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PERS
of MISSISSIPPI

Report on the Annual Valuation of the Public Employees' Retirement System of Mississippi

Prepared as of June 30, 2021

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

December 6, 2021

Board of Trustees
Public Employees' Retirement System of Mississippi
429 Mississippi Street
Jackson, MS 39201-1005

Ladies and Gentlemen:

Presented in this report are the results of the annual actuarial valuation of the Public Employees' Retirement System (PERS) of Mississippi. The purpose of the valuation is to:

- Measure the System's funding progress as of the valuation date,
- To determine the unfunded actuarial accrued liability amortization period beginning July 1, 2021 using the current Fixed Contribution Rate (FCR) of 17.40% of payroll,
- To determine the actuarially determined contribution (ADC) for the fiscal year ending June 30, 2024 using the assumptions and methods in the Board's funding policy,
- To project the System's funding progress for the next thirty years and provide clear reporting and risk analysis of the funding metrics as outlined in the Board's funding policy using a "Signal Light" approach, and
- To assist the Board in determining whether an increase or decrease is needed in the Fixed Contribution Rate.

The results may not be applicable for other purposes. The date of the valuation was June 30, 2021.

The valuation was based upon data, furnished by the Executive Director and the PERS staff, concerning active, inactive, and retired members along with pertinent financial information. While not verifying data at the source, the actuary performed tests for consistency and reasonableness. The complete cooperation of the PERS staff in furnishing materials requested is hereby acknowledged with appreciation.

Your attention is directed particularly to the presentation of the valuation results on page 1 and the projection results on page 6.

Since the previous valuation, the Board adopted new actuarial assumptions based on the experience investigation for the four-year period ending June 30, 2020. The results of this study were presented to the Board in April, 2021 and the Board adopted all of the demographic assumption recommendations (e.g., rates of mortality, retirement, and withdrawal) and the economic assumption recommendations (e.g., investment return, wage inflation, and price inflation assumption) at its August, 2021 meeting. In addition, the Board amended the Funding Policy to set the long-term investment return assumption to 7.55 percent and, upon approval by the Board, the assumption will be reduced until it reaches the rate recommended by the actuary in the most recent experience study using investment gains.

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The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board. We have reviewed the actuarial methods, including the asset valuation method, and continue to believe they are appropriate for the purpose of determining employer contribution levels.

We note that as we are preparing this report, the world is in the midst of a pandemic. We have considered available information, but do not believe that there is yet sufficient data to warrant the modification of any of our assumptions. We will continue to monitor the situation and advise the Board in the future of any adjustments that we believe would be appropriate due to the pandemic.

In order to prepare the results in this report we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

This actuarial valuation was performed to determine the adequacy of the Board approved contribution rate to fund the plan. The asset values used to determine unfunded liabilities and funded ratios are not market values but less volatile market related values. A smoothing technique is applied to market values to determine the market related values. The unfunded liability amounts and funded ratios using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

Edward J. Koebel

Ben Mobley

Edward J. Koebel, EA, FCA, MAAA
Chief Executive Officer

Ben Mobley, ASA, FCA, MAAA
Consulting Actuary

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Section I: Executive Summary

1. This report, prepared as of June 30, 2021, presents the results of the annual actuarial valuation of the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below. The current valuation and reported benefit amounts reflect any benefit increases granted to retirees as of July 1, 2021.

VALUATION DATE	June 30, 2021	June 30, 2020
Investment Return Assumption	**7.55%**	**7.75%**
Active members included in valuation		
Number	145,673	149,855
Annual compensation	$ 6,246,076,841	$ 6,287,441,467
Retirees		
Number	112,158	109,881
Annual allowances	$ 2,875,483,858	$ 2,755,593,924
Assets		
Market related actuarial value	$ 30,768,251,000	$ 28,629,205,000
Market value of assets (MVA)	$ 35,216,597,000	$ 27,827,394,000
Unfunded actuarial accrued liability (UAAL)	$ 19,436,044,743	$ 18,725,258,570
Funded Ratio based on actuarial value	61.3%	60.5%
Employer Fixed Contribution Rate (FCR)		
Normal Cost*	1.77%	1.34%
Accrued liability	15.63	16.06
Total	17.40%	17.40%
Payment period based on the FCR	50.9 years	37.1 years
Actuarially Determined Contribution (ADC) Rate		
Normal Cost*	1.77%	1.34%
Accrued liability	19.72	18.15
Total	21.49%	19.49%
Amortization period for ADC	26.7 years	27.7 years
ADC Ratio to Fixed Contribution Rate	123.51%	112.01%
Unfunded actuarial accrued liability based on MVA	$ 14,987,698,743	$ 19,527,069,570
Funded Ratio based on market value	70.1%	58.8%
Payment Period based on the FCR	25.8 years	41.7 years

* Includes load for administrative expenses. See page 16 for more contribution rate detail.

2. The valuation balance sheet showing the results and liabilities of the System is provided in Section III.
3. Comments on the valuation results are given in Section IV, comments on the experience and actuarial gains and losses during the valuation year are provided in Section V and the rates of contribution payable by employers are provided in Section VI and Section VII.
4. Schedule A of this report presents the development of the assets. The estimated investment return for the plan year ending June 30, 2021 on a market value of assets basis was 32.17% and on an actuarial value of assets basis was 12.47%. These can be compared to the assumed rate of return for the period of 7.75%.
5. Schedule B details the actuarial assumptions and methods employed. Since the previous valuation, various economic and demographic assumptions have been revised. The changes are summarized below and shown in more detail in Schedule B:
   - The investment rate of return assumption was changed from 7.75% to 7.55%.
   - The price inflation assumption was reduced from 2.75% to 2.40%.
   - The wage inflation assumption was reduced from 3.00% to 2.65%.
   - The assumed load for administrative expenses was increased from 0.25% to 0.28% of payroll.
   - Withdrawal rates, pre-retirement mortality rates, disability rates and service retirement rates were also adjusted to reflect actual experience more closely.
   - The percentage of active member disabilities assumed to be in the line of duty was increased from 9% to 12%.
   - The percentage of active member deaths assumed to be in in the line of duty was decreased from 6% to 4%.
   - Changes were made to the Mortality Table for both healthy and disabled lives.
6. Schedule C gives a summary of the benefit and contribution provisions of the plan. There have been no changes since the previous valuation.

7. The employer contribution rate, or Fixed Contribution Rate (FCR), of 17.40% of annual compensation was approved by the Board in 2021 for the fiscal year ending June 30, 2023 and has been the contribution rate for employers since July 1, 2019. As shown on page 1 of the report, the amortization period to pay off the Unfunded Actuarial Accrued Liability (UAAL) using the FCR is just over 50 years, which is a snapshot view of the UAAL as of the valuation date of June 30, 2021. This calculation of the amortization period does not take into consideration the smoothing in of the positive investment gains that the System experienced for fiscal year end June 30, 2021.

8. In addition, as shown on page 1 of the report, the Actuarially Determined Contribution (ADC) Rate for the 2021 valuation year is 21.49% of annual compensation and the ratio of the ADC to the FCR is calculated at 123.51% as of June 30, 2021. Per the Board's Funding Policy, which is provided in Schedule F, this actuarial metric is in the Red Status as the ratio exceeds 110%.

9. The Board's decision earlier this year to keep the FCR at 17.40% of annual compensation was based on the thorough projection analysis that the Board reviewed throughout 2021 that demonstrated that the smoothing in of the positive investment gain that the System experienced for fiscal year end June 30, 2021 would decrease the amortization period quicker and would decrease the ADC/FCR ratio closer to 100% over the next four valuations. **Therefore, beginning this year, we have combined the valuation report and projection report for PERS so that all current and projected metrics are shown in one report.**

10. The projection results, shown beginning in Section IX, allow the Board to see a forecast of the System's funding progress over time, allow the Board to review the funding goals and benchmarks outlined in the funding policy, and provide the status of the metrics/targets in the funding policy that determines whether or not a contribution rate increase should be recommended. The objective of the current funding policy is to accumulate sufficient assets during a member's employment to fully finance the benefit the member receives throughout retirement. In order to reach that objective, some goals and benchmarks were established as follows:

    - Preservation of the defined benefit structure for providing lifetime benefits to the PERS' membership,

- Maintain an increasing trend in the funded ratio over the projection period with an ultimate goal of being 100% funded,
- Ensure benefit improvements are funded through increases in contribution requirements in accordance with Article 14, S 272A, of the Mississippi Constitution.
- Contribution rate stability as a percentage of payroll (Fixed Contribution Rate – FCR),
- Require clear reporting and risk analysis of the metrics by the actuary as outlined in Section II of the policy using a "Signal Light" approach to assist the Board in determining whether increases or decreases are needed in the employer contribution rate.

11. For PERS, if any one of the following metrics are in the Red Signal Light status in conjunction with the annual valuation report and the projection report, the actuary will determine and recommend to the Board an employer contribution rate increase to consider that is sufficient enough to get all three metrics back into the Green Signal Light status.

- Funded Ratio – defined as the actuarial value of assets divided by the actuarial accrued liability. One of the funding goals is to have an increasing funded ratio over the projection period with an ultimate goal of having a 100% funded ratio. The Board sets the Signal Light definition as follows:

Status	Definition
Green	**Funded Ratio above 80% in 2047**
Yellow	**Funded Ratio between 65% and 80% in 2047**
Red	**Funded Ratio below 65% in 2047**

- Cash flow as a percentage of assets – defined as the difference between total contributions coming into the trust and the benefit payments made to retirees and beneficiaries going out of the trust as a percentage of beginning year market value of assets. Over the projection period, this percentage will fluctuate from year to year so for Signal Light testing, the net cash flow percentage over the entire projection period will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Net Cash Flow Percentage above negative 5.80% (-5.80%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.80% (-5.80%) and negative 7.55% (-7.55%) during the projection period
Red	Net Cash Flow Percentage below negative 7.55% (-7.55%) during the projection period

- Actuarially Determined Contribution (ADC) – defined as the contribution requirement determined by the actuary using a contribution allocation procedure based on the principal elements disclosed in Section III of the funding policy:
  1. Actuarial Cost Method
  2. Asset Smoothing Method
  3. Amortization Method

The calculation of the ADC will be determined during the actuarial valuation. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by the Funding Policy will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	ADC ratio at or below 100% of fixed contribution rate
Yellow	ADC ratio between 100% and 110% of fixed contribution rate
Red	ADC ratio above 110% of fixed contribution rate

12. A summary of the estimated metrics from the projection results for the next five years and in the long-term are shown in the following two tables below. More details will be shown beginning in Section IX but as you can see from the first table below, the funded ratio, amortization period and ADC/FCR ratio improve rather quickly over the next five years.

Valuation Year	UAAL ($ in Millions)	Funded Ratio	Amortization Period	Cash Flow %	ADC/FCR Ratio
2021	$19,436	61.3%	51 years	(4.5)%	123.5%
2022	$18,455	64.0%	41 years	(4.7)%	118.4%
2023	$17,545	66.5%	34 years	(4.8)%	113.3%
2024	$16,535	69.0%	28 years	(4.9)%	107.8%
2025	$15,251	71.9%	23 years	(5.0)%	100.9%
2026	$15,274	72.4%	22 years	(5.2)%	101.5%

Metric	2021 Baseline Projection (7.55%)	2021 Status	2020 Baseline Projection (7.75%)	2020 Status
Funding Ratio in 2047	93.5%	Green	67.6%	Yellow
Cash Flow as a Percentage of Assets	-5.65%	Green	-6.20%	Yellow
ADC/FCR Ratio from 2021 Valuation	123.5%	Red	112.0%	Red
ADC/FCR Ratio from 2025 Valuation	100.9%	Yellow	122.0%	Red

As shown above, the ADC/FCR ratio is in "Red Status" for the 2021 valuation and per the Funding Policy, the actuary should recommend an increase in the Fixed Contribution Rate. However, the ADC/FCR ratio is projected to decrease closer to 100% over the next four valuations as the investment gains from the 2021 valuation are fully recognized. Therefore, there is no recommendation for an increase in the Fixed Contribution Rate of 17.40% of annual compensation at this time. However, the Board should review the Sensitivity Analysis section of this report to understand the volatility that may occur in the projections if investment experience is less than expectations going forward.

12. The table on the following page provides a ten-year history of some pertinent figures.

Section I: Executive Summary

Comparative Schedule

Valuation Date June 30	Active Members				Retired Lives				Valuation Results ($ millions)		
	Number	Payroll ($ millions)	Average Salary	% increase from previous year	Number	Active/ Retired Ratio	Annual Benefits ($ millions)	Benefits as % of Payroll	Accrued Liability	Valuation Assets	UAAL
2012	162,311	$5,858	$36,090	2.6	86,829	1.9	$1,752.6	29.9	$34,493	$19,993	$14,500
2013	161,744	5,824	36,005	(0.2)	90,214	1.8	1,874.7	32.2	35,543	20,491	15,052
2014	161,360	5,835	36,159	0.4	93,504	1.7	1,998.3	34.2	37,015	22,570	14,445
2015	157,215	5,905	37,559	3.9	96,338	1.6	2,116.3	35.8	40,364	24,387	15,977
2016	154,104	6,023	39,081	4.1	99,483	1.5	2,249.0	37.3	41,997	25,185	16,812
2017	152,382	6,038	39,626	1.4	102,260	1.5	2,374.7	39.3	43,166	26,364	16,802
2018	150,687	5,999	39,813	0.5	104,973	1.4	2,500.8	41.7	44,396	27,456	16,940
2019	150,651	6,145	40,789	2.5	107,844	1.4	2,635.0	42.9	46,007	28,025	17,982
2020	149,855	6,287	41,957	2.9	109,881	1.4	2,755.6	43.8	47,354	28,629	18,725
2021	145,673	6,246	42,877	2.2	112,158	1.3	2,875.5	46.0	50,204	30,768	19,436

The active membership declined for the ninth consecutive year while the number of retirees increased by 2.1% for the 2021 fiscal year. The ratio of actives to retirees declined to 1.3 for the 2021 fiscal year. The Unfunded Actuarial Accrued Liability (UAAL) increased by $711 million for this valuation.

Section II: Membership Data

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the System as of June 30, 2021 upon which the valuation was based. Detailed tabulations of the data are given in Schedule D.

Active Members

Employers	Number of Employers	Number	Payroll	Group Averages		
				Salary	Age	Service
State Agencies	103	25,325	$1,076,040,014	$42,489	45.9	10.7
State Universities	9	17,114	996,451,048	58,224	43.5	9.8
Public Schools	140	60,108	2,403,327,174	39,983	44.7	10.9
Community/Junior Colleges	15	5,959	300,434,410	50,417	46.9	11.6
Counties*	88	14,620	572,143,978	39,134	47.2	9.8
Municipalities	242	15,471	595,147,054	38,469	44.2	10.0
Other Political Subdivisions	258	7,076	302,533,163	42,755	45.0	9.0
Total in PERS	855	145,673	$6,246,076,841	$42,877	45.1	10.5

*There are 82 counties; however, 3 counties have multiple agencies.

The total number of active members includes 75,790 vested members and 69,883 non-vested members.

Retired Lives

Type of Benefit Payment	No.	Annual Benefits	Group Averages	
			Benefit	Age
Retirement	93,630	$2,517,980,876	$26,893	71.4
Disability	6,394	129,746,233	20,292	64.4
Survivor	12,134	227,756,749	18,770	68.5
Total in PERS	112,158	$2,875,483,858	$25,638	70.6

Section II: Membership Data

Deferred Vested/Inactive Lives

Type of Member	No.	Deferred Benefits	Outstanding Refunds
Deferred Vested - Benefit Provided	14,759	$ 126,691,630	N/A
Deferred Vested – Missing Benefit	978	N/A	$ 38,050,989
Vested – Pending Retirements	1,150	34,356,408	N/A
Inactive	68,026	N/A	335,839,653
Total in PERS	84,913	$ 161,048,038	$ 373,890,642

For the liability in this valuation, deferred vested participants with benefits provided are valued assuming a retirement age of 60 for Tiers 1, 2, and 3 and age 65 for Tier 4. There are 1,150 records determined to be possible "pending retirements" based on the provided member status; these records are valued by assuming immediate benefit commencement.

