanding and appreciation of SERS' risk exposure for readers of this cost note.



Actuarial Cost Note Regarding H.B. 1379, P.N. 1539
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

September 25, 2024

Actuarial Certification

To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,

Korn Ferry

By: Michael Spadaro
Michael Spadaro, F.S.A.
Member American Academy of Actuaries
Enrolled Actuary No. 23-8969

By: Craig R. Graby
Craig R. Graby
Member American Academy of Actuaries
Enrolled Actuary No. 23-7319

September 25, 2024



1205 Westlakes Drive
Suite 290
Berwyn, PA 19312

September 26, 2024

Ms. Terrill J. Sanchez
Executive Director
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, PA 17101

Re: Amendment A05600 to House Bill 1379, Printer's No. 1539

Dear Ms. Sanchez:

As requested, we have examined Amendment A05600 to House Bill 1379, Printer's No. 1539 (A05600). A copy of the Independent Fiscal Office's (IFO) request for analysis, the text of Amendment A05600 to House Bill 1379, Printer's No. 1539 are included in the Appendix to this letter. Our understanding of A05600 is as follows:

- A05600 would provide monthly supplemental annuities for Public School Employees' Retirement System (PSERS or System) retirees who meet the following conditions:
 - (a) Retirees in receipt of a superannuation, withdrawal, or disability annuity from the System on July 1, 2025,
 - (b) Retirees whose most recent effective date of retirement is prior to July 2, 2001, and
 - (c) Retirees whose credited service does not include any service credited as either Class T-D, Class D-4, or Class AA.
- The amount of each eligible retiree's monthly supplemental annuity would be a percentage of the retiree's monthly annuity payment in effect on July 1, 2025. The applicable percentage is based on the retiree's most recent effective date of retirement, as follows:

<u>Most recent effective date of retirement:</u>	<u>Percentage Factor:</u>
July 2, 2000 through July 1, 2001	15.0%
July 2, 1999 through July 1, 2000	15.5%
July 2, 1998 through July 1, 1999	16.0%
July 2, 1997 through July 1, 1998	16.5%
July 2, 1996 through July 1, 1997	17.0%
July 2, 1995 through July 1, 1996	17.5%
July 2, 1994 through July 1, 1995	18.0%
July 2, 1993 through July 1, 1994	18.5%
July 2, 1992 through July 1, 1993	19.0%
July 2, 1991 through July 1, 1992	19.5%
July 2, 1990 through July 1, 1991	20.0%
July 2, 1989 through July 1, 1990	20.5%
July 2, 1988 through July 1, 1989	21.0%
July 2, 1987 through July 1, 1988	21.5%
July 2, 1986 through July 1, 1987	22.0%
July 2, 1985 through July 1, 1986	22.5%
July 2, 1984 through July 1, 1985	23.0%
July 2, 1983 through July 1, 1984	23.5%
July 2, 1982 through July 1, 1983	24.0%
Prior to July 2, 1982	24.5%

- No monthly supplemental annuity would be payable to any beneficiary or survivor of a retiree who dies prior to July 1, 2025.
- The monthly supplemental annuity for eligible retirees would commence with the first monthly annuity payment after July 1, 2025. However, no monthly supplemental annuity would be payable to an annuitant receiving a withdrawal annuity prior to the first day of July coincident with or next following the annuitant's attainment of superannuation age.
- The monthly supplemental annuity would be paid automatically unless the annuitant files a written notice with the Board requesting that the additional monthly supplemental annuity not be paid.
- The monthly supplemental annuity would be payable under the same optional form of payment as the July 1, 2025, annuity payment. It would also be subject to any subsequent modification of the July 1, 2025, annuity form of payment.
- The additional liability attributable to the increase in benefits provided under this legislation would be funded in equal installments over a 10-year period beginning July 1, 2025.

Estimates of the potential financial impact of A05600 are presented in the attached Exhibit 1; A05600's additional cost to the System through 2057 is estimated to be \$935,930,000 on a cash flow basis. The estimates assume this legislation will be initially reflected during the June 30, 2024 actuarial valuation and funded in equal installments over a 10-year period beginning July 1, 2025.

