

General Assembly

Retirement System of Illinois

Annual Actuarial Valuation as of June 30, 2020





January 4, 2021

Board of Trustees
General Assembly Retirement System of Illinois
Springfield, Illinois

Re: General Assembly Retirement System of Illinois Actuarial Valuation as of June 30, 2020

Dear Board Members:

The results of the June 30, 2020, Annual Actuarial Valuation of the General Assembly Retirement System of Illinois ("GARS" or "System") are presented in this report. The purposes of the valuation are to measure the System's funding status and to determine the State's contribution rate for the fiscal year beginning July 1, 2021, and ending June 30, 2022. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with benefits described in this report, for purposes other than those identified above may be significantly different.

Gabriel, Roeder, Smith & Company ("GRS") has prepared this report exclusively for the Trustees of the General Assembly Retirement System of Illinois. GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than GARS only in its entirety and only with the permission of the Trustees.

The State's contribution rate has been determined under Illinois statutes, in particular under 40 ILCS Section 5/2-124. Information required by GASB Statements Nos. 67 and 68 is provided in a separate report. The System's current contribution rate determined under the statutory funding policy may not conform with the Actuarial Standards of Practice. Therefore, the Board adopted a policy to be used to calculate the Actuarially Determined Contribution ("ADC") under GASB Statements Nos. 67 and 68 for financial reporting purposes.

Although the statutory contribution requirements were met, the statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution. Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved. We recommend the adherence to a funding policy, such as the Board policy used to calculate the ADC under GASB Statements Nos. 67 and 68, that funds the normal cost of the plan as well as an amortization payment that seeks to pay off any unfunded accrued liability over a closed period of 20 years.

The contribution requirement in this report is determined using the actuarial assumptions and methods disclosed in Section E of this report. This report includes risk metrics beginning on page 13, but does not include a more robust assessment of the risks if future experience deviates from the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This actuarial valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through June 30, 2020. This actuarial valuation was based upon information furnished by GARS staff, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by GARS staff.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report was prepared using actuarial assumptions adopted by the Board as authorized under the Illinois Pension Code. The actuarial assumptions used for the June 30, 2020, actuarial valuation are based on an experience review for the three-year period from July 1, 2015 through June 30, 2018. Pursuant to Public Act 99-0232, GARS is required to conduct an actuarial experience review once every three years. All actuarial assumptions used in this report are reasonable for the purposes of this actuarial valuation. Additional information about the actuarial assumptions is included in Section E of this report.

Public Act 100-0023, effective July 6, 2017, modified the State's funding policy beginning with fiscal year 2018, by phasing in contribution rate variances due to changes in actuarial assumptions over a five-year period. The State's contribution requirements provided in this report are determined in accordance with Public Act 100-0023.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the GARS as of the actuarial valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Alex Rivera, Heidi G. Barry, and Jeffrey T. Tebeau are Members of the American Academy of Actuaries (MAAA) as indicated, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Gabriel, Roeder, Smith & Company



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SECTION A

SUMMARY OF ACTUARIAL VALUATION RESULTS

Key Valuation Results

Introduction

The law governing the General Assembly Retirement System of Illinois (“GARS” or “System”) requires the Actuary, as the technical advisor to the Board of Trustees to:

“...make an annual valuation of the liabilities and reserves of the System, an annual determination of the amount of the required State contributions and certify the results thereof to the board. (40 ILCS Section 5/2-146 (2)).”

Gabriel, Roeder, Smith & Company (“GRS”) has been retained by the Board of Trustees to perform an actuarial valuation as of June 30, 2020. In this report, we present the results of the actuarial valuation and the appropriation requirements under Public Act 88-0593, Public Act 93-0002, Public Act 93-0839, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023 for fiscal year ending June 30, 2022.

The actuarial valuation was completed based upon membership and financial data provided by the administrative staff of the System. The actuarial assumptions used were based on an experience review for the three-year period ending June 30, 2018. The cost method used to determine the benefit liabilities is the Projected Unit Credit Cost Method. For actuarial valuation purposes, as well as projection purposes, the actuarial value of assets is based on a five-year smoothing method.

Changes Since Last Valuation

Recent Legislative Changes

The following recently passed Public Acts impact GARS as follows.

Public Act (“P.A.”) 100-0023, effective July 6, 2017, modified the State’s funding policy to include smoothing State contribution rate increases or decreases due to changes in actuarial assumptions, including investment return assumptions, over a five-year period in equal annual amounts beginning in fiscal year 2018. In addition, changes in actuarial or investment assumptions that increased or decreased the State contribution rate in fiscal years 2014 through 2017 are to be smoothed over a five-year period in equal annual amounts, applying only to the portion of the five-year phase-in that is applicable to fiscal years on and after 2018. The fiscal year 2018 State contribution was recertified, pursuant to P.A. 100-0023.

A summary of the GARS plan provisions is included in Section F of this report.

Assumptions and Methods

The actuarial valuation results summarized in this report involve actuarial calculations that require assumptions about future events. The actuarial assumptions used for the June 30, 2020, actuarial valuation are based on the Experience Study report for the three-year period from July 1, 2015 through June 30, 2018. Pursuant to Public Act 99-0232, GARS is required to conduct an actuarial experience review once every three years.

There have been no changes to the actuarial assumptions and methods since the June 30, 2019 valuation.



Key Valuation Results

Actuarial Valuation Date:	June 30, 2020	June 30, 2019
Fiscal Year Ending:	June 30, 2022	June 30, 2021
Estimated Statutory Contributions:		
· Annual Amount	\$ 27,820,000	\$ 27,299,000
· Percentage of Projected Capped Payroll for Fiscal Year	286.061%	277.973%
Actuarially Determined Contribution^a (ADC):		
· Annual Amount	\$ 35,005,692	\$ 34,432,777
· Percentage of Projected Capped Payroll for Fiscal Year	359.953%	350.609%
Membership		
· Number of		
- Active Members	124	126
- Members Receiving Payments	438	441
- Inactive Members	65	69
- Total	627	636
· Covered Uncapped Payroll Provided by System	\$ 10,184,857	\$ 10,159,312
· Projected Capped Payroll For Fiscal Year	\$ 9,725,080	\$ 9,820,850
· Annualized Benefit Payments	\$ 25,312,301	\$ 25,010,011
Assets		
· Market Value of Assets (MVA)	\$ 62,993,904	\$ 59,719,220
· Actuarial Value of Assets (AVA)	\$ 63,879,905	\$ 60,057,098
· Return on MVA	4.27%	6.10%
· Return on AVA	5.15%	5.21%
· Ratio – AVA to MVA	101.41%	100.57%
Actuarial Information		
· Employer Normal Cost Amount	\$ 1,879,583	\$ 2,001,416
· Actuarial Accrued Liability (AAL)	\$ 373,493,743	\$ 374,597,259
· Unfunded Actuarial Accrued Liability (UAAL)	\$ 309,613,838	\$ 314,540,161
· Funded Ratio based on AVA	17.10%	16.03%
· UAAL as % of Covered Payroll	3,039.94%	3,096.08%
· Funded Ratio based on MVA	16.87%	15.94%

^a For contributions in fiscal years ending on and after June 30, 2017, the Board adopted a recommended policy used to develop the Actuarially Determined Contribution (ADC) as defined in GASB Statements Nos. 67 and 68. The policy adopted by the Board calculates the ADC as the Normal Cost plus a 20-year level percent of capped payroll closed-period amortization of the Unfunded Accrued Liability. As of June 30, 2020, the remaining amortization period is 15 years. The ADC is used for financial reporting purposes only.

Appropriation Requirements under P.A. 88-0593, P.A. 96-0002, P.A. 93-0839, P.A. 94-0004, P.A. 96-0043, and P.A. 100-0023

The law governing the System under P.A. 88-0593 provides that:

For fiscal years 2011 through 2045, the minimum contribution to the System for each fiscal year shall be an amount determined to be sufficient to cause the total assets of the System to equal 90 percent of the total actuarial liabilities of the System by the end of fiscal year 2045. In making these determinations, the required contribution shall be calculated each year as a level-percentage-of-payroll over the years remaining to and including fiscal year 2045 and shall be determined under the projected unit credit actuarial cost method. For fiscal years 1997 through 2010, the minimum contribution to the System, as a percentage of the payroll, shall be increased in equal annual increments so that by fiscal year 2010, the contribution rate is at the same level as the contribution rate for fiscal years 2011 through 2045.

The above calculation provides the basis for calculating the appropriation requirements under P.A. 93-0002. For fiscal years 2005 and later, the contributions under P.A. 93-0002 start with a calculation of the contribution based upon the hypothetical asset value which assumes no infusion from the proceeds of the General Obligation Bond ("GOB") sale that were deposited July 1, 2003 (Table 4a). This contribution is then reduced by the debt service beginning in fiscal year 2005 to produce the maximum contribution. For fiscal years 2006 and 2007, the maximum contribution is equal to the contribution amounts stated in P.A. 94-0004 for each respective year. The contribution amounts stated in P.A. 94-0004 are \$4,157,000 for fiscal year 2006 and \$5,220,300 for fiscal year 2007. A second projection is performed to develop the P.A. 88-0593 formula rate, which includes the GOB deposit. The lower of this formula rate with the GOB assets included and the maximum contribution is the required state appropriation (Table 4b).

Pursuant to Public Act 96-0043, for the calculation of the fiscal year 2011 contribution and beyond, the value of the System's assets shall be equal to the actuarial value of the System's assets. As of June 30, 2008, the actuarial value of the System's assets shall be equal to the market value of the assets as of that date. In determining the actuarial value of the System's assets for fiscal years after June 30, 2008, any actuarial gains or losses from investment return incurred in a fiscal year shall be recognized in equal annual amounts over the five-year period following that fiscal year. Furthermore, for purposes of determining the required State contribution to the System for a particular year, the projected actuarial value of assets shall be assumed to earn a rate of return equal to the System's actuarially assumed rate of return.

Public Act ("P.A.") 100-0023, effective July 6, 2017, modified the State's funding policy to include smoothing State contribution rate increases or decreases due to changes in actuarial assumptions, including investment return assumptions, over a five-year period in equal annual amounts beginning in fiscal year 2018. In addition, changes in actuarial or investment assumptions that increased or decreased the State contribution rate in fiscal years 2014 through 2017 are to be smoothed over a five-year period in equal annual amounts, applying only to the portion of the five-year phase-in that is applicable to fiscal years on and after 2018. The development of the contribution rate phase-in schedule that applies to State contribution rates determined on and after fiscal year 2018 is provided on page 44.



Development of the Actuarial Value of Assets Based upon the Market Value of Assets

The following tables outline the reconciliation of the market value of assets and the development of the hypothetical asset value as of June 30, 2020. Also, the tables show the development of the actuarial value of assets under both the market value and the hypothetical value of assets.

1. Market Value of Assets 6/30/2019	\$ 59,719,220
2. Actual State Contribution Amount	25,754,000
3. Employee Contribution Amount	1,205,930
4. Benefit Payouts & Refunds	(25,847,714)
5. Administrative Expenses	(400,697)
6. Investment Income	2,563,165
7. Market Value of Assets 6/30/2020	62,993,904
8. Expected Investment Return at 6.50%	3,904,510
9. Investment Gain/(Loss) Current Year	(1,341,345)
10. Deferred Investment Gains and (Losses) All Years	(886,001)
11. Actuarial Value of Assets 6/30/2020 (7. - 10.)	\$ 63,879,905

Development of the Actuarial Value of Assets Based upon the Hypothetical Value of Assets

The hypothetical asset value assumes no infusion from the proceeds of the GOB sale that were deposited July 1, 2003.

1. Hypothetical Value of Assets 6/30/2019	\$ 14,768,743
2. State Contribution Amount ^a	29,496,902
3. Employee Contribution Amount	1,205,930
4. Benefit Payouts & Refunds	(25,847,714)
5. Administrative Expenses	(400,697)
6. Investment Income ^b	724,733
7. Hypothetical Value of Assets 6/30/2020	19,947,897
8. Expected Investment Return at 6.50%	1,102,458
9. Investment Gain/(Loss) Current Year	(377,725)
10. Deferred Investment Gains and (Losses) All Years	(301,910)
11. Hypothetical Actuarial Value of Assets 6/30/2020 (7. - 10.)	\$ 20,249,807

^a Represents FY 2020 no POB basic contribution. This amount was determined as part of the June 30, 2018 actuarial valuation, and is based upon the hypothetical asset value which assumes no infusion from the proceeds of the GOB sale that were deposited July 1, 2003.

^b Investment income assumes hypothetical value of assets earns the Fund's actual rate of return for fiscal year 2020 of 4.27 percent.

The development of the actuarial smoothed value of assets with GOB proceeds and the hypothetical smoothed value of assets without GOB proceeds are provided in each respective historical valuation report GRS has produced since the GOB proceeds were deposited into the trust.

State Contribution Requirement for Fiscal Year 2022

The fiscal year ending June 30, 2021, and June 30, 2022, certified contribution requirements and projected future year required State contribution rates and amounts, assuming deferred investments gains and losses are recognized in the assets, are as follows:

Fiscal Year Ending June 30,	Base Contribution	Assumed Capped Payroll	Total Required Contribution
2021	277.973%	\$9,821,000	\$27,299,000
2022	286.061%	9,725,000	27,820,000
2023	285.159%	9,527,000	27,167,000
2024	284.999%	9,314,000	26,545,000
2025	283.335%	9,088,000	25,749,000
2026	282.148%	9,029,000	25,475,000
2027	280.618%	8,871,000	24,894,000
2028	278.505%	8,804,000	24,520,000
2029	276.442%	8,720,000	24,106,000
2030	273.445%	8,639,000	23,623,000

For fiscal years 2022 through 2033, the base contribution may be limited by the maximum contribution determined under the assumption that the proceeds of the GOB sale were not deposited; therefore, the contribution rate is not level as a percent of pay.

Pursuant to Public Act 96-0043, the fiscal year 2022 contribution rate is calculated assuming the actuarial value of assets as of July 1, 2020, earns a rate of return equal to the System's actuarially assumed rate of return. Pursuant to Public Act 100-0023, contribution rates for fiscal years 2021 through 2025 include smoothing of contribution rate variances due to changes in actuarial assumptions.

The contributions for fiscal years 2023 and beyond, as presented above, are developed in Tables 4c and 4d in this report. In those projections, the actuarial valuations as of June 30 for years 2021 through 2024 have been projected as though an actuarial valuation in each of those years was performed. At each projected actuarial valuation, an additional 20 percent of the investment gains and losses are recognized. The market value of assets at June 30, 2020, is assumed to have a rate of return equal to the valuation interest rate going forward. Therefore, the actuarial value of assets is calculated by adjusting the market value at each respective actuarial valuation date by the remaining percentage of the investment gains and losses. The actuarial value of assets converges to market value in 2024, when all remaining investment gains and losses have been recognized. Because the deferred asset gains and losses are incorporated into the projections, the projections found in Tables 4c and 4d do not show a stable contribution rate until the impact of the five-year asset smoothing has been fully realized.

Method of Calculation for Appropriation Requirements

The results are based on the projected unit credit actuarial cost method, the data provided and actuarial assumptions used for the June 30, 2020, actuarial valuation. In order to determine projected contribution rates and amounts, the following additional assumptions were used:

- Projected annualized capped payroll of \$9,821,000 for fiscal year 2021.
- Total employer contributions of \$27,299,000 for fiscal year 2021.
- Administrative expenses of \$350,880 for fiscal year 2021, as provided by the System.
- New entrants whose average age is 41.65, average uncapped pay is \$82,010 (2020 dollars) and average capped pay is \$81,345 (2020 dollars). Based on the assumption that 50 percent of future members elect to opt out of the pension system, the population is projected to decrease from 124 members as of the valuation date, to 65 members in 2045 and ultimately reach 62 members in 2055.
- Projected benefits for members hired on or after January 1, 2011, are based on the plan provisions established in P.A. 96-0889.

The average increase in total uncapped payroll for the 25-year projection period is approximately 2.50 percent per year. It is important to note that benefits for new hires are based on capped payroll which is ultimately projected to grow at 2.25 percent per year. All results in this actuarial valuation assume that State contributions will be made on capped pay.

To determine the contribution rates, the expected 2021 appropriation was converted to a percentage of the expected 2021 payroll. An amortization schedule was then determined based on the assumption that:

- The ratio of total assets to total actuarial liabilities will be 90 percent by June 30, 2045.
- The actuarial value of assets shall be assumed to earn a rate of return equal to the System's actuarially assumed rate of return.
- The contribution rates for fiscal years 2010 through 2033 will not be uniform, but the rate for any one of these years will be the minimum of: the difference between the "without-GOB" contribution and the debt service, and the underlying formula rate as determined by Public Act 88-0593.
- The contribution rate for fiscal year 2021 will be 277.973 percent based on expected total employer contributions of \$27,299,000.
- The contribution rates for fiscal years 2034 through 2045 will be a uniform percentage of capped payroll.
- The contribution rates for fiscal years 2021 through 2025 are reduced according to the phase-in schedule provided on page 44.

The certified 2022 contribution rate of 286.061 percent is applied to expected FY 2022 capped payroll. The resulting amount of \$27,820,000 is budgeted pursuant to the continuing appropriations process and deposited into the System in FY 2022.



Observations on Actuarial Funding and Statutory Funding

GASB Statements Nos. 25, 27, 67, and 68 provide guidance for retirement plans and plan sponsors on the development of an annual expense requirement to be reported in their annual financial statements. Under the rules established by previous GASB Statements Nos. 25 and 27, this expense requirement is called the Annual Required Contribution (ARC). The ARC is the sum of the normal cost and amortization of the unfunded accrued liability and represents the annual employer contributions that are projected to finance benefits for current plan members over a period not to exceed 30 years.