Section III: Valuation Balance Sheet

The following valuation balance sheet shows the assets and liabilities of the retirement system as of the current valuation date of June 30, 2021 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2020. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date. The development of the actuarial value of assets is presented in Schedule A.

Section III: Valuation Balance Sheet

VALUATION BALANCE SHEET
SHOWING THE ASSETS AND LIABILITIES OF THE
PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI

	JUNE 30, 2021	June 30, 2020
ASSETS		
Current actuarial value of assets:		
Annuity Savings Account	$ 5,728,172,130	$ 5,710,182,245
Annuity Reserve	7,074,949,003	6,719,505,570
Employers' Accumulation Account	17,965,129,867	16,199,517,185
Total current assets	$ 30,768,251,000	$ 28,629,205,000
Future member contributions to Annuity Savings Account	$ 3,787,600,399	$ 3,634,111,165
Prospective contributions to Employer's Accumulation Account		
Normal contributions	$ 627,058,288	$ 440,131,241
Unfunded actuarial accrued liability contributions	19,436,044,743	18,725,258,570
Total prospective contributions	$ 20,063,103,031	$ 19,165,389,811
Total assets	$ 54,618,954,430	$ 51,428,705,976
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	$ 31,821,654,514	$ 30,220,083,007
Present value of benefits payable on account of active members	20,764,222,444	19,383,269,836
Present value of benefits payable on account of inactive members for service rendered before the valuation date	2,033,077,472	1,825,353,133
Total liabilities	$ 54,618,954,430	$ 51,428,705,976

BREAKDOWN OF TOTAL AND ACCRUED LIABILITIES
AS OF JUNE 30, 2021

	Total Liability	Accrued Liability
Active Members		
Retirement	$ 18,038,309,816	$ 15,573,726,336
Death	286,640,859	199,026,322
Disability	413,744,942	265,837,767
Termination	2,025,526,827	310,973,332
Total	$ 20,764,222,444	$ 16,349,563,757
Retirees		
Retirement	$ 28,552,224,489	$ 28,552,224,489
Survivor	1,957,416,165	1,957,416,165
Disability	1,312,013,860	1,312,013,860
Total	$ 31,821,654,514	$ 31,821,654,514
Deferred Vested Members	1,546,109,975	1,546,109,975
Inactive Members	486,967,497	486,967,497
Total Actuarial Values	$ 54,618,954,430	$ 50,204,295,743
Actuarial Value of Assets		30,768,251,000
Unfunded Actuarial Accrued Liability		$ 19,436,044,743

The total liability is the present value of future benefits for all current members as of the valuation date. The accrued liability is the present value of benefits that have been accrued as of the valuation date. Since all inactive members and retirees have accrued their full benefits, the total liability and accrued liability are the same. For actives, the difference between the total liability and the accrued liability is the present value of all future accruals.

Section IV: Comments on Valuation

The valuation balance sheet gives the following information with respect to the funds of the System as of June 30, 2021.

Total Assets

The Annuity Savings Account is the fund to which are credited contributions made by members together with interest thereon. When a member retires, the amount of his or her accumulated contributions is transferred from the Annuity Savings Account to the Annuity Reserve. The Employer's Accumulation Account is the fund to which are credited employer contributions and investment income, and from which are paid all employer-provided benefits under the plan. The assets credited to the Annuity Savings Account as of the valuation date, which represent the accumulated contributions of members to that date, amounted to $5,728,172,130. The assets credited to the Annuity Reserve were $7,074,949,003 and the assets credited to the Employer's Accumulation Account totaled $17,965,129,867. Current actuarial assets as of the valuation date equaled the sum of these three funds, $30,768,251,000. Future member contributions to the Annuity Savings Account were valued to be $3,787,600,399. Prospective contributions to the Employer's Accumulation Account were calculated to be $20,063,103,031 of which $627,058,288 is attributable to service rendered after the valuation date (normal contributions) and $19,436,044,743 is attributable to service rendered before the valuation date (unfunded actuarial accrued liability contributions).

Therefore, the balance sheet shows the present value of current and future assets of the System to be $54,618,954,430 as of June 30, 2021.

Total Liabilities

The present value of benefits payable on account of presently retired members and beneficiaries totaled $31,821,654,514 as of the valuation date. The present value of future benefit payments on behalf of active members amounted to $20,764,222,444. In addition, the present value of benefits for inactive members, due to service rendered before the valuation date, was calculated to be $2,033,077,472.

Therefore, the balance sheet shows the present value for all prospective benefit payments under the System to be $54,618,954,430 as of June 30, 2021.

Section 25-11-123(a)(1) of State law requires that active members contribute 9.00% of annual compensation to the System.

Section IV: Comments on Valuation

Section 25-11-123(c) requires that the State contribute a certain percentage of the annual compensation of members to cover the normal contributions and a certain percentage to cover the accrued liability contributions of the System. These individual contribution percentages are established in accordance with an actuarial valuation. The PERS Board of Trustees increased the employer contribution rate from 15.75% to 17.40% of annual compensation effective for the fiscal year beginning July 1, 2019. The Board voted in 2021 to maintain the employer contribution rate of 17.40% of annual compensation through the fiscal year ending June 30, 2023. Since the amortization period is calculated on an open basis, the amortization period for the June 30, 2021 valuation is 50.9 years, compared to 37.1 years for the previous valuation.

The primary reason for the increase in the amortization period was due to the change in assumptions from the recommendations of the experience study for the 4-year period ending on June 30, 2020, especially the decrease in the wage inflation assumption. There were also losses due to aggregate demographic experience for PERS. These losses were somewhat offset by the gain due to investment earnings on the actuarial value of assets basis better than expected (12.47% vs. 7.75%).

See Section VI for a reconciliation of the amortization periods from last year to this year and see Schedule E for a complete analysis of the Financial Experience.

Section V: Derivation of Experience Gains & Losses

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain/(loss) for the year ended June 30, 2021 and for the previous valuation is shown below.

		2021 Results $ millions	2020 Results $ millions
(1)	UAAL* as of beginning of year	$ 18,725.3	$ 17,982.2
(2)	Total Normal cost from last valuation	667.9	661.1
(3)	Total Employee and Employer Contributions	1,764.6	1,766.5
(4)	Interest accrual: [[(1) + (2)] x .0775] - [(3) x .03875]	1,434.5	1,376.3
(5)	Expected UAAL before changes: (1) + (2) – (3) + (4)	19,063.1	18,253.1
(6)	Change due to plan amendments	0.0	0.0
(7)	Change due to new actuarial assumptions or methods	1,405.0	0.0
(8)	Expected UAAL after changes: (5) + (6) + (7)	$ 20,468.1	$ 18,253.1
(9)	Actual UAAL as of end of year	$ 19,436.0	$ 18,725.3
(10)	Gain/(loss): (8) – (9)	$ 1,032.1	$ (472.2)
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	2.2%	(1.0)%

*Unfunded actuarial accrued liability.

Valuation Date June 30	Actuarial Gain/(Loss) as a % of Beginning Accrued Liabilities
2016	(1.4)%
2017	1.1
2018	0.5
2019	(0.9)
2020	(1.0)
2021	2.2

Section VI: Fixed Contribution Rate (FCR)

1. The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by employers to the Retirement System. The following table shows the rates of contribution payable by employers as determined from the present valuation and a comparison to the previous valuation results.

Contribution for	2021 Valuation	2020 Valuation
Normal Cost:		
Service retirement benefits	8.80%	8.42%
Disability benefits	0.31	0.40
Survivor benefits	0.19	0.20
Total	9.30%	9.02%
Member Contributions:	9.00%	9.00%
Less future refunds	(1.19)	(1.07)
Available for benefits	7.81%	7.93%
Employer Normal Cost	1.49%	1.09%
Administrative Expense Load	0.28%	0.25%
Total Employer Normal Cost	1.77%	1.34%
Unfunded Actuarial Accrued Liabilities (50.9 years level % of payroll amortization*)	15.63%	16.06%
Total Computed Employer Contribution Rate	17.40%	17.40%

* Amortization period a year ago was 37.1 years.

2. The Board maintained a Fixed Contribution Rate (FCR) of 17.40% of annual compensation for the fiscal year ending June 30, 2023 and set the amortization period to open-ended. Thirty-year projections are completed to determine if an increase or decrease in the employer contribution rate is warranted according to the metrics set forth in the funding policy. Please see the projection results beginning in Section IX.

Section VI: Fixed Contribution Rate (FCR)

3. The components of the change in the computed unfunded actuarial accrued liability amortization period from 37.1 years to 50.9 years are as follows:

Previously Reported Period	37.1 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	(2.5)
Assumption/Method changes	17.1
Plan amendments	0.0
Contribution Shortfall/(Excess)	0.2
Computed Period	50.9 years

Section VII: Actuarially Determined Contribution Rate (ADC)

1. One of the metrics in the Funding Policy, as shown in Schedule F, is to calculate the Actuarially Determined Contribution (ADC) based on the principle elements of the Amortization Method disclosed in the Funding Policy. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by this Funding Policy will be tested each valuation. The Funding Policy provides that the unfunded actuarial accrued liability as of June 30, 2018 (Transitional UAAL) will be amortized as a level percentage of payroll over a closed 30-year period. In each subsequent valuation, all benefit changes, assumption and method changes, and experience gains and/or losses that have occurred since the previous valuation will combine to determine a New Incremental UAAL. Each New Incremental UAAL will be amortized as a level percentage of payroll over a closed 25-year period from the date it is established.

2. The following table shows the components of the total Unfunded Actuarial Accrued Liability (UAAL) and the derivation of the UAAL Contribution Rate in accordance with the funding policy as of the valuation date:

TOTAL UAAL AND UAAL CONTRIBUTION RATE
($ in Thousands)

Date Established	Original UAAL Balance	Remaining UAAL Balance	Remaining Amortization Period	Amortization Payment
June 30, 2018	$16,940,459	$17,606,307	27 years	$1,161,725
June 30, 2019	784,879	795,026	23 years	57,101
June 30, 2020	524,319	528,113	24 years	37,053
June 30, 2021	506,599	506,599	25 years	34,775
Total		$19,436,045		$1,290,654
Estimated Payroll				$6,546,352
UAAL Amortization Contribution Rate				19.72%

3. The calculation of Actuarial Determined Contribution (ADC) for the past two valuations is shown below:

Funding Policy ADC Metric Test		
Valuation Date June 30	2021	2020
Actuarially Determined Contribution (ADC) rate		
Normal Cost*	1.77%	1.34%
Accrued liability	19.72	18.15
Total	21.49%	19.49%
Ratio of ADC to FCR	123.51%	112.01%
Funding Policy Metric Status	Red	Red
Anticipated accrued liability payment period	26.7 years	27.7 years

* Estimated budgeted administrative expenses are included in the normal cost rate

4. Although the Ratio of ADC to FCR is above 110% and the Metric Status is in the "Red Status" for the 2021 valuation and per the Funding Policy the actuary should recommend an increase to the FCR, the anticipated smoothing in of the positive investment experience for the fiscal year ending June 30, 2021 will improve this ratio within the next four valuations. Therefore, there is no recommendation for an increase in the Fixed Contribution Rate of 17.40% of annual compensation at this time. More details can be found in the Projection section of this report beginning in Section IX. We will continue to monitor this metric to determine if the Board should consider an increase to the FCR in the future.

Section VIII: Supplemental Disclosure Information

1. The following supplemental disclosure information is provided for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

NUMBER OF ACTIVE AND RETIRED PARTICIPANTS
AS OF JUNE 30, 2021

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	112,158
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	84,913
Active Participants	145,673
Total	342,744

2. Another such item is the schedule of funding progress as shown below. As can be seen in column 3 of the table below, the funded ratio has remained in a narrow range since 2014. However, the unfunded actuarial accrued liability as a percentage of payroll, shown in column 6, has steadily increased over the last 10 years. This is mainly due to the annual covered payroll not growing as anticipated over this period.

SCHEDULE OF FUNDING PROGRESS
($ Thousands)

Plan Year Ended	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Funded Ratio (1)/(2)	(4) Unfunded AAL (2) – (1)	(5) Annual Covered Payroll	(6) Unfunded AAL as a Percentage of Covered Payroll (4)/(5)
06/30/12	$19,992,797	$34,492,873	58.0%	$14,500,076	$5,857,789	247.5%
06/30/13#	20,490,555	35,542,848	57.7	15,052,293	5,823,578	258.5
06/30/14	22,569,940	37,015,288	61.0	14,445,348	5,834,687	247.6
06/30/15#	24,387,161	40,364,584	60.4	15,977,423	5,904,827	270.6
06/30/16*#	25,185,078	41,997,513	60.0	16,812,435	6,022,533	279.2
06/30/17#	26,364,446	43,166,491	61.1	16,802,045	6,038,229	278.3
06/30/18	27,455,702	44,396,161	61.8	16,940,459	5,999,231	282.4
06/30/19#	28,024,611	46,006,859	60.9	17,982,248	6,144,916	292.6
06/30/20	28,629,205	47,354,464	60.5	18,725,259	6,287,441	297.8
06/30/21#	30,768,251	50,204,296	61.3	19,436,045	6,246,077	311.2

* After change in benefit provisions.
\# After change in actuarial assumptions.

Solvency Tests
($ in Thousands)

Valuation Date	Actuarial Accrued Liabilities for: (1) Accumulated Employee Contributions Including Allocated Investment Earnings	(2) Retirees and Beneficiaries Currently Receiving Benefits	(3) Active and Inactive Members Employer Financed Portion	Net Assets Available for Benefits	Portions of Accrued Liabilities Covered by Assets (1)	(2)	(3)
6/30/12	$4,463,252	$19,547,367	$10,482,254	$19,992,797	100.0%	79.4%	0.0%
6/30/13	5,053,888	20,789,551	9,699,409	20,490,555	100.0	74.3	0.0
6/30/14	5,277,944	22,033,588	9,703,756	22,569,940	100.0	78.5	0.0
6/30/15	5,379,226	24,012,624	10,972,734	24,387,161	100.0	79.2	0.0
6/30/16	5,468,859	25,390,774	11,137,880	25,185,078	100.0	77.7	0.0
6/30/17	5,534,403	26,686,958	10,945,130	26,364,446	100.0	78.1	0.0
6/30/18	5,570,524	27,874,365	10,951,272	27,455,702	100.0	78.5	0.0
6/30/19	5,626,602	29,109,623	11,270,634	28,024,611	100.0	76.9	0.0
6/30/20	5,710,182	30,220,083	11,424,199	28,629,205	100.0	75.8	0.0
6/30/21	5,728,172	31,821,655	12,654,469	30,768,251	100.0	78.7	0.0

As can be seen from the table above, the PERS plan assets currently covers 100% of the active member contribution account balances as of the valuation date but only covers about 79% of the retiree liability. This ratio had increased from 2016 through 2018, decreased from 2019 through 2020 and increased again in 2021. There remains zero assets to cover any employer-financed active liabilities.