It should be noted that increasing benefits at a time when the funded status of the System is only at 63.6% based on the actuarial value of assets at June 30, 2023, and employer pension contribution levels are at a rate of 32.92% of payroll should be carefully considered; particularly, the impact on the System's projected funded status and employer contribution rates. However, Gallagher does not take a position in favor of or in opposition to A05600.

Exhibit 2 provides a distribution of the eligible benefit recipients based on A05600's "most recent effective date of retirement" supplemental annuity subgroups.

Exhibit 3 provides the projected annual annuity cash flows for the eligible recipients with and without A05600's supplemental annuity.

In addition, the IFO has requested the following supplemental information:

- i) The total number of eligible recipients as of June 30, 2023, the most recent date as of which data is available, is 40,021.
- ii) The average age of the eligible retirees as of June 30, 2023, was 83.30 years.
- iii) The total of annual annuities paid to the eligible recipients as of June 30, 2023, was \$767,015,368.
- iv) The total of annual annuities for the eligible recipients with the supplemental annuity increases is estimated to be \$901,340,860 as of June 30, 2023. This includes \$30,494 in prospective annual supplemental annuities for retirees receiving a withdrawal annuity who have not attained superannuation age; the supplemental annuities for these retirees are deferred to the first day of July coincident with or next following the annuitant's attainment of superannuation age.
- v) The expected annual increases in benefit payments due to the proposed supplemental annuity are reported in Exhibit 3.

- vi) The average life expectancy for eligible retirees as of June 30, 2023, was 9.61 years.

The calculations presented here are based on the data, methods, and assumptions used in the June 30, 2023, actuarial valuation of PSERS, including an assumed annual rate of return on System assets of 7.00%, as well as the following assumptions for the projected future actuarial valuation results:

- (a) The workforce size is assumed to remain constant over the projection period.
- (b) Among new school employees hired on or after July 1, 2023, 98% will become Class T-G members, 1% will elect Class T-H membership, and 1% will elect Class DC participation.
- (c) Future new employees are assumed to have similar demographic characteristics (age/gender/salary) to those of new members who entered PSERS from July 1, 2020, through June 30, 2023.

In addition:

- The information presented in this analysis is based on the June 30, 2023, valuation data and projection of mortality in accordance with the valuation mortality assumption to the first effective payment of the supplemental annuity. The estimates of A05600's potential statistical and financial impact will be reduced by the statistics and cost of the supplemental annuity for contingent annuitants of any eligible member who dies prior to the COLA effective date, as they are not eligible; the expected impact of these deaths will reduce the overall cost impact of A05600.
- All eligible recipients were assumed to accept A05600's supplemental annuity.
- The System's annual actuarial valuation does not anticipate subsequent modifications to current retirees' annuity form of payment. Therefore, this analysis does not consider future modifications to A05600's supplemental annuity form of payment.
- A05600 requires funding of the additional liability in equal payments over a 10-year period. However, this contradicts § 8328(d) of current statutes, which stipulates that the additional liability for increases in supplemental benefits due to legislation enacted after June 30, 2010, is to be funded as a level percentage of compensation over a 10-year period. We are not qualified to comment on possible conflicts in Pennsylvania law. This analysis is based on A05600's provisions. The estimates of A05600's potential financial impact, as presented in the attached Exhibit 1, will change if it is determined that § 8328(d) of current statutes takes precedence over the funding provisions of A05600.

The information contained herein was developed at your request by Gallagher Benefit Services, Inc., using generally accepted actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs). The purpose of this analysis is to provide an estimate of A05600's projected additional cost to the System. Use of this presentation for any other purpose, or by anyone other than the Board of Trustees or the staff of PSERS, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the presentation for that purpose. Gallagher should be asked to review any statement to be made on the basis of the results contained herein. Gallagher will accept no liability for any such statement made without prior review by Gallagher. No third-party recipient of Gallagher's work product should rely upon Gallagher's work product absent involvement of Gallagher or without our approval.