GASB Statements Nos. 67 and 68, which replaced GASB Statements Nos. 25 and 27, no longer use the ARC. However, measuring the Statutory Contribution against a policy such as the ARC helps evaluate the funding adequacy of the current Statutory funding method. Thus, the Board adopted a policy to calculate the Actuarial Determined Contribution (ADC). Under this funding policy, the ADC is calculated as the Normal Cost plus a 20-year level percent of capped payroll closed-period amortization, as of June 30, 2015, of the Unfunded Accrued Liability. The remaining amortization period as of the June 30, 2020, actuarial valuation is 15 years.

The ADC for fiscal years 2021 and 2022, as well as the statutory contribution for fiscal years 2021 and 2022 are shown below as a percentage of projected capped payroll. The ADC percentage and statutory contribution for 2021 are based on the results of the June 30, 2019, actuarial valuation. The dollar amount of the ADC for 2021 and 2022, and the statutory contribution for 2021 and 2022 will be the product of the actual payroll for 2021 and 2022 and the percentages shown.

Actuarial Valuation Date:	June 30, 2020	June 30, 2019
Actuarially Determined Contributions for Fiscal Year Ending:	June 30, 2022	June 30, 2021
1. Employer normal cost	\$ 1,879,583	\$ 2,001,416
2. Initial amount to amortize the unfunded liability over a 20-year closed-period, beginning July 1, 2015, as a level percentage of capped payroll	33,126,109	32,431,361
3. ADC [(1) + (2)]	\$35,005,692	\$34,432,777
4. Projected capped payroll for fiscal year	\$ 9,725,080	\$ 9,820,850
5. ADC as a percentage of projected capped payroll	359.953%	350.609%
6. Estimated statutory contribution	\$27,820,000	\$27,299,000
7. Estimated statutory contribution as a percentage of projected capped payroll	286.061%	277.973%
8. Estimated statutory contribution as a percentage of ADC [(6) / (3)]	79.473%	79.282%

A key objective of the ADC is to accrue costs over the working lifetime of plan members to ensure that benefit obligations are satisfied and intergenerational equity is promoted. Although the ADC is solely an accounting provision, in certain circumstances it could represent a reasonable annual funding target and therefore is used by some plan sponsors as their “de facto” funding requirement. Given there is no requirement that the accounting provision for pension expense must equal the annual funding requirement, some plan sponsors adopt funding policies that differ from the ADC. However, a funding policy that differs significantly from the ADC approach could result in a potential “back-loading,” meaning contributions are deferred to the future. Back-loading could result in an underfunding of the system.

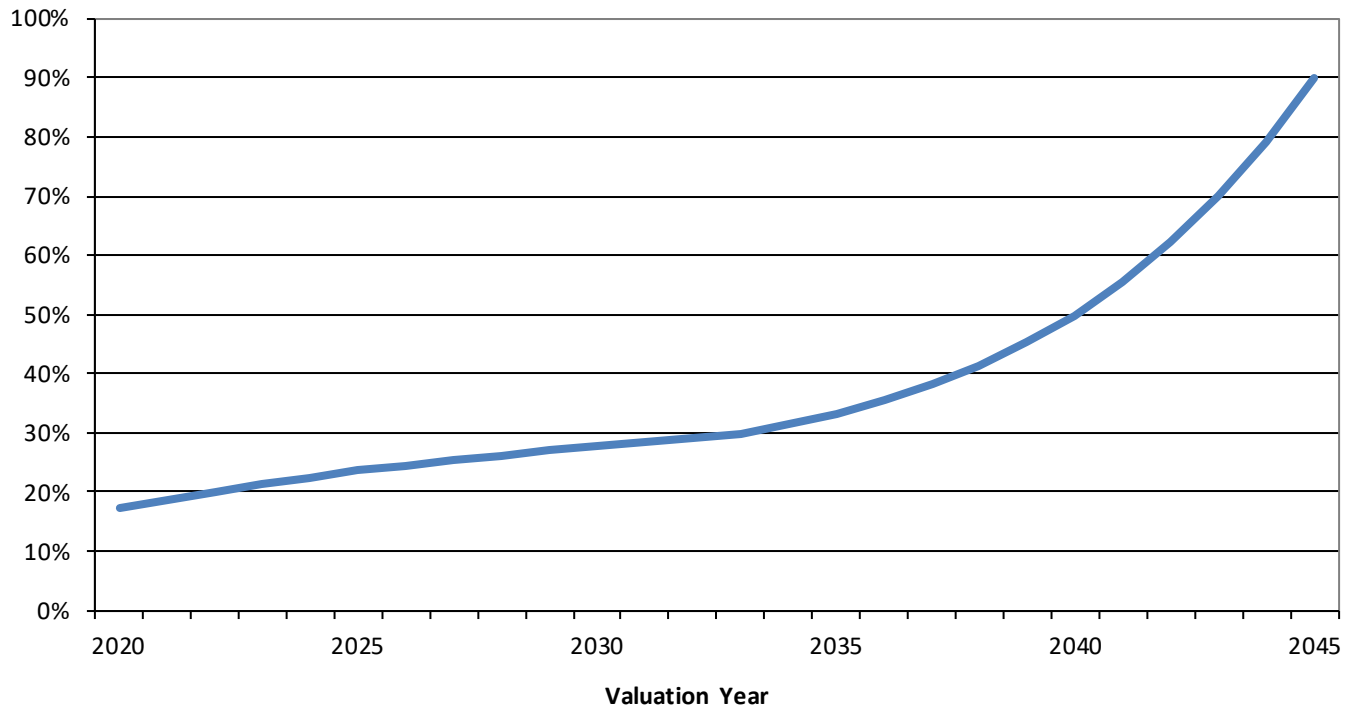
The statutory funding policy adopted for GARS provides for level percent of pay funding that produces a funding target of 90 percent by 2045, assuming an open group projection. The following graph shows the projected funded ratio. A key observation is that the funded ratio does not grow markedly



Observations on Actuarial Funding and Statutory Funding

until after 2033. That is, a majority of the funding occurs between 2034 and 2045. This illustrates how significantly the current funding policy defers or back-loads contributions into the future.

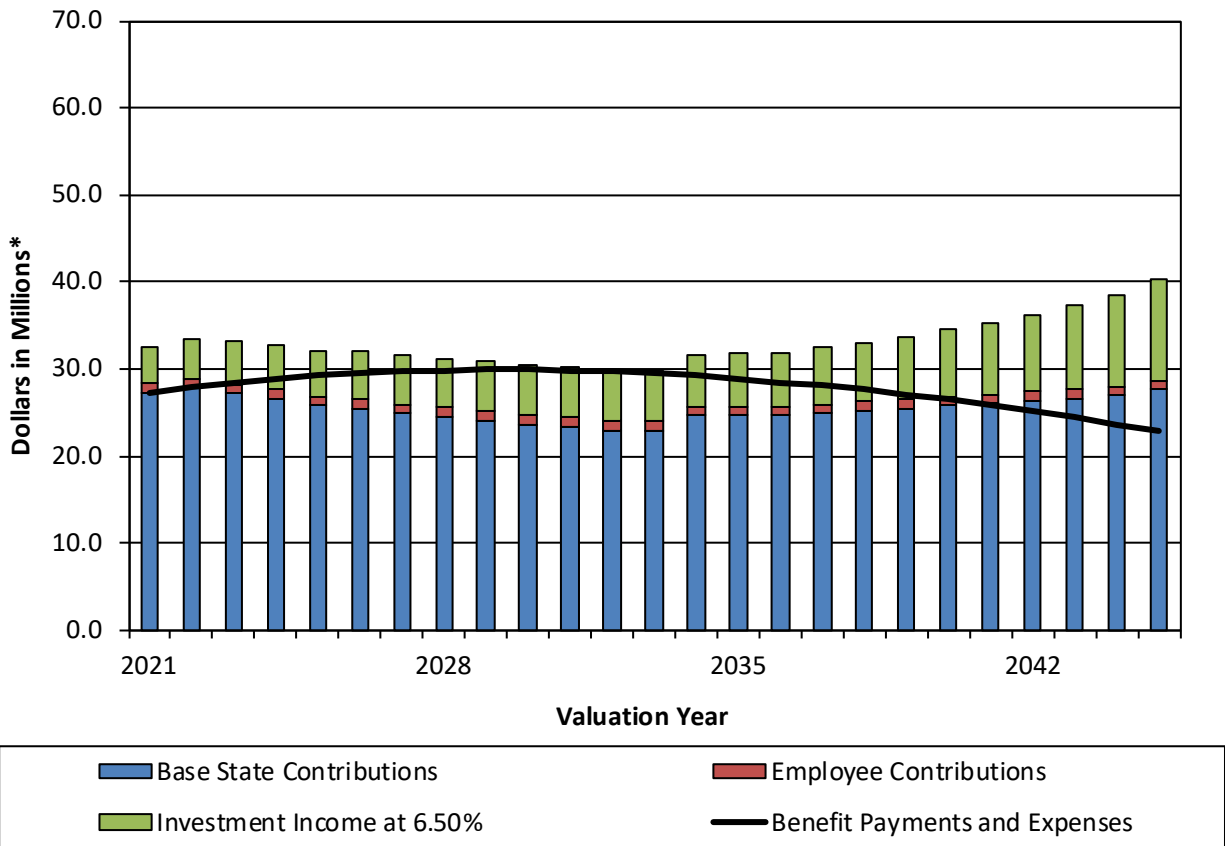
Funded Ratio



Observations on Actuarial Funding and Statutory Funding

The following graph compares the projected benefits and expenses against employer contributions, employee contributions and investment income. Benefits and expenses are projected to exceed State and employee contributions beginning in fiscal year 2023. From 2024 to 2032, the percentage of investment income needed to pay ongoing benefits increases from approximately 19 percent to 93 percent. This implies that a lower level of investment income is projected to be available for potential asset growth. After 2032, the percentage of investment income needed to pay ongoing benefits is projected to decrease from approximately 89 percent in 2033 to 3 percent in 2039, which is projected to cause assets to grow at a higher rate.

Comparison of Cash Flows



**Future dollar amounts are based on assumed inflationary increases.*

The provisions of P.A. 96-0043 develop a theoretical value of assets that does not recognize deferred investment gains and losses in the projection of assets used to develop the statutory contribution. This policy has a tendency to defer contributions when plan assets experience a loss.

Given that the GARS funded ratio at June 30, 2020, is only 17 percent on a market value of assets basis and because the current statutory policy tends to back-load and defer contributions, we advise strengthening the current statutory funding policy. Examples of methods to strengthen the current funding policy include:



Observations on Actuarial Funding and Statutory Funding

1. Increasing the 90 percent funding target;
2. Reducing the projection period needed to reach the funding target;
3. Eliminating the maximum contribution cap; and,
4. Changing the actuarial cost method for calculating liabilities from the Projected Unit Credit to the Entry Age Normal method.

Also, the statutory contribution policy could be strengthened by changing to an ADC-based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

At the April 15, 2015, Board meeting, the Board adopted a policy, for purposes of financial reporting under GASB Statements Nos. 67 and 68, which provides for the annual financing of GARS' normal cost and amortizing the unfunded liability over 20 years as a level percent of capped payroll.

Number of Projected Future Active Members

The statutory contribution is based on performing an open group projection through the year 2045. The projection is based on assuming that new active members are hired to replace the current members who leave active membership (through termination, retirement or death). The number of active members has decreased by about 32 percent between 2010 and 2020, which is an average annualized decrease of about 3.76 percent.

Currently, the actuarial valuation assumes that 50 percent of future members will elect to opt-out of the System. Given the decrease in the number of active members over the past 10 years, we recommend to continue to use the 50 percent opt out assumption and will reevaluate the opt-out percentage during the next experience study.

Active Membership				
Fiscal Year Ending June 30,	Total	Annual Change in Membership	% Annual Change in Membership	Uncapped Payroll (\$ in Millions)
2010	182			\$14.67
2011	180	(2)	-1.10%	14.46
2012	176	(4)	-2.22%	14.00
2013	160	(16)	-9.09%	12.95
2014	158	(2)	-1.25%	12.78
2015	145	(13)	-8.23%	11.61
2016	141	(4)	-2.76%	11.30
2017	135	(6)	-4.26%	11.00
2018	132	(3)	-2.22%	10.71
2019	126	(6)	-4.55%	10.16
2020	124	(2)	-1.59%	10.18
Total Change		(58)	-3.76%	

Actuarial Standards of Practice (ASOP) No. 4 Disclosures

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.50 percent on the actuarial value of assets), it is expected that:

1. The State contribution rate will be level as a percentage of payroll beginning in 2034 through 2045 (after all deferred asset gains and losses are fully recognized);
2. The unfunded liability will continue to decrease;
3. The unfunded actuarial accrued liabilities will never be fully amortized; and
4. The funded status of the plan will increase gradually towards a 90 percent funded ratio in 2045.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction;
2. The measurement is dependent upon the actuarial cost method which, in combination with the plan's statutory funding policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100 percent is not synonymous with no required future contributions. If the funded status were 100 percent, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit); and
3. The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.



Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

The determination of the accrued liability and the total required employer contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the total required employer contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Fund's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the Fund's future financial condition include:

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the Fund's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

Section J of the report provides stress and sensitivity analysis which reviews some of the risk metrics listed above. Key highlights of the analysis include:

- Tables 4a, 4b, 4c and 4d in Section B of this report show projections of the funded status and statutory contribution requirements. These projections assume static asset returns of 6.50 percent per year. Scenarios 1 through 5 in Section J of this report provide projections assuming alternative static returns of 5.64 percent and 4.15 percent, and alternative dynamic returns of 6.50 percent, 5.64 percent (40th percentile) and 4.15 percent (25th percentile). The dynamic scenarios show volatile annual returns, for representative trials, based on a set of capital market assumptions. If assets earn 5.64 percent instead of 6.50 percent over the 25-year projection period, the present value of future employer contributions increases by approximately 2.5 percent. If assets earn 4.15 percent instead of 6.50 percent per year, the present value of future employer contributions increases by 6.10 percent.
- Exhibit B-9 in Section J compares the projected funded ratio, and the percentage change in assets to the percentage change in actuarial liabilities. The key observations include: (i) assets need to grow at a higher rate especially towards the end of the projection period, and (ii) contributions are somewhat backloaded. This illustrates a potential mismatch between assets and liabilities.
- Scenarios 6 and 7 in Section J show the impact to plan costs if 75 percent, and alternatively 100 percent, of new entrants opt out of the pension system. These scenarios result in 24 percent and 63 percent respective increases to the calculated fiscal year 2023 contribution as the result of a lower payroll base from a decreasing future population.

The statutory funding policy provides for a projected funded ratio target of 90 percent at plan year end 2045. Employer contributions are based on a level percentage of projected payroll. This policy spreads investment and demographic gains over the entire projection period. Consequently, statutory contributions depend primarily on the assumptions and methods used to project assets and open group liabilities. The System funded ratio is only 17 percent as of June 30, 2020. For fiscal year 2022, the statutory contribution is \$27.8 million and the pro forma actuarial determined contribution is \$35.1 million.

The statutory contribution for fiscal year 2022 shown on page 6 may be considered as a minimum contribution that complies with the funding policy governed by State statute. The timely receipt of the statutory contribution is critical to support the financial health of the Fund. Users of this report should be aware that contributions made at the statutorily determined amount do not necessarily guarantee benefit security.

Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

Valuation Year	Ratio of the Market Value of Assets to Uncapped Payroll	Ratio of Actuarial Accrued Liability to Uncapped Payroll	Ratio of Unfunded Accrued Liability to Uncapped Payroll	Funded Ratio Market Value Basis
2016	4.34	32.16	27.82	13.50%
2017	4.94	33.72	28.77	14.66%
2018	5.30	35.08	29.78	15.12%
2019	5.88	36.87	30.99	15.94%
2020	6.19	36.67	30.49	16.87%

Valuation Year	Ratio of Actives to Retirees and Beneficiaries	Ratio of Retiree Accrued Liability to Total Accrued Liability	Approximate Duration of Actuarial Accrued Liability	Ratio of Net Cash Flow to Market Value of Assets	Ratio of Benefit Payments and Expenses to Contributions
2016	0.34	76.37%	10.9	-10.16%	1.29
2017	0.32	76.80%	10.7	0.29%	0.99
2018	0.32	77.61%	10.6	-2.23%	1.06
2019	0.29	81.09%	10.3	-0.92%	1.02
2020	0.28	81.24%	10.2	1.13%	0.97

Ratio of Market Value of Assets to Payroll

For funding policies that are based on actuarially determined contributions, which are expressed as a percentage of payroll, the ratio of market value of assets to payroll may provide an indicator of the sensitivity in contribution rates due to recent investment experience. However, this sensitivity indicator generally depends on the relative level of liabilities and the funded ratio of the plan. In addition, the ratio of market value of assets to payroll is more difficult to interpret if payroll is projected to decline. For this System, the ratio has increased from 4.34 in 2016 to 6.19 in 2020 partly because payroll has declined during the period.

For example, better funded plans will have lower contribution rates when compared to worst funded plans. Investment loss will generally have a greater impact on the contribution rates of better funded plans when compared to worst funded plans.

Consequently, as assets increase and the funding ratio improves, investment experience will generally have a greater marginal impact on contribution rates, even though contribution rates may be decreasing. However, for plans with declining projected payroll, contribution rates could increase even though the funded ratio is improving. In this case, it may be more appropriate to express contributions as a dollar amount instead of a percentage of payroll.

Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

Ratio of Actuarial Accrued Liability to Payroll

The ratio of actuarial liability to payroll may indicate the maturity of a plan. For example, a closed plan comprised primarily of retired members will generally have a high ratio of liability to payroll. For this System, the ratio has increased from 32.16 in 2016 to 36.67 in 2020 which suggests that the system is maturing. However, for open plans it is important to also measure the unfunded liability relative to payroll. For plans that are closed or are projected to experience declining payroll, the ratio of either liability to payroll or unfunded liability to payroll may be more difficult to interpret.

