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January 31, 2023

CONFIDENTIAL

Mr. Doug Anderson
Executive Director
Public Employees Retirement Association of Minnesota
60 Empire Drive, Suite 200
St. Paul, MN 55103

Re: Projection of Contributions and Funding Status – General Employees Plan

Dear Mr. Anderson:

Attached are 30-year projections of estimated funded status, required contributions, and statutory contributions under three asset return scenarios for the General Employees Retirement Plan. These projections, including the underlying investment return assumptions, are required by the Minnesota Standards for Actuarial Work. Unless noted otherwise, the estimates are based on participant data, assets, and plan provisions as outlined in the General Employees Retirement Plan actuarial funding valuation as of July 1, 2022.

Basis for Projections

For all enclosed projections, liabilities are determined using the statutory investment return assumption of 7.5%. As required by the Minnesota Standards for Actuarial Work, the projections reflect three asset return scenarios (7.5%, 6.0% and 9.0%). Note that we believe the 7.5% and 9.0% rate of return assumptions are outside of the range of reasonable expected returns for this plan.

The estimates are based on the market value of assets with no smoothing of investment gains or losses. Consequently, the required contributions for the fiscal year will not match the figures based on the actuarial value of assets shown in our valuation report. Payroll is assumed to increase approximately 3.00% per year over the long-term, consistent with the valuation assumption for total payroll growth.

The projection is an open group projection; meaning, active members projected to retire or otherwise terminate in the future are replaced with new active members so that the total active membership of the fund remains at 149,987 members. The profile of these new members is the same as new members hired between July 1, 2016 and June 30, 2021. Average salary at hire increases at the assumed payroll growth rate.

- Average age at hire is 37.0
- Average salary at hire is $36,400
- Approximately 67% female, 33% male

If actuarial accrued liability exceeds assets, the unfunded actuarial accrued liability is amortized through June 30, 2048 per Minnesota Statute 356.215, Subdivision 11. Per Minnesota Statute 356.215, Subdivision 11 (l), a negative unfunded actuarial accrued liability (i.e., when assets exceed liability) is amortized over a rolling 30-year period.

Additional employer contributions of 1.0% of payroll expire when the plan reaches 100% funding (on an Actuarial Value basis). The additional employer contributions are projected to be eliminated in fiscal years ending 2030 and 2034 in the 9.0% and 7.5% investment return scenarios, respectively.

Actual benefit increases will equal one-half the Social Security Cost-of-Living Adjustment, not less than 1.00% and not more than 1.50%. The projections assume a constant post-retirement benefit increase of 1.25%. If actual benefit increases are greater than assumed, liabilities and required contributions will be greater than the amounts shown in the enclosed projections. More information about this assumption can be found in the valuation report as of July 1, 2022.

Comments

The reader should keep the following in mind when reviewing these results:

- Statutory contributions are defined in statutes as a fixed percentage of payroll plus any statutory supplemental contributions and represent the amount that is actually contributed to the plan. Required contributions are defined in statutes and the LCPR Standard for Actuarial Work and represent the amount needed to fully fund the plan by June 30, 2048 (normal cost, expenses and a payment to amortize the unfunded liability).
- Investment experience that has occurred since the measurement date is not reflected in this report.
- The enclosed projections are based on assumptions as outlined in the General Employees Retirement Plan actuarial funding valuation as of July 1, 2022. Please see that report for comments regarding the 7.5% statutory investment return assumption, and sensitivity test results based on alternate assumptions.
- Note that plan changes may result in behavior changes that are not anticipated in the current assumptions.
- In the 7.5% and 9.0% investment return scenarios, surplus assets reduce the projected required contributions to amounts less than normal cost. We typically recommend the contribution be at least equal to the normal cost of the plan and suggest that plans with considerable surplus assets investigate the pros and cons of reducing the risk of the plan's investment allocation to preserve surplus assets.
- A 2022 analysis of long-term rate of investment return and inflation assumptions concluded that the probability of exceeding the current 7.5% assumption over 10 years is only 34%. The statutory requirement for projections that are 1.5% above and 1.5% below the assumed rate may give the reader the impression that the 7.5% projection is an accurate (middle of the road) representation of the expected future results. Based on our modeling, the 7.5% scenario is optimistic and not representative of the expected (median) result. We caution against adjusting contribution rates without full consideration of the median results.

- Note that as funding ratios decline, as they are expected to in one of the investment return scenarios shown in this letter, it will be increasingly difficult for the plan to attain the assumed scenario investment return. Each year, a larger proportion of assets is paid out in benefits, and less capital is available to invest.