Unless stated otherwise, references to "funded ratio" and "unfunded accrued liability" are measured using the actuarial value of assets. It should be noted that if the same measurements were made using the market value of assets, different funded ratios and unfunded accrued liabilities would result. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future

contributions but makes no assessment regarding the funded status of the System if the System were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

These results may be used as estimates of the likely pattern of emerging costs and liabilities resulting from A05600's proposed changes but should not be viewed as a guarantee of actual costs. Actual future funding obligations will be determined by actuarial valuations made on future valuation dates and will likely differ from the estimates provided in this analysis.

ASOP Nos. 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the Board do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. The Board adopted a new set of economic and demographic assumptions for the June 30, 2021, actuarial valuation based on the recommendations outlined by Gallagher in their 5-year experience study for the period July 1, 2015, to June 30, 2020. In the case of the Board's selection of an expected return on assets ("EROA"), we reviewed the analysis provided by the System's investment advisor as well as Gallagher's Financial Risk Management practice and determined the EROA assumption together with the System's other economic and demographic assumptions do not significantly conflict with what is reasonable for the purpose of the measurement. In our professional judgement, the combined effect of the assumptions is expected to have no significant bias.

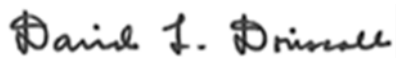
The Appendix presents a discussion of risks of actual future measurements deviating from expected future measurements and models used in calculating the results shown in this analysis.

This cost analysis only provides information regarding future funding contributions of the System. It does not provide any information regarding the impact any changes may have on financial disclosures under applicable GASB standards.

This cost analysis was prepared under my supervision. I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. I meet the Academy's qualification Standards to issue this Statement of Actuarial Opinion. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and I am available to answer questions about it.

Please contact me if you have any questions concerning this report.

Sincerely,



David L. Driscoll, FSA, MAAA, EA, FCA
Principal, Consulting Actuary

Enc.

Pc: Brian Lyman

Exhibit 1

Pennsylvania Public School Employees' Retirement System
Projection of Contribution Rates and Funded Ratios As of June 30, 2033
PSERS (Current) vs. Amendment A05600 to House Bill 1379, Printer's No. 1539 (A05600)