Ratio of Unfunded Actuarial Liability to Payroll

Plans with high unfunded liabilities relative to payroll could result in unsustainable contribution rates even though the plan is open. This may indicate the need to strengthen the funding policy, for example by reducing the amortization period. The ratio of unfunded actuarial liability to payroll has increased from 27.82 in 2016 to 30.49 in 2020 which indicates either the unfunded liability is increasing, payroll is decreasing, or a combination of both. Section I, Historical Valuation Results, shows declining payroll from 2016 to 2020, and a decrease in the unfunded actuarial liability for 2019 and 2020.

Funded Ratio

The ratio of actuarial accrued liability provides another metric of progress towards funding. The funded ratio has increased from 13.5 percent in 2016 to 16.87 percent in 2020. Consequently, the System has experienced a positive trend in the funded ratio. However, over the statutory funding projection period, the funded ratio increases at a very slow rate, from 19 percent in 2021, to 28 percent in 2030, to 50 percent in 2040, and to 90 percent in 2045. Consequently, most of the growth in the funded ratio occurs during the last five years of the projection period. See Section B Table 4d for additional details on the statutory funding projections.

Ratio of Actives to Retired Members

A newly established plan, that does not grant past service credits, will have a high ratio of active to retired members. As the plan matures the ratio approaches 1.0. A very mature plan may have more retired members relative to active members which produce a ratio under 1.0. Very mature plans that have not been adequately funded could produce intergenerational inequities.

The System's ratio of active to retired members is trending downward and has decreased from 0.34 in 2016 to 0.28 in 2020, which suggests that the System is maturing.

Ratio of Retiree Actuarial Accrued Liability to Total Actuarial Accrued Liability

The ratio of retiree actuarial accrued liability to total actuarial accrued liability also provides a measure of the maturity of the plan relative to the level of plan benefits that have been earned to date. This ratio has increased from 76 percent in 2016 to 81 percent for 2020, which means the System is maturing.

As the program matures it is important to consider the matching of assets to liabilities to ensure intergenerational equity. For example, retiree liabilities that have not been pre-funded during the working lifetime of the retired member could produce intergenerational inequities. As of June 30, 2020, the System's funded ratio is only 17 percent and 81 percent of total liabilities are attributable to current retirees and beneficiaries.



Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity of a one percentage point change in the assumed discount rate. For example, a duration of 10 indicates that the liability could increase by approximately 10 percent if the assumed discount rate was lowered by one percentage point. The duration for active member liabilities is generally higher when compared to the duration for retired members. Consequently, a lower duration generally indicates a greater proportion of retired member liability. Changes to the discount rate assumption could also cause the duration factor to change. For the System, the duration factors have decreased slightly from 10.9 in 2016 to 10.2 in 2020, which suggests a maturing system. Other factors such as emerging experience or changes in assumptions could also impact the year-to-year change in duration.

Ratio of Net Cash Flow to Market Value of Assets and Ratio of Benefit Payments to Contributions

Net cash flow is defined as the difference between total contributions, and benefits and expenses made during the plan year. If benefits and expenses are greater than contributions, a portion of either investment return or principal will be used to pay benefits and expenses during the year. A negative percentage means a decrease in assets, whereas a positive ratio means an increase in assets.

For underfunded plans, it is preferable for this ratio to be positive. This would imply that investment income is maintained in the trust which helps the growth in assets. For the System, the percentage has ranged from -10.16 percent in 2016 to 1.13 percent in 2020. In 2020 contributions exceeded benefit payments. However, given the low ratio of assets to liabilities and the high ratio of retiree liabilities to total liabilities, it is preferable if this margin is significantly more than just one percent, which implies that investment income is not being used to pay benefits.

For sufficiently well-funded plans, it is appropriate for a portion of investment income to be used to pay benefits. In this case, a negative ratio means that assets have grown to a reasonably sufficient level and can be used to pay benefits.

The ratio of benefit payments and expenses to contributions is closely related to the percentage of net cash flows to the market value of assets. For underfunded plans it is preferable for contributions to exceed benefit payments, which implies a ratio less than 1.0. During the last five years the ratio has ranged from 1.29 in 2016 to 0.97 in 2020.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. At the Board's request, we conducted additional risk assessment of investment, and contribution risk through sensitivity and stress testing the investment return assumption, future active population growth and changes in the wage inflation assumption. Please see Section J for additional details.

SECTION B

FUNDING RESULTS

Table 1

Results of Actuarial Valuation as of June 30, 2020

1	Number of Members		
	a. Active		124
	b. Inactive:		
	i. Eligible for deferred vested pension benefits		51
	ii. Eligible for return of contributions only		14
	c. Current Benefit Recipients:		
	i. Retirement annuities		318
	ii. Survivor annuities*		120
	iii. Reversionary annuities		-
	d. Total		627
2	Covered Uncapped Payroll	\$	10,184,857
3	Annualized Benefit Payments Currently Being Made		
	a. Retirement	\$	20,810,321
	b. Survivor*	\$	4,501,980
	c. Reversionary		-
	d. Total	\$	25,312,301
4	Actuarial Liability—Annuitants		
	a. Current Benefit Recipients:		
	i. Retirement annuities	\$	262,406,269
	ii. Survivor annuities*		41,016,812
	b. Total	\$	303,423,081

**Includes 11 alternate payees resulting from QILDROs and 2 retired members also receiving a survivor annuity.*

Table 1 (Concluded)

Results of Actuarial Valuation as of June 30, 2020

5	Actuarial Liability—Inactive Members		\$ 28,655,318
		Normal Cost	Actuarial Liability
6	Active Members		
	a. Pension Benefits	\$ 1,592,994	\$ 27,206,079
	b. Cost-of-Living Adjustments	609,274	10,039,789
	c. Death Benefits	92,933	474,865
	d. Disability	-	-
	e. Withdrawal	362,900	3,694,611
	f. Expenses	350,880	-
	g. Total	\$ 3,008,981	\$ 41,415,344
7	Total Actuarial Liability (4 + 5 + 6)		\$ 373,493,743
8	Market Value of Assets (MVA)		\$ 62,993,904
9	Unfunded Actuarial Liability Based on MVA (7 – 8)		\$ 310,499,839
10	Funded Percentage Based on MVA (8 ÷ 7)		16.87%
11	Actuarial Value of Assets (AVA)		\$ 63,879,905
12	Unfunded Actuarial Liability Based on AVA (7 – 11)		\$ 309,613,838
13	Funded Percentage Based on AVA (11 ÷ 7) ^a		17.10%
14	Total Normal Cost	\$ 3,008,981	
15	Employee Contributions	\$ 1,129,398	
16	Annual Employer Normal Cost (% uncapped payroll)	\$ 1,879,583 18.45%	

^aThe funded status measure is appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.



Table 2

Analysis of Change in Unfunded Accrued Actuarial Liability

In addition to the expected change in the unfunded accrued actuarial liability, changes in membership demographics and fund assets have affected the valuation results. The decrease in the unfunded accrued actuarial liability ("UAAL") of \$4,926,323 was due to the following:

1	UAAL at 06/30/2019	\$	314,540,161
2	Contributions		
	a. Contributions due (Normal Cost plus Interest on UAAL)		
	i interest on 1)	\$	20,445,110
	ii members contributions		1,205,930
	iii employer normal cost		2,001,416
	iv interest on ii and iii		102,598
	v total due	\$	23,755,054
	b. Contributions paid (Actual)		
	i member contributions	\$	1,205,930
	ii state agencies		25,754,000
	iii interest on i and ii		862,404
	iv total paid	\$	27,822,334
	c. Expected increase in UAAL	\$	(4,067,280)
3	Expected UAAL at 06/30/2020	\$	310,472,881
4	(Gains)/Losses		
	a. investment income	\$	815,183
	b. demographic		(1,674,226)
	c. total	\$	(859,043)
5	Plan Provision Changes	\$	-
6	Assumption Changes	\$	-
7	Total Change in UAAL	\$	(4,926,323)
8	UAAL at 06/30/2020	\$	309,613,838

Table 3

Analysis of Financial Gains and Losses in Unfunded Accrued Actuarial Liability for Fiscal Year Ended June 30, 2020

	<u>Activity</u>	<u>(Gain)/Loss</u>	<u>% of 06/30/2019 AAL</u>
1	Actuarial (Gain)/Loss		
	a. Retirements	\$ 235,456	0.06%
	b. Incidence of Disability	-	0.00%
	c. In-Service Mortality	14,830	0.00%
	d. Retiree Experience	(2,129,314)	-0.57%
	e. Salary Increases	207,874	0.06%
	f. Terminations	364,733	0.10%
	g. Investment	815,183	0.22%
	h. New Entrant Liability	29,544	0.01%
	i. Data/Method Changes	-	0.00%
	j. Other	(397,349)	-0.11%
	k. Total Actuarial (Gain)/Loss	\$ (859,043)	-0.23%
2	Plan Provision Changes	\$ -	0.00%
3	Assumption Changes	\$ -	0.00%
4	Contribution (Excess)/Shortfall ^b	\$ (4,067,280)	-1.09%
5	Total Financial (Gain)/Loss	\$ (4,926,323)	-1.32%

^a Represents the increase in the Unfunded Actuarial Accrued Liability due to actual contributions being less than the Normal Cost plus interest on the beginning of year Unfunded Actuarial Accrued Liability.

Table 4a
Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023
Maximum Contribution Calculation: Without GOB Proceeds
Investment Return of 6.50% Each Year (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				State Contribution		Total Expenses
							Total	Employee Cont.	Normal Cost	Percent of Pay	Amount	Percent of Pay	
2021	117	\$372.79	\$26.45	\$346.34	7.10%	\$9.82	\$ 3.01	\$1.13	\$1.88	19.14%	\$30.82	313.78%	\$27.22
2022	112	371.10	32.68	338.42	8.81%	9.73	2.85	1.12	1.73	17.78%	31.23	321.13%	27.97
2023	107	368.67	38.09	330.58	10.33%	9.53	2.69	1.10	1.59	16.68%	30.51	320.25%	28.42
2024	102	365.43	42.55	322.88	11.64%	9.31	2.54	1.07	1.47	15.79%	29.75	319.37%	28.89
2025	99	361.50	46.17	315.33	12.77%	9.09	2.42	1.05	1.37	15.07%	29.02	319.37%	29.25
2026	95	356.98	49.56	307.42	13.88%	9.03	2.35	1.04	1.31	14.51%	28.84	319.37%	29.49
2027	92	351.91	52.48	299.43	14.91%	8.87	2.24	1.02	1.22	13.75%	28.33	319.37%	29.65
2028	89	346.26	55.19	291.07	15.94%	8.80	2.17	1.01	1.16	13.18%	28.12	319.37%	29.81
2029	86	339.99	57.63	282.36	16.95%	8.72	2.09	1.00	1.09	12.50%	27.85	319.37%	29.97
2030	84	333.29	59.99	273.30	18.00%	8.64	2.02	0.99	1.03	11.92%	27.59	319.37%	29.92
2031	81	326.20	62.59	263.61	19.19%	8.64	1.98	0.99	0.99	11.46%	27.58	319.37%	29.84
2032	79	318.78	65.18	253.60	20.45%	8.53	1.91	0.98	0.93	10.90%	27.23	319.37%	29.65
2033	78	311.04	68.11	242.93	21.90%	8.52	1.88	0.98	0.90	10.56%	27.22	319.37%	29.47
2034	76	302.99	71.77	231.22	23.69%	8.62	1.88	0.99	0.89	10.32%	27.53	319.37%	29.27
2035	74	294.75	75.99	218.76	25.78%	8.61	1.84	0.99	0.85	9.87%	27.50	319.37%	28.91

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4a (Concluded)
Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023
Maximum Contribution Calculation: Without GOB Proceeds
Investment Return of 6.50% Each Year (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				State Contribution		Total Expenses
							Total	Employee Cont.	Normal Cost	Percent of Pay	Amount	Percent of Pay	
2036	73	\$286.38	\$80.87	\$205.51	28.24%	\$8.59	\$1.82	\$0.99	\$0.83	9.66%	\$27.45	319.37%	\$28.49
2037	72	277.89	86.84	191.05	31.25%	8.69	1.81	1.00	0.81	9.32%	27.77	319.37%	28.07
2038	71	269.30	94.00	175.30	34.91%	8.80	1.81	1.01	0.80	9.09%	28.09	319.37%	27.63
2039	70	260.79	102.61	158.18	39.35%	8.90	1.82	1.02	0.80	8.99%	28.42	319.37%	27.03
2040	69	252.32	112.70	139.62	44.67%	9.00	1.81	1.03	0.78	8.67%	28.73	319.37%	26.45
2041	68	244.01	124.48	119.53	51.01%	9.09	1.83	1.05	0.78	8.58%	29.04	319.37%	25.76
2042	67	235.89	138.08	97.81	58.54%	9.19	1.84	1.06	0.78	8.49%	29.36	319.37%	25.08
2043	66	227.98	153.64	74.34	67.39%	9.29	1.85	1.07	0.78	8.40%	29.68	319.37%	24.37
2044	66	220.38	171.34	49.04	77.75%	9.39	1.87	1.08	0.79	8.41%	29.99	319.37%	23.59
2045	65	213.07	191.77	21.30	90.00%	9.63	1.91	1.11	0.80	8.31%	30.77	319.37%	22.87

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4b

Baseline Projections — State Contributions Determined under Public Act 88-0593, Public Act 94-0002, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023 Investment Return of 6.50% Each Year (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				Required State Contribution						
							Total	Employer			(a) Without GOB Cont.	(b) Debt Service	(c)=(a)-(b) Maximum Cont.	(d) Formula Rate With GOB	Minimum of (c) and (d)		Total Expenses
								Employee Cont.	Normal Cost	Percent of Pay					Required Cont.	Percent of Pay	
2021	117	\$372.79	\$69.28	\$303.51	18.58%	\$9.82	\$3.01	\$1.13	\$1.88	19.14%	\$30.82	\$2.64	\$28.18	\$27.30	\$27.30	277.97%	\$27.22
2022	112	371.10	74.78	296.32	20.15%	9.73	2.85	1.12	1.73	17.78%	31.23	2.77	28.46	27.82	27.82	286.06%	27.97
2023	107	368.67	79.48	289.19	21.56%	9.53	2.69	1.10	1.59	16.68%	30.51	2.90	27.61	27.17	27.17	285.18%	28.42
2024	102	365.43	83.26	282.17	22.78%	9.31	2.54	1.07	1.47	15.79%	29.75	3.11	26.64	26.48	26.48	284.31%	28.89
2025	99	361.50	86.12	275.38	23.82%	9.09	2.42	1.05	1.37	15.07%	29.02	3.30	25.72	25.84	25.72	283.05%	29.25
2026	95	356.98	88.61	268.37	24.82%	9.03	2.35	1.04	1.31	14.51%	28.84	3.39	25.45	25.67	25.45	281.86%	29.49
2027	92	351.91	90.50	261.41	25.72%	8.87	2.24	1.02	1.22	13.75%	28.33	3.46	24.87	25.22	24.87	280.33%	29.65
2028	89	346.26	91.94	254.32	26.55%	8.80	2.17	1.01	1.16	13.18%	28.12	3.63	24.49	25.03	24.49	278.22%	29.81
2029	86	339.99	92.88	247.11	27.32%	8.72	2.09	1.00	1.09	12.50%	27.85	3.77	24.08	24.79	24.08	276.16%	29.97
2030	84	333.29	93.41	239.88	28.03%	8.64	2.02	0.99	1.03	11.92%	27.59	3.99	23.60	24.56	23.60	273.16%	29.92
2031	81	326.20	93.85	232.35	28.77%	8.64	1.98	0.99	0.99	11.46%	27.58	4.19	23.39	24.55	23.39	270.77%	29.84
2032	79	318.78	94.04	224.74	29.50%	8.53	1.91	0.98	0.93	10.90%	27.23	4.29	22.94	24.24	22.94	269.06%	29.65
2033	78	311.04	94.43	216.61	30.36%	8.52	1.88	0.98	0.90	10.56%	27.22	4.28	22.94	24.23	22.94	269.18%	29.47
2034	76	302.99	96.68	206.31	31.91%	8.62	1.88	0.99	0.89	10.32%	27.53	0.00	N/A	24.51	24.51	284.31%	29.27
2035	74	294.75	99.41	195.34	33.73%	8.61	1.84	0.99	0.85	9.87%	27.50	0.00	N/A	24.48	24.48	284.31%	28.91

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 93-0002, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4b (Concluded)
**Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0002, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023**
Investment Return of 6.50% Each Year (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				Required State Contribution					Total Expenses	
							Employer			(a) Without GOB Cont.	(b) Debt Service	(c)=(a)-(b) Maximum Cont.	(d) Rate With Formula GOB	Minimum of (c) and (d)			
							Total Employee Cont.	Normal Cost	Percent of Pay					Required Cont.	Percent of Pay		
2036	73	\$286.38	\$102.70	\$183.68	35.86%	\$8.59	\$1.82	\$0.99	\$0.83	9.66%	\$27.45	\$0.00	N/A	\$24.43	\$24.43	284.31%	\$28.49
2037	72	277.89	106.94	170.95	38.48%	8.69	1.81	1.00	0.81	9.32%	27.77	0.00	N/A	24.72	24.72	284.31%	28.07
2038	71	269.30	112.23	157.07	41.67%	8.80	1.81	1.01	0.80	9.09%	28.09	0.00	N/A	25.01	25.01	284.31%	27.63
2039	70	260.79	118.80	141.99	45.55%	8.90	1.82	1.02	0.80	8.99%	28.42	0.00	N/A	25.30	25.30	284.31%	27.03
2040	69	252.32	126.68	125.64	50.21%	9.00	1.81	1.03	0.78	8.67%	28.73	0.00	N/A	25.58	25.58	284.31%	26.45
2041	68	244.01	136.09	107.92	55.77%	9.09	1.83	1.05	0.78	8.58%	29.04	0.00	N/A	25.85	25.85	284.31%	25.76
2042	67	235.89	147.12	88.77	62.37%	9.19	1.84	1.06	0.78	8.49%	29.36	0.00	N/A	26.13	26.13	284.31%	25.08
2043	66	227.98	159.89	68.09	70.13%	9.29	1.85	1.07	0.78	8.40%	29.68	0.00	N/A	26.42	26.42	284.31%	24.37
2044	66	220.38	174.60	45.78	79.23%	9.39	1.87	1.08	0.79	8.41%	29.99	0.00	N/A	26.70	26.70	284.31%	23.59
2045	65	213.07	191.76	21.31	90.00%	9.63	1.91	1.11	0.80	8.31%	30.77	0.00	N/A	27.39	27.39	284.31%	22.87