Disclosures

The purpose of this report is to estimate the Fund's funding progress and required contribution rates over a 30-year period according to prescribed assumptions and the Minnesota Standards for Actuarial Work. To the best of our knowledge and belief, the calculations were completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement.

This report should not be relied upon for any purpose other than the purpose described herein. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results. GRS is not responsible for the consequences of any unauthorized use.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis section of the valuation report, except as noted. PERA is solely responsible for communicating to GRS any changes required thereto.

In a 2022 analysis of long-term rate of investment return and inflation assumptions, GRS suggested that an investment return assumption in the range of 5.64% to 6.84% would be reasonable for this valuation. This implies that the 7.5% and 9.0% rate of return assumptions would be outside the range of reasonable returns for this plan. Please see our letter dated July 12, 2022 for additional information. For informational purposes, results based on a 6.5% discount rate are shown on page 6 of the July 1, 2022 valuation report.

The projections assume 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 contribution rates shown in this report have been determined using the actuarial assumptions and methods disclosed in the Actuarial Basis section of the July 1, 2022 valuation report. This valuation report includes risk metrics on pages 7 through 10, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The valuation was based upon information furnished by the Public Employees Retirement Association (PERA), concerning benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal 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 PERA.

This report was prepared using our proprietary valuation model and related software which, in our professional judgement, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report reflects the impact of COVID-19 through June 30, 2022. It does not reflect the ongoing impact of COVID-19, which is likely to influence demographic and investment experience, at least in the short term. We will continue to monitor these developments and their impact on the plan.

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 or applicable law.

Professional Qualifications

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief, the information contained in this report is accurate and fairly presents the actuarial position of the General Employees Retirement Plan as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Brian B. Murphy, Bonita J. Wurst and Sheryl L. Christensen 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. The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Brian B. Murphy

Brian B. Murphy, FSA, EA, FCA, MAAA, PhD

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, FCA, MAAA

Sheryl Christensen

Sheryl L. Christensen, FSA, EA, FCA, MAAA

BJW/BBM/SLC:dj

Other Observations

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

Given the plan's contribution allocation procedure, if there are no changes in benefits, Chapter 356 required contributions are made, and all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the market value of assets, as prescribed by statutes), it is expected that:

(1) The normal cost of the plan is expected to remain approximately level as a percent of pay;
(2) The funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 26 years; and
(3) The unfunded liability is expected to grow initially as a dollar amount before beginning to decline.

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 market 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 amortization 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% is not synonymous with no required future contributions. If the funded status were 100%, 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).
(3) The measurement would produce a different result if the actuarial value of assets were used instead of the market value of assets.