Fiscal Year Ending June 30	Total Payroll (\$Thousands)		Projected DC Payroll (\$Thousands)		Fiscal Year Market Rate of Return		Pension Rate Floor		Member Contribution Rate		Employer Normal Cost Rate		Employer Unfunded Liability Rate		Preliminary Employer Pension Rate		Health Care Contribution		Employer DC Contribution Rate		Total Employer Contribution Rate		Projected Total Employer Contribution (\$Thousands)				Funded Ratio		Unfunded Accrued Liability (Based on Actuarial Value of Assets & Millions)		Actuarial Value of Assets (\$Millions)		Market Value of Assets (\$Millions)	
																							Cost/Savings		Present Value as of June 30, 2023 (7.00%)									
	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600	Current	A05600		
2022	\$ 14,289,000	\$ 14,289,000	\$ 1,294,059	\$ 1,294,059	2.23 %	2.23 %	7.20 %	7.20 %	7.56 %	7.56 %	7.20 %	7.20 %	26.79 %	26.79 %	33.99 %	33.99 %	0.80 %	0.80 %			34.94 %	34.94 %			61.6 %	61.6 %	\$ 43,965.5	\$ 43,965.5	\$ 70,646.8	\$ 70,646.8	\$ 70,663.7	\$ 70,663.7		
2023	14,497,000	14,497,000	1,294,059	1,294,059	3.54	3.54	6.07	6.07	7.52	7.52	6.07	6.07	28.24	28.24	34.31	34.31	0.75	0.75			35.26	35.26			63.6	63.6	42,398.8	42,398.8	74,044.1	74,044.1	72,253.0	72,253.0		
2024	15,260,000	15,260,000	1,847,170	1,847,170	7.00	7.00	5.86	5.86	7.44	7.44	5.86	5.86	27.23	27.23	33.09	33.09	0.64	0.64	0.27 %	0.27 %	34.00	34.00	\$ 5,188,400	\$ 5,188,400	\$ 0	\$ 0	64.8	64.8	41,771.7	41,771.7	75,706.1	75,706.1		
2025	15,590,000	15,590,000	2,484,916	2,484,916	7.00	7.00	5.68	5.68	7.37	7.37	5.68	5.68	27.24	27.24	32.92	32.92	0.63	0.63	0.35	0.35	33.90	33.90	\$ 5,285,010	\$ 5,285,010	0	0	66.3	66.0	40,816.2	41,473.5	80,334.0	80,334.0		
2026	15,742,025	15,742,025	3,011,867	3,011,867	7.00	7.00	5.46	5.46	7.29	7.29	5.46	5.46	28.13	28.73	33.59	34.19	0.70	0.70	0.43	0.43	34.72	35.32	\$ 5,466,180	\$ 5,559,773	93,593	76,400	68.2	67.9	39,240.0	39,849.8	84,269.4	84,250.3		
2027	15,892,933	15,892,933	3,529,441	3,529,441	7.00	7.00	5.28	5.28	7.22	7.22	5.28	5.28	28.93	29.52	34.21	34.80	0.70	0.70	0.50	0.50	35.41	36.00	\$ 5,628,241	\$ 5,721,834	93,593	71,402	69.9	69.7	37,476.0	38,034.8	88,334.0	88,303.5		
2028	16,044,830	16,044,830	4,038,146	4,038,146	7.00	7.00	5.09	5.09	7.15	7.15	5.09	5.09	29.59	30.17	34.68	35.26	0.70	0.70	0.56	0.56	35.94	36.52	\$ 5,766,356	\$ 5,859,949	93,593	66,731	72.3	72.0	35,501.7	36,061.1	92,542.5	92,508.9		
2029	16,198,131	16,198,131	4,539,099	4,539,099	7.00	7.00	4.90	4.90	7.09	7.09	4.90	4.90	30.30	30.88	35.20	35.78	0.70	0.70	0.63	0.63	36.53	37.11	\$ 5,917,054	\$ 6,010,647	93,593	62,365	74.5	74.3	33,175.7	33,621.8	97,018.0	96,989.9		
2030	16,352,636	16,352,636	5,032,658	5,032,658	7.00	7.00	4.71	4.71	7.03	7.03	4.71	4.71	31.05	31.62	35.76	36.33	0.69	0.69	0.70	0.70	37.15	37.72	\$ 6,075,388	\$ 6,168,981	93,593	58,285	77.2	77.0	30,179.4	30,563.2	102,056.9	102,043.3		
2031	16,505,002	16,505,002	5,539,774	5,539,774	7.00	7.00	4.51	4.51	6.97	6.97	4.51	4.51	31.81	32.37	36.32	36.88	0.70	0.70	0.76	0.76	37.78	38.34	\$ 6,235,005	\$ 6,328,598	93,593	54,472	79.3	79.1	27,822.0	28,139.1	106,354.6	106,364.7		
2032	16,654,259	16,654,259	6,063,041	6,063,041	7.00	7.00	4.31	4.31	6.91	6.91	4.31	4.31	32.45	33.01	36.76	37.32	0.68	0.68	0.82	0.82	38.26	38.82	\$ 6,371,097	\$ 6,464,690	93,593	50,908	81.9	81.7	24,651.1	24,896.8	111,337.7	111,381.1		
2033	16,801,797	16,801,797	6,605,893	6,605,893	7.00	7.00	4.10	4.10	6.85	6.85	4.10	4.10	33.53	34.09	37.63	38.19	0.68	0.68	0.89	0.89	39.20	39.76	\$ 6,586,147	\$ 6,679,740	93,593	47,578	84.9	84.8	20,814.4	20,983.7	116,841.9	116,928.3		
2034	16,950,576	16,950,576	7,165,928	7,165,928	7.00	7.00	3.90	3.90	6.78	6.78	3.90	3.90	34.43	34.98	38.33	38.88	0.68	0.68	0.95	0.95	39.96	40.51	\$ 6,773,823	\$ 6,867,416	93,593	44,465	88.1	88.1	16,495.5	16,582.9	122,688.5	122,828.0		
2035	17,098,408	17,098,408	7,732,452	7,732,452	7.00	7.00	3.68	3.68	6.72	6.72	3.68	3.68	35.27	35.82	38.95	39.50	0.67	0.67	1.02	1.02	40.64	41.19	\$ 6,949,292	\$ 7,042,885	93,593	41,556	91.7	91.7	11,676.2	11,672.2	128,857.2	129,059.9		