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 93-0002, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4c
Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023
Maximum Contribution Calculation: Without GOB Proceeds
Investment Return of 6.50% Each Year
Phase-In of Deferred Investment Gains and Losses Recognized in the
Projected Actuarial Value of Assets (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost			State Contribution		Total Expenses	
							Total	Employee Cont.	Normal Cost	Percent of Pay	Amount		Percent of Pay
2021	117	\$372.79	\$26.38	\$346.41	7.08%	\$9.82	\$3.01	\$1.13	\$1.88	19.14%	\$30.82	313.78%	\$27.22
2022	112	371.10	32.54	338.56	8.77%	9.73	2.85	1.12	1.73	17.78%	31.26	321.42%	27.97
2023	107	368.67	37.86	330.81	10.27%	9.53	2.69	1.10	1.59	16.68%	30.54	320.54%	28.42
2024	102	365.43	42.26	323.17	11.56%	9.31	2.54	1.07	1.47	15.79%	29.77	319.66%	28.89
2025	99	361.50	45.88	315.62	12.69%	9.09	2.42	1.05	1.37	15.07%	29.05	319.66%	29.25
2026	95	356.98	49.28	307.70	13.80%	9.03	2.35	1.04	1.31	14.51%	28.86	319.66%	29.49
2027	92	351.91	52.21	299.70	14.84%	8.87	2.24	1.02	1.22	13.75%	28.36	319.66%	29.65
2028	89	346.26	54.93	291.33	15.86%	8.80	2.17	1.01	1.16	13.18%	28.14	319.66%	29.81
2029	86	339.99	57.37	282.62	16.87%	8.72	2.09	1.00	1.09	12.50%	27.87	319.66%	29.97
2030	84	333.29	59.74	273.55	17.92%	8.64	2.02	0.99	1.03	11.92%	27.61	319.66%	29.92
2031	81	326.20	62.35	263.85	19.11%	8.64	1.98	0.99	0.99	11.46%	27.61	319.66%	29.84
2032	79	318.78	64.95	253.83	20.37%	8.53	1.91	0.98	0.93	10.90%	27.26	319.66%	29.65
2033	78	311.04	67.89	243.15	21.83%	8.52	1.88	0.98	0.90	10.56%	27.24	319.66%	29.47
2034	76	302.99	71.56	231.43	23.62%	8.62	1.88	0.99	0.89	10.32%	27.56	319.66%	29.27
2035	74	294.75	75.80	218.95	25.72%	8.61	1.84	0.99	0.85	9.87%	27.52	319.66%	28.91

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4c (Concluded)
Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023
Maximum Contribution Calculation: Without GOB Proceeds
Investment Return of 6.50% Each Year
Phase-In of Deferred Investment Gains and Losses Recognized in the
Projected Actuarial Value of Assets (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				State Contribution		Total Expenses
							Total	Employee Cont.	Normal Cost	Percent of Pay	Amount	Percent of Pay	
2036	73	\$286.38	\$80.69	\$205.69	28.18%	\$8.59	\$1.82	\$0.99	\$0.83	9.66%	\$27.47	319.66%	\$28.49
2037	72	277.89	86.67	191.22	31.19%	8.69	1.81	1.00	0.81	9.32%	27.79	319.66%	28.07
2038	71	269.30	93.85	175.45	34.85%	8.80	1.81	1.01	0.80	9.09%	28.12	319.66%	27.63
2039	70	260.79	102.47	158.32	39.29%	8.90	1.82	1.02	0.80	8.99%	28.44	319.66%	27.03
2040	69	252.32	112.58	139.74	44.62%	9.00	1.81	1.03	0.78	8.67%	28.76	319.66%	26.45
2041	68	244.01	124.38	119.63	50.97%	9.09	1.83	1.05	0.78	8.58%	29.07	319.66%	25.76
2042	67	235.89	138.00	97.89	58.50%	9.19	1.84	1.06	0.78	8.49%	29.38	319.66%	25.08
2043	66	227.98	153.58	74.40	67.37%	9.29	1.85	1.07	0.78	8.40%	29.70	319.66%	24.37
2044	66	220.38	171.30	49.08	77.73%	9.39	1.87	1.08	0.79	8.41%	30.02	319.66%	23.59
2045	65	213.07	191.76	21.31	90.00%	9.63	1.91	1.11	0.80	8.31%	30.79	319.66%	22.87

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4d
Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0002, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023
Investment Return of 6.50% Each Year
Phase-In of Deferred Investment Gains and Losses Recognized in the
Projected Actuarial Value of Assets (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost				Required State Contribution					Total Expenses	
							Employer			Without GOB Cont.	(a) GOB Cont.	(b) Debt Service	(c)=(a)-(b) Maximum Cont.	(d) Formula Rate With GOB	Minimum of (c) and (d)		
							Total	Employee Cont.	Normal Cost						Percent of Pay		Required Cont.
2021	117	\$372.79	\$69.27	\$303.52	18.58%	\$9.82	\$3.01	\$1.13	\$1.88	19.14%	\$30.82	\$2.64	\$28.18	\$27.30	\$27.30	277.97%	\$27.22
2022	112	371.10	74.39	296.71	20.05%	9.73	2.85	1.12	1.73	17.78%	31.26	2.78	28.48	27.82	27.82	286.06%	27.97
2023	107	368.67	78.68	289.99	21.34%	9.53	2.69	1.10	1.59	16.68%	30.54	2.90	27.64	27.17	27.17	285.16%	28.42
2024	102	365.43	82.19	283.24	22.49%	9.31	2.54	1.07	1.47	15.79%	29.77	3.11	26.66	26.54	26.54	285.00%	28.89
2025	99	361.50	85.00	276.50	23.51%	9.09	2.42	1.05	1.37	15.07%	29.05	3.30	25.75	25.98	25.75	283.34%	29.25
2026	95	356.98	87.45	269.53	24.50%	9.03	2.35	1.04	1.31	14.51%	28.86	3.38	25.48	25.86	25.48	282.15%	29.49
2027	92	351.91	89.28	262.63	25.37%	8.87	2.24	1.02	1.22	13.75%	28.36	3.47	24.89	25.41	24.89	280.62%	29.65
2028	89	346.26	90.67	255.59	26.19%	8.80	2.17	1.01	1.16	13.18%	28.14	3.62	24.52	25.22	24.52	278.50%	29.81
2029	86	339.99	91.55	248.44	26.93%	8.72	2.09	1.00	1.09	12.50%	27.87	3.76	24.11	24.98	24.11	276.44%	29.97
2030	84	333.29	92.03	241.26	27.61%	8.64	2.02	0.99	1.03	11.92%	27.61	3.99	23.62	24.74	23.62	273.44%	29.92
2031	81	326.20	92.40	233.80	28.33%	8.64	1.98	0.99	0.99	11.46%	27.61	4.20	23.41	24.74	23.41	271.06%	29.84
2032	79	318.78	92.52	226.26	29.02%	8.53	1.91	0.98	0.93	10.90%	27.26	4.29	22.97	24.42	22.97	269.34%	29.65
2033	78	311.04	92.84	218.20	29.85%	8.52	1.88	0.98	0.90	10.56%	27.24	4.27	22.97	24.41	22.97	269.47%	29.47
2034	76	302.99	95.18	207.81	31.41%	8.62	1.88	0.99	0.89	10.32%	27.56	0.00	N/A	24.69	24.69	286.43%	29.27
2035	74	294.75	98.00	196.75	33.25%	8.61	1.84	0.99	0.85	9.87%	27.52	0.00	N/A	24.66	24.66	286.43%	28.91

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 93-0002, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 4d (Concluded)
**Baseline Projections — State Contributions Determined under Public Act 88-0593,
Public Act 94-0002, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023**
Investment Return of 6.50% Each Year
Phase-In of Deferred Investment Gains and Losses Recognized in the
Projected Actuarial Value of Assets (\$ in Millions)

Plan Year End 6/30	Number Active	Actuarial Accrued Liability	Assets	Unfunded Liability	Funded Ratio	Total Payroll	Annual Normal Cost			Required State Contribution					Total Expenses		
							Employee Cont.	Normal Cost	Percent of Pay	(a) Without GOB Cont.	(b) Debt Service	(c)=(a)-(b) Maximum Cont.	(d) Formula Rate With GOB	Minimum of (c) and (d) Required Cont.		Percent of Pay	
2036	73	\$286.38	\$101.38	\$185.00	35.40%	\$8.59	\$1.82	\$0.99	\$0.83	9.66%	\$27.47	\$0.00	N/A	\$24.61	\$24.61	286.43%	\$28.49
2037	72	277.89	105.73	172.16	38.05%	8.69	1.81	1.00	0.81	9.32%	27.79	0.00	N/A	24.90	24.90	286.43%	28.07
2038	71	269.30	111.13	158.17	41.27%	8.80	1.81	1.01	0.80	9.09%	28.12	0.00	N/A	25.20	25.20	286.43%	27.63
2039	70	260.79	117.82	142.97	45.18%	8.90	1.82	1.02	0.80	8.99%	28.44	0.00	N/A	25.49	25.49	286.43%	27.03
2040	69	252.32	125.84	126.48	49.87%	9.00	1.81	1.03	0.78	8.67%	28.76	0.00	N/A	25.77	25.77	286.43%	26.45
2041	68	244.01	135.39	108.62	55.49%	9.09	1.83	1.05	0.78	8.58%	29.07	0.00	N/A	26.05	26.05	286.43%	25.76
2042	67	235.89	146.57	89.32	62.13%	9.19	1.84	1.06	0.78	8.49%	29.38	0.00	N/A	26.33	26.33	286.43%	25.08
2043	66	227.98	159.52	68.46	69.97%	9.29	1.85	1.07	0.78	8.40%	29.70	0.00	N/A	26.62	26.62	286.43%	24.37
2044	66	220.38	174.41	45.97	79.14%	9.39	1.87	1.08	0.79	8.41%	30.02	0.00	N/A	26.89	26.89	286.43%	23.59
2045	65	213.07	191.76	21.31	90.00%	9.63	1.91	1.11	0.80	8.31%	30.79	0.00	N/A	27.59	27.59	286.43%	22.87

Normal cost rate includes administrative expenses.

State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 93-0002, Public Act 94-0004, Public Act 96-0043 and Public Act 100-0023.

Total expenses shown include benefit payments, refunds and administrative expenses.

Actuarial accrued liability and assets are measured at Plan Year End.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



SECTION C

FUND ASSETS

Table 5
Statement of Fiduciary Net Position
for Years Ended June 30, 2020, and 2019

	2020	2019
Assets		
Cash	\$ 5,913,822	\$ 4,144,035
Receivables:		
Contributions:		
Participants	\$ 38,626	\$ 70,197
Employer - GRF Fund	-	967,540
Other accounts	5,227	11,839
	\$ 43,853	\$ 1,049,576
Investments - held in the Illinois State Board of Investment Commingled Fund at fair value	\$ 57,110,620	\$ 54,604,432
Securities lending collateral with State Treasurer	1,190,000	863,000
Capital assets, net of accumulated depreciation	\$ 38,435	\$ 31,952
Total Assets	\$ 64,296,730	\$ 60,692,995
Liabilities		
Benefits payable	\$ -	\$ -
Refunds payable	-	-
Administrative expenses payable	42,115	37,774
Participants' deferred service credit accounts	-	-
Due to Judges' Retirement System of Illinois	70,711	73,001
Securities lending collateral with State Treasurer	1,190,000	863,000
Total Liabilities	\$ 1,302,826	\$ 973,775
Net assets held in trust for pension benefits	\$ 62,993,904	\$ 59,719,220

Assets were updated subsequent to the delivery of the actuarial valuation report which was presented to the Board on October 30, 2020. The updates did not significantly impact the certified contribution rate which was approved by the Board on October 30, 2020. The asset update increased investments from \$57,110,620 to \$57,128,519. This change increased the market value of assets at June 30, 2020, from \$62,993,904 to \$63,011,803.



Table 6

Statement of Changes in Fiduciary Net Position for Years Ended June 30, 2020, and 2019

	<u>2020</u>	<u>2019</u>
Additions:		
Contributions:		
Participants	\$ 1,205,930	\$ 1,317,187
Employing state agencies and appropriations	25,754,000	23,253,426
Total Contributions revenue	<u>\$ 26,959,930</u>	<u>\$ 24,570,613</u>
Investments income:		
Net investment income	\$ 553,644	\$ 807,117
Interest earned on cash balances	56,977	72,927
Net appreciation in fair value of investments	1,952,544	2,569,372
Total Investments income	<u>\$ 2,563,165</u>	<u>\$ 3,449,416</u>
Other:		
Miscellaneous	\$ -	\$ -
Total Investments income	<u>\$ -</u>	<u>\$ -</u>
Total Additions	\$ 29,523,095	\$ 28,020,029
Deductions:		
Benefits:		
Retirement annuities	\$ 21,641,643	\$ 20,590,350
Survivors' annuities	4,068,261	3,968,090
Disability benefits	-	-
Lump-sum benefits	-	-
Total Benefits	<u>\$ 25,709,904</u>	<u>\$ 24,558,440</u>
Refunds	137,810	168,920
Administrative	400,697	389,833
Total Deductions	<u>\$ 26,248,411</u>	<u>\$ 25,117,193</u>
Net increase	<u>\$ 3,274,684</u>	<u>\$ 2,902,836</u>
Net assets held in trust for pension benefits:		
Beginning of year	<u>\$ 59,719,220</u>	<u>\$ 56,816,384</u>
End of year	<u>\$ 62,993,904</u>	<u>\$ 59,719,220</u>

Assets were updated subsequent to the delivery of the actuarial valuation report which was presented to the Board on October 30, 2020. The updates did not significantly impact the certified contribution rate which was approved by the Board on October 30, 2020. The asset update increased the net appreciation in fair value of investments from \$1,952,544 to \$1,970,444. This change increased the market value of assets at June 30, 2020, from \$62,993,904 to \$63,011,803.



Table 7

Development of the Actuarial Value of Assets – Actual Assets

Year Ending June 30	2020	2021	2022	2023	2024
Beginning of Year:					
(1) Market Value of Assets	\$ 59,719,220				
(2) Actuarial Value of Assets	60,057,098				
End of Year:					
(3) Market Value of Assets	62,993,904				
(4) Contributions and Disbursements					
(4a) Actual State Contribution Amount	25,754,000				
(4b) Employee Contribution Amount	1,205,930				
(4c) Benefit Payouts & Refunds	(25,847,714)				
(4d) Administrative Expenses	(400,697)				
(4e) Net of Contributions and Disbursements	711,519				
(5) Total Investment Income					
=(3)-(1)-(4e)	2,563,165				
(6) Projected Rate of Return	6.50%				
(7) Projected Investment Income					
=(1)x(6)+([1+(6)] ^{.5} -1)x(4e)	3,904,510				
(8) Investment Income in Excess of Projected Income	(1,341,345)				
(9) Excess Investment Income Recognized This Year (5-year recognition)					
(9a) From This Year	\$ (268,269)				
(9b) From One Year Ago	(73,509)	\$ (268,269)			
(9c) From Two Years Ago	21,397	(73,509)	\$ (268,269)		
(9d) From Three Years Ago	364,807	21,397	(73,509)	\$ (268,269)	
(9e) From Four Years Ago	(837,648)	364,809	21,395	(73,508)	\$ (268,269)
(9f) Total Recognized Investment Gain	(793,222)	44,428	(320,383)	(341,777)	(268,269)
(10) Change in Actuarial Value of Assets					
=(4e)+(7)+(9f)	\$ 3,822,807				
End of Year:					
(3) Market Value of Assets	\$ 62,993,904				
(11) Actuarial Value of Assets					
=(2)+(10)	\$ 63,879,905				



Table 8

Development of the Actuarial Value of Assets – Hypothetical Assets

Year Ending June 30	2020	2021	2022	2023	2024
Beginning of Year:					
(1) Hypothetical Value of Assets	\$ 14,768,743				
(2) Hypothetical Actuarial Value of Assets	14,824,395				
End of Year:					
(3) Hypothetical Value of Assets	19,947,897				
(4) Contributions and Disbursements					
(4a) State Contribution Amount ^a	29,496,902				
(4b) Employee Contribution Amount	1,205,930				
(4c) Benefit Payouts & Refunds	(25,847,714)				
(4d) Administrative Expenses	(400,697)				
(4e) Net of Contributions and Disbursements	4,454,421				
(5) Total Investment Income ^b					
=(3)-(1)-(4e)	724,733				
(6) Projected Rate of Return	6.50%				
(7) Projected Investment Income					
=(1)x(6)+[(1+(6)) ⁵ -1]x(4e)	1,102,458				
(8) Investment Income in Excess of Projected Income	(377,725)				
(9) Excess Investment Income Recognized This Year (5-year recognition)					
(9a) From This Year	\$ (75,545)				
(9b) From One Year Ago	(16,164)	\$ (75,545)			
(9c) From Two Years Ago	3,650	(16,164)	\$ (75,545)		
(9d) From Three Years Ago	41,463	3,650	(16,164)	\$ (75,545)	
(9e) From Four Years Ago	(84,871)	41,461	3,649	(16,162)	\$ (75,545)
(9f) Total Recognized Investment Gain	(131,467)	(46,598)	(88,060)	(91,707)	(75,545)
(10) Change in Hypothetical Actuarial Value of Assets					
=(4e)+(7)+(9f)	\$ 5,425,412				
End of Year:					
(3) Hypothetical Market Value of Assets	\$ 19,947,897				
(11) Hypothetical Actuarial Value of Assets					
= (2)+(10)	\$ 20,249,807				

^a Represents FY 2020 no POB basic contribution. This amount was determined as part of the June 30, 2018, valuation and is based upon the hypothetical asset value which assumes no infusion from the proceeds of the GOB sale that were deposited July 1, 2003.