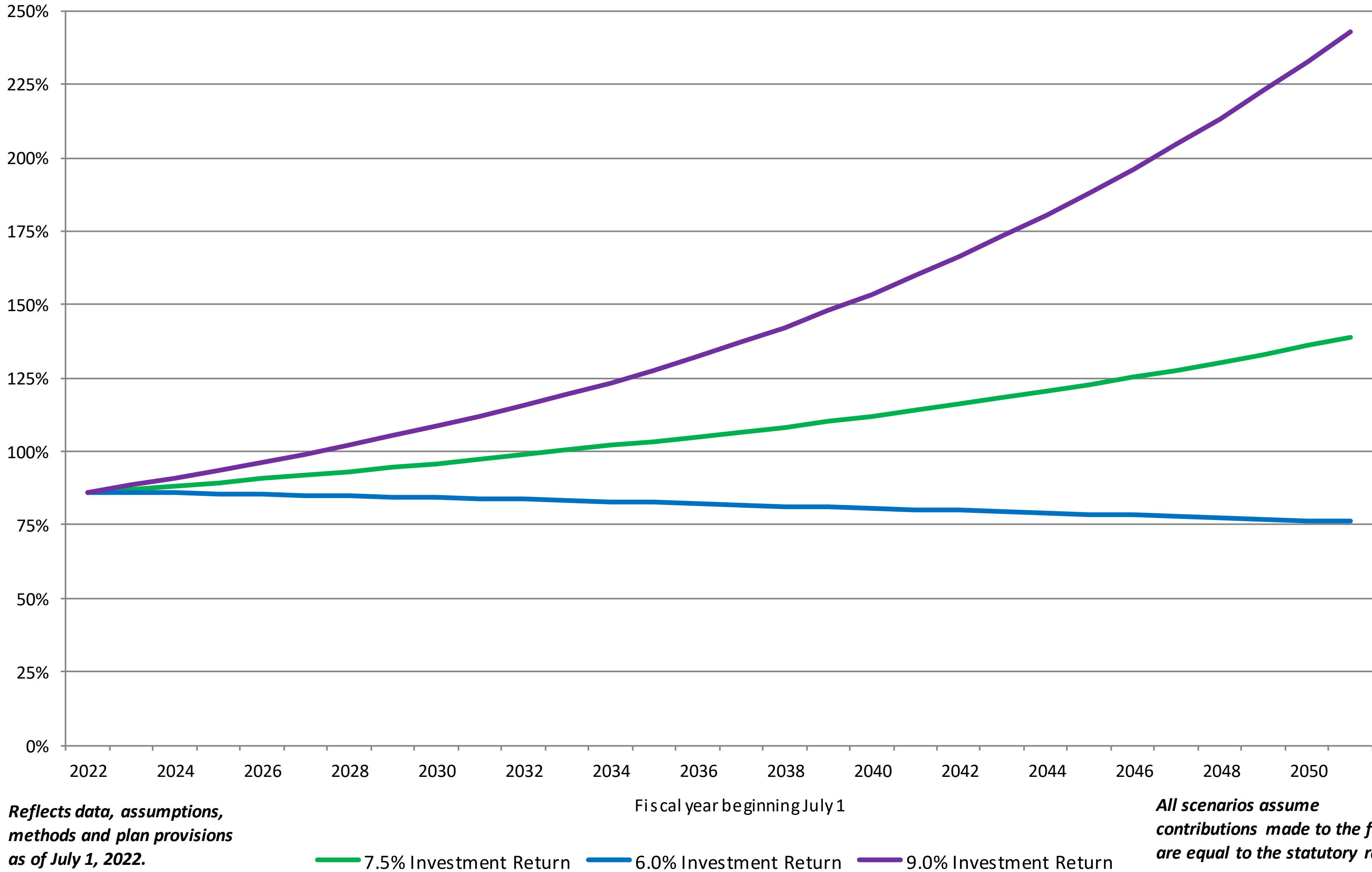
Limitations of Project Scope

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.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter to PERA.

PERA General Employees Retirement Plan Estimated Accrued Liability Funded Ratio
(Market Value of Assets Basis)

In all scenarios, the interest rate used to discount liabilities was 7.50%.



Reflects data, assumptions, methods and plan provisions as of July 1, 2022.

All scenarios assume contributions made to the fund are equal to the statutory rate.

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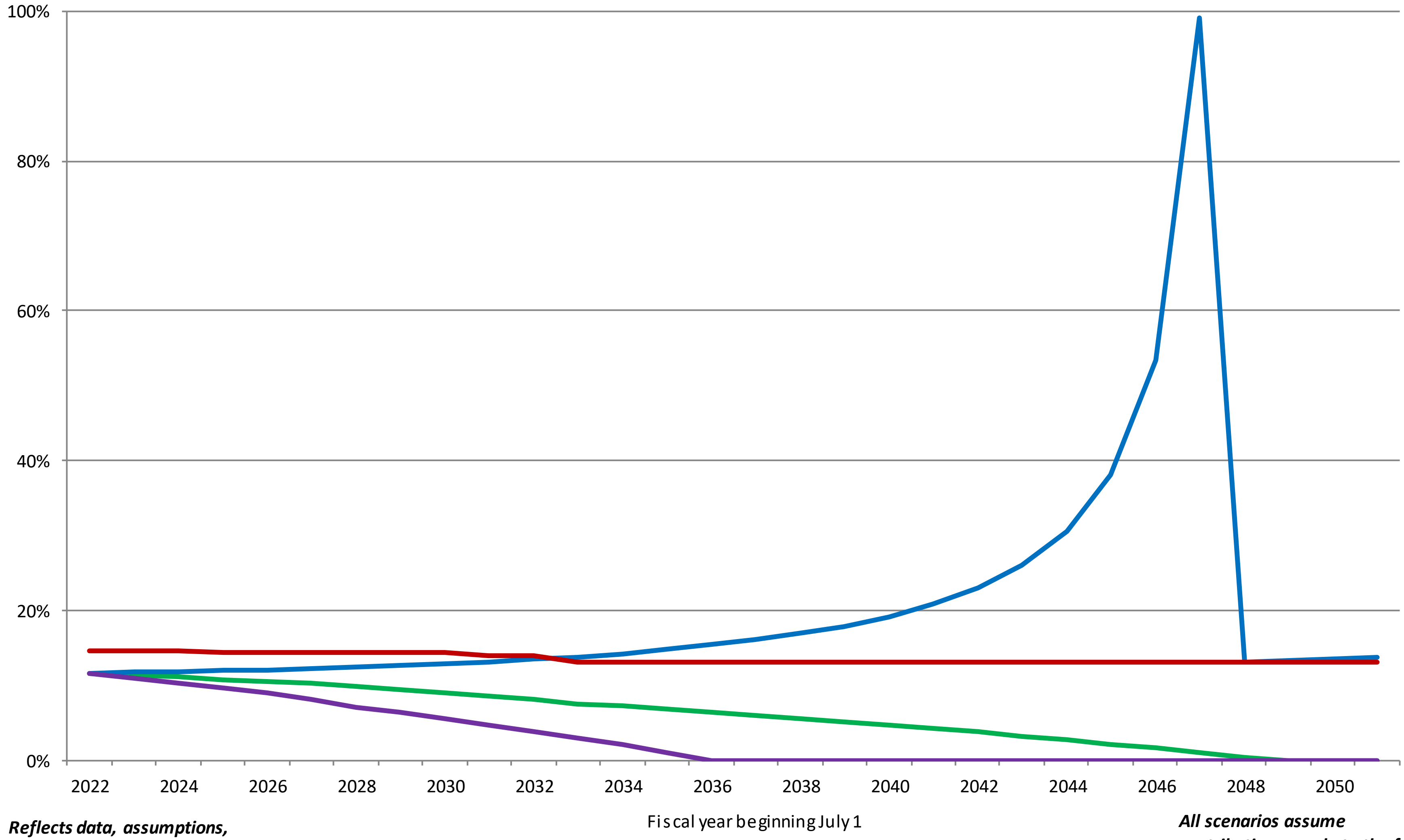
PERA General Employees Retirement Plan Estimated Required Contribution Rates