2036	17,235,863	17,235,863	8,306,292	8,306,292	7.00	7.00	3.46	3.46	6.66	6.66	3.46	3.46	18.12	18.12	21.58	21.58	0.67	0.67	1.08	1.08	23.33	23.33	\$ 4,021,068	\$ 4,021,068	0	93.4	93.4	9,413.6	9,413.6	132,069.1	132,248.7			
2037	17,360,435	17,360,435	8,892,913	8,892,913	7.00	7.00	3.25	3.25	6.59	6.59	3.25	3.25	13.98	13.98	17.23	17.23	0.67	0.67	1.15	1.15	19.05	19.05	\$ 3,307,533	\$ 3,307,533	(0)	94.6	94.6	7,686.3	7,686.3	134,822.0	134,862.3			
2038	17,482,325	17,482,325	9,496,520	9,496,520	7.00	7.00	3.03	3.03	6.52	6.52	3.03	3.03	12.25	12.25	15.28	15.28	0.67	0.67	1.22	1.22	17.17	17.17	\$ 3,002,420	\$ 3,002,420	0	95.7	95.7	6,116.6	6,116.6	137,061.0	137,205.7			
2039	17,602,075	17,602,075	10,117,850	10,117,850	7.00	7.00	2.81	2.81	6.45	6.45	2.81	2.81	10.21	10.21	13.02	13.02	0.67	0.67	1.29	1.29	14.98	14.98	\$ 2,636,643	\$ 2,636,643	0	96.7	96.7	4,776.1	4,776.1	138,836.4	138,968.6			
2040	17,723,882	17,723,882	10,756,151	10,756,151	7.00	7.00	2.58	2.58	6.38	6.38	2.58	2.58	8.60	8.60	11.18	11.18	0.67	0.67	1.36	1.36	13.21	13.21	\$ 2,341,105	\$ 2,341,105	0	97.5	97.5	3,608.6	3,608.6	140,176.9	140,299.7			
2041	17,846,936	17,846,936	11,410,402	11,410,402	7.00	7.00	2.36	2.36	6.31	6.31	2.36	2.36	7.16	7.16	9.52	9.52	0.67	0.67	1.43	1.43	11.62	11.62	\$ 2,073,921	\$ 2,073,921	(0)	98.2	98.2	2,597.1	2,597.1	141,162.1	141,278.2			
2042	17,974,385	17,974,385	12,079,143	12,079,143	7.00	7.00	2.15	2.15	6.23	6.23	2.15	2.15	2.95	2.95	5.10	5.10	0.67	0.67	1.50	1.50	7.27	7.27	\$ 1,306,678	\$ 1,306,678	(0)	98.4	98.4	2,258.9	2,258.9	141,266.1	141,377.9			
2043	18,112,788	18,112,788	12,759,749	12,759,749	7.00	7.00	1.93	1.93	6.16	6.16	1.93	1.93	1.83	1.83	3.76	3.76	0.67	0.67	1.57	1.57	6.00	6.00	\$ 1,086,647	\$ 1,086,647	0	98.5	98.5	2,093.9	2,093.9	141,026.0	141,135.7			
2044	18,268,354	18,268,354	13,450,480	13,450,480	7.00	7.00	1.74	1.74	6.08	6.08	1.74	1.74	1.59	1.59	3.33	3.33	0.67	0.67	1.64	1.64	5.64	5.64	\$ 1,029,757	\$ 1,029,757	(0)	98.6	98.6	1,957.2	1,957.2	140,626.0	140,735.6			
2045	18,446,553	18,446,553	14,148,627	14,148,627	7.00	7.00	1.55	1.55	6.01	6.01	1.55	1.55	2.06	2.06	3.61	3.61	0.67	0.67	1.72	1.72	6.00	6.00	\$ 1,106,526	\$ 1,106,526	0	98.8	98.8	1,719.6	1,719.6	140,277.1	140,388.1			
2046	18,651,710	18,651,710	14,846,390	14,846,390	7.00	7.00	1.39	1.39	5.94	5.94	1.39	1.39	1.87	1.87	3.26	3.26	0.67	0.67	1.80	1.80	5.73	5.73	\$ 1,068,513	\$ 1,068,513	0	98.9	98.9	1,495.4	1,495.4	139,887.2	140,011.2			
2047	18,888,894	18,888,894	15,541,571	15,541,571	7.00	7.00	1.25	1.25	5.87	5.87	1.25	1.25	0.33	0.33	1.58	1.58	0.67	0.67	1.85	1.85	4.10	4.10	\$ 773,709	\$ 773,709	0	98.9	98.9	1,541.5	1,541.5	139,353.3	139,471.6			
2048	19,160,838	19,160,838	16,230,234	16,230,234	7.00	7.00	1.13	1.13	5.81	5.81	1.13	1.13	1.15	1.15	2.28	2.28	0.67	0.67	1.91	1.91	4.86	4.86	\$ 930,577	\$ 930,577	0	99.0	99.0	1,432.1	1,432.1	139,059.4	139,183.2			
2049	19,474,398	19,474,398	16,913,673	16,913,673	7.00	7.00	1.03	1.03	5.76	5.76	1.03	1.03	1.64	1.64	2.67	2.67	0.67	0.67	1.96	1.96	5.30	5.30	\$ 1,031,391	\$ 1,031,391	(0)	99.1	99.1	1,215.4	1,215.4	138,983.5	139,113.9			
2050	19,829,136	19,829,136	17,596,394	17,596,394	7.00	7.00	0.95	0.95	5.71	5.71	0.95	0.95	1.19	1.19	2.14	2.14	0.67	0.67	2.00	2.00	4.81	4.81	\$ 935,366	\$ 953,366	(0)	99.2	99.2	1,066.3	1,066.3	139,052.7	139,092.6			
2051	20,226,362	20,226,362	18,279,447	18,279,447	7.00	7.00	0.90	0.90	5.66	5.66	0.90	0.90	0.93	0.93	1.83	1.83	0.67	0.67	2.03	2.03	4.53	4.53	\$ 916,186	\$ 916,186	(0)	99.3	99.3	953.96	953.96	139,084.1	139,168.7			
2052	20,602,964	20,602,964	19,061,305	19,061,305	7.00	7.00	0.86	0.86	5.62	5.62	0.86	0.86	0.74	0.74	1.80	1.80	0.67	0.67	2.06	2.06	4.24	4.24	\$ 896,424	\$ 896,424	(0)	99.4	99.4	898.4	898.4	139,043.9	139,129.3			
2053	21,133,165	21,133,165	19,620,696	19,620,696	7.00	7.00	0.82	0.82	5.59	5.59	0.82	0.82	0.89	0.89	1.71	1.71	0.67	0.67	2.09	2.09	4.47	4.47	\$ 847,740	\$ 847,740</										