^b Investment income assumes hypothetical value of assets earns the Fund's actual rate of return for fiscal year 2020 of 4.27 percent.

SECTION D

PARTICIPANT DATA

Table 9
Active Age and Service Distribution as of June 30, 2020

Age Group	Years of Service									Total	Percentage of Total	
	0-1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35&Up			
Under 20												
20-24	1										1	1%
25-29		3									3	2%
30-34		3	2								5	4%
35-39		10	3	2							15	12%
40-44	1	6	3	2							12	10%
45-49		7	9	4	1						21	17%
50-54		6	7	2	3	2					20	16%
55-59	2	2	4	4	3	2	2				19	15%
60-64		2	6	3	1		2				14	11%
65-69		1	2	2	1			1			7	6%
70 & Over		1		1	1	3			1		7	6%
Total	4	41	36	20	10	7	4	1	1	124	100%	
Percentage of Total	3%	33%	29%	16%	8%	6%	3%	1%	1%	100%		

Based on data received from the System, of the 124 active members, 43 were classified as "Single," 69 classified as "Married," and 12 were classified as "Unknown." We assume 75 percent are married and elect survivor benefits when they retire.

Table 10
Retirees and Beneficiaries by Type of Benefit Being Paid as of June 30, 2020

<u>Type of Benefit Being Paid</u>	<u>Count</u>	<u>Monthly Payment</u>	<u>Annual Payment</u>	<u>Average Annual Payment</u>
Retirement Annuity	318	\$ 1,734,193	\$ 20,810,321	\$ 65,441
Survivor's Annuity	109	\$ 353,600	\$ 4,243,200	\$ 38,928
QILDRO	11	\$ 21,565	\$ 258,780	\$ 23,525
Total	438	\$ 2,109,358	\$ 25,312,301	\$ 57,791

SECTION E



ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

Actuarial Cost Method as Mandated by 40 ILCS 5/2-124, Adopted June 30, 1989

The projected unit credit normal cost method is used. Under this method, the projected pension at retirement age is first calculated and the present value at the individual member's current or attained age is determined. The normal cost for the member for the current year is equal to actuarial present value divided by the member's projected service at retirement. The normal cost for the plan for the year is the sum of the individual normal costs.

The actuarial accrued liability at any point in time is the present value of the projected pensions at that time less the value of future normal costs.

For ancillary benefits for active members, in particular death and survivor benefits, termination benefits, and the postretirement increases, the same procedure as outlined above is followed.

Estimated annual administrative expenses are added to the normal cost.

For actuarial valuation purposes, as well as projection purposes, an actuarial value of assets is used.

Most Actuarial Assumptions Adopted June 30, 2019

Actuarial assumptions are set by the Board of Trustees. Additional information regarding the rationale for the assumptions may be found in the experience review of the General Assembly Retirement System for the three-year period ending June 30, 2018. All actuarial assumptions are expectations of future experience, not market measures.

Mortality

Post-Retirement Mortality

Pub-2010 Above-Median Income General Healthy Retiree Mortality tables, sex distinct, with scaling factors of 99 percent for males and females, and the MP-2018 two-dimensional generational mortality improvement scale. This assumption provides a margin for future mortality improvements.

Pre-Retirement Mortality, including terminated vested members prior to attaining age 50

Pub-2010 Above-Median Income General Employee Mortality tables, sex distinct, with no scaling factors, and the MP-2018 two-dimensional generational mortality improvement scale. This assumption provides a margin for future mortality improvements.

Future mortality improvements are reflected by projecting the base mortality tables forward from the year 2010 using the MP-2018 projection scale.



Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

Interest

6.50 percent per annum, compounded annually.

General Inflation

2.25 percent per annum, compounded annually.

This assumption serves as the basis for the determination of Tier Two pay cap growth and annual increases that are equal to the lesser of 3.0 percent or the annual change in the Consumer Price Index-U during the preceding 12-month calendar year.

Marriage Assumption

75.0 percent of active and retired participants are assumed to be married.

Termination

Rates of withdrawal are assumed to be equal to six percent for all ages 20 through 65.

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Salary Increases

A salary increase assumption of 2.50 percent per annum, compounded annually, was used. This 2.50 percent salary increase assumption includes an inflation component of 2.25 percent per year, and a productivity/merit/promotion component of 0.25 percent per annum.

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

Load for Inactive Members Eligible for Deferred Vested Pension Benefits

Deferred vested liability is increased by 10 percent to account for increases in final average salary due to participation in a reciprocal system. This assumption was developed based on the average increase in actuarial liability due to reciprocal salary increases of inactive members over the period July 1, 2013, to June 30, 2018, and will be reviewed during the next experience study. Below is the analysis used to develop this assumption:

Impact of Reciprocal Salary Increases of Inactive Members					
Valuation Date	Estimated Benefits of Inactive Members who Retired During Year	Actual Benefits of Inactive Members who Retired during Year	Increase in Benefits		
6/30/2013	\$ 243,726	\$ 257,156	5.5%		
6/30/2014	122,961	137,838	12.1%		
6/30/2015	97,204	106,026	9.1%		
6/30/2016	181,647	190,816	5.0%		
6/30/2017	118,439	122,802	3.7%		
6/30/2018	160,213	199,518	24.5%		
Total	\$ 924,190	\$ 1,014,157			
			Geometric Average	9.8%	

Disability

No assumption for disability was used.

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

Population Projection

For purposes of determining the annual appropriation as a percent of total covered payroll, the size of the active group is projected to decrease from 124 members as of the valuation date, to 65 members in 2045, and ultimately reach 62 members in 2055, due to the assumption that 50 percent of future members will elect to opt out of the pension system. New entrants are assumed to enter with an average age and average pay as disclosed below. The new entrant profile is based on the averages for all current active members. New entrant pay is assumed to increase by the salary scale assumption, and is limited by the projected statutory salary cap.

New Entrant Profile			
Age Group	No.	Uncapped Salary	Capped Salary
Under 20			
20-24			
25-29	12	\$ 996,519	\$ 996,519
30-34	20	1,722,864	1,694,274
35-39	22	1,752,774	1,752,774
40-44	21	1,697,609	1,661,942
45-49	17	1,380,831	1,380,831
50-54	13	1,099,372	1,085,078
55-59	12	957,805	957,805
60-64			
65-69	1	69,464	69,464
70 & Over			
Total	118	\$ 9,677,238	\$ 9,598,687
Avg. Salary		\$ 82,010	\$ 81,345
Avg. Age			41.65
Percent Male			60.17%

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates	
Age	Males & Females
55	5.00%
56-64	15.00%
65-74	20.00%
75	100.00%

Assets

Assets available for benefits are determined as shown on page 33. The asset valuation method is prescribed by statute, and does not appear to allow a corridor; therefore, a corridor has not been established.

Expenses

As estimated and advised by GARS staff, based on current expenses and expected to increase in relation to the projected capped payroll. Expenses are included in the service cost.

Spouse's Age

The female spouse is assumed to be four years younger than the male spouse.

Decrement Timing

All decrements are assumed to occur beginning of year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Turnover decrements do not operate after member reaches retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.



Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2020, Actuarial Valuation)

415(b) and 401(a)(17) Limits

No explicit assumption is made with respect to these items.

Assumptions as a Result of Public Act 96-0889 – Tier 2 Assumptions

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Retirement rates for Tier Two members to account for the change in retirement age, as follows:

Retirement Rates for Tier Two Members	
Age	Male & Female
67	35.00%
68-70	25.00%
71-74	20.00%
75	100.00%
Early Retirement Rates for Tier Two Members	
Age	Males and Females
62	20.00%
63	10.00%
64	12.00%
65	14.00%
66	16.00%

Rates of withdrawal for Tier Two members are assumed to be equal to six percent for all ages 20 through 65.

Projection Methodology and Appropriation Requirements under P.A. 93-0002, P.A. 94-0004, P.A. 96-0043, and P.A. 100-0023

State Contributions under P.A. 93-0002

In general, for each year during the life of the GOB program, the state contributions to the System are to be calculated as follows:

1. Calculation of the contribution maximum
 - a. A projection of contributions will be made from the valuation date to June 30, 2045. Such projection will be based on hypothetical asset values determined using the following assumptions:
 - i) That the System had received no portion of the general obligation bond proceeds in excess of the scheduled contributions for the remainder of fiscal 2003 and for the entirety of 2004;
 - ii) That hypothetical state contributions had been made each fiscal year from 2005 through the valuation date, based on the funding process in place prior to P.A. 93-0002 (without regard to prior state minimum requirements);
 - iii) That the actual amounts of member contributions and the actual cash outflows (benefit payments, refunds and administrative expenses) for each year prior to the valuation date were realized; and
 - iv) That the hypothetical fund earned returns in each prior fiscal year equal to the rate of total return actually earned by the retirement fund in that year.
 - b. The hypothetical asset values developed in a., above, will not exceed the actual assets of the fund.
 - c. A projection of maximum contributions for each year of the GOB program will be performed each year, by reducing the contributions produced in a., above, by the respective amount of debt service allocated to the System for each year.
2. Calculation of the contribution with GOB proceeds
 - a. The basic projection of State contributions from the valuation date through June 30, 2045, will be made, taking into account all assets of the System, including the GOB proceeds;
 - b. State contribution rates (expressed as a percentage of covered pay), in the pattern required by the funding sections of the statutes, are calculated; and
 - c. In those projections, the dollars of state contributions which are added to assets each year during the GOB program are limited by the contribution maximum. Because the bonds are to be liquidated by the end of fiscal 2033, there is no contribution maximum thereafter.

Projection Methodology and Appropriation Requirements under P.A. 93-0002, P.A. 94-0004, P.A. 96-0043, and P.A. 100-0023

State Contributions under P.A. 94-0004

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/2-124:

(c) Notwithstanding any other provision of this Article, the total State contribution for fiscal year 2006 is \$4,157,000.

Notwithstanding any other provision of this Article, the total State contribution for fiscal year 2007 is \$5,220,300.

For each State fiscal years 2008 through 2010, the State contribution to the System, as a percentage of the applicable payroll, shall be increased in equal annual increments from the required State contribution for State fiscal year 2007, so that by State fiscal year 2011, the State is contributing at a rate otherwise required under this Section.

State Contributions under P.A. 96-0043

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/2-124:

(d) For purposes of determining the required State contribution to the System, the value of the System's assets shall be equal to the actuarial value of the System's assets, which shall be calculated as follows:

As of June 30, 2008, the actuarial value of the System's assets shall be equal to the market value of the assets as of that date. In determining the actuarial value of the System's assets for fiscal years after June 30, 2008, any actuarial gains or losses from investment return incurred in a fiscal year shall be recognized in equal annual amounts over the five-year period following that fiscal year.

(e) For purposes of determining the required State contribution to the system for a particular year, the actuarial value of assets shall be assumed to earn a rate of return equal to the system's actuarially assumed rate of return.

State Contributions under P.A. 100-0023

Public Act ("P.A.") 100-0023, effective July 6, 2017, modified the State's funding policy to include smoothing State contribution rate increases or decreases due to changes in actuarial assumptions, including investment return assumptions, over a five-year period in equal annual amounts beginning in fiscal year 2018. In addition, changes in actuarial or investment assumptions that increased or decreased the State contribution rate in fiscal years 2014 through 2017 are to be smoothed over a five-year period in equal annual amounts, applying only to the portion of the five-year phase-in that is applicable to fiscal years on and after 2018.



Projection Methodology and Appropriation Requirements under P.A. 93-0002, P.A. 94-0004, P.A. 96-0043, and P.A. 100-0023

Phase-in of the Financial Impact of Assumption Changes

Following is a table with the recognition schedule for the phase-in of actuarial assumption changes required under Public Act 100-0023. The following actuarial assumption changes were made:

1. Beginning with the June 30, 2013, actuarial valuation, there were changes to the economic and demographic assumptions.
2. Beginning with the June 30, 2015, actuarial valuation, there were changes to the new entrant population assumptions.
3. Beginning with the June 30, 2016, actuarial valuation, there were changes to the economic and demographic assumptions.
4. Beginning with the June 30, 2018, actuarial valuation, there were changes to the economic assumptions.
5. Beginning with the June 30, 2019, actuarial valuation, there were changes to the economic and demographic assumptions.

Valuation Year Ending June 30,	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Applicable Fiscal Year Ending June 30,	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	\$ in Millions After Impact of GOB Proceeds										
Contribution Before Assumption Change											
(1) Contribution Dollar	\$ 14.562	\$ -	\$ 16.207	\$ 23.261	\$ -	\$ 25.578	\$ 27.643	\$ -			
(2) Contribution Rate	108.440%	0.000%	140.241%	221.533%	0.000%	255.977%	282.677%	0.000%			
Contribution After Assumption Change											
(3) Contribution Dollar	\$ 15.809	\$ -	\$ 21.721	\$ 26.679	\$ -	\$ 26.088	\$ 26.825	\$ -			
(4) Contribution Rate	122.168%	0.000%	194.949%	255.539%	0.000%	261.122%	273.142%	0.000%			
(5) Assumption Change Impact as a Percentage of Capped Payroll [(4) - (2)]	13.728%	0.000%	54.708%	34.006%	0.000%	5.145%	-9.535%	0.000%			
(6) Assumption Change Impact Recognized This Year (5-year Recognition)											
(6a) From This Year	2.746%	0.000%	10.942%	6.801%	0.000%	1.029%	-1.907%	0.000%			
(6b) From One Year Ago	0.000%	2.746%	0.000%	10.942%	6.801%	0.000%	1.029%	-1.907%	0.000%		
(6c) From Two Years Ago	0.000%	0.000%	2.746%	0.000%	10.942%	6.801%	0.000%	1.029%	-1.907%	0.000%	
(6d) From Three Years Ago	0.000%	0.000%	0.000%	2.746%	0.000%	10.942%	6.801%	0.000%	1.029%	-1.907%	0.000%
(6e) From Four Years Ago	0.000%	0.000%	0.000%	0.000%	2.744%	0.000%	10.940%	6.802%	0.000%	1.029%	-1.907%
(6f) Total Recognized Assumption Change Impact	2.746%	2.746%	13.688%	20.489%	20.487%	18.772%	16.863%	5.924%	-0.878%	-0.878%	-1.907%



SECTION F

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions

(as of June 30, 2020)

1. Participation. A person eligible for membership must participate in the system as a condition of employment unless an "Election Not to Participate" is filed within 24 months from the date of assuming office.
2. Member Contributions. All members of the system are required to contribute to the system the following percentage of their salaries:

Retirement Annuity	8.5%
Automatic Annuity Increase	1.0
Survivor's Annuity	<u>2.0</u>
Total	11.5%

3. Retirement Annuity – Eligibility. A member who has at least eight years of creditable service is entitled to a retirement annuity upon attainment of age 55. A member with at least four years of service but less than eight years of service is entitled to a retirement annuity upon attainment of age 62.

A member with at least eight years of service who becomes disabled while in service is entitled to a retirement annuity regardless of age.

4. Retirement Annuity – Amount. The retirement annuity is determined according to the following formula based upon the member's final rate of salary:

- 3.0% for each of the first 4 years of service, plus
- 3.5% for each of the next 2 years of service, plus
- 4.0% for each of the next 2 years of service, plus
- 4.5% for each of the next 4 years of service, plus
- 5.0% for each year of service in excess of 12

The maximum retirement annuity is 85% of the final rate of salary.

5. Automatic Increase in Retirement Annuity.

- (a) Annual automatic increases of 3% of the current amount of retirement annuity are provided. The initial increase is effective in the month of January or July of the year next following the year in which the first anniversary of retirement occurs, but in no event prior to attainment of age 60.
- (b) Beginning January 1, 1990, for persons who become participants prior to August 8, 2003, and who remain in service after attaining 20 years of creditable service, 3% annual automatic increases begin to accrue on January 1 next following the date the participant attains age 55 or completes 20 years of creditable service, whichever occurs later. For any person who has service credit for the entire period from January 15, 1969 through December 31, 1992, the increases shall accrue from age 50 instead of age 55. However, such increases shall not become payable until the January 1 or July 1 next following the first anniversary of retirement, or the first of the month following attainment of age 60, whichever occurs later.



Summary of Plan Provisions (as of June 30, 2020)

6. Survivor's Annuity – Eligibility. A surviving spouse without children is eligible for survivor benefits at age 50 or over provided marriage to the member had been in effect for at least one year immediately prior to the member's death.

A surviving spouse with unmarried eligible children is eligible for a survivor's annuity benefit at any age provided the above marriage requirements have been met. When all children are disqualified because of death, marriage or attainment of age 18 or age 22 in the case of a fulltime student, the spouse's benefit is suspended if the spouse is under age 50 until the attainment of such age.