(% of Pay, Market Value of Assets Basis)

In all scenarios, the interest rate used to discount liabilities was 7.50%.



Reflects data, assumptions, methods and plan provisions as of July 1, 2022.

7.5% Investment Return
9.0% Investment Return
6.0% Investment Return
Statutory Contribution Rate (7.5% Scenario)

All scenarios assume contributions made to the fund are equal to the statutory rate.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter to PERA.

General Employees Retirement Plan

Scenario: 7.5% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (% of Payroll)										
Statutory - Chapter 353	14.51%	14.50%	14.48%	14.47%	14.45%	14.44%	14.43%	14.41%	14.40%	14.00%
Required - Chapter 356 (MVA)	11.58%	11.34%	11.06%	10.78%	10.49%	10.17%	9.82%	9.44%	9.01%	8.53%
Sufficiency / (Deficiency)	2.93%	3.16%	3.42%	3.69%	3.96%	4.27%	4.61%	4.97%	5.39%	5.47%
Contributions										
Statutory - Chapter 353	$ 1,046,545	$ 1,077,451	$ 1,116,069	$ 1,149,905	$ 1,183,013	$ 1,218,090	$ 1,252,422	$ 1,287,487	$ 1,323,464	$ 1,323,216
Required - Chapter 356 (MVA)	834,836	842,397	852,233	857,291	858,845	858,059	852,715	842,886	827,746	806,049
Sufficiency / (Deficiency)	211,709	235,054	263,835	292,615	324,168	360,031	399,707	444,601	495,718	517,167
Funding Ratios										
Current Assets (MVA)	$26,034,185	$27,128,953	$28,254,652	$29,416,311	$30,618,634	$31,863,807	$33,159,088	$34,511,184	$35,926,112	$37,412,394
Actuarial Accrued Liability (AAL)	30,189,649	31,086,609	31,984,579	32,879,307	33,776,837	34,677,267	35,583,462	36,499,557	37,427,741	38,372,323
Unfunded AAL	4,155,464	3,957,656	3,729,928	3,462,995	3,158,203	2,813,460	2,424,374	1,988,372	1,501,629	959,928
Funding Ratio	86.2%	87.3%	88.3%	89.5%	90.7%	91.9%	93.2%	94.6%	96.0%	97.5%
Benefit Payments	$ 1,859,635	$ 1,939,449	$ 2,024,257	$ 2,102,416	$ 2,180,689	$ 2,257,004	$ 2,329,744	$ 2,401,515	$ 2,470,512	$ 2,538,402
Ratio of Assets to Benefit Payments	14.00	13.99	13.96	13.99	14.04	14.12	14.23	14.37	14.54	14.74

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter to PERA.