Section VIII: Supplemental Disclosure Information

Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Active Members Number	Active Members Annual Payroll	Active Members Annual Average Pay	Active Members % Increase in Average Pay
2012	870	162,311	$5,857,789,376	$36,090	2.6%
2013	873	161,744	5,823,577,978	36,005	(0.2)
2014	871	161,360	5,834,686,655	36,159	0.4
2015	868	157,215	5,904,827,181	37,559	3.9
2016	862	154,104	6,022,532,933	39,081	4.1
2017	861	152,382	6,038,228,708	39,626	1.4
2018	858	150,687	5,999,230,701	39,813	0.5
2019	854	150,651	6,144,915,630	40,789	2.5
2020	853	149,855	6,287,441,467	41,957	2.9
2021	855	145,673	6,246,076,841	42,877	2.2

Schedule of Retirants Added to and Removed From Rolls*
Last Ten Fiscal Years

	Fiscal Year Ended June 30									
Item	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Beginning of Year	83,115	86,829	90,214	93,504	96,338	99,483	102,260	104,973	107,844	109,881
Added	6,569	6,276	6,159	5,907	6,548	6,219	5,985	6,101	5,645	6,502
Removed	(2,855)	(2,891)	(2,869)	(3,073)	(3,403)	(3,442)	(3,272)	(3,230)	(3,608)	(4,225)
End of Year	86,829	90,214	93,504	96,338	99,483	102,260	104,973	107,844	109,881	112,158

* See Schedule D for a breakdown by type of retirement.

Schedule of Annual Benefit Payments Added to and Removed From Rolls
Last Seven Fiscal Years

Year Ending	2015	2016	2017	2018	2019	2020	2021
Beginning of Year	$1,998,322,954	$2,116,322,652	$2,249,044,704	$2,374,747,017	$2,500,750,392	$2,635,004,675	$2,755,593,924
Added	117,113,206	132,970,248	123,938,697	121,870,115	129,095,132	121,134,338	133,897,944
Removed	(55,158,128)	(59,603,335)	(62,470,173)	(64,186,324)	(67,416,138)	(76,727,172)	(93,663,207)
Benefit increase due to annual COLA	56,044,620	59,355,139	64,233,789	68,319,584	72,575,289	76,182,083	79,655,197
Benefit increase due to plan amendments	0	0	0	0	0	0	0
End of Year	$2,116,322,652	$2,249,044,704	$2,374,747,017	$2,500,750,392	$2,635,004,675	$2,755,593,924	$2,875,483,858

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-14	15-19	20-24	25	26-29	30	31+	TOTAL
July 1, 2020 to June 30, 2021									
Average Monthly Benefit	$484.13	$797.70	$1,170.70	$1,723.73	$2,080.55	$2,202.62	$2,731.08	$3,198.31	$1,678.95
Average Final Salary	$34,676	$39,370	$43,511	$49,033	$52,995	$54,445	$62,496	$62,914	$48,259
Number of Active Retirants	775	1,026	971	1,186	365	1,098	200	881	6,502
July 1, 2019 to June 30, 2020									
Average Monthly Benefit	$495.24	$780.45	$1,218.15	$1,881.34	$1,994.68	$2,307.13	$2,634.63	$3,166.16	$1,762.99
Average Final Salary	$34,969	$38,904	$45,180	$52,942	$51,515	$56,787	$60,150	$61,884	$49,926
Number of Active Retirants	641	844	787	1,037	339	1,062	192	838	5,645
July 1, 2018 to June 30, 2019									
Average Monthly Benefit	$476.23	$730.46	$1,156.10	$1,852.18	$2,090.55	$2,315.68	$2,469.25	$3,355.92	$1,734.50
Average Final Salary	$33,243	$36,871	$42,708	$51,686	$52,874	$55,298	$55,458	$65,639	$48,544
Number of Active Retirants	730	930	870	1,127	359	1,062	204	819	6,101
July 1, 2017 to June 30, 2018									
Average Monthly Benefit	$485.22	$722.11	$1,057.13	$1,767.43	$2,023.90	$2,173.95	$2,533.72	$3,178.78	$1,676.34
Average Final Salary	$32,660	$37,608	$39,878	$49,009	$52,289	$52,205	$57,261	$60,427	$46,987
Number of Active Retirants	672	933	849	1,047	348	1,080	192	864	5,985
July 1, 2016 to June 30, 2017									
Average Monthly Benefit	$475.88	$727.37	$1,013.30	$1,655.71	$1,947.82	$2,105.82	$2,446.29	$3,092.75	$1,632.44
Average Final Salary	$31,990	$37,033	$39,332	$47,400	$49,568	$50,461	$55,156	$59,849	$45,739
Number of Active Retirants	732	938	859	1,014	369	1,174	190	943	6,219

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-14	15-19	20-24	25	26-29	30	31+	TOTAL
July 1, 2015 to June 30, 2016									
Average Monthly Benefit	$512.05	$701.11	$1,053.82	$1,638.19	$1,878.66	$2,117.88	$2,400.11	$3,196.32	$1,665.54
Average Final Salary	$31,771	$34,459	$39,422	$45,571	$46,533	$50,536	$52,472	$59,306	$44,872
Number of Active Retirants	751	997	874	1,048	402	1,204	234	1,038	6,548
July 1, 2014 to June 30, 2015									
Average Monthly Benefit	$458.27	$688.17	$977.30	$1,346.27	$1,833.91	$1,989.13	$2,217.36	$2,898.93	$1,600.68
Average Final Salary	$29,781	$33,585	$37,938	$40,770	$46,461	$48,614	$50,908	$57,019	$43,642
Number of Active Retirants	599	898	774	693	494	1,072	230	1,147	5,907
July 1, 2013 to June 30, 2014									
Average Monthly Benefit	$465.38	$712.04	$998.80	$1,383.89	$1,871.16	$1,992.51	$2,283.20	$2,954.14	$1,585.88
Average Final Salary	$31,044	$35,356	$37,962	$40,947	$47,490	$48,732	$51,456	$57,022	$43,744
Number of Active Retirants	751	945	815	663	505	1,146	232	1,102	6,159
July 1, 2012 to June 30, 2013									
Average Monthly Benefit	$442.04	$694.71	$963.61	$1,421.74	$1,924.91	$2,016.94	$2,187.80	$2,931.36	$1,563.58
Average Final Salary	$30,487	$34,404	$36,876	$41,550	$47,768	$48,862	$49,470	$56,341	$43,082
Number of Active Retirants	915	901	740	758	496	1,121	224	1,121	6,276
July 1, 2011 to June 30, 2012									
Average Monthly Benefit	$436.84	$655.76	$984.40	$1,325.25	$1,823.47	$1,956.67	$2,283.30	$2,938.26	$1,560.13
Average Final Salary	$29,120	$32,872	$37,561	$40,246	$46,050	$47,965	$51,720	$56,263	$42,606
Number of Active Retirants	1,007	867	779	736	501	1,138	260	1,281	6,569

Section IX: Projection Results

Annual actuarial valuations are performed for PERS which re-measure the assets and liabilities and the adequacy of the contribution rate. Actuarial projections are also performed every year with sensitivity testing of several factors. PERS also has experience studies performed every two years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and projections and periodic experience studies are practical ways to monitor and reassess risk.

As mentioned earlier in the report, the intended purpose of the projection results is to help assess the Plan's funding progress and to provide information to decision makers to help ensure that the applicable pension liabilities and funding mechanisms are managed in a manner that promotes sustainability.

The projection process should be viewed as an enhancement to the actuarial valuation control cycle by providing additional evaluation metrics to assess the need for further, in-depth analysis of the risks to the Plan's sustainability. The actuarial valuation control cycle is a key component of managing a long-term liability whose ultimate value is based upon uncertain future events. As the ultimate value of future cash flows cannot be predicted with certainty, pension liabilities are managed in the short-term through the continuous monitoring of economic and demographic assumptions, with a keen eye on the identification, measurement, and management of risks.

The projection process, like other actuarial modeling, is not intended to provide absolute results. The intended purpose of the projection process is to identify anticipated trends and to compare various outcomes, under a given methodology, rather than predicting certain future events. The results produced by the projection process do not predict the financial condition of the Plan or the Plan's ability to pay benefits in the future and do not provide any guarantee of future financial soundness of the Plan. Because actual experience will not unfold exactly as expected, actual results can be expected to differ from the results presented herein. To the extent actual experience deviates significantly from the assumptions, results could be significantly better or significantly worse than the expected outcome indicated in this report.

Section IX: Projection Results

SPECIAL ASSUMPTIONS

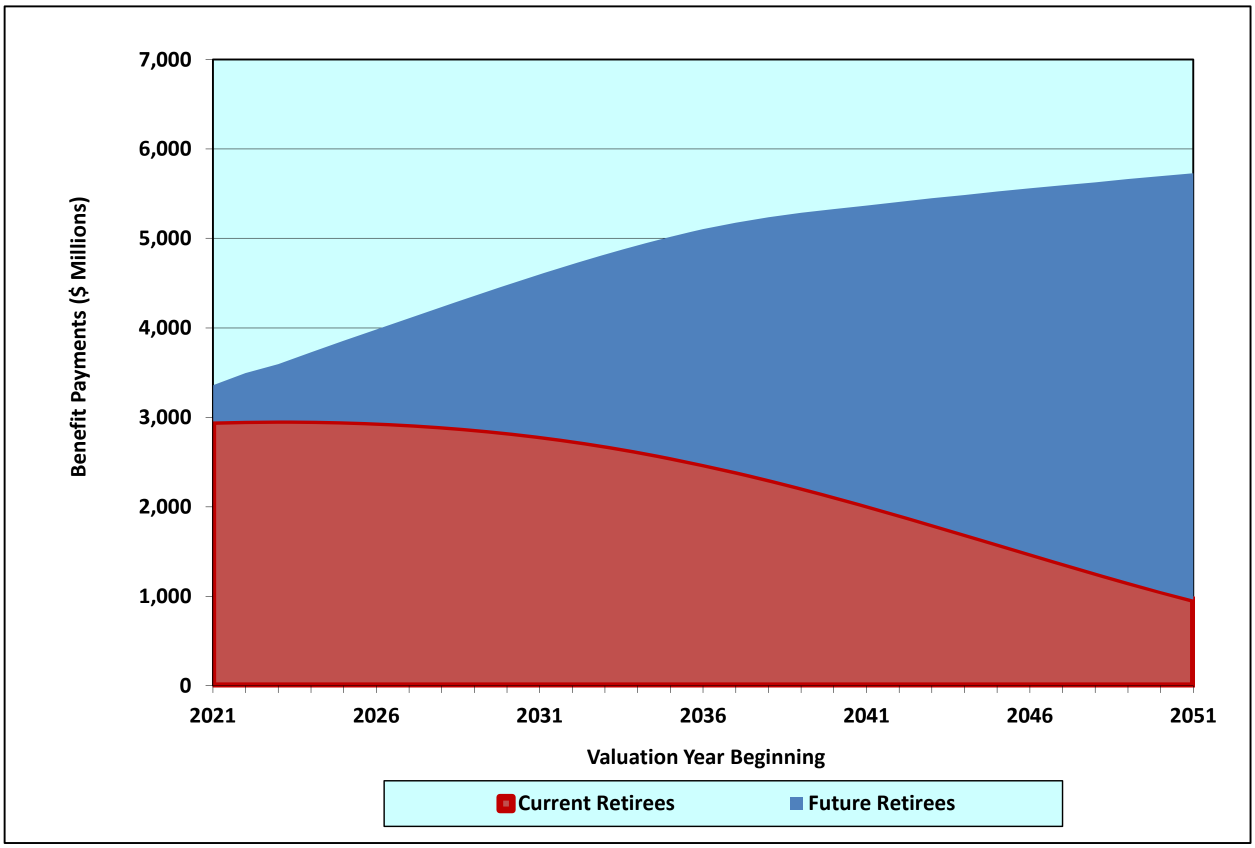
In addition to the regular valuation assumptions used in performing the annual actuarial valuations of PERS, additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection, it was assumed that the number of active members would remain static over the 30-year projection period.

But since we assume active members will leave the system through termination, death, disability, or retirement, we need to make some assumptions as to the composition of new hires that will replace departing members in order to maintain the membership at a constant number. The new entrant profile we developed was based on the new hires over the 3-year period prior to the projection start date of June 30, 2021. That profile is summarized in the table below.

Age	Average Pay	Percent Male	Weight
19	$28,500	65%	1.0%
23	30,800	40	19.8
27	34,200	36	20.7
32	34,200	34	12.9
37	34,500	33	10.8
42	34,000	33	8.9
47	34,000	37	7.7
52	34,000	37	6.8
57	34,000	42	5.6
62	34,000	47	3.4
69	30,000	50	2.4

Section IX: Projection Results

For the projection results presented in this section of the report, it was further assumed that the benefit structure as it exists on June 30, 2021 would remain in place for the following 30 years. The following graph shows the projection of benefit payments of PERS members. The red area of the graph are the benefit payments for current retirees and the blue area are the benefit payments for any future retirees. PERS currently pays approximately $3.0 Billion in benefit payments to its retirees but over the 30-year period, that amount is expected to nearly double.



Section IX: Projection Results

FUTURE MEMBERSHIP

The following chart and graph show the headcounts of active participants and retired members over the projection period. The actives are broken down into those existing as of June 30, 2021 and those who are hired after June 30, 2021. Even though the membership at PERS has been trending downward over the past few years, we believe that the active membership will continue at or around its current population of 145,673 active members over the projected period. After a reduction in active membership since 2008, many statewide public sector systems are beginning to experience a turnaround and active membership is starting to level off and even increase.

By the end of the projection period, we estimate that about 97.9% of those active employees will have been hired after June 30, 2021 and be included in the Tier 4 benefit structure.

Member	2021	2026	2031	2041	2047	2051
Active – Existing Employees	145,673	83,368	50,100	16,406	7,277	3,081
Active – New Entrants	0	62,305	95,573	129,267	138,396	142,592
Retired/Deferred Vesteds	129,045	141,732	149,435	149,149	143,726	140,359
Total	274,718	287,405	295,108	294,822	289,399	286,032

Projection Results

The baseline valuation and projection results shown below use the same actuarial assumptions as used in the June 30, 2021 actuarial valuation. In addition, the projection results using different long-term investment return assumptions for future valuations (7.25% and 7.00%) are included.