An unmarried eligible child under age 18 or under age 22 and a full-time student or over age 18 and disabled may qualify for the survivor's annuity if there is no surviving spouse or if the spouse dies. Legally adopted children are eligible for survivor benefits on the same basis as other children.

If the member dies in service as a member, the member must have at least two years of service credit for survivor's annuity eligibility. If death occurs after termination of service but before retirement, the deceased member must have at least four years of service credit for survivor's annuity eligibility.

7. Survivor's Annuity – Amount.

- (a) A surviving spouse is entitled to a survivor's annuity of $66 \frac{2}{3}\%$ of the amount of retirement annuity to which the member was entitled on the date of death, without regard to whether the member had attained age 55 as of the time of death, subject to a minimum payment of 10% of salary.
- (b) If a surviving spouse has in his or her care eligible children, the survivor's annuity shall be the greater of the following:
- (1) $66 \frac{2}{3}\%$ of the amount of retirement annuity to which the member was entitled on the date of death, or (2) 30% of the member's salary increased by 10% of salary on account of each eligible child, subject to a total payment for the surviving spouse and children of 50% of salary. If only unmarried children survive, each such child shall be entitled to an annuity of 20% of salary, subject to a maximum total payment for all children of 50% of salary.
- (c) Upon the death of a member after termination of service, or upon the death of an annuitant, the maximum total payment to a surviving spouse and eligible children, or eligible children alone if there is no surviving spouse, shall be 75% of the retirement annuity to which the member or annuitant was entitled.
- (d) Survivor's annuities are subject to annual automatic increases of 3% of the current amount of annuity.
- (e) The minimum survivor's annuity provided by the system is \$300 per month.
- (f) In the case of a proportional survivor's annuity under the Retirement Systems Reciprocal Act, if the amount payable by the system on January 1, 1993, is less than \$300 per month, the amount shall be increased as of that date by \$2 per month for each full year elapsed since the annuity began.



Summary of Plan Provisions (as of June 30, 2020)

8. Refund of Contributions. Upon termination of service, a member is entitled to a refund of his total contributions without interest.

A member who has no eligible survivor's annuity beneficiaries, or is unmarried at the time of retirement, is entitled to a refund of his or her contributions for the survivor's annuity.

9. Retirement System Reciprocal Act. According to the provisions of the Retirement System Reciprocal Act provided in Illinois Compiled statutes 40 ILCS 5/20, a member who has pension credit in two or more participating systems may be entitled to a proportional retirement annuity if his or her combined pension credit satisfies the longest minimum retirement eligibility requirement of any such system.

In calculating the proportional retirement annuity, the earnings credits under all participating systems shall be considered in determining final average salary.

Persons Who First Become Participants On or After January 1, 2011 ("Tier 2")

The following changes to the above provisions apply to persons who first become participants on or after January 1, 2011:

1. The highest salary for annuity purposes is equal to the average monthly salary obtained by dividing the participant's total salary during the 96 consecutive months of service within the last 120 months of service in which the total compensation was the highest by the number of months in that period.
2. Required contributions shall not exceed the contributions that would be due on the highest salary for annuity purposes.
3. For 2011, the final average salary is limited to the Social Security wage base of \$106,800. Limitations for future years shall automatically be increased or decreased, as applicable, by a percentage change in the Consumer Price Index-U during the preceding 12-month calendar year.
4. A participant is eligible to retire with unreduced benefits after attainment of age 67 with at least eight years of service credit. However, a participant may elect to retire at age 62 with at least eight years of service credit and receive a retirement annuity reduced by one-half of 1% for each month that his or her age is under 67.
5. The annual retirement annuity provided is equal to 3% of the participant's final average salary for each year of service. The maximum retirement annuity payable shall be 60% of the participant's final average salary.
6. Automatic annual increases are provided in the retirement annuity then being paid equal to 3% or the annual change in the Consumer Price Index for all Urban Consumers, whichever is less. Such increases are payable in the January or July next following the first anniversary of retirement, and in the same month of each year thereafter.



Summary of Plan Provisions (as of June 30, 2020)

7. Automatic annual increases are provided in the survivor annuity then being paid equal to 3% or the annual change in the Consumer Price Index for all Urban Consumers, whichever is less. Such increases are payable (1) on each January 1 occurring on or after the commencement of the annuity if the deceased member died while receiving a retirement annuity, or (2) in other cases, on each January 1 occurring on or after the first anniversary of the commencement of the annuity.

8. The retirement annuity being paid is suspended when an annuitant accepts full-time employment in a position covered under the General Assembly Retirement System or any other Article of the Illinois Pension Code. Upon termination of the employment, the retirement annuity shall resume and, if appropriate, be recalculated.

9. Salary and COLA development for members hired on or after January 1, 2011, are shown in the table below:

Year Ending	CPI-U	COLA	Maximum Annual Pensionable Earnings
2011		3.00%	\$106,800.00
2012	3.90%	3.00%	\$110,004.00
2013	2.00%	2.00%	\$112,204.08
2014	1.20%	1.20%	\$113,550.53
2015	1.70%	1.70%	\$115,480.89
2016	0.00%	0.00%	\$115,480.89
2017	1.50%	1.50%	\$117,213.10
2018	2.20%	2.20%	\$119,791.79
2019	2.30%	2.30%	\$122,547.00
2020	1.70%	1.70%	\$124,630.30

SECTION G

GLOSSARY OF TERMS

Glossary of Terms

<i>Actuarial Accrued Liability (“AAL”)</i>	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
<i>Actuarial Assumptions</i>	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
<i>Actuarial Cost Method</i>	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
<i>Actuarial Equivalent</i>	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
<i>Actuarial Present Value (“APV”)</i>	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
<i>Actuarial Present Value of Future Benefits (“APVFB”)</i>	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
<i>Actuarial Valuation</i>	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 67, such as the Funded Ratio and the Actuarially Determined Contribution (“ADC”).
<i>Actuarial Value of Assets</i>	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio or contribution requirement.

Glossary of Terms

<i>Actuarially Determined Contribution (“ADC”)</i>	The employer’s periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and Amortization Payment.
<i>Amortization Method</i>	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.
<i>Amortization Payment</i>	That portion of the plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
<i>Amortization Period</i>	The period used in calculating the Amortization Payment.
<i>Closed Amortization Period</i>	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
<i>Employer Normal Cost</i>	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
<i>Equivalent Single Amortization Period</i>	For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL payment.
<i>Experience Gain/Loss</i>	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience; e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience; i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

Glossary of Terms

<i>Funded Ratio</i>	The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability.
<i>GASB</i>	Governmental Accounting Standards Board.
<i>GASB No. 67 and GASB No. 68</i>	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68, which replaced Statement No. 27 effective with fiscal year ending June 30, 2015, sets the accounting rules for the employers that sponsor or contribute to public retirement systems. Statement No. 67, which replaced Statement No. 25 effective with fiscal year ending June 30, 2014, sets the rules for the systems themselves.
<i>Normal Cost</i>	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
<i>Open Amortization Period</i>	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.
<i>Unfunded Actuarial Accrued Liability</i>	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
<i>Valuation Date</i>	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.

SECTION H

ADDITIONAL PROJECTION DETAILS

Table 11
Additional Projection Details — Actuarial Accrued Liability
(\$ in Millions)

Valuation Date June 30	Current Inactives		Current Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2020	\$ 303.42	\$ 28.66	\$ 36.29	\$ 5.12	\$ -	\$ 332.08	\$ 41.42	\$ 373.49
2021	297.02	29.51	39.96	6.30	-	326.53	46.26	372.79
2022	290.13	30.24	43.15	7.52	0.06	320.36	50.74	371.10
2023	282.77	30.90	46.03	8.78	0.19	313.67	55.00	368.67
2024	274.96	31.45	48.59	10.05	0.38	306.41	59.02	365.43
2025	266.72	31.92	50.87	11.36	0.63	298.63	62.86	361.50
2026	258.06	32.31	52.95	12.71	0.95	290.37	66.62	356.98
2027	249.02	32.62	54.80	14.13	1.34	281.64	70.27	351.91
2028	239.64	32.89	56.37	15.56	1.80	272.53	73.73	346.26
2029	229.93	33.10	57.65	16.97	2.34	263.03	76.96	339.99
2030	219.96	33.27	58.70	18.38	2.98	253.24	80.06	333.29
2031	209.76	33.38	59.55	19.79	3.72	243.14	83.06	326.20
2032	199.39	33.45	60.20	21.19	4.56	232.84	85.95	318.78
2033	188.89	33.41	60.68	22.57	5.50	222.30	88.74	311.04
2034	178.32	33.28	60.91	23.91	6.56	211.60	91.38	302.99
2035	167.74	33.11	60.98	25.19	7.73	200.85	93.90	294.75
2036	157.20	32.88	60.89	26.39	9.01	190.09	96.29	286.38
2037	146.78	32.60	60.59	27.52	10.41	179.38	98.51	277.89
2038	136.51	32.27	60.07	28.52	11.93	168.78	100.53	269.30
2039	126.46	31.87	59.39	29.48	13.59	158.33	102.46	260.79
2040	116.69	31.41	58.56	30.30	15.36	148.10	104.22	252.32
2041	107.23	30.89	57.60	31.05	17.25	138.12	105.90	244.01
2042	98.13	30.31	56.49	31.70	19.26	128.44	107.45	235.89
2043	89.43	29.66	55.27	32.23	21.39	119.10	108.89	227.98
2044	81.16	28.96	53.92	32.71	23.63	110.12	110.26	220.38
2045	73.35	28.19	52.46	33.08	26.00	101.53	111.54	213.07



Table 12
Additional Projection Details — Present Value of Future Benefits
(\$ in Millions)

Valuation Date June 30	Current Inactives		Current Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2020	\$ 303.42	\$ 28.66	\$ 46.33	\$ 15.13	\$ -	\$ 332.08	\$ 61.45	\$ 393.53
2021	297.02	29.51	48.68	15.81	0.91	326.53	65.40	391.93
2022	290.13	30.24	50.72	16.51	1.81	320.36	69.04	389.40
2023	282.77	30.90	52.58	17.24	2.70	313.67	72.53	386.20
2024	274.96	31.45	54.26	18.00	3.64	306.41	75.90	382.31
2025	266.72	31.92	55.77	18.79	4.74	298.63	79.30	377.94
2026	258.06	32.31	57.15	19.62	5.60	290.37	82.37	372.73
2027	249.02	32.62	58.38	20.53	6.71	281.64	85.62	367.26
2028	239.64	32.89	59.41	21.46	7.81	272.53	88.68	361.21
2029	229.93	33.10	60.22	22.40	8.96	263.03	91.58	354.61
2030	219.96	33.27	60.87	23.36	10.27	253.24	94.50	347.73
2031	209.76	33.38	61.37	24.33	11.43	243.14	97.13	340.28
2032	199.39	33.45	61.73	25.31	12.84	232.84	99.88	332.72
2033	188.89	33.41	61.96	26.29	14.46	222.30	102.71	325.01
2034	178.32	33.28	61.98	27.26	15.94	211.60	105.17	316.77
2035	167.74	33.11	61.85	28.18	17.54	200.85	107.57	308.42
2036	157.20	32.88	61.61	29.05	19.39	190.09	110.05	300.14
2037	146.78	32.60	61.17	29.88	21.37	179.38	112.42	291.80
2038	136.51	32.27	60.54	30.62	23.43	168.78	114.58	283.36
2039	126.46	31.87	59.77	31.32	25.51	158.33	116.60	274.93
2040	116.69	31.41	58.86	31.92	27.75	148.10	118.53	266.62
2041	107.23	30.89	57.83	32.46	30.04	138.12	120.33	258.45
2042	98.13	30.31	56.68	32.92	32.43	128.44	122.04	250.48
2043	89.43	29.66	55.41	33.29	34.92	119.10	123.62	242.72
2044	81.16	28.96	54.03	33.62	37.73	110.12	125.38	235.50
2045	73.35	28.19	52.54	33.85	40.42	101.53	126.81	228.34



Table 13
Additional Projection Details — Benefit Payments Including Administrative Expenses
(\$ in Millions)

Valuation Date June 30	Current Inactives		Current Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2020	\$ 25.32	\$ 0.98	\$ 0.64	\$ 0.29	\$ -	\$ 26.29	\$ 0.92	\$ 27.22
2021	25.39	1.16	1.09	0.32	0.02	26.54	1.43	27.97
2022	25.40	1.26	1.39	0.33	0.04	26.67	1.76	28.42
2023	25.38	1.41	1.69	0.36	0.06	26.78	2.11	28.89
2024	25.31	1.53	1.96	0.36	0.09	26.84	2.41	29.25
2025	25.19	1.64	2.18	0.38	0.12	26.82	2.67	29.49
2026	25.01	1.73	2.40	0.36	0.14	26.74	2.90	29.65
2027	24.78	1.79	2.68	0.39	0.17	26.57	3.24	29.81
2028	24.49	1.87	2.96	0.44	0.20	26.37	3.60	29.97
2029	24.15	1.91	3.16	0.48	0.22	26.06	3.86	29.92
2030	23.74	1.99	3.35	0.53	0.23	25.73	4.11	29.84
2031	23.27	2.04	3.52	0.58	0.25	25.30	4.35	29.65
2032	22.73	2.15	3.67	0.65	0.27	24.88	4.59	29.47
2033	22.14	2.22	3.89	0.72	0.30	24.36	4.91	29.27
2034	21.48	2.26	4.02	0.82	0.32	23.75	5.16	28.91
2035	20.77	2.30	4.14	0.93	0.35	23.08	5.42	28.49
2036	20.01	2.34	4.31	1.03	0.39	22.35	5.72	28.07
2037	19.19	2.38	4.46	1.17	0.43	21.57	6.06	27.63
2038	18.33	2.42	4.56	1.25	0.47	20.75	6.28	27.03
2039	17.44	2.45	4.64	1.40	0.53	19.89	6.56	26.45
2040	16.51	2.48	4.71	1.48	0.58	19.00	6.77	25.76
2041	15.57	2.51	4.76	1.60	0.64	18.08	7.00	25.08
2042	14.61	2.53	4.80	1.72	0.71	17.14	7.23	24.37
2043	13.65	2.55	4.83	1.78	0.79	16.20	7.39	23.59
2044	12.69	2.57	4.85	1.90	0.87	15.26	7.62	22.87
2045	11.74	2.58	4.85	1.98	0.96	14.32	7.79	22.12

Table 14
Additional Projection Details — Active Population, Covered Payroll,
Employee Contributions and Normal Costs
(\$ in Millions)

Valuation Date	Tier 1 Active Members				Tier 2 Active Members				Future Tier 2 Active Members			
	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost
2020	46	\$ 4.07	\$ 0.47	\$ 1.90	78	\$ 5.75	\$ 0.66	\$ 1.11	0	\$ -	\$ -	\$ -
2021	38	3.53	0.41	1.67	72	5.66	0.65	1.10	6	0.53	0.06	0.08
2022	33	3.10	0.36	1.46	68	5.41	0.62	1.08	12	1.02	0.12	0.16
2023	28	2.71	0.31	1.27	63	5.14	0.59	1.03	17	1.46	0.17	0.23
2024	23	2.36	0.27	1.11	58	4.84	0.56	1.00	21	1.89	0.22	0.31
2025	20	2.07	0.24	0.99	53	4.58	0.53	0.97	26	2.38	0.27	0.39
2026	17	1.85	0.21	0.86	49	4.35	0.50	0.93	28	2.68	0.31	0.45
2027	15	1.62	0.19	0.75	45	4.09	0.47	0.88	32	3.10	0.36	0.53
2028	13	1.42	0.16	0.65	41	3.83	0.44	0.83	35	3.47	0.40	0.61
2029	11	1.24	0.14	0.55	38	3.56	0.41	0.78	38	3.84	0.44	0.69
2030	9	1.07	0.12	0.47	34	3.34	0.38	0.74	41	4.23	0.49	0.77
2031	8	0.92	0.11	0.39	31	3.12	0.36	0.69	42	4.48	0.52	0.83
2032	6	0.78	0.09	0.34	29	2.91	0.33	0.65	44	4.83	0.56	0.90
2033	5	0.68	0.08	0.29	26	2.70	0.31	0.60	47	5.24	0.60	0.98
2034	5	0.59	0.07	0.25	24	2.52	0.29	0.55	48	5.50	0.63	1.04
2035	4	0.51	0.06	0.21	21	2.31	0.27	0.51	49	5.78	0.66	1.10
2036	3	0.44	0.05	0.18	19	2.12	0.24	0.46	51	6.14	0.71	1.18
2037	3	0.36	0.04	0.15	17	1.93	0.22	0.41	53	6.51	0.75	1.25
2038	2	0.30	0.03	0.12	15	1.75	0.20	0.38	54	6.85	0.79	1.32
2039	2	0.25	0.03	0.10	13	1.61	0.19	0.34	55	7.13	0.82	1.38
2040	1	0.20	0.02	0.08	12	1.45	0.17	0.30	56	7.44	0.86	1.45
2041	1	0.17	0.02	0.06	10	1.32	0.15	0.27	56	7.71	0.89	1.50
2042	1	0.14	0.02	0.05	9	1.18	0.14	0.24	57	7.97	0.92	1.56
2043	1	0.12	0.01	0.04	8	1.05	0.12	0.21	57	8.22	0.95	1.61
2044	1	0.09	0.01	0.03	7	0.94	0.11	0.19	58	8.60	0.99	1.69
2045	0	0.07	0.01	0.03	6	0.84	0.10	0.17	59	8.82	1.01	1.73



SECTION I

HISTORICAL VALUATION INFORMATION AND RESULTS

Key Historical Valuation Results

Historical Actuarial Valuation Information and Results (\$ in Millions)													
Valuation Year	(1) Member Counts			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Active	Inactive	Retiree	Covered Uncapped Payroll	Benefits and Expenses	Net Investment Income	Actual State Contributions	Employee Contributions	Actuarially Determined Contribution	ADC Contribution Shortfall	Total Normal Cost ^a		
2016	141	71	415	\$ 11.30	\$ 22.37	\$ (0.54)	\$ 16.07	\$ 1.31	\$ 17.14	\$ 1.07	\$ 4.16		
2017	135	73	421	11.00	22.85	5.14	21.72	1.28	26.98	5.26	3.83		
2018	132	68	417	10.71	23.68	3.73	21.16	1.26	32.08	10.93	3.68		
2019	126	69	441	10.16	25.12	3.45	23.25	1.32	32.65	9.40	3.15		
2020	124	65	438	10.18	26.25	2.58	25.75	1.21	34.41	8.66	3.01		

^a Includes load for Administrative Expense Contribution.