Exhibit 2
Eligible Benefit Recipients based on the June 30, 2023 Valuation Data
Distributed on Most Recent Effective Date of Retirement

Most recent effective date of retirement	Percentage Factor	Number of Eligible Benefit Recipients
July 2, 2000 through July 1, 2001	15.00%	1,267
July 2, 1999 through July 1, 2000	15.50%	3,080
July 2, 1998 through July 1, 1999	16.00%	6,354
July 2, 1997 through July 1, 1998	16.50%	3,529
July 2, 1996 through July 1, 1997	17.00%	4,814
July 2, 1995 through July 1, 1996	17.50%	2,913
July 2, 1994 through July 1, 1995	18.00%	1,702
July 2, 1993 through July 1, 1994	18.50%	1,535
July 2, 1992 through July 1, 1993	19.00%	3,795
July 2, 1991 through July 1, 1992	19.50%	1,339
July 2, 1990 through July 1, 1991	20.00%	1,292
July 2, 1989 through July 1, 1990	20.50%	1,132
July 2, 1988 through July 1, 1989	21.00%	1,004
July 2, 1987 through July 1, 1988	21.50%	776
July 2, 1986 through July 1, 1987	22.00%	775
July 2, 1985 through July 1, 1986	22.50%	888
July 2, 1984 through July 1, 1985	23.00%	757
July 2, 1983 through July 1, 1984	23.50%	653
July 2, 1982 through July 1, 1983	24.00%	506
Prior to July 2, 1982	24.50%	1,910
Total		40,021