Baseline Projection Results (7.55%)
($ in Thousands)

	2021	2026	2031	2041	2047	2051
Total Payroll	$6,246,077	$7,002,983	$7,789,969	$9,887,092	$11,550,805	$12,828,866
UAL	$19,436,045	$15,274,287	$15,006,268	$11,039,698	$4,355,409	$0
Normal Cost Rate	1.77%	1.68%	1.67%	1.71%	1.75%	1.79%
UAL Rate	15.63%	15.72%	15.73%	15.69%	15.65%	15.61%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	72.4%	74.6%	82.7%	93.5%	100.0%
Amortization Period	51 years	22 years	18 years	9 years	3 years	0 years
ADC	21.49%	17.66%	18.25%	19.78%	19.77%	3.08%
ADC/FCR Ratio	123.5%	101.5%	104.9%	113.6%	113.6%	17.7%
Cash Flow Percentage	-4.5%	-5.2%	-5.5%	-5.0%	-3.8%	-3.0%

Projection Results Assuming 7.25% Long-Term Investment Return
($ in Thousands)

	2021	2026	2031	2041	2047	2051
Total Payroll	$6,246,077	$7,002,983	$7,789,969	$9,887,092	$11,550,805	$12,828,866
UAL	$19,436,045	$17,559,061	$18,424,700	$18,379,315	$15,814,784	$12,305,393
Normal Cost Rate	1.77%	2.32%	2.29%	2.33%	2.39%	2.43%
UAL Rate	15.63%	15.08%	15.11%	15.07%	15.01%	14.97%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	69.3%	69.9%	72.2%	77.2%	83.0%
Amortization Period	51 years	30 years	26 years	17 years	12 years	7 years
ADC	21.49%	20.69%	21.98%	27.23%	28.82%	13.30%
ADC/FCR Ratio	123.5%	118.9%	126.3%	156.5%	165.6%	76.4%
Cash Flow Percentage	-4.5%	-5.2%	-5.8%	-5.5%	-4.5%	-3.6%

Section IX: Projection Results

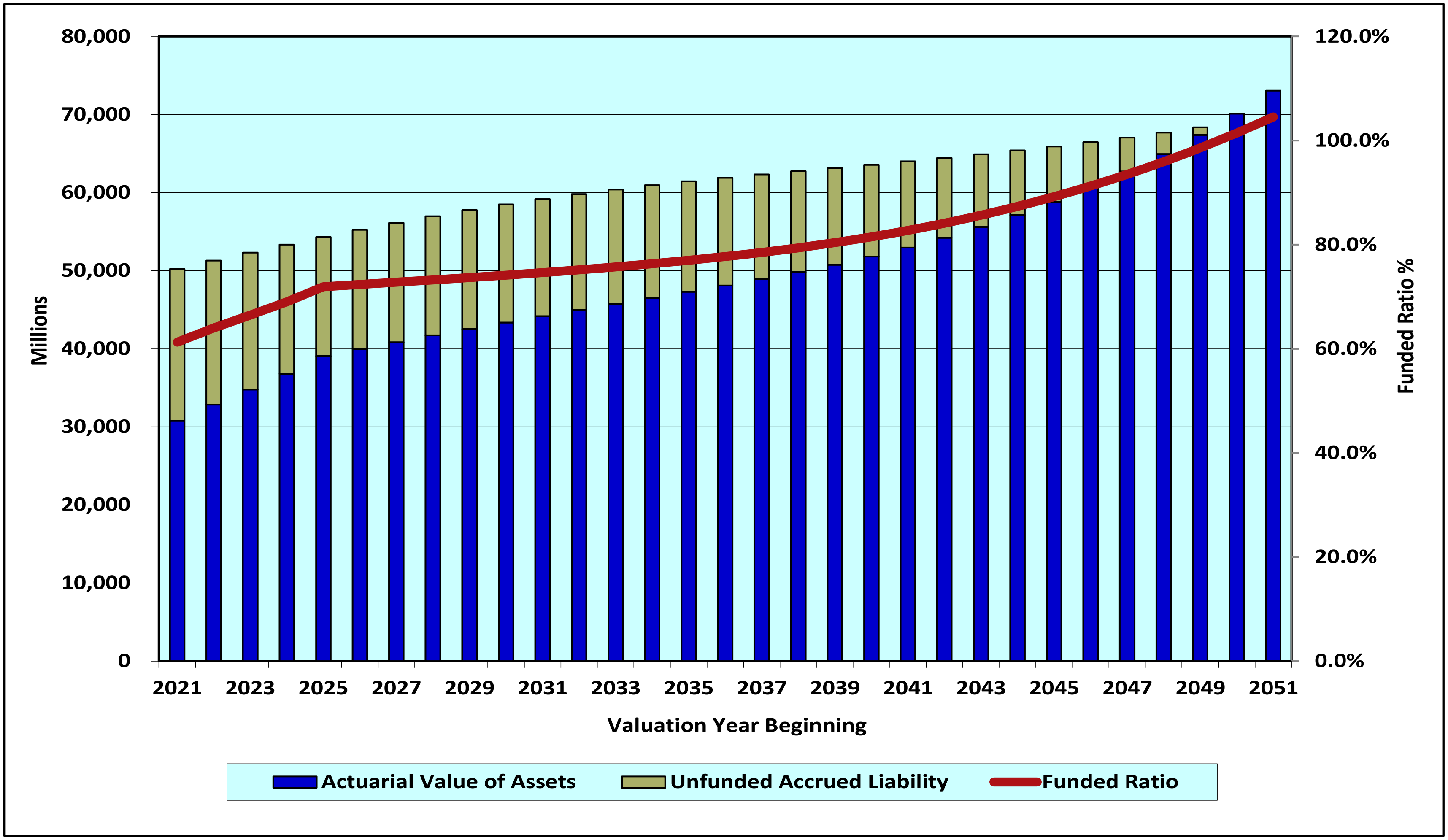
Projection Results Assuming 7.00% Long-Term Investment Return
($ in Thousands)

	2021	2026	2031	2041	2047	2051
Total Payroll	$6,246,077	$7,002,983	$7,789,969	$9,887,092	$11,550,805	$12,828,866
UAL	$19,436,045	$19,473,833	$21,259,243	$24,266,023	$24,796,898	$24,244,456
Normal Cost Rate	1.77%	2.85%	2.81%	2.85%	2.91%	2.96%
UAL Rate	15.63%	14.55%	14.59%	14.55%	14.49%	14.44%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	66.8%	66.1%	64.3%	65.2%	67.4%
Amortization Period	51 years	38 years	36 years	28 years	23 years	19 years
ADC	21.49%	23.22%	24.97%	33.04%	35.65%	21.00%
ADC/FCR Ratio	123.5%	133.5%	143.5%	189.9%	204.9%	120.7%
Cash Flow Percentage	-4.5%	-5.3%	-6.0%	-6.0%	-5.2%	-4.3%

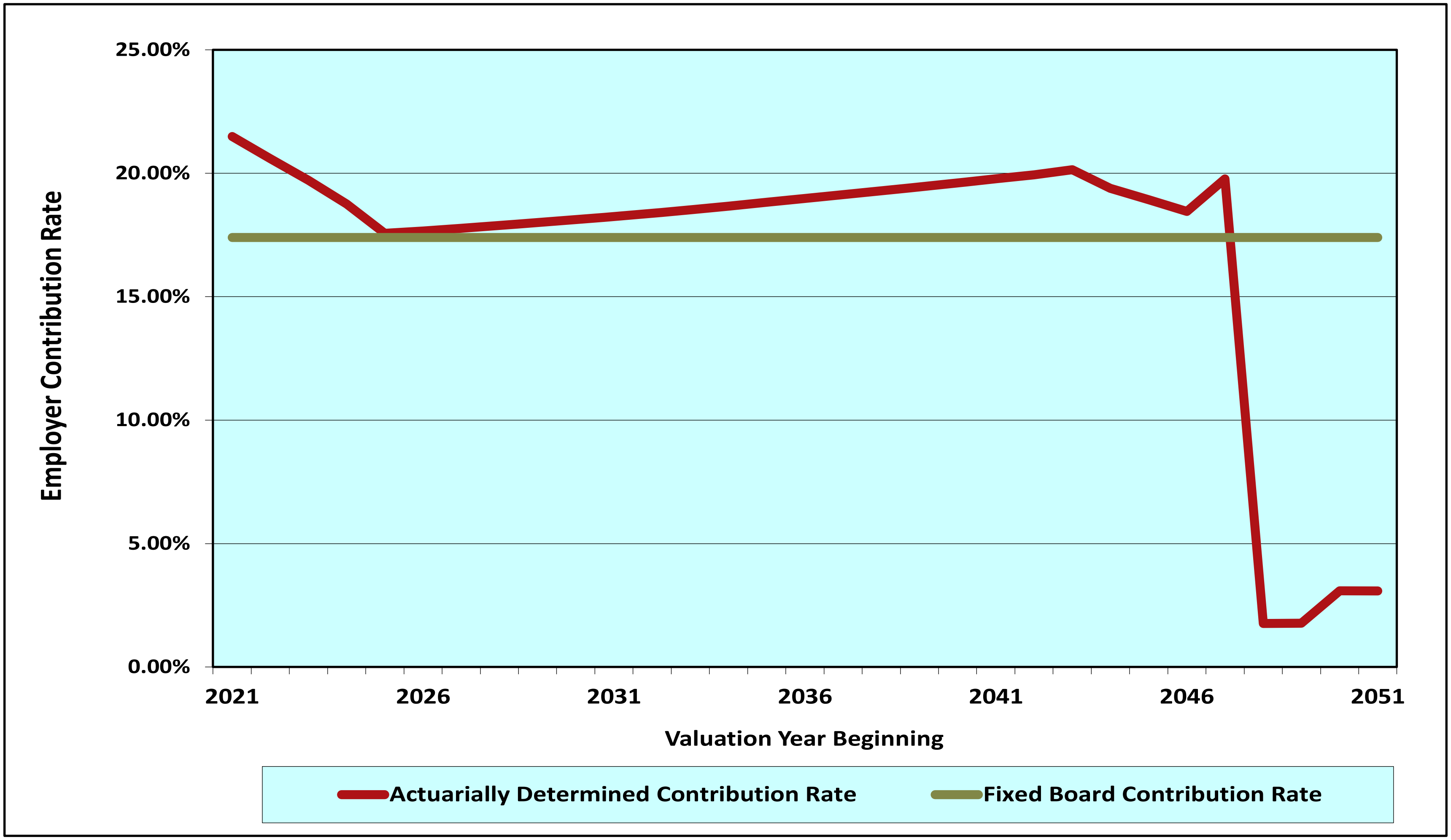
The first graph that follows shows the projection of the Unfunded Accrued Liability (UAL), Actuarial Value of Assets and the Funded Ratio under the baseline valuation (assuming 7.55%) from the amounts shown in the table on page 31. As you can see from the graph, under the current assumptions, the funded ratio is expected to increase to nearly 75% within the next ten years and then remain on a slight upward trend over the remaining projection period until PERS is expected to reach 100% funded in or around the 2050 valuation year.

The second graph shows the projection of the calculated Actuarially Determined Contribution (ADC) based on the Board's Funding Policy and the current Fixed Contribution Rate (FCR) of 17.40% under the baseline valuation. As you can see from the graph, the ADC is expected to decrease over the next five years as the investment gains from the fiscal year ending June 30, 2021 are fully recognized. After this initial period, the ADC is then expected to increase but expected to remain at modest levels between 17% and 20% for most of the projection period. The drop in the ADC near the end of the projection period is a result of the initial 2018 UAL base of $17 Billion being paid off, based on the closed amortization period per the Board's Funding Policy.

Mississippi PERS – PERS Plan
30 Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2021 Valuation Results



Mississippi PERS – PERS Plan
30 Year Projection of the Employer Contribution Rates
Based on June 30, 2021 Valuation Results



Section X: Cash Flow Projections

Cash Flow Projections

The funded ratio is the primary measure of funded status of a pension plan and, thereby, the most common measurement used for drawing conclusions on funding progress. The funded ratio is the ratio of the actuarial value of assets to the actuarial or accrued liability of the system as calculated by the funding method used in developing system contribution levels. When using the funded ratio in assessing trends over several valuations, we recommend that the basis for determining both the assets and liabilities in the ratio are taken into consideration and reasonable efforts are made to adjust the ratio to reflect these differences when they are known. On a consistent basis, an increasing funded ratio would typically indicate progress in meeting the obligations of the system. In most cases, other measures should also be considered in a trend assessment. These may include the trend in the length of the amortization period, the required contribution rate, percentage of required contributions funded, and the unfunded actuarial liability as a percentage of payroll. Focusing solely on any one measure as the indication of funding progress is an over-simplification of a complex and dynamic system.

Another of those additional metrics is an outlook on the cash flow as a percentage of assets for the System. Most retirement systems are funded with an advance-funding mechanism, meaning contributions and investment earnings are earned during a member's active lifetime in order to pay for the benefit payments during his retirement years. Many mature retirement systems, like PERS, have negative cash flow, where benefit payments paid out of the trust are more than the contributions being collected by employers and employees.

For the fiscal year ending June 30, 2022, we are projecting PERS to have a negative cash flow of approximately $1.60 Billion (benefit payments of $3.36 Billion and contributions of $1.76 Billion). With a market value of assets of $35.2 Billion as of June 30, 2021, the cash flow as a percentage of assets is estimated to be negative 4.53% for the 2022 fiscal year. While the market value of assets is assumed to earn 7.55% each year, the difference between the investment return assumption and the negative cash flow percentage is positive, meaning assets are projected to grow for the 2022 fiscal year. When assets do not earn a positive return enough to cover this negative cash flow percentage, assets are expected to decline for the year. If the

Section X: Cash Flow Projections

negative cash flow percentage does not grow more than the assumed investment return assumption, the System's assets will continue to increase, and sustainability of the plan may be achieved.

The tables on the following two pages demonstrate the open group projection of cash flow on the baseline assumption and then a sensitivity analysis, using a one-year investment return of negative 7.00% for the fiscal year ending June 30, 2022. This demonstrates the projection of this metric if PERS experiences one significant bad investment year in one of the next five years without a correction in the market. As can be seen from the table on page 37, the cash flow as a percentage of market value of assets does not get more than negative 5.65% on the baseline assumption, meaning that PERS' assets should continue to increase as long as all baseline actuarial assumptions are met. However, if there is a significant negative investment experience in one of the next five years (as seen on the table on page 38), the negative cash flow could be significantly more than the investment experience of the Plan and PERS' assets may decrease at some point during the projection period.

This metric will continue to be monitored as part of the funding policy under the baseline assumptions to ensure the continued growth of PERS' assets during the projection period.

Section X: Cash Flow Projections

Mississippi PERS
30-year Open Group Projection of Cash Flow
PERS Plan
Based on June 30, 2021 Valuation Results

Projection of Cash Flow

Contribution Methodology: Employee and Employer Contributions

Investment Return Methodology: As Programmed

Valuation Year Beginning July 1	Expected Short-term Investment Return	Valuation Annual Payroll	Market Value of Assets July 1	Total Contributions	Projected Benefit Payments	Ratio of Cash Flow to MVA	Expected Investment Return	Net Cash Flow	Market Value of Assets June 30	Valuation Year Ending June 30
2021	7.55%	6,546,352,060	35,216,597,000	1,762,801,683	(3,359,217,941)	-4.53%	2,599,684,841	1,003,268,583	36,219,865,583	2022
2022	7.55%	6,623,241,507	36,219,865,583	1,783,506,473	(3,496,958,156)	-4.73%	2,671,093,916	957,642,233	37,177,507,816	2023
2023	7.55%	6,738,532,363	37,177,507,816	1,814,551,995	(3,597,778,724)	-4.80%	2,740,809,821	957,583,092	38,135,090,908	2024
2024	7.55%	6,866,744,784	38,135,090,908	1,849,077,035	(3,727,736,796)	-4.93%	2,809,570,294	930,910,533	39,066,001,441	2025
2025	7.55%	7,002,983,257	39,066,001,441	1,885,763,331	(3,858,726,277)	-5.05%	2,876,358,865	903,395,920	39,969,397,361	2026
2026	7.55%	7,146,637,892	39,969,397,361	1,924,446,652	(3,984,363,118)	-5.15%	2,941,342,485	881,426,018	40,850,823,379	2027
2027	7.55%	7,297,992,380	40,850,823,379	1,965,203,388	(4,111,199,327)	-5.25%	3,004,699,772	858,703,833	41,709,527,212	2028
2028	7.55%	7,455,106,143	41,709,527,212	2,007,510,982	(4,235,474,567)	-5.34%	3,066,493,931	838,530,346	42,548,057,558	2029
2029	7.55%	7,618,783,465	42,548,057,558	2,051,586,011	(4,363,088,342)	-5.43%	3,126,706,763	815,204,433	43,363,261,991	2030
2030	7.55%	7,789,969,069	43,363,261,991	2,097,682,871	(4,481,315,828)	-5.50%	3,185,581,308	801,948,351	44,165,210,342	2031
2031	7.55%	7,966,193,581	44,165,210,342	2,145,136,607	(4,597,868,446)	-5.55%	3,243,567,386	790,835,548	44,956,045,889	2032
2032	7.55%	8,147,802,749	44,956,045,889	2,194,040,324	(4,712,930,287)	-5.60%	3,300,823,440	781,933,477	45,737,979,367	2033
2033	7.55%	8,334,673,725	45,737,979,367	2,244,360,941	(4,823,942,803)	-5.64%	3,357,609,984	778,028,121	46,516,007,488	2034
2034	7.55%	8,527,701,336	46,516,007,488	2,296,339,416	(4,926,785,479)	-5.65%	3,414,465,919	784,019,856	47,300,027,344	2035
2035	7.55%	8,729,583,082	47,300,027,344	2,350,702,132	(5,022,341,678)	-5.65%	3,472,132,658	800,493,113	48,100,520,457	2036
2036	7.55%	8,939,216,358	48,100,520,457	2,407,152,181	(5,106,263,642)	-5.61%	3,531,551,692	832,440,231	48,932,960,688	2037
2037	7.55%	9,160,028,617	48,932,960,688	2,466,612,506	(5,178,739,368)	-5.54%	3,593,918,537	881,791,675	49,814,752,363	2038
2038	7.55%	9,392,059,470	49,814,752,363	2,529,093,774	(5,238,783,901)	-5.44%	3,660,584,122	950,893,995	50,765,646,358	2039
2039	7.55%	9,634,707,205	50,765,646,358	2,594,433,956	(5,288,602,941)	-5.31%	3,732,951,881	1,038,782,896	51,804,429,254	2040
2040	7.55%	9,887,092,368	51,804,429,254	2,662,396,233	(5,330,600,077)	-5.15%	3,812,342,340	1,144,138,496	52,948,567,750	2041
2041	7.55%	10,147,668,629	52,948,567,750	2,732,564,208	(5,369,677,744)	-4.98%	3,899,877,101	1,262,763,565	54,211,331,315	2042
2042	7.55%	10,414,671,719	54,211,331,315	2,804,462,800	(5,411,719,917)	-4.81%	3,996,322,324	1,389,065,208	55,600,396,523	2043
2043	7.55%	10,687,364,330	55,600,396,523	2,877,893,467	(5,451,136,547)	-4.63%	4,102,457,415	1,529,214,335	57,129,610,858	2044
2044	7.55%	10,967,171,358	57,129,610,858	2,953,239,903	(5,489,602,670)	-4.44%	4,219,279,998	1,682,917,231	58,812,528,089	2045
2045	7.55%	11,255,084,749	58,812,528,089	3,030,769,221	(5,527,914,538)	-4.25%	4,347,793,772	1,850,648,455	60,663,176,544	2046
2046	7.55%	11,550,804,529	60,663,176,544	3,110,400,644	(5,563,194,380)	-4.04%	4,489,161,540	2,036,367,803	62,699,544,347	2047
2047	7.55%	11,855,827,168	62,699,544,347	3,192,537,140	(5,597,901,614)	-3.84%	4,644,665,187	2,239,300,713	64,938,845,060	2048
2048	7.55%	12,170,408,524	64,938,845,060	3,277,247,607	(5,631,635,970)	-3.63%	4,815,621,727	2,461,233,364	67,400,078,424	2049
2049	7.55%	12,494,670,376	67,400,078,424	3,364,564,839	(5,665,244,701)	-3.41%	5,003,435,453	2,702,755,591	70,102,834,015	2050
2050	7.55%	12,828,865,987	70,102,834,015	3,454,557,033	(5,700,438,866)	-3.20%	5,209,524,488	2,963,642,655	73,066,476,670	2051
2051	7.55%	13,171,882,512	73,066,476,670	3,546,924,523	(5,730,668,190)	-2.99%	5,435,582,545	3,251,838,878	76,318,315,548	2052