(1) through (3). The number of retirees has increased from 415 in 2016 to 438 in 2020 and the number of actives has decreased from 141 in 2016 to 124 in 2020. The trend shown in the table suggests that the System is maturing.

(5). Benefits and expenses were less than contributions in 2020. For underfunded plans it is preferable for contributions to exceed benefits and expenses, otherwise assets may not grow at an adequate rate.

(9). The actuarially determined contribution (ADC) has increased from \$17 million in 2016 to \$34 million in 2020, an increase of 101 percent over the period. The ADC increased significantly in 2018 primarily due to the change in amortization policy. The ADC has also increased because the statutory policy has produced contributions that are less than the ADC.

(10). ADC less Actual State Contributions. Represents additional employer contribution needed to finance normal cost and existing unfunded actuarial liability over a 20-year closed period as of July 1, 2015, expressed as a level percentage of capped payroll.

(11). The total normal cost has decreased from \$4.16 million in 2016 to \$3.01 million in 2020. The decrease is mainly due to a declining active population, as well as the growing proportion of active members with Tier 2 benefits.

Key Historical Valuation Results

Historical Actuarial Valuation Information and Results (\$ in Millions)												
Valuation Year	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)			Funded Ratio (AVA/AAL)	Demographic (Gain)/Loss	Investment (Gain)/Loss	Impact of Plan Changes	Impact of Assumption Changes	Contribution (Excess)/Shortfall		
		Active	Inactive	Retiree	Total							
2016	\$ 50.82	\$ 59.39	\$ 26.47	\$ 277.47	\$ 363.34	13.99%	\$ (5.10)	\$ 0.27	\$ -	\$ 36.73	\$ 4.94	
2017	55.06	55.79	30.22	284.75	370.76	14.85%	2.21	(0.65)	-	-	1.62	
2018	57.62	55.32	28.83	291.63	375.78	15.33%	1.17	(0.15)	-	(0.73)	2.17	
2019	60.06	41.57	29.28	303.76	374.60	16.03%	4.26	0.83	-	(8.78)	0.07	
2020	63.88	41.42	28.66	303.42	373.49	17.10%	(1.67)	0.82	-	-	(4.07)	

(13) and (15). The actuarial liability for active members has decreased whereas the actuarial liability for retired members has increased. This is mostly due to a declining active population and the relative level of Tier 1 and Tier 2 benefits. The actuarial liability for retired members is comprised primarily of Tier 1 benefits, whereas the actuarial liability for active members is comprised of both Tier 1 and Tier 2 benefits. The level of Tier 2 benefits for active members increases as newly retired Tier 1 members are effectively replaced with newly hired Tier 2 members.

(17). The funded ratio has grown marginally from 13.99 percent at 2016 to 17.10 percent at 2020. One of the key reasons for the slow growth in the funded ratio is the statutory funding policy.

(18) and (21). An Experience Study was performed in 2018 and assumptions were modified to be more consistent with observed experience. The increase in liabilities resulting from a reduction to the assumed rate of investment return was offset by the impact of updated demographic assumptions, which reduced liabilities.

(22) Contribution shortfall reflects the additional contributions needed to maintain the current level of unfunded actuarial liability. Note that this measure does not address the additional contributions needed to reduce the unfunded actuarial liability.

SECTION J

STRESS TESTING SCENARIOS



December 8, 2020

Board of Trustees
General Assembly Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, IL 62794-9255

Re: Stress Testing Scenarios Based on Actuarial Valuation Results as of June 30, 2020

Dear Members of the Board:

At your request, we have performed stress testing of the required statutory contributions and funded ratio for the General Assembly Retirement System of Illinois ("GARS") based on the results of the June 30, 2020, actuarial valuation. This stress testing was performed to illustrate the projected impact on actuarial valuation results (including the annual contribution requirement and funded ratio) if there is a significant market downturn or significant volatility in investment returns, or volatility in future System participation.

GRS has prepared this analysis exclusively for the Trustees of the General Assembly Retirement System; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than the GARS only in its entirety and only with the permission of the Board.

Exhibit A-1 contains the rates of return used for the investment return stress test. The investment return stress test analysis projects the actuarial valuation results assuming that the plan assets earn 6.50 percent, the 25th percentile return of 4.15 percent, and the 40th percentile return of 5.64 percent. In order to demonstrate the risk and volatility of the returns, we are providing results assuming both static returns of 6.50 percent, 4.15 percent, or 5.64 percent and volatile returns that produce 25-year geometric average returns of 6.50 percent, 4.15 percent or 5.64 percent. In Scenarios 1 through 5, the discount rate used to determine liabilities remains at 6.50 percent, average future wage inflation remains at 2.50 percent per year and 50 percent of future members are assumed to opt out of the pension System. Please note that each volatile scenario represents one possible trial that generates the targeted average geometric return, and that another equally likely trial that produces the same targeted average geometric return could produce significantly different contribution and funded ratio patterns. The 25th and 40th percentile returns used in Scenarios 2 through 5 were determined based on the expected investment return and the current target asset allocation of the System as of the most recent economic assumption review issued to the System on April 13, 2020.

In addition to the investment return stress test scenarios, we have provided scenarios that stress test the required statutory contributions and funded ratio based on fluctuations in the new entrant opt-out assumption. In order to demonstrate the risk and volatility associated with changes to future System

participation, we are providing results under the following scenarios: Scenario 6 – new entrant opt-out assumption increases by 25.00 percentage points from the assumed rate of 50.00 percent per year to 75.00 percent per year; and Scenario 7 – new entrant opt-out assumption increases by 50.00 percentage points from the assumed rate of 50.00 percent per year to 100.00 percent per year. Scenario 7 simulates closing GARS to new entrants. In Scenarios 6 and 7, the investment return assumption and discount rate used to determine the liabilities remain at 6.50 percent.

GRS believes that these scenarios provide a reasonable illustration of potential future volatility of investment returns, future System participation and the resulting actuarial valuation results. Annual returns will likely be significantly different from the returns shown in Exhibit A-1 and the 25-year geometric average of actual returns may be either higher or lower than the assumption of 6.50 percent.

Exhibits B-1 through B-9 contain the numerical results of the stress testing.

Analysis of Stress Testing Scenario Results

Baseline – Static 6.50 Percent

Under the projected results from the actuarial valuation as of June 30, 2020, in which all future actuarial assumptions are assumed to be realized, the statutory dollar contribution increases through 2022, then decreases from 2022 to 2033, and increases by a fairly steady rate beginning in year 2033, once the statutory contributions are no longer limited by the maximum contribution.

A Baseline projection of cash flows, accrued liabilities, and market value of assets can be found in Exhibit B-9. The accrued liability is projected to decrease each year, at an increasing rate, since 50 percent of future new entrants are expected to opt out of the plan. The market value of assets is projected to increase, at a decreasing rate from 2021 to 2033, primarily due to the GOB contribution limit. After 2033, the market value of assets increases, at an increasing rate, since contributions are not impacted by the GOB contribution limit. Most of the growth in assets occurs from 2038 through 2045. The declining growth in the market value of assets through 2033, due to the GOB contribution limit, is the primary reason for the slow growth in the funded ratio through 2033. After 2038, the funded ratio grows significantly from 41 percent in 2038 to 90 percent in 2045.

Scenario 1 – Volatile 6.50 Percent

In Scenario 1, which is based on the assumption that the 25-year geometric average of the returns is equal to 6.50 percent but with volatility in the year-to-year rate of return, the annual contribution requirement is not as stable as the baseline scenario. Relative to the baseline, the contribution requirement is lower through 2033 and intermittently higher and lower from 2034 through 2045.

Scenario 2 – Static 4.15 Percent

In Scenario 2, which is based on the assumption that the annual rate of return is equal to 4.15 percent, the annual contribution requirement steadily increases at an increasing rate beginning in year 2034, once the statutory contributions are no longer limited by the maximum contribution. Relative to the baseline, the contribution requirement is higher in all years after 2024.



Scenario 3 – Volatile 4.15 Percent

In Scenario 3, which is based on the assumption that the 25-year geometric average of the returns is equal to 4.15 percent but with volatility in the year-to-year rate of return. The annual contribution requirement, relative to the baseline, is lower in years 2023-2033, then significantly higher through 2045. The Scenario demonstrates that while the long-term geometric average may be the same as Scenario 2, the pattern of contributions can be significantly different.

Scenario 4 – Static 5.64 Percent

In Scenario 4, which is based on the assumption that the annual rate of return is equal to 5.64 percent, the annual contribution requirement steadily increases at an increasing rate beginning in year 2034, once the statutory contributions are no longer limited by the maximum contribution. Relative to the baseline, the contribution requirement is higher in all years after 2025. Relative to Scenario 2, the rate of increase is lower because more investment income is used to fund benefits.

Scenario 5 – Volatile 5.64 Percent

In Scenario 5, which is based on the assumption that the 25-year geometric average of the returns is equal to 5.64 percent but with volatility in the year-to-year rate of return, the annual contribution requirement relative to the baseline is lower in 2023, 2024, and 2029 through 2038, and higher in all other years. Again, this Scenario demonstrates that while the long-term geometric average may be the same as Scenario 4, the pattern of contributions can be drastically different.

Scenario 6 – 75.00 Percent New Entrant Opt-Out

In Scenario 6, which is based on the assumption that the new entrant opt-out rate increases from the baseline assumption of 50.00 percent per year to 75.00 percent per year, the statutory dollar contribution generally decreases from 2023 to 2045, with a slight increase in 2034. Relative to the baseline, the contribution requirement is higher through 2029 and then lower through 2045. The fiscal year 2023 contribution is projected to be \$33.71 million compared to \$27.17 under the baseline (24 percent increase). This is due to a lower payroll base resulting from the decrease in future population.

Scenario 7 – 100.00 Percent New Entrant Opt-Out (Closed System)

In Scenario 7, which is based on the assumption that the new entrant opt-out rate increases from the baseline assumption of 50.00 percent per year to 100.00 percent per year, the statutory contribution decreases gradually from 2023 to 2033, increases in 2034, and decreases after 2034. Relative to the baseline, the contribution requirement is higher through 2029 and then lower through 2045. The fiscal year 2023 contribution is projected to be \$44.39 million compared to \$27.17 under the baseline (63 percent increase). This is due to a lower payroll base resulting from the decrease in future population. In all Scenarios, it is apparent that based on the funding policy of attaining 90 percent funding in 2045, market volatility will have a larger impact on the statutory contribution as the number of years until 2045 becomes shorter.



In Scenarios 1 through 4, the funded ratio is not 90 percent in the year 2045 because of deferred asset gains and losses that have not been fully recognized in the actuarial value of assets. This is a result of the fact that the assumed investment return in each of these Scenarios is not equal to the valuation assumption of 6.50 percent.

In each projection Scenario, the actuarial valuations in each year have been projected as though a valuation in each of those years was performed. The market value of assets at each projected valuation is assumed to have a rate of return according to the Scenario being modeled for that one year and the valuation interest rate going forward. At each projected valuation, an additional 20 percent of the investment gains and losses are recognized. This iterative process is followed for each projection year through 2045.

Statutory contributions in each projection scenario were determined in accordance with Public Act 100-0023, which modified the State's funding policy beginning in fiscal year 2018, by phasing in contribution rate variances due to changes in actuarial assumptions over a five-year period. The phase-in schedule used to determine the statutory contributions can be found in the June 30, 2020, draft actuarial valuation report.

It is important to note that the Scenarios presented in this letter represent an extremely small sample of possibilities.

This plan has a very small active population. Small groups may experience more volatility than large groups due to actual demographic changes over time.

In each scenario, we have assumed that the plan sponsor will make the statutory contribution when due. However, some scenarios result in very high contribution rates for extended periods of time and may jeopardize the sustainability of the System. We are not qualified to opine on the sponsor's ability to pay the statutory contribution when due.

To the best of our knowledge, this actuarial statement is complete and accurate, fairly presents the actuarial position of GARS as of June 30, 2020, based on the stress testing scenarios, and has been prepared in accordance with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions, contribution amounts or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements in this report.

This letter is part of the actuarial valuation as of June 30, 2020, and is subject to the same actuarial assumptions and disclosures as used in the presentation and annual actuarial valuation report. The



investment return stress testing scenarios used future investment returns as shown in Exhibit A-1. The future System participation stress testing scenarios used future populations and wage inflation assumptions as shown in exhibits A-2 and A-3. All other assumptions and methods were the same as those used in the actuarial valuation.

The statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution. Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved. We recommend adherence to a funding policy, such as the Board policy used to calculate the ADC under GASB Statement Nos. 67 and 68, that funds the normal cost of the plan as well as an amortization payment that seeks to pay off any unfunded accrued liability over a closed period of 20 years beginning July 1, 2015.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

The signing actuaries are independent of the plan sponsor.

Alex Rivera, Heidi Barry and Jeffrey Tebeau are Members of the American Academy of Actuaries (“MAAA”) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Gabriel, Roeder, Smith & Company



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Senior Consultant



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General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Assumed Rates of Investment Return
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS						
Scenario	Baseline	1	2	3	4	5
Investment Return Assumption	6.50% per year	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter
25-Year Geometric Return	6.50%	6.50%	4.15%	4.15%	5.64%	5.64%
Summary of Investment Returns Included in the Scenario	N/A	Investment returns during the first 25 years with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with volatility, based on the System's asset allocation policy
Fiscal Year	Rates of Investment Returns					
2021	6.50%	14.20%	4.15%	20.65%	5.64%	3.17%
2022	6.50%	-4.86%	4.15%	9.50%	5.64%	1.77%
2023	6.50%	18.47%	4.15%	-18.35%	5.64%	8.68%
2024	6.50%	6.03%	4.15%	-24.77%	5.64%	6.62%
2025	6.50%	-9.48%	4.15%	8.56%	5.64%	28.44%
2026	6.50%	13.73%	4.15%	10.95%	5.64%	0.46%
2027	6.50%	12.24%	4.15%	14.50%	5.64%	20.44%
2028	6.50%	3.43%	4.15%	2.93%	5.64%	1.75%
2029	6.50%	-1.34%	4.15%	22.18%	5.64%	7.03%
2030	6.50%	15.16%	4.15%	8.38%	5.64%	13.53%
2031	6.50%	-4.07%	4.15%	7.39%	5.64%	7.05%
2032	6.50%	5.05%	4.15%	12.74%	5.64%	17.93%
2033	6.50%	19.55%	4.15%	-4.04%	5.64%	-19.70%
2034	6.50%	15.16%	4.15%	0.01%	5.64%	9.06%
2035	6.50%	16.65%	4.15%	-5.86%	5.64%	-2.47%
2036	6.50%	19.88%	4.15%	29.25%	5.64%	-2.71%
2037	6.50%	19.37%	4.15%	6.12%	5.64%	19.67%
2038	6.50%	-0.03%	4.15%	-1.58%	5.64%	2.99%
2039	6.50%	-13.36%	4.15%	15.38%	5.64%	-19.79%
2040	6.50%	-3.28%	4.15%	14.81%	5.64%	7.78%
2041	6.50%	-3.67%	4.15%	-4.88%	5.64%	18.48%
2042	6.50%	15.14%	4.15%	3.37%	5.64%	11.00%
2043	6.50%	6.07%	4.15%	-5.61%	5.64%	16.96%
2044	6.50%	0.10%	4.15%	4.50%	5.64%	6.67%
2045	6.50%	13.90%	4.15%	-4.43%	5.64%	-8.17%

General Assembly Retirement System of Illinois
 Comparison of Actuarial Valuation Results and Stress Testing Scenarios
 Projection of Active Population
 Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline; 1-5	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Active Population		
2021	117	114	111
2022	112	106	100
2023	107	99	91
2024	102	92	81
2025	99	86	73
2026	95	81	67
2027	92	76	60
2028	89	71	54
2029	86	67	49
2030	84	63	44
2031	81	60	39
2032	79	57	35
2033	78	54	31
2034	76	52	28
2035	74	50	25
2036	73	48	22
2037	72	46	20
2038	71	44	17
2039	70	42	15
2040	69	41	13
2041	68	40	12
2042	67	39	10
2043	66	38	9
2044	66	37	8
2045	65	36	7

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Capped Payroll
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline; 1-5	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Capped Payroll (\$ in millions)		
2021	\$9.82	\$9.82	\$9.82
2022	9.73	9.47	9.22
2023	9.53	9.01	8.54
2024	9.31	8.61	7.88
2025	9.09	8.19	7.23
2026	9.03	7.83	6.68
2027	8.87	7.55	6.23
2028	8.80	7.26	5.74
2029	8.72	6.94	5.28
2030	8.64	6.71	4.83
2031	8.64	6.45	4.43
2032	8.53	6.29	4.07
2033	8.52	6.12	3.72
2034	8.62	5.93	3.40
2035	8.61	5.85	3.13
2036	8.59	5.77	2.84
2037	8.69	5.68	2.58
2038	8.80	5.58	2.31
2039	8.90	5.47	2.07
2040	9.00	5.36	1.88
2041	9.09	5.36	1.67
2042	9.19	5.37	1.54
2043	9.29	5.37	1.38
2044	9.39	5.37	1.22
2045	9.63	5.37	1.10