General Employees Retirement Plan
Scenario: 7.5% Investment Return for All Years
Fiscal Year Beginning July 1

$ in Thousands	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Contributions (% of Payroll)										
Statutory - Chapter 353	14.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Required - Chapter 356 (MVA)	8.02%	7.52%	7.17%	6.80%	6.42%	6.03%	5.61%	5.18%	4.72%	4.25%
Sufficiency / (Deficiency)	5.98%	5.48%	5.83%	6.20%	6.58%	6.97%	7.39%	7.82%	8.28%	8.75%
Contributions										
Statutory - Chapter 353	$ 1,360,732	$ 1,299,207	$ 1,335,896	$ 1,373,453	$ 1,411,996	$ 1,451,662	$ 1,492,318	$ 1,533,965	$ 1,576,631	$ 1,620,435
Required - Chapter 356 (MVA)	779,682	751,259	736,671	718,924	697,785	673,018	644,182	610,904	572,804	529,529
Sufficiency / (Deficiency)	581,050	547,949	599,225	654,529	714,211	778,644	848,136	923,061	1,003,826	1,090,906
Funding Ratios										
Current Assets (MVA)	$38,938,937	$40,548,685	$42,146,632	$43,834,573	$45,619,235	$47,508,987	$49,514,328	$51,647,784	$53,920,097	$56,343,017
Actuarial Accrued Liability (AAL)	39,336,163	40,321,915	41,333,260	42,373,510	43,444,469	44,549,123	45,692,105	46,879,751	48,116,138	49,405,834
Unfunded AAL	397,226	(226,770)	(813,371)	(1,461,063)	(2,174,766)	(2,959,864)	(3,822,222)	(4,768,033)	(5,803,960)	(6,937,183)
Funding Ratio	99.0%	100.6%	102.0%	103.5%	105.0%	106.6%	108.4%	110.2%	112.1%	114.0%
Benefit Payments	$ 2,605,563	$ 2,671,260	$ 2,736,184	$ 2,801,987	$ 2,867,687	$ 2,931,971	$ 2,993,513	$ 3,054,939	$ 3,116,081	$ 3,177,878
Ratio of Assets to Benefit Payments	14.94	15.18	15.40	15.64	15.91	16.20	16.54	16.91	17.30	17.73

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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General Employees Retirement Plan

Scenario: 7.5% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Contributions (% of Payroll)										
Statutory - Chapter 353	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Required - Chapter 356 (MVA)	3.75%	3.23%	2.69%	2.12%	1.53%	0.92%	0.27%	0.00%	0.00%	0.00%
Sufficiency / (Deficiency)	9.25%	9.77%	10.31%	10.88%	11.47%	12.08%	12.73%	13.00%	13.00%	13.00%
Contributions										
Statutory - Chapter 353	$ 1,665,456	$ 1,711,773	$ 1,759,415	$ 1,808,443	$ 1,858,942	$ 1,911,051	$ 1,964,839	$ 2,020,425	$ 2,077,823	$ 2,137,166
Required - Chapter 356 (MVA)	480,665	425,746	364,239	295,603	219,269	134,626	40,967	-	-	-
Sufficiency / (Deficiency)	1,184,791	1,286,027	1,395,176	1,512,840	1,639,673	1,776,426	1,923,872	2,020,425	2,077,823	2,137,166
Funding Ratios										
Current Assets (MVA)	$58,928,326	$61,688,572	$ 64,636,571	$ 67,786,183	$ 71,151,157	$ 74,745,320	$ 78,583,627	$ 82,682,462	$ 87,060,008	$ 91,733,701
Actuarial Accrued Liability (AAL)	50,752,847	52,161,344	53,635,084	55,178,191	56,793,920	58,484,776	60,253,476	62,103,206	64,037,910	66,059,729
Unfunded AAL	(8,175,478)	(9,527,228)	(11,001,487)	(12,607,992)	(14,357,237)	(16,260,544)	(18,330,151)	(20,579,256)	(23,022,099)	(25,673,972)
Funding Ratio	116.1%	118.3%	120.5%	122.9%	125.3%	127.8%	130.4%	133.1%	136.0%	138.9%
Benefit Payments	$ 3,240,516	$ 3,304,724	$ 3,370,453	$ 3,438,869	$ 3,510,977	$ 3,586,823	$ 3,666,181	$ 3,748,620	$ 3,836,185	$ 3,928,820
Ratio of Assets to Benefit Payments	18.18	18.67	19.18	19.71	20.27	20.84	21.43	22.06	22.69	23.35

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter to PERA.