Section X: Cash Flow Projections

Mississippi PERS
30-year Open Group Projection of Cash Flow
PERS Plan
Based on June 30, 2021 Valuation Results

Projection of Cash Flow

Contribution Methodology:	Employee and Employer Contributions
Investment Return Methodology:	As Programmed

Valuation Year Beginning July 1	Expected Short-term Investment Return	Valuation Annual Payroll	Market Value of Assets July 1	Total Contributions	Projected Benefit Payments	Ratio of Cash Flow to MVA	Expected Investment Return	Net Cash Flow	Market Value of Assets June 30	Valuation Year Ending June 30
2021	-7.00%	6,546,352,060	35,216,597,000	1,762,801,683	(3,359,217,941)	-4.53%	(2,408,273,618)	(4,004,689,876)	31,211,907,124	2022
2022	7.55%	6,623,241,507	31,211,907,124	1,783,506,473	(3,496,958,156)	-5.49%	2,292,993,052	579,541,369	31,791,448,493	2023
2023	7.55%	6,738,532,363	31,791,448,493	1,814,551,995	(3,597,778,724)	-5.61%	2,334,162,342	550,935,613	32,342,384,106	2024
2024	7.55%	6,866,744,784	32,342,384,106	1,849,077,035	(3,727,736,796)	-5.81%	2,372,220,931	493,561,170	32,835,945,276	2025
2025	7.55%	7,002,983,257	32,835,945,276	1,885,763,331	(3,858,726,277)	-6.01%	2,405,989,625	433,026,680	33,268,971,956	2026
2026	7.55%	7,146,637,892	33,268,971,956	1,924,446,652	(3,984,363,118)	-6.19%	2,435,460,367	375,543,900	33,644,515,856	2027
2027	7.55%	7,297,992,380	33,644,515,856	1,965,203,388	(4,111,199,327)	-6.38%	2,460,623,554	314,627,615	33,959,143,471	2028
2028	7.55%	7,455,106,143	33,959,143,471	2,007,510,982	(4,235,474,567)	-6.56%	2,481,339,959	253,376,374	34,212,519,845	2029
2029	7.55%	7,618,783,465	34,212,519,845	2,051,586,011	(4,363,088,342)	-6.76%	2,497,373,665	185,871,335	34,398,391,180	2030
2030	7.55%	7,789,969,069	34,398,391,180	2,097,682,871	(4,481,315,828)	-6.93%	2,508,733,562	125,100,605	34,523,491,785	2031
2031	7.55%	7,966,193,581	34,523,491,785	2,145,136,607	(4,597,868,446)	-7.10%	2,515,617,635	62,885,797	34,586,377,581	2032
2032	7.55%	8,147,802,749	34,586,377,581	2,194,040,324	(4,712,930,287)	-7.28%	2,517,913,483	(976,480)	34,585,401,102	2033
2033	7.55%	8,334,673,725	34,585,401,102	2,244,360,941	(4,823,942,803)	-7.46%	2,515,590,325	(63,991,538)	34,521,409,564	2034
2034	7.55%	8,527,701,336	34,521,409,564	2,296,339,416	(4,926,785,479)	**-7.62%**	2,508,873,776	(121,572,287)	34,399,837,277	2035
2035	7.55%	8,729,583,082	34,399,837,277	2,350,702,132	(5,022,341,678)	**-7.77%**	2,498,168,308	(173,471,237)	34,226,366,040	2036
2036	7.55%	8,939,216,358	34,226,366,040	2,407,152,181	(5,106,263,642)	**-7.89%**	2,484,053,033	(215,058,428)	34,011,307,612	2037
2037	7.55%	9,160,028,617	34,011,307,612	2,466,612,506	(5,178,739,368)	**-7.97%**	2,467,333,730	(244,793,132)	33,766,514,480	2038
2038	7.55%	9,392,059,470	33,766,514,480	2,529,093,774	(5,238,783,901)	**-8.02%**	2,448,942,162	(260,747,965)	33,505,766,515	2039
2039	7.55%	9,634,707,205	33,505,766,515	2,594,433,956	(5,288,602,941)	**-8.04%**	2,429,830,953	(264,338,032)	33,241,428,483	2040
2040	7.55%	9,887,092,368	33,241,428,483	2,662,396,233	(5,330,600,077)	**-8.03%**	2,410,835,782	(257,368,062)	32,984,060,421	2041
2041	7.55%	10,147,668,629	32,984,060,421	2,732,564,208	(5,369,677,744)	**-8.00%**	2,392,556,798	(244,556,738)	32,739,503,683	2042
2042	7.55%	10,414,671,719	32,739,503,683	2,804,462,800	(5,411,719,917)	**-7.96%**	2,375,199,338	(232,057,778)	32,507,445,905	2043
2043	7.55%	10,687,364,330	32,507,445,905	2,877,893,467	(5,451,136,547)	**-7.92%**	2,358,939,643	(214,303,437)	32,293,142,468	2044
2044	7.55%	10,967,171,358	32,293,142,468	2,953,239,903	(5,489,602,670)	**-7.85%**	2,344,126,635	(192,236,132)	32,100,906,336	2045
2045	7.55%	11,255,084,749	32,100,906,336	3,030,769,221	(5,527,914,538)	**-7.78%**	2,331,066,329	(166,078,988)	31,934,827,348	2046
2046	7.55%	11,550,804,529	31,934,827,348	3,110,400,644	(5,563,194,380)	**-7.68%**	2,320,171,175	(132,622,562)	31,802,204,786	2047
2047	7.55%	11,855,827,168	31,802,204,786	3,192,537,140	(5,597,901,614)	**-7.56%**	2,311,916,050	(93,448,424)	31,708,756,362	2048
2048	7.55%	12,170,408,524	31,708,756,362	3,277,247,607	(5,631,635,970)	-7.43%	2,306,750,030	(47,638,333)	31,661,118,029	2049
2049	7.55%	12,494,670,376	31,661,118,029	3,364,564,839	(5,665,244,701)	-7.27%	2,305,143,943	4,464,081	31,665,582,110	2050
2050	7.55%	12,828,865,987	31,665,582,110	3,454,557,033	(5,700,438,866)	-7.09%	2,307,511,969	61,630,136	31,727,212,246	2051
2051	7.55%	13,171,882,512	31,727,212,246	3,546,924,523	(5,730,668,190)	-6.88%	2,314,468,081	130,724,414	31,857,936,660	2052

Section XI: Sensitivity Analysis

Sensitivity Analysis

Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from expected. Actuarial valuations include the risk that actual future measurements will deviate from expected future measurements due to actual experience that is different than the actuarial assumptions. The primary areas of risk in this actuarial valuation are.

- Investment Risk – the potential that actual investment returns will be different than expected.
- Longevity and Other Demographic Risks – the potential that mortality or other demographic experience will be different than expected.
- Interest Rate Risk – To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results.
- Contribution Risk – The potential that actual contributions are different than the fixed contribution rates.

Section XI: Sensitivity Analysis

Investment Risk

In this section of the report, we will demonstrate the variability in achieving funding goals based on sensitivity around the three key variables listed above. Earlier in this section, we reviewed the projections if the long-term investment return assumption was lowered to rates below 7.55% (7.25% and 7.00%). In this section, we keep the long-term investment return assumption at 7.55% but review the sensitivity of short-term investment returns as a single year event (and then 7.55% for all years thereafter) and simulate the next 10-year periods of returns (and then 7.55% for all years thereafter).

Projected Funded Ratio in 2047

Single Year Event	
• 1.55% in 2022	74.5%
• 3.55% in 2022	80.8%
• 5.55% in 2022	87.2%
• **7.55% in 2022 (Baseline)**	**93.5%**
• 9.55% in 2022	99.8%
• 11.55% in 2022	106.2%
• 13.55% in 2022	112.5%
• Negative 5% in 2022	53.8%
• Simulate 2008 loss using -15% in 2022	22.1%
Average Returns over next 10-Year Period (Simulated returns using mean and standard deviations from PERS' Investment Consultant's Capital Market Assumptions)*	
• 6.00%	55.9%
• 7.00%	80.1%
• 8.00%	112.7%

* *6.00% Average Returns over the next 10-Year Period: 7.04%, 10.32%, 2.25%, 5.45%, 8.52%, 0.00%, 5.44%, 11.49%,-7.04%, 18.53%*
7.00% Average Returns over the next 10-Year Period: 3.61%, 20.67%,-0.02%, 11.58%,-4.84%, 8.13%, 18.10%, 2.04%, 0.83%, 12.67%
8.00% Average Returns over the next 10 Year Period: 9.00%, 9.01%, 16.24%, 4.84%, 16.62%, 6.78%,-3.74%, 6.19%, 18.57%,-1.19%

Section XI: Sensitivity Analysis

As can be seen from the projected funded ratios on the table above, the sensitivity of short-term investment returns could have a significant impact to the funding of PERS in the long-term, especially another repeat of the Great Recession of 2008. We believe it demonstrates the importance of these continued projection reports and the continued monitoring of this sensitivity analysis because short-term differences in investment returns can have a major impact on the projection of funded ratios.

Section XI: Sensitivity Analysis

Demographic Risk

While actual investment returns compared to that assumed is the most critical driver of funding, many other assumptions are used in the actuarial projections to review sensitivity, such as population growth and wage inflation. Variances in these other assumptions over the long-term may also have an impact on the funding of the Plan.

For PERS, there has been a significant decline in active membership since 2008. In the baseline projections we assume a static population, meaning the active membership will be the same in each of the projections than it is in 2021. For sensitivity analysis, we have performed the projections assuming both a 0.25% and 0.50% increase and decrease each year around this static assumption. For PERS, a 0.50% decrease in active population each year of the projection results in the active population dropping to 120,000 (it is currently near 145,000). In the table below, we review these alternatives to the static active membership growth:

Projected Funded Ratio in 2047

Active Membership Growth	
• Increase 0.50% each year	100.7%
• Increase 0.25% each year	97.1%
• **Static Population (Baseline Assumption)**	**93.5%**
• Decrease 0.25% each year	90.0%
• Decrease 0.50% each year	86.5%

Section XI: Sensitivity Analysis

Assumption Risk

We also performed a sensitivity analysis for the wage inflation assumption. As a result of the experience study presented in April 2021, the Board adopted a reduction in the wage inflation assumption from 3.00% to 2.65%, which is 0.25% above the price inflation of 2.40%. Wage inflation is major component of the underlying salary increase assumptions, as well as the amortization of the Unfunded Accrued Liability which is based on the level percent of payroll amortization methodology.

In the table below, the second scenario lowers the discount rate to 7.30% but does not change the price inflation or wage inflation. The third scenario lowers the price and wage inflation by 0.30% and lowers the discount rate to 7.30%.

Projected Funded Ratio in 2047

Scenario	Price Inflation	Discount Rate	Wage Inflation	
1 - Baseline	2.40%	7.55%	2.65%	**93.5%**
2	2.40%	7.30%	2.65%	79.8%
3	2.10%	7.30%	2.35%	79.4%

Section XI: Sensitivity Analysis

Contribution Risk

To demonstrate the contribution risk of making the Fixed Contribution Rates (FCR) for PERS, we have calculated the projected funded ratios if the FCRs were 1% higher or 1% lower than the current rates for all future years beginning on July 1, 2023.

Projected Funded Ratio in 2047

Change in Fixed Contribution Rate (FCR)	
• Baseline	**93.5%**
• 1.00% increase in FCR	101.0%
• 1.00% decrease in FCR	86.0%

Over a long projection period, gains and losses due to population growth and wage inflation assumptions will be relatively concentrated around the expected value of these assumptions. So, the impact of the sensitivity around these baseline assumptions is small when compared to the investment return assumption.

Section XII: Projection Summary

Utilizing the funding policy for PERS and with a fixed contribution rate as a percentage of annual compensation of 17.40% of payroll, the projection results for 2021 show that the Plan will have a "Green" light status for the funded ratio and cash flow metrics and have a "Yellow" status for the Actuarially Determined Contribution (ADC) metric within the next few years.

Metric	2021 Baseline Projection (7.55%)	2021 Status	2020 Baseline Projection (7.75%)	2020 Status
Funding Ratio in 2047	93.5%	**Green**	67.6%	**Yellow**
Cash Flow as a Percentage of Assets	-5.65%	**Green**	-6.20%	**Yellow**
ADC/FCR Ratio from 2021 Valuation	123.5%	**Red**	112.0%	**Red**
ADC/FCR Ratio from 2025 Valuation	100.9%	**Yellow**	122.0%	**Red**

Although the ADC/FCR ratio is in "Red Status" for the 2021 valuation and per the Funding Policy, the actuary should recommend an increase in the Fixed Contribution Rate, the ADC/FCR ratio is projected to decrease as the investment gains from the 2021 valuation are fully recognized. This is seen as the ADC/FCR ratio is projected to be approximately 101% in the 2025 valuation and in the "Yellow Status". Therefore, there is no recommendation for an increase in the Fixed Contribution Rate of 17.40% of annual compensation at this time. However, the Board should continue to monitor these projection results during the fiscal year as actual investment and cash flow experience is known.