This is an attachment to Gallagher's September 26, 2024 cost analysis on Amendment A05600 to House Bill 1379, Printer's No. 1539. Please refer to that cost analysis for more information.

Exhibit 3
Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting A05600 Supplemental Annuity	Increase in Benefit Payments due to A05600 Supplemental Annuity
2025	694,111,929	694,111,929	0
2026	645,045,526	757,137,483	112,091,957
2027	596,002,330	699,247,941	103,245,611
2028	547,356,896	641,878,566	94,521,670
2029	499,478,290	585,470,530	85,992,239
2030	452,726,711	530,438,803	77,712,092
2031	407,446,387	477,188,872	69,742,485
2032	363,958,363	426,089,526	62,131,163
2033	322,554,682	377,479,163	54,924,480
2034	283,493,139	331,653,756	48,160,617
2035	246,992,355	288,863,029	41,870,674
2036	213,227,201	249,305,243	36,078,042
2037	182,323,363	213,121,154	30,797,791
2038	154,351,181	180,387,006	26,035,825
2039	129,324,099	151,113,028	21,788,929
2040	107,201,206	125,246,574	18,045,368
2041	87,891,170	102,676,781	14,785,611
2042	71,256,876	83,239,969	11,983,093
2043	57,120,392	66,725,604	9,605,212
2044	45,272,106	52,886,693	7,614,587
2045	35,482,868	41,454,074	5,971,206
2046	27,513,443	32,147,274	4,633,831
2047	21,121,573	24,682,720	3,561,147
2048	16,070,434	18,783,513	2,713,080
2049	12,136,296	14,188,257	2,051,961
2050	9,114,413	10,657,904	1,543,491
2051	6,823,045	7,980,330	1,157,285
2052	5,105,343	5,972,505	867,162
2053	3,829,776	4,480,977	651,201
2054	2,889,120	3,380,650	491,530
2055	2,198,205	2,572,146	373,941
2056	1,691,008	1,978,426	287,418
2057	1,317,534	1,541,112	223,579
2058	1,040,756	1,216,961	176,205
2059	833,743	974,501	140,758
2060	677,140	791,101	113,961
2061	557,150	650,614	93,464
2062	464,015	541,609	77,594
2063	390,846	456,010	65,164
2064	332,740	388,065	55,324

Exhibit 3
Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting A05600 Supplemental Annuity	Increase in Benefit Payments due to A05600 Supplemental Annuity
2065	286,148	333,607	47,459
2066	248,438	289,546	41,108
2067	217,626	253,556	35,930
2068	192,205	223,868	31,664
2069	171,018	199,128	28,110
2070	153,142	178,254	25,113
2071	137,838	160,385	22,547
2072	124,543	144,862	20,319
2073	112,824	131,180	18,356
2074	102,348	118,952	16,604
2075	92,865	107,886	15,021
2076	84,187	97,764	13,576
2077	76,182	88,429	12,248
2078	68,759	79,779	11,020
2079	61,861	71,745	9,884
2080	55,445	64,276	8,832
2081	49,482	57,340	7,858
2082	43,953	50,913	6,960
2083	38,845	44,979	6,133
2084	34,145	39,521	5,377
2085	29,844	34,532	4,687
2086	25,936	30,000	4,064
2087	22,405	25,908	3,503
2088	19,234	22,236	3,002
2089	16,404	18,960	2,556
2090	13,897	16,059	2,162
2091	11,693	13,510	1,817
2092	9,766	11,282	1,516
2093	8,089	9,344	1,255
2094	6,639	7,668	1,029
2095	5,394	6,229	836
2096	4,334	5,005	671
2097	3,439	3,971	532
2098	2,690	3,106	416
2099	2,070	2,391	320
2100	1,565	1,808	242
2101	1,161	1,340	180
2102	842	972	130
2103	596	688	92
2104	411	474	64