General Employees Retirement Plan
Scenario: 6.0% Investment Return for All Years
Fiscal Year Beginning July 1

$ in Thousands	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (% of Payroll)										
Statutory - Chapter 353	14.51%	14.50%	14.48%	14.47%	14.45%	14.44%	14.43%	14.41%	14.40%	14.00%
Required - Chapter 356 (MVA)	11.58%	11.68%	11.77%	11.90%	12.05%	12.21%	12.40%	12.61%	12.84%	13.11%
Sufficiency / (Deficiency)	2.93%	2.82%	2.71%	2.57%	2.40%	2.23%	2.03%	1.80%	1.56%	0.89%
Contributions										
Statutory - Chapter 353	$ 1,046,545	$ 1,077,451	$ 1,116,069	$ 1,149,905	$ 1,183,013	$ 1,218,090	$ 1,252,422	$ 1,287,487	$ 1,323,464	$ 1,323,216
Required - Chapter 356 (MVA)	834,836	867,863	907,009	945,784	986,137	1,030,037	1,076,238	1,126,001	1,179,958	1,238,670
Sufficiency / (Deficiency)	211,709	209,588	209,059	204,122	196,876	188,053	176,184	161,486	143,507	84,546
Funding Ratios										
Current Assets (MVA)	$26,034,185	$26,744,641	$27,446,918	$28,143,215	$28,835,165	$29,521,648	$30,206,356	$30,892,105	$31,580,702	$32,276,102
Actuarial Accrued Liability (AAL)	30,189,649	31,086,609	31,984,579	32,879,307	33,776,837	34,677,267	35,583,462	36,499,557	37,427,741	38,372,323
Unfunded AAL	4,155,464	4,341,968	4,537,662	4,736,092	4,941,673	5,155,618	5,377,107	5,607,452	5,847,039	6,096,221
Funding Ratio	86.2%	86.0%	85.8%	85.6%	85.4%	85.1%	84.9%	84.6%	84.4%	84.1%
Benefit Payments	$ 1,859,635	$ 1,939,449	$ 2,024,257	$ 2,102,416	$ 2,180,689	$ 2,257,004	$ 2,329,744	$ 2,401,515	$ 2,470,512	$ 2,538,402
Ratio of Assets to Benefit Payments	14.00	13.79	13.56	13.39	13.22	13.08	12.97	12.86	12.78	12.72

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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General Employees Retirement Plan
Scenario: 6.0% Investment Return for All Years
Fiscal Year Beginning July 1

$ in Thousands	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Contributions (% of Payroll)										
Statutory - Chapter 353	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%
Required - Chapter 356 (MVA)	13.44%	13.82%	14.25%	14.75%	15.34%	16.02%	16.85%	17.86%	19.13%	20.76%
Sufficiency / (Deficiency)	0.56%	0.18%	(0.25)%	(0.75)%	(1.34)%	(2.02)%	(2.85)%	(3.86)%	(5.13)%	(6.76)%
Contributions										
Statutory - Chapter 353	$ 1,360,732	$ 1,399,146	$ 1,438,657	$ 1,479,103	$ 1,520,611	$ 1,563,328	$ 1,607,112	$ 1,651,963	$ 1,697,910	$ 1,745,084
Required - Chapter 356 (MVA)	1,306,275	1,381,055	1,464,558	1,558,570	1,665,681	1,789,417	1,934,501	2,107,910	2,320,140	2,587,741
Sufficiency / (Deficiency)	54,457	18,091	(25,901)	(79,467)	(145,069)	(226,089)	(327,390)	(455,948)	(622,231)	(842,656)
Funding Ratios										
Current Assets (MVA)	$32,942,530	$33,617,885	$34,305,123	$35,006,866	$35,724,032	$36,458,729	$37,214,697	$37,997,121	$38,808,790	$39,652,867
Actuarial Accrued Liability (AAL)	39,336,163	40,321,915	41,333,260	42,373,510	43,444,469	44,549,123	45,692,105	46,879,751	48,116,138	49,405,834
Unfunded AAL	6,393,633	6,704,030	7,028,138	7,366,644	7,720,437	8,090,394	8,477,408	8,882,630	9,307,347	9,752,968
Funding Ratio	83.8%	83.4%	83.0%	82.6%	82.2%	81.8%	81.5%	81.1%	80.7%	80.3%
Benefit Payments	$ 2,605,563	$ 2,671,260	$ 2,736,184	$ 2,801,987	$ 2,867,687	$ 2,931,971	$ 2,993,513	$ 3,054,939	$ 3,116,081	$ 3,177,878
Ratio of Assets to Benefit Payments	12.64	12.59	12.54	12.49	12.46	12.43	12.43	12.44	12.45	12.48