Schedule A: Development of Assets

($ thousands)

	Valuation Date June 30:	2020	2021	2022	2023	2024	2025
A.	Actuarial Value Beginning of Year	$28,024,611	$28,629,205				
B.	Market Value End of Year	27,827,394	35,216,597				
C.	Market Value Beginning of Year	28,206,602	27,827,394				
D.	Cash Flow						
	D1. Contributions	1,766,516	1,764,555				
	D2. Other Revenue	0	0				
	D3. Benefit Payments	(2,878,073)	(2,995,255)				
	D4. Refunds	(104,851)	(101,044)				
	D5. Administrative Expenses	(19,757)	(15,691)				
	D6. Net	(1,236,165)	(1,347,435)				
E.	Investment Income						
	E1. Market Total: B.-C.-D6.	856,957	8,736,638				
	E2. Assumed Rate	7.75%	7.75%				
	E3. Amount for Immediate Recognition	2,138,110	2,104,410				
	E4. Amount for Phased-In Recognition	(1,281,153)	6,632,228				
F.	Phased-In Recognition of Investment Income						
	F1. Current Year: 0.20*E4.	(256,231)	1,326,446				
	F2. First Prior Year	(81,275)	(256,231)	1,326,446			
	F3. Second Prior Year	73,801	(81,275)	(256,231)	1,326,446		
	F4. Third Prior Year	319,330	73,801	(81,275)	(256,231)	1,326,446	
	F5. Fourth Prior Year	(352,976)	319,330	73,801	(81,275)	(256,231)	1,326,450
	F6. Total Recognized Investment Gain	(297,351)	1,382,071	1,062,741	988,940	1,070,215	1,326,450
G.	Actuarial Value End of Year:						
	A.+D6.+E3.+F6.	$28,629,205	$30,768,251				
H.	Difference Between Market & Actuarial Values	$801,811	$(4,448,346)	$(3,385,605)	$(2,396,665)	$(1,326,450)	$0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.

Schedule A: Development of Assets

	Asset Summary June 30, 2021 ($ in Thousands)	
	Market Value	**Actuarial Value**
(1) Assets at June 30, 2020	$27,827,394	$28,629,205
(2) Contributions and Misc. Revenue	1,764,555	1,764,555
(3) Investment Increment	8,736,638	3,486,481
(4) Benefit Payments	(2,995,255)	(2,995,255)
(5) Refunds	(101,044)	(101,044)
(6) Administrative Expenses	(15,691)	(15,691)
(7) Assets at June 30, 2021 (1) + (2) + (3) + (4) + (5) + (6)	$35,216,597	$30,768,251
(8) Net Investment Return [2 x (3)] / [(7) + (1) – (3)]	32.17%	12.47%

Per the Board's funding policy, since the actual market value of asset return for the fiscal year ending June 30, 2021 was more than the current assumption, the long-term investment return assumption was reduced to 7.55 percent for the 2021 valuation. Please see the Funding Policy in Schedule E for an explanation of this process.

Schedule A: Development of Assets

The net investment returns for the past five valuations are summarized in the table below:

Period Ending June 30	Market Value	Actuarial Value
2017	14.9%	9.3%
2018	9.6%	9.2%
2019	6.3%	6.8%
2020	3.1%	6.7%
2021	32.2%	12.5%

Since 1986, PERS' assets have experienced better than assumed investment returns overall. As you can see from the table below, for the period ending June 30, 2021, the annualized returns for each rolling period is above the current assumption of 7.55%. The historical rolling returns are as follows (these returns are gross returns):

Period Ending June 30	10-Year Annualized Rate of Return	20-Year Annualized Rate of Return	25-Year Annualized Rate of Return	30-Year Annualized Rate of Return
2018	7.4%	6.2%	7.8%	8.5%
2019	10.5	6.0	8.1	8.3
2020	9.4	5.8	7.5	8.0
2021	10.1	7.7	8.1	8.7

INTEREST RATE: 7.55% per annum, compounded annually (net of investment expense only). The expected return on assets consists of 2.40% price inflation and 5.15% real rate of return.

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed rates of separation from active service are as follows:

	Annual Rates of			
	Death*		Disability	
Age	Male	Female	Male	Female
20	0.0483%	0.0126%	0.006%	0.006%
25	0.0567	0.0189	0.011	0.011
30	0.0630	0.0259	0.016	0.016
35	0.0714	0.0350	0.020	0.020
40	0.0893	0.0483	0.090	0.050
45	0.1218	0.0665	0.170	0.100
50	0.1764	0.0917	0.260	0.170
55	0.2594	0.1274	0.370	0.290
60	0.3980	0.1757	0.310	0.250
65	0.6353	0.2429	0.280	0.220
70	1.1655	0.4739	0.200	0.150
75	2.1389	0.9247	0.200	0.150
79	3.4755	1.5785	0.200	0.150

* Adjusted Base Rates

AGE	Annual Rates of Withdrawal* Years of Service											
	0		5		10		15		20		24	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
20	40.00%	45.00%	13.00%	14.00%								
25	34.50	37.00	13.00	12.50	9.00%	9.00%						
30	34.00	35.00	12.00	12.50	6.50	6.50	5.00%	5.00%				
35	33.75	30.00	12.00	12.00	6.50	6.25	4.00	4.25	4.00%	3.50%		
40	33.50	28.00	9.50	9.50	6.00	6.00	4.00	4.25	4.00	3.50	4.00%	3.50%
45	32.00	27.50	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
50	28.00	27.50	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
55	25.00	25.00	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
60	25.00	25.00	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50

*Rates stop at eligibility for retirement. For Tier 4, rates at 24 years of service are extended out to 29 years of service.

Annual Rates of Service Retirements				
	Male		Female	
Age	Under 25 Years of Service*	25 Years of Service and Over*	Under 25 Years of Service*	25 Years of Service and Over*
45		25.00%		21.00%
50		19.00		14.50
55		18.00		19.75
60	11.25%	19.00	13.25%	21.50
62	21.00	29.00	18.75	34.00
65	25.50	32.00	30.00	42.25
70	19.50	26.00	23.00	30.00
75	22.00	24.00	21.50	25.00
80	100.00	100.00	100.00	100.00

*For Tier 4 members, 30 years of service.

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

		Annual Rates of	
Service	Merit & Seniority	Base (Economy)	Increase Next Year
0	15.25%	2.65%	17.90%
1	5.25	2.65	7.90
2	2.75	2.65	5.40
3	1.75	2.65	4.40
4	1.25	2.65	3.90
5-7	0.75	2.65	3.40
8-27	0.25	2.65	2.90
28 and Over	0.00	2.65	2.65

DEATH AFTER RETIREMENT:

*Service Retirees**

Membership Table	Adjustment to Rates	Projection Scale
PubS.H-2010(B) Retiree	Male: 95% up to age 60, 110% for ages 61 to 75, and 101% for ages above 77 Female: 84% up to age 72, 100% for ages above 76	MP-2020

*Contingent Annuitants**

Membership Table	Adjustment to Rates	Projection Scale
PubS.H-2010(B) Contingent Annuitant	Male: 97% for all ages Female: 110% for all ages	MP-2020

*Disabled Retirees**

Membership Table	Adjustment to Rates	Projection Scale
PubG.H-2010 Disabled	Male: 134% for all ages Female: 121% for all ages	MP-2020

* Please note that none of the recommended tables have any setbacks or setforwards.

Representative values of the assumed rates of death after retirement are as follows:

	Rates of Death After Retirement*					
	Service Retirees		Contingent Annuitants		Disabled Retirees	
AGE	Male	Female	Male	Female	Male	Female
45	0.2983%	0.0983%	0.7692%	0.5104%	1.4660%	1.1919%
50	0.4190%	0.1638%	0.8837%	0.6556%	2.2780%	1.7956%
55	0.5197%	0.2738%	1.0156%	0.7843%	2.9855%	2.1078%
60	0.7771%	0.4578%	1.2397%	1.0131%	3.6475%	2.4684%
65	1.3211%	0.7652%	1.6286%	1.4157%	4.5426%	2.9730%
70	2.1758%	1.2785%	2.4153%	1.9998%	5.8129%	3.8127%
75	3.8566%	2.3659%	3.7209%	3.0052%	7.6661%	5.2683%
80	6.2640%	4.2530%	5.7734%	4.7289%	10.8125%	7.7779%
85	11.0605%	7.3240%	9.2228%	7.8562%	15.7785%	11.9947%
90	17.6902%	12.6470%	14.6577%	13.4530%	22.7224%	17.5353%

*Adjusted Base Rates

PAYROLL GROWTH: 2.65% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.28% of payroll.

TIMING OF DECREMENTS AND PAY INCREASES: Middle of Year.

ACTIVE MEMBER DISABILITY ASSUMPTION: 12% of active member disabilities are assumed to be in the line of duty and 88% of active member disabilities are assumed to not be in the line of duty.

ACTIVE MEMBER DEATH ASSUMPTION: 4% of active deaths are assumed to be in the line of duty and 96% of active member deaths are assumed to not be in the line of duty.

ACTIVE MEMBER WITHDRAWAL ASSUMPTION: 60% of vested participants who terminate before retirement elect to receive a deferred benefit upon attaining the eligibility requirements for retirement. They are assumed to commence their benefit at age 60 for Tiers 1, 2 and 3 and age 62 for Tier 4. The remaining 40% elect to withdraw their contributions.

FINAL AVERAGE COMPENSATION: 0.25% load on the final average compensation produced by our valuation software.

MARRIAGE ASSUMPTION: 85% married with the husband three years older than his wife.

UNUSED SICK LEAVE: Assumed 0.50 years at retirement.

MILITARY SERVICE: Assumed that participants will have on average 0.25 years of military service at retirement.

MAXIMUM COVERED EARNINGS ASSUMPTION GROWTH: 2.65%

AGE-LIMITED DISABILITY DECREMENTS: Assumed to turn off at age 60.

DEFERRED VESTEDS: Deferred vested benefits are assumed to commence at age 60 for Tiers 1, 2 and 3 and at age 65 for Tier 4.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%.

ASSET VALUATION METHOD: Actuarial value, as developed in Schedule A. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

Schedule B: Statement of Actuarial Assumptions & Methods

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability, or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.55%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of PERS are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.

The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the PERS. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

Schedule C: Summary of Main Benefit & Contribution Provisions

The following summary presents the main benefit and contribution provisions of the System in effect July 1, 2021, as interpreted in preparing the actuarial valuation.

DEFINITIONS

Average Compensation	Average annual covered earnings of an employee during the four highest years of service. To determine the four highest years, PERS considers these scenarios: • Four highest fiscal years of earned compensation; • Four highest calendar years of earned compensation; • Combination of four highest fiscal and calendar years of earned compensation that do not overlap; or • Final 48 months of earned compensation prior to termination of employment.
Covered Earnings	Gross salary not in excess of the maximum amount on which contributions were required.
Fiscal Year	Year commencing on July 1 and ending June 30.
Credited Service	Service while a contributing member plus additional service as described below.
Unused Sick and Vacation Leave	Service credit is provided at no charge to members for unused sick and vacation time that has accrued at the time of retirement. A payment of up to 240 hours of leave may be used in the Average Compensation definition.
Additional Service	Additional service credit may be granted for service prior to February 1, 1953, active duty military service, out-of-state service, professional leave and non-covered and retroactive service

The maximum covered earnings for employers and employees over the last ten years are as follows:

**EMPLOYER AND EMPLOYEE RATES OF CONTRIBUTION
AND MAXIMUM COVERED EARNINGS**

Fiscal Date From	Fiscal Date To	Employer Rate	Maximum Covered Earnings	Employee Rate	Maximum Covered Earnings
7/1/10	6/30/11	12.00%	$245,000	9.00%	$245,000
7/1/11	12/31/11	12.00	245,000	9.00	245,000
1/1/12	6/30/12	12.93	245,000	9.00	245,000
7/1/12	6/30/13	14.26	250,000	9.00	250,000
7/1/13	6/30/14	15.75	255,000	9.00	255,000
7/1/14	6/30/15	15.75	260,000	9.00	260,000
7/1/15	6/30/17	15.75	265,000	9.00	265,000
7/1/17	6/30/18	15.75	270,000	9.00	270,000
7/1/18	6/30/19	15.75	275,000	9.00	275,000
7/1/19	6/30/20	17.40	280,000	9.00	280,000
7/1/20	6/30/21	17.40	285,000	9.00	285,000
7/1/21	6/30/22	17.40	290,000	9.00	290,000

BENEFITS

Superannuation Retirement

Condition for Retirement	A retirement allowance is paid upon the request of any member who retires and has attained age 60 and completed at least eight years (4 years if hired prior to July 1, 2011) of membership service. A retirement allowance may also be paid upon the completion of 25 years of creditable service for members hired prior to July 1, 2011 or upon the completion of 30 years of creditable service for members hired on or after July 1, 2011.
Amount of Allowance	The annual retirement allowance payable to a member who retires is equal to: 1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus 2. For a member hired prior to July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 25 years of creditable service plus 2-1/2% for each year of creditable service over 25 years. 3. For a member hired on or after July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 30 years of creditable service plus 2-1/2% for each year of creditable service over 30 years. There will be an actuarial reduction for each year of creditable service below 30 or for each year of age below age 65, whichever is less. For members hired prior to July 1, 2011, the minimum allowance is $120 for each year of creditable service.

Early Retirement

Condition for Retirement	For members hired on or after July 1, 2011, an actuarially reduced retirement allowance is paid upon the request of any member who retires with less than 30 years of creditable service.
Amount of Allowance	The annual actuarially reduced retirement allowance is equal to the benefit in the section above reduced for each year of creditable service below 30 or for each year in age below age 65, whichever is less.

Deferred Vested

Condition for Termination

Any member who withdraws from service prior to his or her attainment of age 60 and who has completed at least eight years (4 years if hired prior to July 1, 2007) of membership service is entitled to receive, in lieu of a refund of his or her accumulated contributions, a retirement allowance.

Amount of Allowance

The annual retirement allowance payable to a member who terminates as a deferred vested payable at age 60 is equal to:

1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus
2. For a member hired prior to July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 25 years of creditable service plus 2-1/2% for each year of creditable service over 25 years.
3. For a member hired on or after July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 30 years of creditable service plus 2-1/2% for each year of creditable service over 30 years. There will be an actuarial reduction for each year of creditable service below 30 or for each year of age below age 65, whichever is less.

For members hired prior to July 1, 2011, the minimum allowance is $120 for each year of creditable service.

Disability Retirement

Condition for Retirement

A retirement allowance is paid to a member who is totally and permanently disabled, as determined by the Board of Trustees, and has accumulated eight or more years* of membership service.

* four years for those who entered the system before July 1, 2007

Amount of Allowance

For those who were active members prior to July 1, 1992, and did not elect the benefit structure outlined below, the annual disability retirement allowance payable is equal to a superannuation retirement allowance if the member has attained age 60, otherwise it is equal to a superannuation retirement allowance calculated as follows:

1. A member's annuity equal to the actuarial equivalent of his or her accumulated contributions at the time of retirement, plus
2. An employer's annuity equal to the amount that would have been payable had the member continued in service to age 60.

For those who become active members after June 30, 1992, and for those who were active members prior to July 1, 1992, who so elected, the following benefits are payable:

1. A temporary allowance equal to the greater of (a) 40% of average compensation plus 10% for each dependent child up to a maximum of 2, or (b) the member's accrued allowance. This temporary allowance is paid for a period of time based on the member's age at disability, as follows:

Age at Disability	Duration
60 and earlier	to age 65
61	to age 66
62	to age 66
63	to age 67
64	to age 67
65	to age 68
66	to age 68
67	to age 69
68	to age 70
69 and later	one year

For members hired prior to July 1, 2011, the minimum allowance is $120 per year of creditable service.

2. A deferred allowance commencing when the temporary allowance ceases equal to the greater of (a) the allowance the member would have received based on service to the termination age of the temporary allowance, but not more than 40% of average compensation, or (b) the member's accrued allowance.

For members hired prior to July 1, 2011, the minimum allowance is $120 per year of creditable service.