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Statutory Contribution Dollars
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS						
Scenario	Baseline	1	2	3	4	5
Investment Return Assumption	6.50% per year	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter
25-Year Geometric Return	6.50%	6.50%	4.15%	4.15%	5.64%	5.64%
Summary of Investment Returns Included in the Scenario	N/A	Investment returns during the first 25 years with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with volatility, based on the System's asset allocation policy
Fiscal Year	Contribution Dollar Amount (\$ in millions)					
2021	\$27.30	\$27.30	\$27.30	\$27.30	\$27.30	\$27.30
2022	27.82	27.82	27.82	27.82	27.82	27.82
2023	27.17	25.97	26.89	25.17	27.01	26.86
2024	26.54	25.07	26.33	24.16	26.41	26.33
2025	25.75	24.17	25.85	23.41	25.88	25.84
2026	25.48	23.87	25.89	23.51	25.77	25.79
2027	24.89	23.40	25.68	23.37	25.21	25.07
2028	24.52	23.15	25.50	23.44	24.87	24.59
2029	24.11	22.72	25.18	23.44	24.49	23.79
2030	23.62	22.31	24.80	23.14	24.05	23.09
2031	23.41	22.25	24.72	22.76	23.89	22.63
2032	22.97	21.75	24.40	22.12	23.49	22.11
2033	22.97	21.83	24.55	21.94	23.55	21.67
2034	24.69	28.10	26.67	31.52	25.47	21.47
2035	24.66	28.12	26.88	31.29	25.54	21.64
2036	24.61	27.73	27.09	31.31	25.60	22.04
2037	24.90	27.61	27.69	31.95	26.02	23.22
2038	25.20	26.75	28.32	32.38	26.46	24.85
2039	25.49	25.13	29.00	32.80	26.92	26.73
2040	25.77	23.82	29.72	33.27	27.39	27.32
2041	26.05	23.97	30.55	33.41	27.90	29.41
2042	26.33	25.68	31.52	32.70	28.48	31.68
2043	26.62	29.76	32.76	33.21	29.17	32.91
2044	26.89	36.27	34.52	34.56	30.07	34.76
2045	27.59	46.33	38.46	39.77	32.10	34.16
Total Cont. Through 2045	\$635.35	\$660.88	\$698.09	\$709.75	\$660.86	\$653.08
Present Value of Total Cont.	\$321.11	\$322.47	\$340.64	\$337.86	\$328.99	\$322.84

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Statutory Contribution as a Percent of Pay
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS						
Scenario	Baseline	1	2	3	4	5
Investment Return Assumption	6.50% per year	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter
25-Year Geometric Return	6.50%	6.50%	4.15%	4.15%	5.64%	5.64%
Summary of Investment Returns Included in the Scenario	N/A	Investment returns during the first 25 years with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with volatility, based on the System's asset allocation policy
Fiscal Year	Contribution as a Percent of Payroll					
2021	277.97%	277.97%	277.97%	277.97%	277.97%	277.97%
2022	286.06%	286.06%	286.06%	286.06%	286.06%	286.06%
2023	285.16%	272.60%	282.29%	264.18%	283.54%	281.92%
2024	285.00%	269.17%	282.67%	259.39%	283.54%	282.70%
2025	283.34%	265.99%	284.46%	257.55%	284.74%	284.31%
2026	282.15%	264.34%	286.77%	260.40%	285.39%	285.67%
2027	280.62%	263.82%	289.46%	263.39%	284.20%	282.64%
2028	278.51%	262.98%	289.61%	266.28%	282.50%	279.28%
2029	276.44%	260.50%	288.76%	268.85%	280.90%	272.83%
2030	273.45%	258.28%	287.11%	267.86%	278.41%	267.25%
2031	271.06%	257.64%	286.21%	263.53%	276.60%	262.07%
2032	269.34%	255.03%	286.11%	259.46%	275.51%	259.33%
2033	269.47%	256.15%	287.99%	257.39%	276.33%	254.27%
2034	286.43%	325.90%	309.39%	365.62%	295.42%	249.07%
2035	286.43%	326.56%	312.24%	363.38%	296.62%	251.36%
2036	286.43%	322.72%	315.25%	364.35%	297.89%	256.47%
2037	286.43%	317.57%	318.44%	367.51%	299.27%	267.08%
2038	286.43%	304.10%	321.94%	368.11%	300.77%	282.45%
2039	286.43%	282.44%	325.86%	368.67%	302.49%	300.43%
2040	286.43%	264.83%	330.39%	369.83%	304.44%	303.65%
2041	286.43%	263.62%	335.90%	367.42%	306.82%	323.35%
2042	286.43%	279.39%	342.91%	355.74%	309.84%	344.64%
2043	286.43%	320.26%	352.58%	357.38%	313.95%	354.17%
2044	286.43%	386.26%	367.65%	368.11%	320.23%	370.22%
2045	286.43%	480.89%	399.23%	412.88%	333.26%	354.57%

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Funded Ratio
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS						
Scenario	Baseline	1	2	3	4	5
Investment Return Assumption	6.50% per year	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter
25-Year Geometric Return	6.50%	6.50%	4.15%	4.15%	5.64%	5.64%
Summary of Investment Returns Included in the Scenario	N/A	Investment returns during the first 25 years with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with volatility, based on the System's asset allocation policy
Fiscal Year	Funded Ratio					
2021	18.58%	18.84%	18.50%	19.06%	18.55%	18.47%
2022	20.05%	20.21%	19.77%	21.30%	19.95%	19.61%
2023	21.34%	21.38%	20.68%	21.73%	21.08%	20.52%
2024	22.49%	22.43%	21.31%	20.36%	22.02%	21.31%
2025	23.51%	22.56%	21.77%	18.45%	22.85%	22.98%
2026	24.50%	22.37%	22.20%	16.07%	23.66%	24.78%
2027	25.37%	22.83%	22.57%	13.63%	24.35%	27.28%
2028	26.19%	22.67%	22.88%	12.25%	24.96%	29.61%
2029	26.93%	21.98%	23.09%	12.32%	25.49%	31.77%
2030	27.61%	22.18%	23.22%	12.38%	25.94%	33.34%
2031	28.33%	21.72%	23.36%	12.24%	26.41%	35.47%
2032	29.02%	20.64%	23.47%	11.82%	26.86%	37.68%
2033	29.85%	20.18%	23.69%	11.21%	27.42%	38.37%
2034	31.41%	22.80%	24.74%	13.16%	28.76%	38.58%
2035	33.25%	26.04%	26.08%	14.96%	30.38%	37.93%
2036	35.40%	31.16%	27.78%	17.66%	32.33%	36.72%
2037	38.05%	38.20%	30.03%	21.09%	34.79%	35.71%
2038	41.27%	44.87%	32.92%	25.20%	37.85%	38.04%
2039	45.18%	49.18%	36.60%	30.75%	41.65%	39.30%
2040	49.87%	51.53%	41.19%	38.50%	46.28%	41.41%
2041	55.48%	52.38%	46.86%	45.92%	51.90%	46.64%
2042	62.14%	53.75%	53.84%	53.62%	58.68%	53.60%
2043	69.97%	58.51%	62.39%	61.85%	66.82%	64.01%
2044	79.14%	68.86%	72.96%	70.87%	76.58%	79.72%
2045	90.00%	87.59%	86.85%	81.63%	88.72%	94.44%

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Unfunded Actuarial Accrued Liability
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS						
Scenario	Baseline	1	2	3	4	5
Investment Return Assumption	6.50% per year	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter	Varying Rates for the first 25 years, 6.50% per year thereafter
25-Year Geometric Return	6.50%	6.50%	4.15%	4.15%	5.64%	5.64%
Summary of Investment Returns Included in the Scenario	N/A	Investment returns during the first 25 years with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 25th percentile return with volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with no volatility, based on the System's asset allocation policy	Investment returns during the first 25 years represent the 40th percentile return with volatility, based on the System's asset allocation policy
Fiscal Year	Unfunded Accrued Liability (\$ in millions)					
2021	\$303.52	\$302.54	\$303.82	\$301.72	\$303.63	\$303.94
2022	296.71	296.11	297.72	292.06	297.08	298.33
2023	289.99	289.85	292.44	288.57	290.95	293.03
2024	283.24	283.47	287.54	291.03	284.95	287.55
2025	276.50	279.94	282.82	294.81	278.89	278.44
2026	269.53	277.14	277.73	299.61	272.50	268.53
2027	262.63	271.57	272.49	303.95	266.22	255.91
2028	255.59	267.76	267.04	303.84	259.82	243.72
2029	248.44	265.25	261.49	298.12	253.33	231.96
2030	241.26	259.35	255.91	292.01	246.83	222.16
2031	233.80	255.33	250.00	286.28	240.04	210.51
2032	226.26	252.98	243.97	281.09	233.16	198.67
2033	218.20	248.27	237.34	276.16	225.75	191.68
2034	207.81	233.92	228.04	263.11	215.85	186.09
2035	196.75	217.99	217.87	250.65	205.22	182.94
2036	185.00	197.13	206.81	235.80	193.81	181.22
2037	172.16	171.72	194.43	219.27	181.22	178.66
2038	158.17	148.46	180.64	201.43	167.37	166.85
2039	142.97	132.54	165.34	180.59	152.18	158.31
2040	126.48	122.29	148.40	155.17	135.55	147.84
2041	108.62	116.19	129.66	131.97	117.36	130.19
2042	89.32	109.10	108.90	109.41	97.47	109.46
2043	68.46	94.59	85.74	86.98	75.65	82.05
2044	45.97	68.64	59.58	64.20	51.60	44.68
2045	21.31	26.44	28.03	39.15	24.03	11.86

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Statutory Contribution Dollars
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Contribution Dollar Amount (\$ in millions)		
2021	\$27.30	\$27.30	\$27.30
2022	27.82	27.82	27.82
2023	27.17	33.71	44.39
2024	26.54	31.80	40.47
2025	25.75	29.89	36.65
2026	25.48	28.36	33.54
2027	24.89	27.14	30.99
2028	24.52	25.79	28.11
2029	24.11	24.34	25.44
2030	23.62	23.20	22.74
2031	23.41	21.95	20.32
2032	22.97	21.19	18.23
2033	22.97	20.51	16.29
2034	24.69	22.83	22.05
2035	24.66	22.53	20.28
2036	24.61	22.20	18.39
2037	24.90	21.85	16.69
2038	25.20	21.48	14.94
2039	25.49	21.07	13.39
2040	25.77	20.62	12.18
2041	26.05	20.64	10.81
2042	26.33	20.66	9.99
2043	26.62	20.68	8.91
2044	26.89	20.68	7.91
2045	27.59	20.66	7.13
Total Cont. Through 2045	\$635.35	\$598.90	\$534.96
Present Value of Total Cont.	\$321.11	\$320.48	\$319.86

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Projection of Statutory Contribution as a Percent of Pay
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Contribution as a Percent of Payroll		
2021	277.97%	277.97%	277.97%
2022	286.06%	286.06%	286.06%
2023	285.16%	373.98%	519.80%
2024	285.00%	369.18%	513.44%
2025	283.34%	364.96%	507.19%
2026	282.15%	362.03%	502.16%
2027	280.62%	359.40%	497.29%
2028	278.51%	355.34%	489.75%
2029	276.44%	350.94%	481.54%
2030	273.45%	345.76%	470.29%
2031	271.06%	340.20%	458.22%
2032	269.34%	337.02%	447.54%
2033	269.47%	335.34%	437.91%
2034	286.43%	384.98%	647.52%
2035	286.43%	384.98%	647.52%
2036	286.43%	384.98%	647.52%
2037	286.43%	384.98%	647.52%
2038	286.43%	384.98%	647.52%
2039	286.43%	384.98%	647.52%
2040	286.43%	384.98%	647.52%
2041	286.43%	384.98%	647.52%
2042	286.43%	384.98%	647.52%
2043	286.43%	384.98%	647.52%
2044	286.43%	384.98%	647.52%
2045	286.43%	384.98%	647.52%

General Assembly Retirement System of Illinois
 Comparison of Actuarial Valuation Results and Stress Testing Scenarios
 Projection of Funded Ratio
 Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Funded Ratio		
2021	18.58%	18.58%	18.58%
2022	20.05%	20.05%	20.05%
2023	21.34%	22.95%	25.72%
2024	22.49%	25.69%	31.11%
2025	23.51%	28.14%	35.90%
2026	24.50%	30.31%	40.18%
2027	25.37%	32.30%	44.10%
2028	26.19%	34.06%	47.54%
2029	26.93%	35.53%	50.51%
2030	27.61%	36.83%	52.99%
2031	28.33%	37.89%	54.99%
2032	29.02%	38.86%	56.59%
2033	29.85%	39.78%	57.77%
2034	31.41%	41.65%	61.14%
2035	33.25%	43.73%	64.38%
2036	35.40%	46.06%	67.44%
2037	38.05%	48.67%	70.35%
2038	41.27%	51.60%	73.05%
2039	45.18%	54.90%	75.60%
2040	49.87%	58.62%	78.10%
2041	55.48%	63.04%	80.46%
2042	62.14%	68.26%	82.89%
2043	69.97%	74.40%	85.27%
2044	79.14%	81.60%	87.62%
2045	90.00%	90.00%	90.00%

General Assembly Retirement System of Illinois
Comparison of Actuarial Valuation Results and Stress Testing Scenarios
Unfunded Actuarial Accrued Liability
Based on Actuarial Valuation as of June 30, 2020

Illinois GARS			
Scenario	Baseline	6	7
Investment Return Assumption	6.50% per year	6.50% per year	6.50% per year
Wage Inflation Assumption	2.50%	2.50%	2.50%
Population Growth Assumption	50 percent of future members will elect to opt out of the pension System	75 percent of future members will elect to opt out of the pension System	100 percent of future members will elect to opt out of the pension System
Fiscal Year	Unfunded Accrued Liability (\$ in millions)		
2021	\$303.52	\$303.52	\$303.52
2022	296.71	297.44	298.17
2023	289.99	283.99	273.72
2024	283.24	271.40	251.48
2025	276.50	259.56	231.33
2026	269.53	248.47	212.99
2027	262.63	237.80	195.97
2028	255.59	227.74	180.71
2029	248.44	218.43	167.11
2030	241.26	209.63	155.31
2031	233.80	201.47	145.17
2032	226.26	193.50	136.44
2033	218.20	185.67	129.07
2034	207.81	174.89	115.23
2035	196.75	163.67	102.26
2036	185.00	152.04	90.34
2037	172.16	139.97	79.34
2038	158.17	127.46	69.38
2039	142.97	114.55	60.35
2040	126.48	101.22	51.92
2041	108.62	87.00	44.35
2042	89.32	71.82	37.09
2043	68.46	55.62	30.45
2044	45.97	38.37	24.38
2045	21.31	20.00	18.72

**General Assembly Retirement System of Illinois
 Baseline Valuation
 Projection of Cashflows, Accrued Liability, and Market Value of Assets
 Based on Actuarial Valuation as of June 30, 2020**

Baseline Valuation Projection (\$ in Millions)								
Fiscal Year	Employer Contributions	Benefits and Administrative Expenses	Employer Normal Cost	Actuarial Accrued Liability (AAL)	Annual Change in AAL (%)	Market Value of Assets (MVA)	Annual Change in MVA (%)	Funded Ratio
2021	\$27.30	\$27.22	\$1.88	\$372.79		\$68.34		18%
2022	27.82	27.97	1.73	371.10	-0.45%	73.78	7.96%	20%
2023	27.17	28.42	1.59	368.67	-0.65%	78.41	6.28%	21%
2024	26.54	28.89	1.47	365.43	-0.88%	82.19	4.82%	22%
2025	25.75	29.25	1.37	361.50	-1.08%	85.00	3.42%	24%
2026	25.48	29.49	1.31	356.98	-1.25%	87.45	2.88%	24%
2027	24.89	29.65	1.22	351.91	-1.42%	89.28	2.10%	25%
2028	24.52	29.81	1.16	346.26	-1.61%	90.67	1.56%	26%
2029	24.11	29.97	1.09	339.99	-1.81%	91.55	0.97%	27%
2030	23.62	29.92	1.03	333.29	-1.97%	92.03	0.52%	28%
2031	23.41	29.84	0.99	326.20	-2.13%	92.40	0.41%	28%
2032	22.97	29.65	0.93	318.78	-2.27%	92.52	0.13%	29%
2033	22.97	29.47	0.90	311.04	-2.43%	92.84	0.34%	30%
2034	24.69	29.27	0.89	302.99	-2.59%	95.18	2.52%	31%
2035	24.66	28.91	0.85	294.75	-2.72%	98.00	2.96%	33%
2036	24.61	28.49	0.83	286.38	-2.84%	101.38	3.45%	35%
2037	24.90	28.07	0.81	277.89	-2.96%	105.73	4.29%	38%
2038	25.20	27.63	0.80	269.30	-3.09%	111.13	5.11%	41%
2039	25.49	27.03	0.80	260.79	-3.16%	117.82	6.02%	45%
2040	25.77	26.45	0.78	252.32	-3.25%	125.84	6.81%	50%
2041	26.05	25.76	0.78	244.01	-3.29%	135.39	7.59%	55%
2042	26.33	25.08	0.78	235.89	-3.33%	146.57	8.26%	62%
2043	26.62	24.37	0.78	227.98	-3.35%	159.52	8.83%	70%
2044	26.89	23.59	0.79	220.38	-3.33%	174.41	9.33%	79%
2045	27.59	22.87	0.80	213.07	-3.32%	191.76	9.95%	90%