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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General Employees Retirement Plan

Scenario: 6.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Contributions (% of Payroll)										
Statutory - Chapter 353	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%
Required - Chapter 356 (MVA)	22.93%	25.98%	30.55%	38.18%	53.43%	99.20%	12.99%	13.19%	13.41%	13.65%
Sufficiency / (Deficiency)	(8.93)%	(11.98)%	(16.55)%	(24.18)%	(39.43)%	(85.20)%	1.01%	0.81%	0.59%	0.35%
Contributions										
Statutory - Chapter 353	$ 1,793,568	$ 1,843,448	$ 1,894,755	$ 1,947,554	$ 2,001,937	$ 2,058,055	$ 2,115,980	$ 2,175,843	$ 2,237,655	$ 2,301,563
Required - Chapter 356 (MVA)	2,938,211	3,421,006	4,134,963	5,310,743	7,640,270	14,582,897	1,963,219	2,050,620	2,144,140	2,244,488
Sufficiency / (Deficiency)	(1,144,643)	(1,577,558)	(2,240,208)	(3,363,190)	(5,638,332)	(12,524,842)	152,762	125,223	93,515	57,075
Funding Ratios										
Current Assets (MVA)	$40,531,868	$41,448,352	$42,404,370	$43,402,176	$44,443,029	$45,527,315	$46,655,554	$47,828,602	$49,047,942	$50,313,054
Actuarial Accrued Liability (AAL)	50,752,847	52,161,344	53,635,084	55,178,191	56,793,920	58,484,776	60,253,476	62,103,206	64,037,910	66,059,729
Unfunded AAL	10,220,980	10,712,992	11,230,714	11,776,014	12,350,892	12,957,461	13,597,922	14,274,604	14,989,968	15,746,676
Funding Ratio	79.9%	79.5%	79.1%	78.7%	78.3%	77.8%	77.4%	77.0%	76.6%	76.2%
Benefit Payments	$ 3,240,516	$ 3,304,724	$ 3,370,453	$ 3,438,869	$ 3,510,977	$ 3,586,823	$ 3,666,181	$ 3,748,620	$ 3,836,185	$ 3,928,820
Ratio of Assets to Benefit Payments	12.51	12.54	12.58	12.62	12.66	12.69	12.73	12.76	12.79	12.81

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter to PERA.

General Employees Retirement Plan
Scenario: 9.0% Investment Return for All Years
Fiscal Year Beginning July 1

$ in Thousands	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (% of Payroll)										
Statutory - Chapter 353	14.51%	14.50%	14.48%	14.47%	14.45%	14.44%	14.43%	13.41%	13.40%	13.00%
Required - Chapter 356 (MVA)	11.58%	10.99%	10.34%	9.64%	8.87%	8.01%	7.05%	6.37%	5.57%	4.73%
Sufficiency / (Deficiency)	2.93%	3.51%	4.14%	4.83%	5.58%	6.43%	7.38%	7.04%	7.83%	8.27%
Contributions										
Statutory - Chapter 353	$ 1,046,545	$ 1,077,451	$ 1,116,069	$ 1,149,905	$ 1,183,013	$ 1,218,090	$ 1,252,422	$ 1,198,167	$ 1,231,574	$ 1,228,701
Required - Chapter 356 (MVA)	834,836	816,930	796,675	766,240	725,965	675,886	612,415	569,284	512,240	447,073
Sufficiency / (Deficiency)	211,709	260,521	319,393	383,666	457,048	542,204	640,007	628,883	719,334	781,628
Funding Ratios										
Current Assets (MVA)	$26,034,185	$27,513,265	$29,073,915	$30,726,207	$32,480,408	$34,344,820	$36,333,438	$38,460,408	$40,646,611	$42,991,871
Actuarial Accrued Liability (AAL)	30,189,649	31,086,609	31,984,579	32,879,307	33,776,837	34,677,267	35,583,462	36,499,557	37,427,741	38,372,323
Unfunded AAL	4,155,464	3,573,344	2,910,664	2,153,100	1,296,429	332,446	(749,976)	(1,960,852)	(3,218,871)	(4,619,549)
Funding Ratio	86.2%	88.5%	90.9%	93.5%	96.2%	99.0%	102.1%	105.4%	108.6%	112.0%
Benefit Payments	$ 1,859,635	$ 1,939,449	$ 2,024,257	$ 2,102,416	$ 2,180,689	$ 2,257,004	$ 2,329,744	$ 2,401,515	$ 2,470,512	$ 2,538,402
Ratio of Assets to Benefit Payments	14.00	14.19	14.36	14.61	14.89	15.22	15.60	16.02	16.45	16.94

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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General Employees Retirement Plan

Scenario: 9.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Contributions (% of Payroll)										
Statutory - Chapter 353	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Required - Chapter 356 (MVA)	3.86%	2.94%	1.97%	0.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sufficiency / (Deficiency)	9.14%	10.06%	11.03%	12.06%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Contributions										
Statutory - Chapter 353	$ 1,263,537	$ 1,299,207	$ 1,335,896	$ 1,373,453	$ 1,411,996	$ 1,451,662	$ 1,492,318	$ 1,533,965	$ 1,576,631	$ 1,620,435
Required - Chapter 356 (MVA)	375,282	293,938	202,201	98,930	-	-	-	-	-	-
Sufficiency / (Deficiency)	888,256	1,005,269	1,133,695	1,274,522	1,411,996	1,451,662	1,492,318	1,533,965	1,576,631	1,620,435
Funding Ratios										
Current Assets (MVA)	$45,473,736	$48,144,656	$51,024,037	$ 54,132,496	$ 57,490,625	$ 61,122,019	$ 65,053,905	$ 69,317,216	$ 73,942,919	$ 78,964,976
Actuarial Accrued Liability (AAL)	39,336,163	40,321,915	41,333,260	42,373,510	43,444,469	44,549,123	45,692,105	46,879,751	48,116,138	49,405,834
Unfunded AAL	(6,137,572)	(7,822,741)	(9,690,777)	(11,758,986)	(14,046,156)	(16,572,895)	(19,361,800)	(22,437,465)	(25,826,782)	(29,559,142)
Funding Ratio	115.6%	119.4%	123.5%	127.8%	132.3%	137.2%	142.4%	147.9%	153.7%	159.8%
Benefit Payments	$ 2,605,563	$ 2,671,260	$ 2,736,184	$ 2,801,987	$ 2,867,687	$ 2,931,971	$ 2,993,513	$ 3,054,939	$ 3,116,081	$ 3,177,878
Ratio of Assets to Benefit Payments	17.45	18.02	18.65	19.32	20.05	20.85	21.73	22.69	23.73	24.85

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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General Employees Retirement Plan

Scenario: 9.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Contributions (% of Payroll)										
Statutory - Chapter 353	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Required - Chapter 356 (MVA)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sufficiency / (Deficiency)	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Contributions										
Statutory - Chapter 353	$ 1,665,456	$ 1,711,773	$ 1,759,415	$ 1,808,443	$ 1,858,942	$ 1,911,051	$ 1,964,839	$ 2,020,425	$ 2,077,823	$ 2,137,166
Required - Chapter 356 (MVA)	-	-	-	-	-	-	-	-	-	-
Sufficiency / (Deficiency)	1,665,456	1,711,773	1,759,415	1,808,443	1,858,942	1,911,051	1,964,839	2,020,425	2,077,823	2,137,166
Funding Ratios										
Current Assets (MVA)	$ 84,419,548	$ 90,345,933	$ 96,786,289	$103,786,648	$111,396,031	$119,666,905	$128,656,557	$138,427,735	$149,049,410	$160,594,633
Actuarial Accrued Liability (AAL)	50,752,847	52,161,344	53,635,084	55,178,191	56,793,920	58,484,776	60,253,476	62,103,206	64,037,910	66,059,729
Unfunded AAL	(33,666,700)	(38,184,589)	(43,151,205)	(48,608,458)	(54,602,111)	(61,182,129)	(68,403,081)	(76,324,529)	(85,011,500)	(94,534,904)
Funding Ratio	166.3%	173.2%	180.5%	188.1%	196.1%	204.6%	213.5%	222.9%	232.8%	243.1%
Benefit Payments	$ 3,240,516	$ 3,304,724	$ 3,370,453	$ 3,438,869	$ 3,510,977	$ 3,586,823	$ 3,666,181	$ 3,748,620	$ 3,836,185	$ 3,928,820
Ratio of Assets to Benefit Payments	26.05	27.34	28.72	30.18	31.73	33.36	35.09	36.93	38.85	40.88

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.