Effective July 1, 2004, a temporary benefit can be paid out of a member's accumulated contribution balance while the member is awaiting a determination for eligibility for disability benefits. Future disability payments, if any, would be offset by advanced payments made from the member's accumulated contributions.

Accidental Disability Retirement

Condition for Retirement	A retirement allowance is paid to a member who is totally and permanently disabled in the line of performance of duty.
Amount of Allowance	The annual accidental disability retirement allowance is equal to the allowance payable on disability retirement but not less than 50% of average compensation. There is no minimum benefit.

Accidental Death Benefit

Condition for Benefit	A retirement allowance is paid to a spouse and/or dependent children upon the death of an active member in the line of performance of duty.
Amount of Allowance	The annual retirement allowance is equal to 50% of average compensation payable to the spouse and 25% of average compensation payable to one dependent child or 50% to two or more children until age 19 (23 if a full time student). There is no minimum benefit.

Ordinary Death Benefit

Condition for Benefit	Upon the death of a member who has completed at least eight years* of membership service, a benefit is payable, in lieu of a refund of the member's accumulated contributions, to his or her spouse, if said spouse has been married to the member for not less than one year. *four years for those who entered the system before July 1, 2007.
Amount of Allowance	The annual retirement allowance payable to the lawful spouse of a vested member who dies is equal to the greater of (i) the allowance that would have been payable had the member retired and elected Option 2, reduced by an actuarially determined factor based on the number of years the member lacked in qualifying for unreduced retirement benefits, or (ii) a lifetime benefit equal to 20% of the deceased member's average compensation, but not less than $50 per month. In addition, a benefit is payable to dependent children until age 19 (23 if a full time student). The benefit is equal to the greater of 10% of average compensation or $50 per month for each dependent child up to 3.

Return of Contributions

Upon the withdrawal of a member without a retirement benefit, his or her contributions are returned to him or her, together with accumulated regular interest thereon.

Upon the death of a member before retirement, his or her contributions, together with the full accumulated regular interest thereon, are paid to his or her designated beneficiary, if any, otherwise, to his or her estate provided no other survivor benefits are payable.

Effective July 1, 2016, the interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent.

Normal Form of Benefit

The normal form of benefit (modified cash refund) is an allowance payable during the life of the member with the provision that upon his or her death the excess of his or her total contributions at the time of retirement over the total retirement annuity paid to him or her will be paid to his or her designated beneficiary.

Optional Benefits

A member upon retirement may elect to receive his or her allowance in one of the following forms which are computed to be actuarially equivalent to the applicable retirement allowance.

Option 1. Reduced allowance with the provision that if the pensioner dies before he receives the value of the member's annuity as it was at the time of retirement, the balance shall be paid to his or her beneficiary.

Option 2. Upon his or her death, his or her reduced retirement allowance shall be continued throughout the life of, and paid to, his or her beneficiary.

Option 3. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary and the other 50% of his or her reduced retirement allowance to some other designated beneficiary.

Option 4. Upon his or her death, 75% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4A. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4B. A reduced retirement allowance shall be continued throughout the life of the pensioner, but with the further guarantee of payment to the pensioner or his or her beneficiary for a specified number of years certain.

Option 4C. A member may elect any option with the added provision that the member shall receive, so far as possible, the same total amount annually (considering both PERS and Social Security benefits) before and after the earliest age at

which the member becomes eligible for a Social Security benefit. This option was only available to those who retired prior to July 1, 2004.

A member who elects Option 2, Option 4, or Option 4A at retirement may revert to the normal form of benefit if the designated beneficiary predeceases the retired member or if the retired member divorces the designated beneficiary. A member who elects the normal form of benefit or Option 1 at retirement may select Option 2, Option 4, or Option 4A to provide beneficiary protection to a new spouse if married after retirement.

A member hired prior to July 1, 2011 and who has at least 28 years of creditable service* or a member hired on or after July 1, 2011 who has at least 33 years of creditable service can select a partial lump-sum option at retirement. Under this option, the retiree has the option of taking a partial lump-sum distribution equal to 12, 24, or 36 times the base maximum monthly benefit. With each lump-sum amount, the base maximum monthly benefit will be actuarially reduced. A member selecting the partial lump-sum option may also select any of the regular options except Option 1, the prorated single-life annuity, and Option 4-C, the Social Security leveling provision. The benefit is then calculated using the new reduced maximum benefit as a starting point in applying the appropriate option factors for the reduction.

* or at least age 63 with four years of membership service for those who entered the system before July 1, 2007.

Post-Retirement Adjustments In Allowances

The allowances of retired members are adjusted annually by an amount equal to (a) 3% of the annual retirement allowance for each full fiscal year of retirement prior to the year in which the member reaches age 55*, plus (b) 3% compounded for each year thereafter beginning with the fiscal year in which the member turns age 55*.

*Age 60 for members hired on or after July 1, 2011

A prorated portion of the annual adjustment will be paid to the member, beneficiary, or estate of any member or beneficiary who is receiving the annual adjustment in a lump sum, but whose benefits are terminated between July 1 and December 1.

Schedule D: Detailed Tabulations of the Data

RECONCILIATION OF DATA RECEIVED FROM PERS

Reconciliation of Data received from PERS	Active File			Pensioner File			Total
	Active	Inactive NonVested	Inactive Vested	Retirees	Disableds	Survivors	
From PERS	148,990	65,885	15,309	93,583	6,391	12,243	342,401
Return to Active Status				(1)			(1)
Deceased			(16)	(5)		(3)	(24)
Certain Period Ended						(112)	(112)
Added Back			41	53	3	6	103
Pay less than $100	(1,084)	1,015	68				(1)
Not Contributing	(2,233)	1,810	374				(49)
Balance = 0		(679)					(679)
Status Change		(5)	(2)				(7)
In Retiree Status			(35)				(35)
In Disabled Status			(14)				(14)
Pending Retirees			1,150				1,150
Suspended Beneficiaries			12				12
For Valuation	145,673	68,026	16,887	93,630	6,394	12,134	342,744

Schedule D: Detailed Tabulations of the Data

STATUS RECONCILIATION FROM 2020 TO 2021

Reconciliation of Data from Last Year to This Year	Actives	Retirees	Disableds	Survivors	Inactives		Total
					Vested	Non-Vested	
As of June 30, 2020	149,855	91,642	6,471	11,768	16,436	62,211	338,383
Retirement	(3,350)	5,198	(1)		(1,846)	(1)	
Disabled	(160)	(7)	228		(59)	(2)	
Death with Survivor	(127)	(681)	(55)	1,072	(41)	(11)	157
Terminated Vested	(3,404)			(11)	3,478	(63)	
Terminated Non-Vested	(8,057)					8,057	
Return to Active Service	2,898	(44)			(653)	(2,201)	
Refunded	(5,444)				(388)	(2,837)	(8,669)
Death No Survivor	(35)	(2,483)	(249)	(593)	(13)	(5)	(3,378)
Benefit Ended				(108)	(5)		(113)
Removed/Cleanup					(26)	(72)	(98)
New	13,497						13,497
Pickups		5		6	4	2,950	2,965
As of June 30, 2021	145,673	93,630	6,394	12,134	16,887	68,026	342,744

Schedule D: Detailed Tabulations of the Data

Retirants & Beneficiaries as of June 30, 2021
Tabulated by Year of Retirement

Year of Retirement Ending June 30	No.	Total Annual Benefits, excluding COLA	COLA	Total Annual Benefits	Average Monthly Total Benefit
2021	5,100	$111,156,787	$121,074	$111,277,861	$1,818
2020	5,136	113,738,974	1,439,210	115,178,184	1,869
2019	5,279	115,275,439	4,928,243	120,203,682	1,898
2018	5,348	111,854,858	8,107,963	119,962,821	1,869
2017	5,249	107,234,557	11,065,326	118,299,883	1,878
2016	5,383	112,714,472	15,240,259	127,954,731	1,981
2015	4,986	100,794,219	17,090,568	117,884,787	1,970
2014	5,453	108,842,779	22,291,863	131,134,642	2,004
2013	5,181	103,124,979	24,906,166	128,031,145	2,059
2012	5,433	108,502,796	30,052,268	138,555,064	2,125
2011	5,295	107,653,844	34,130,030	141,783,874	2,231
2010	4,493	86,599,324	30,530,143	117,129,467	2,172
2009	3,761	71,369,077	28,088,746	99,457,823	2,204
2008	4,042	77,018,692	33,206,581	110,225,273	2,272
2007	3,763	69,542,614	32,785,604	102,328,218	2,266
2006	3,709	64,784,703	33,147,488	97,932,191	2,200
2005	3,367	60,613,292	33,752,501	94,365,793	2,336
2004	3,486	61,293,057	37,272,511	98,565,568	2,356
2003	3,168	55,379,478	36,144,376	91,523,854	2,408
2002	3,131	51,688,459	36,226,257	87,914,716	2,340
2001	2,928	49,309,983	36,972,426	86,282,409	2,456
2000	2,231	36,690,059	29,558,772	66,248,831	2,475
1999	1,905	29,784,155	25,573,275	55,357,430	2,422
1998	1,916	29,020,554	26,380,560	55,401,114	2,410
1997	1,848	26,678,974	25,841,261	52,520,235	2,368
1996	1,787	25,645,683	26,409,615	52,055,298	2,427
1995	1,397	18,442,504	20,059,252	38,501,756	2,297
1994	1,239	15,850,061	18,091,085	33,941,146	2,283
1993	1,274	17,066,009	20,770,477	37,836,486	2,475
1992	1,299	17,202,179	22,012,050	39,214,229	2,516
1991	705	8,596,938	11,760,286	20,357,224	2,406
1990	673	6,995,414	9,940,179	16,935,593	2,097
1989	248	2,250,245	3,343,040	5,593,285	1,879
1988	342	3,350,831	5,173,458	8,524,289	2,077
1987	432	4,613,142	7,798,140	12,411,282	2,394
1986 & Prior	1,171	8,386,124	16,207,550	24,593,674	1,750
Totals	112,158	$2,099,065,255	$776,418,603	$2,875,483,858	$2,136

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Type of Benefit

Benefits Payable June 30, 2021

Amount of Monthly Benefit**	Number of Rets.	Ret. Type 1*	Ret. Type 2*	Ret. Type 3*
$1-$500	21,614	16,049	851	4,714
501-1,000	22,168	16,747	2,108	3,313
1,001-1,500	19,581	16,119	1,612	1,850
1,501-2,000	16,596	14,687	952	957
2,001-2,500	12,540	11,528	458	554
2,501-3,000	7,627	7,147	204	276
3,001-3,500	4,836	4,549	91	196
3,501-4,000	2,635	2,470	58	107
4,001-4,500	1,674	1,577	36	61
4,501-5,000	897	855	9	33
Over 5,000	1,990	1,902	15	73
Totals	112,158	93,630	6,394	12,134

*Type of Retirement
1 – Retirement for Age & Service
2 – Disability Retirement
3 – Survivor Payment

**Reflects reduced benefit

Schedule of Retired Members by Option

Benefits Payable June 30, 2021

Amount of Monthly Benefit**	Number of Rets.	Life	Option 1	Option 2	Option 3	Option 4	Option 4A	Option 4B	Option 4C*	Option 5	PLSO 1 Year*	PLSO 2 Years*	PLSO 3 Years*
$1-$500	21,614	15,646	670	2,610	197	177	430	1,853	147	31	584	480	2,187
501-1,000	22,168	15,553	673	2,932	209	271	898	1,577	702	55	905	651	2,144
1,001-1,500	19,581	12,712	638	3,049	223	328	1,107	1,470	866	54	888	768	3,046
1,501-2,000	16,596	10,335	458	2,713	150	369	1,203	1,344	390	24	788	828	3,601
2,001-2,500	12,540	7,573	301	2,066	103	273	1,156	1,051	107	17	830	705	2,965
2,501-3,000	7,627	4,619	170	1,209	44	200	702	670	41	13	600	458	1,697
3,001-3,500	4,836	2,894	108	788	26	131	481	401	16	7	475	338	939
3,501-4,000	2,635	1,597	58	439	14	59	261	207	8	0	272	178	452
4,001-4,500	1,674	935	28	304	6	56	217	128	3	0	165	109	312
4,501-5,000	897	510	12	162	4	27	117	65	2	0	83	45	163
Over 5,000	1,990	966	22	452	8	102	292	148	2	0	165	87	309
Totals	112,158	73,340	3,138	16,724	984	1,993	6,864	8,914	2,284	201	5,755	4,647	17,815

Option Selected		
Life	-	Return of Contributions
Opt. 1	-	Return of Member's Annuity
Opt. 2	-	100% Survivorship
Opt. 3	-	50%/50% Dual Survivorship
Opt. 4	-	75% Survivorship
Opt. 4A	-	50% Survivorship
Opt. 4B	-	Years Certain & Life
Opt. 4C	-	Social Security Leveling *
Opt. 5	-	Pop-Up
PLSO	-	Partial Lump Sum Option*

*Included in other options
** Reflects reduced benefit

Schedule D: Detailed Tabulations of the Data

Retirant and Beneficiary Information June 30, 2021
Tabulated by Attained Ages

Attained Age	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20					416	$2,007,908	416	$2,007,908
20 – 24					203	1,240,273	203	1,240,273
25 – 29					99	901,506	99	901,506
30 – 34			2	35,046	115	1,284,068	117	1,319,114
35 – 39			44	725,205	195	2,194,111	239	2,919,316
40 – 44	9	191,014	123	2,263,966	271	3,203,680	403	5,658,660
45 – 49	491	14,256,968	277	5,412,490	363	4,190,354	1,131	23,859,812
50 – 54	2,669	81,495,228	590	12,284,770	519	7,041,056	3,778	100,821,054
55 – 59	5,404	172,021,539	1,002	21,066,308	707	9,866,545	7,113	202,954,392
60 – 64	13,307	351,703,844	1,292	27,127,097	1,039	16,789,920	15,638	395,620,861
65 – 69	20,775	542,100,170	1,290	26,388,680	1,367	25,427,109	23,432	593,915,959
70 – 74	21,692	583,691,370	969	19,066,978	1,795	36,295,718	24,456	639,054,066
75 – 79	13,934	375,679,766	457	9,506,587	1,632	35,177,175	16,023	420,363,528
80 – 84	8,505	223,569,360	232	4,005,004	1,534	37,097,466	10,271	264,671,830
85 – 89	4,381	111,539,833	95	1,526,522	1,129	27,763,342	5,605	140,829,697
90 – 94	1,926	48,732,703	19	299,839	576	13,015,815	2,521	62,048,357
95	170	4,111,692			44	960,140	214	5,071,832
96	127	3,093,151			44	1,227,484	171	4,320,635
97	84	1,818,816	1	16,185	21	554,616	106	2,389,617
98	50	1,516,949			17	422,434	67	1,939,383
99	27	517,832	1	21,556	22	481,509	50	1,020,897
100 & Over	79	1,940,641			26	614,520	105	2,555,161
Totals	93,630	$2,517,980,876	6,394	$129,746,233	12,134	$227,756,749	112,158	$2,875,483,858

Average Age:	70.6 years
Average Age at Retirement:	59.3 years
Average Age at Death:	80.4 years
Average Years Since Retirement:	12.3 years

Schedule D: Detailed Tabulations of the Data

Total Active Members as of June 30, 2021
Tabulated by Attained Ages and Years of Service

Attained Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Over	Total No.	Total Payroll
Under 20	310							310	$ 6,278,043
20 to 24	5,820	43						5,863	173,390,605
25 to 29	10,691	2,521	19					13,231	475,376,639
30 to 34	7,138	6,709	1,667	37				15,551	623,502,766
35 to 39	5,856	4,740	5,351	1,799	48			17,794	777,301,457
40 to 44	5,143	4,049	3,825	5,002	1,661	23		19,703	919,367,298
45 to 49	4,420	3,566	3,239	3,368	4,161	1,061	16	19,831	942,376,731
50 to 54	4,078	3,185	2,907	2,972	3,125	2,245	475	18,987	873,035,281
55 to 59	3,323	2,873	2,507	2,642	2,685	1,576	1,038	16,644	719,883,032
60 to 64	2,164	2,232	1,787	1,698	1,698	1,066	959	11,604	487,902,990
65 to 69	858	937	649	545	436	302	371	4,098	168,508,362
70 & Over	480	401	333	287	227	120	209	2,057	79,153,637
Total Count	50,281	31,256	22,284	18,350	14,041	6,393	3,068	145,673	$ 6,246,076,841

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	45.1 years
Service:	10.5 years
Entry Age:	35 years
Annual Payroll:	$42,877

Schedule E: Analysis of Financial Experience

Gains & Losses in Accrued Liabilities
Resulting from Difference Between
Assumed Experience & Actual Experience
($ Millions)

Type of Activity	$ Gain (or Loss) For Year Ending 6/30/2021	$ Gain (or Loss) For Year Ending 6/30/2020
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$ 12.4	$ 86.9
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	1.4	3.3
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(1.5)	(1.9)
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(213.5)	(185.6)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	50.4	(20.0)
New Members. Additional unfunded accrued liability will produce a loss.	(63.8)	(67.3)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	1,319.9	(283.2)
Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	72.9	(20.2)
Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	(146.1)	15.8
Gain (or Loss) During Year From Financial Experience	$ 1,032.1	$ (472.2)
Non-Recurring Items. Adjustments for plan amendments, software changes, assumption changes, or method changes.	(1,405.0)	0.0
Composite Gain (or Loss) During Year	$ (372.9)	$ (472.2)

The purpose of the funding policy is to state the overall funding goals and objectives for the Public Employees' Retirement System of Mississippi (PERS), and to document both the metrics that will be used to measure progress toward achieving those goals, and the methods and assumptions employed to develop the metrics.