Exhibit 3
Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting A05600 Supplemental Annuity	Increase in Benefit Payments due to A05600 Supplemental Annuity
2105	275	318	43
2106	178	206	28
2107	112	129	17
2108	68	78	10
2109	39	45	6
2110	22	25	3
2111	12	13	2
2112	6	7	1
2113	3	3	0
2114	1	2	0
2115	1	1	0
2116	0	0	0
2117	0	0	0

This is an attachment to Gallagher's September 26, 2024 cost analysis on Amendment A05600 to House Bill 1379, Printer's No. 1539. Please refer to that cost analysis for more information.

Appendix

Actuarial Standard of Practice No. 56

ASOP No. 56 provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Gallagher uses the following:

- third-party software in the performance of annual actuarial valuations and projections to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report.
- an internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report.

Gallagher has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability, and consistency with prior results. Gallagher also reviews the third-party model when significant changes are made to the software or model. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within the company who are familiar with the details of the required changes.

Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important. ASOP 51 requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgment, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts on the Retirement System.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the Retirement System's future financial condition:

- Investment risk – potential that the investment return will differ from the 7.00% expected in the actuarial valuation.
- Salary increases – potential that salary increases will be different from that assumed for the actuarial valuation.

- Longevity risk – potential that participants live longer than expected from the valuation mortality assumptions.
- Declining workforce – potential that future employer contribution rates will be different from expected.
- Contribution risk – potential that the contribution will be different than the recommended contribution in the actuarial valuation.

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. This list is not all-inclusive; it is an attempt to identify the most significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the Retirement System employers to make contributions to the Retirement System when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or guidance on the management or reduction of risk. Gallagher welcomes the opportunity to assist in such matters as part of a separate project or projects utilizing the appropriate staff and resources for those objectives.

Investment Risk: Retirement System costs are very sensitive to the market return. Returns on assets below those assumed will increase costs.

- Investment returns at less-than-expected levels will cause the assets to be lower than expected. This decrease in assets will increase the Retirement System cost.
- The Retirement System uses an actuarial value of assets that smooths gains and losses on market returns over a ten-year period to help control some of the volatility in costs due to investment risk.

Salary increases: Retirement System costs are sensitive to salary increases since benefits at retirement are pay-related.

- Salary increases above those expected would lead to higher liabilities, larger unfunded liabilities, and larger employer contributions.
- Salaries below those expected would lead to lower liabilities but may increase employer contribution rates due to lower employer payroll.

Longevity Risk: Retirement System costs will increase as participants are expected to live longer. This is because:

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, increasing participants' life expectancies. As health care improves, Retirement System costs will increase.
- The mortality assumption used in the actuarial valuation of the Retirement System incorporates assumed future improvement in longevity. Future longevity improvements exceeding those reflected in the current mortality assumption would lead to increased Retirement System costs.
- Granting benefit improvements may increase the impact of this risk due to larger benefits being paid over a longer period than is presently expected. Because the benefit increases are ad hoc, one-time improvements, the increase in longevity risk may be mitigated.

Declining workforce: Employer contributions are based on a percentage of participants' salaries. If the required dollar amount of contributions remains level or increases, a declining active workforce will result in higher contribution rates in order to meet required contribution levels.

Contribution Risk: The Retirement System contribution is a budgeted amount. There is a risk associated with the employer's contribution when the budgeted amount and recommended amount differ. This is because:

- If budgeted contributions are lower than recommended contributions, the Retirement System may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts needed to cover the additional Unfunded Actuarial Accrued Liability associated with contributions at levels below those recommended.