The employer contribution rate for PERS will be set based on the metrics, assumptions and methods outlined in Section II and III of this policy.

I. Funding Goals and Objectives

The objective in requiring employer and member contributions to PERS is to accumulate sufficient assets during a member's employment to fully finance the benefits the member will receive in retirement. In meeting this objective, PERS will strive to meet the following goals:

- Preservation of the defined benefit structure for providing lifetime benefits to the PERS membership,
- Contribution rate stability as a percentage of payroll (Fixed Contribution Rate – FCR),
- Maintain an increasing trend in the funded ratio over the projection period with an ultimate goal of being 100% funded,
- Require clear reporting and risk analysis of the metrics by the actuary as outlined in Section II of this policy using a "Signal Light" approach to assist the Board in determining whether increases or decreases are needed in the employer contribution rate, and
- Ensure benefit improvements are funded through increases in contribution requirements in accordance with Article 14, S 272A, of the Mississippi Constitution.

II. Metrics

To track progress in achieving the outlined funding goals and objectives and to assist the Board in making a determination whether an increase or decrease in the employer contribution rate for PERS should be considered, certain metrics will be measured annually in conjunction with information provided in the actuarial valuation and projection report. As part of the annual valuation and projection reports, each metric will be calculated and assigned a "Signal Light" with the following definitions:

Status	Definition
Green	Plan passes metric and PERS' funding goals, and objectives are achieved
Yellow	Plan passes metric but a warning is issued that negative experience may lead to failing status
Red	Plan fails metric and PERS must consider contribution increases

If any one of the metrics are in the Red Signal Light status in conjunction with the annual valuation report and the projection report, the actuary will determine and recommend to the Board an employer contribution rate increase to consider that is sufficient enough to get all three metrics back into the Green Signal Light status. The employer contribution rate increase would be effective for the July 1st, 18 months following the completion of the projection report (e.g., if the projection report in 2019 deems an increase to be considered, then it would be effective for July 1, 2021).

The following metrics will be measured:

- **Funded Ratio** – Funded Ratio is defined as the actuarial value of assets divided by the actuarial accrued liability. One of the funding goals is to have an increasing funded ratio over the projection period with an ultimate goal of having a 100 percent funded ratio. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Funded Ratio above 80% in 2047
Yellow	Funded Ratio between 65% and 80% in 2047
Red	Funded Ratio below 65% in 2047

- **Cash flow as a percentage of assets** – Cash flow as a percentage of assets is defined as the difference between total contributions coming into the trust and the benefit payments made to retirees and beneficiaries going out of the trust as a percentage of beginning year market value of assets. Over the projection period, this percentage will fluctuate from year to year so for Signal Light testing, the net cash flow percentage over the entire projection period will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Net Cash Flow Percentage above negative 5.80% (-5.80%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.80% (-5.80%) and negative 7.55% (-7.55%) during the projection period
Red	Net Cash Flow Percentage below negative 7.55% (-7.55%) during the projection period

- **Actuarially Determined Contribution (ADC)** – ADC is defined as the contribution requirement determined by the actuary using a contribution allocation procedure based on the principal elements disclosed in Section III of this funding policy:

    1. Actuarial Cost Method
    2. Asset Smoothing Method
    3. Amortization Method

    The calculation of the ADC will be determined during the actuarial valuation and not during the projection report. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by this Funding Policy will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	ADC ratio at or below 100% of fixed contribution rate at valuation date
Yellow	ADC ratio between 100% and 110% of fixed contribution rate at valuation date
Red	ADC ratio above 110% of fixed contribution rate at valuation date

III. Assumptions and Methods

Each year, the actuary will perform an actuarial valuation and projection report for funding purposes. During the process, the actuary shall calculate all the metrics listed in Section II of this funding policy and PERS' Signal Light status for each metric. The following three major components of a funding valuation will be used:

- **Actuarial Cost Method** – This component determines the attribution method upon which the cost/liability of the retirement benefits are allocated to a given period, defining the normal cost or annual accrual rate associated with projected benefits. The Entry Age Normal Cost Method (EAN) is to be used for determination of the normal cost rate and the actuarial accrued liability for purposes of calculating the Actuarial Determined Contribution (ADC).
- **Asset Valuation Method** – This component dictates the method by which the asset value, used in the determination of the Unfunded Actuarial Accrued Liability (UAAL) and Funded Ratio, is determined. The asset valuation method to be used shall be a five-year smoothed market value of assets. The difference between the actual market value investment returns and the expected market investment returns is recognized equally over a five-year period.

- **Amortization Method** – This component prescribes, in terms of duration and pattern, the systematic manner in which the difference between the accrued liability and the actuarial value of assets is reduced. For purposes of calculating the ADC metric, the following amortization method assumptions are used:
  - I. Once established for any component of the UAAL, the amortization period for that component will be closed and will decrease by one year annually.
  - II. The amortization payment will be determined on a level percentage of pay basis.
  - III. The length of the amortization periods will be as follows:
    - a. Existing UAAL on June 30, 2018 – 30 years.
    - b. Annual future actuarial experience gains and losses, assumption changes or benefit enhancements or reductions – 25 years from the date of the valuation.
  - IV. If any future annual actuarial valuation indicates that PERS has a negative UAAL, the ADC shall be set equal to the Normal Cost.
- **Actuarial Assumptions** – The actuarial assumptions are used to develop the annual and projected actuarial metrics, as well as the ADC rates. The actuarial assumptions are derived and proposed by the actuary and adopted by the PERS' Board in conformity with the *Actuarial Standards of Practice*. The actuarial assumptions for this funding policy were developed using the experience for the four-year period ending June 30, 2020 (State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2020). The long-term investment return assumption adopted by the PERS' Board in conjunction with the experience investigation is 7.55 percent and, upon approval by the Board, will be reduced until it reaches the rate recommended by the actuary in the most recent experience study using investment gains based on the following parameters:
  - 2% Excess return over assumed rate, lower assumption by 5 basis points,
  - 5% Excess return over assumed rate, lower assumption by 10 basis points,
  - 8% Excess return over assumed rate, lower assumption by 15 basis points,
  - 12% Excess return over assumed rate, lower assumption by 20 basis points.

IV. Governance Policy/Process

Below is a list of specific actuarial and funding related studies, the frequency at which they should be commissioned by the Board and additional responsibilities related to each:

- **Actuarial Valuation (performed annually)** – The Board is responsible for the review of PERS' annual actuarial valuation report, which provides the annual funded ratio and the calculation of the ADC.
- **Projection Report (performed annually)** – The Board is responsible for the review of PERS' 30-year projection report, which will include the actuarial metrics and Signal Light status for each metric over a 30-year period.
- **Experience Analysis (performed every two years on a rolling four-year)** – The Board is responsible for ensuring that an experience analysis is performed as prescribed, review of the results of the study, and approving the actuarial assumptions and methodologies to be used for all actuarial purposes relating to the defined benefit pension plan.
- **Actuarial Audit (performed at least every five years)** – The Board is responsible for the review of an audit report performed by a new actuarial firm to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.
- **Funding Policy Review (performed at least annually)** – The Board is responsible for the periodic review of this policy, but at least annually following the Projection Report and biennially following the Experience Analysis.

V. Glossary of Funding Policy Terms

- **Actuarial Accrued Liability (AAL):** The AAL is the value at a particular point in time of all past normal costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions, and participant data had always been in effect, contributions equal to the normal cost had been made, and all actuarial assumptions had been met.
- **Actuarial Cost Method:** The actuarial cost method allocates a portion of the total cost (present value of benefits) to each year of service, both past service and future service.
- **Actuarial Determined Contribution (ADC):** The potential payment to the plan as determined by the actuary using a contribution allocation procedure that, if contributed consistently and combined with investment earnings, would be sufficient to pay promised benefits in full over the long term. The ADC may or may not be the amount actually paid by the plan sponsor or other contributing entity.
- **Asset Values**:
  - **Actuarial Value of Assets (AVA):** The AVA is the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.

  - **Market Value of Assets (MVA):** The MVA is the fair value of assets of the plan as reported in the plan's audited financial statements.

- **Entry Age Normal Actuarial Cost Method (EAN):** The EAN actuarial cost method is a funding method that calculates the normal cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.
- **Funded Ratio:** The funded ratio is the ratio of the plan assets to the plan's actuarial accrued liabilities.
  - **Actuarial Value Funded Ratio:** is the ratio of the AVA to the AAL.
- **Normal Cost**: The normal cost is the cost allocated under the actuarial cost method to each year of active member service.
- **Present Value of Benefits (PVB) or total cost:** The PVB is the value at a particular point in time of all projected future benefit payments for current plan members. The future benefit payments and the value of those payments are determined using actuarial assumptions regarding future events. Examples of these assumptions are estimates of retirement and termination patterns, salary increases, investment returns, etc.
- **Surplus:** A surplus refers to the positive difference, if any, between the AVA and the AAL.
- **Unfunded Actuarial Accrued Liability (UAAL):** The UAAL is the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.
- **Valuation Date:** The valuation date is the annual date upon which an actuarial valuation is performed; meaning that the trust assets and liabilities of the plan are valued as of that date. PERS' annual valuation date is June 30.

Schedule G: History of PERS Plan Provisions

Since 1985, the benefit structure of the Public Employees Retirement System (PERS) of Mississippi has undergone significant changes as noted in the table below.

Fiscal Year Beginning	Benefit Modifications
July 1, 1985	• Final average compensation calculated using the highest four consecutive years (reduced from highest five consecutive years) • Liberalized survivor benefit provision to reduce the marriage requirement from 5 years to 1 year and to allow a member to designate a child as beneficiary • Minimum benefit increased from \$5.00 to \$7.50 per month for each year of creditable service for current and future retirees • Eligibility for service retirement reduced from 10 years to 4 years at age 60 • Established "discretionary" COLA provision in addition to the base COLA provision to be paid to eligible retirees based on sufficient actuarial gains • 3% ad hoc increase for all retirees
July 1, 1986	• Eligibility for non-duty related disability retirement reduced from 10 years to 4 years • Permanent exemption from 3% penalty for those required to retire at age 60 • Retirement incentive granted – one additional year of credit to any member with 30 years of service credit or age 60
July 1, 1987	• Established service retirement eligibility based on 25 & out with reduced benefits • Benefit accrual increased from 1-5/8% to 1-3/4% for the first 20 years • Minimum benefit increased from \$7.50 to \$10.00 per month for each year of service for current and future retirees • 5% ad hoc increase for all retirees • Provided elected official leave credit
July 1, 1989	• Unreduced retirement at age 55 with 25 years of service • Benefit accrual increased from 1-3/4% to 1-7/8% for the first 30 years of service • Unreduced retirement lowered from age 65 to age 60 • 5% ad hoc increase for all retirees
July 1, 1990	• Provided that base COLA percentage granted shall be cumulative from year to year
July 1, 1991	• Unreduced retirement at any age with 25 years of service • Benefit accrual increased to 2% for all years of service over 25

Schedule G: History of PERS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 1992	• Ad hoc increase for those retired prior to July 1, 1991, with more than 25 years of service • Tiered disability benefit • Expanded survivor benefits to include automatic spousal and dependent child benefits • Liberalized definition of average compensation to provide that the highest four years did not have to be consecutive years • Expanded military service credit to include all active duty military • Removed reference to "Governor's Salary" and established maximum compensation cap at $125,000
July 1, 1994	• Benefits for all retirees under Options 2(5) and 4A(5) were recalculated to remove the reduction imposed for the right to revert to the Maximum
July 1, 1999	• Benefit accrual increased from 2% to 2-1/4% for all years of service over 25 for current and future retirees • Base COLA increased to 3% simple up to age 55 and 3% compounded after age 55 • Reemployed retiree COLA will be based on all fiscal years in retirement, not just the fiscal years in retirement since the last retirement. • Provided that the COLA will be prorated and paid to the beneficiary of a retiree or beneficiary who is receiving the COLA in a lump sum and who dies between July 1 and December 1
July 1, 2000	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 10 and less than 25 for current and future retirees
July 1, 2001	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 5 and less than 25 for current and future retirees
July 1, 2002	• Benefit accrual increased from 1-7/8% to 2% for all years of service up to and including 25 and from 2-1/4% to 2-1/2% for all years of service over 25 for current and future retirees • Increased maximum compensation cap to $150,000 • Provided for free active duty military service for pre-1972 service in the Commissioned Corps of the U.S. Public Health Service for those retiring on or after July 1, 2002 • Reemployed retiree who has previously been retired for at least one full fiscal year no longer has to wait another full fiscal year for his or her COLA to resume • A local county or municipal elected official who is receiving retirement benefits may receive a salary for the elected position that does not exceed 25% of the retiree's average compensation

Schedule G: History of PERS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 2004	• Removed remarriage penalty on certain spouse / survivor benefits and provided upon application for the reinstatement of spouse survivor benefits previously terminated due to remarriage
July 1, 2008	• Maximum reportable earned compensation was increased from $150,000 to $230,000 to coincide with the compensation limit set pursuant to Section 401(a)(17) of the Internal Revenue Code • Vesting requirement for those employees hired on or after July 1, 2007 was increased from 4 to 8 years of service.
July 1, 2010	• Members who retire on or after July 1, 2010 receive additional credit toward retirement for one-half day of leave for each full fiscal year of membership service accrued after June 30, 2010 • Option 4, a 75% joint and survivor annuity, made available to members who retire on or after January 1, 2011
July 1, 2011	• For members hired on or after July 1, 2011, 30 years of creditable service will be required for retirement regardless of age. • For members hired on or after July 1, 2011, 33 years of creditable service will be required to select a partial lump sum option at retirement. • For members hired on or after July 1, 2011, the retirement formula will be 2% of average compensation for the first 30 years of creditable service plus 2.5% of average compensation for each year beyond 30 years of creditable service. • For members hired on or after July 1, 2011, the actuarial reduction for early retirement will be the lesser of the number of years below 30 years of creditable service or the number of years in age a member is below age 65. • For members hired on or after July 1, 2011, the COLA will be a simple 3% of the annual retirement allowance at retirement up to the fiscal year in which the retired member reaches age 60. Thereafter, the COLA will be a compounded 3% for all future years.
July 1, 2016	• The interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent.