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PERS
of MISSISSIPPI

Report on the Annual Valuation of the Mississippi Highway Safety Patrol Retirement System

Prepared as of June 30, 2023

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The experience and dedication you deserve

November 15, 2023

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 Mississippi Highway Safety Patrol Retirement System (HSPRS). 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, 2023 using the Fixed Contribution Rate (FCR) of 49.08% of payroll,
- To determine the actuarially determined contribution (ADC) for the fiscal year beginning July 1, 2025 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, 2023.

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 valuation results on page 1 and the projection results on page 6. Since none of the funding policy metrics are in the Red Status, we do not recommend an increase in the Fixed Contribution Rate (FCR) of 49.08% of annual compensation at this time. However, if there is any negative experience in the near future, the Fixed Contribution Rate may need to be increased.

Since the previous valuation, the Board adopted new actuarial assumptions based on the experience investigation for the four-year period ending June 30, 2022. The results of this study were presented to the Board in April, 2023 and the Board adopted the demographic assumption recommendations with regard to the rates of retirement, disability, and salary merit scale. The Board also adopted a decrease in the investment return assumption from 7.55% to 7.00% at its August, 2023 meeting. The complete list of actuarial assumption changes is shown on page 2 of this report. No changes were made to the plan provisions since the previous valuation.

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.

In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the system's funded status); and changes in plan provisions or applicable law. An analysis of the potential range of future measurements is provided in Section XI of this report.

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, 2023, 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, 2023.

VALUATION DATE	June 30, 2023	June 30, 2022
Investment Return Assumption	**7.00%**	**7.55%**
Active members included in valuation		
Number	507	478
Annual compensation	$ 34,845,681	$ 33,758,750
Retirees		
Number	792	785
Annual allowances	$ 38,778,092	$ 37,420,188
Assets		
Market related actuarial value	$ 429,909,000	$ 419,219,000
Market value of assets (MVR)	$ 416,724,000	$ 405,372,000
Unfunded actuarial accrued liability (UAAL)	$ 227,309,721	$ 184,865,201
Funded Ratio based on actuarial value	65.4%	69.4%
Employer Fixed Contribution Rate (FCR)		
Normal Cost*	19.36%	16.06%
Accrued liability	29.72	33.02
Total	49.08%	49.08%
Payment period based on the FCR	30.6 years	19.9 years
Actuarially Determined Contribution (ADC) Rate		
Normal Cost*	19.36%	16.06%
Accrued liability	32.26	24.72
Total	51.62%	40.78%
Amortization Period for ADC	25.0 years	30.0 years
ADC Ratio to Fixed Contribution Rate	105.18%	83.09%
Unfunded actuarial accrued liability based on MVA	$ 240,494,721	$ 198,712,201
Funded Ratio based on market value	63.4%	67.1%

* Includes load for administrative expenses. See Section VI for more contribution rate detail.

2. The valuation balance sheet showing the results and liabilities of the valuation is given in Section III.
3. Comments on the valuation results are provided 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. Due to Senate Bill No. 2659 enacted in 2004 and House Bill No. 1015 enacted April 25, 2013, additional contributions, classified as Motor Vehicle Replacement (MVR) fees are being made to the System and are expected to continue in the future. For the 2023 fiscal year, the total additional fees were $3,159,000. We have lowered our expected contributions from these sources from $3,600,000 to $3,400,000 based on the average of actual monies received over the past three fiscal years and the expectation from these sources in the future. The employers are also required to contribute the employer contribution rate as determined based on the funding policy. The funding period of the UAAL of 30.6 years shown on the previous page reflects the additional contributions from Senate Bill No. 2659 and House Bill No. 1015. Without these additional contributions, the funding period would have been 53.5 years on the current employer rate basis.
5. Schedule A of this report presents the development of the assets. The estimated investment return for the plan year ending June 30, 2023 on a market value of assets basis was 7.45% and on an actuarial value of assets basis was 7.37%. These can be compared to the assumed rate of return for the same period of 7.55%.
6. 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 reduced from 7.55% to 7.00%.
   - Disability rates and service retirement rates were adjusted to reflect actual experience more closely.
   - Salary merit scale was changed to a service-based table with minor adjustments to better match experience of the system.
   - Unused leave and military service assumed for all members at retirement was increased from 2.00 years to 2.25 years.

Section I: Executive Summary

7. Schedule C gives a summary of the benefit and contribution provisions of the Plan. There have been no changes since the previous valuation.

8. The funded ratio shown in the Summary of Principal Results is the ratio of actuarial value of assets to the actuarial accrued liability. The funded status is different based on the market value of assets. The funded ratio is an indication of progress in funding the promised benefits. Since the ratio is less than 100%, there is a need for additional contributions toward the payment of the unfunded accrued liability. In addition, this funded ratio does not have any relationship to measuring the sufficiency if the plan had to settle its liabilities.

9. The employer contribution rate, or Fixed Contribution Rate (FCR), of 49.08% of annual compensation has been the contribution rate for employers since July 1, 2018. As shown on page 1 of the report, the amortization period to pay off the Unfunded Actuarial Accrued Liability (UAAL) using the FCR of 49.08% is over 30 years, which is a snapshot view of the UAAL as of the valuation date of June 30, 2023. However, this snapshot calculation of the amortization period does not take into consideration the smoothing in of the investment experience that the System will encounter over the next four years. The majority of this anticipated experience over the next four years will be negative.

10. In addition, as shown on page 1 of the report, the Actuarially Determined Contribution (ADC) Rate for the 2023 valuation year is 51.62% of annual compensation and the ratio of the ADC to the FCR (51.62% to 49.08%) is calculated at 105.18% as of June 30, 2023. Per the Board's Funding Policy, which is provided in Schedule F, this actuarial metric is in the Yellow Status as the ratio is between 100% and 110%.

11. 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 HSPRS' 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.

12. For HSPRS, 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 shall determine and recommend to the Board an employer contribution rate increase to consider that is sufficient 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 90% in 2047**
Yellow	**Funded Ratio between 70% and 90% in 2047**
Red	**Funded Ratio below 70% 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 5.25% (-5.25%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.25% (-5.25%) and negative 7.00% (-7.00%) during the projection period
Red	Net Cash Flow Percentage below negative 7.00% (-7.00%) 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

Section I: Executive Summary

13. 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 and cash flow percentage remain relatively stable while the ADC/FCR ratio increases over the next five years.

Valuation Year	UAAL ($ in Thousands)	Funded Ratio	Cash Flow %	ADC/FCR Ratio
2023	$227,310	65.4%	(3.9)%	105.2%
2024	230,557	65.7	(3.8)	106.5
2025	229,552	66.6	(3.9)	106.8
2026	246,114	64.9	(4.0)	113.3
2027	247,608	65.5	(4.0)	114.8
2028	248,991	66.0	(4.1)	116.5

Metrics	2023 Projection with 49.08% FCR (7.00%)	Status
Funding Ratio in 2047	78.6%	Yellow
Cash Flow as a Percentage of Assets	(4.4)%	Green
ADC/FCR Ratio from 2023 Valuation	105.2%	Yellow
ADC/FCR Ratio from 2024 Valuation	106.5%	Yellow

As shown above, none of the metrics are in the "Red Status" for the valuation and projections. **Therefore, we recommend to the PERS Board that the Fixed Contribution Rate (FCR) continue at a rate of 49.08% of annual compensation for HSPRS at this time**. **However, if there is any negative experience in the near future, the Fixed Contribution Rate may need to be increased.** The Board should continue to review the Sensitivity Analysis section of this report during the fiscal year to understand the volatility that may occur in the projections if investment experience is more or less than expected going forward.

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

Comparative Schedule

	Active Members				Retired Lives				Valuation Results ($ thousands)		
Valuation Date June 30	Number	Payroll ($ in thousands)	Average Salary	% increase from previous year	Number	Active/ Retired Ratio	Annual Benefits ($ thousands)	Benefits as % of Payroll	Actuarial Accrued Liability	Valuation Assets	UAAL
2014	495	$25,554	$51,624	4.0%	720	0.7	$26,966.4	105.5%	$445,822	$295,298	$150,524
2015	518	25,505	49,237	(4.6)	724	0.7	28,076.5	110.1	477,803	316,149	161,654
2016	484	27,380	56,571	14.9	724	0.7	28,782.0	105.1	494,101	324,894	169,207
2017	470	28,845	61,373	8.5	726	0.6	29,563.8	102.5	497,992	339,114	158,878
2018	511	29,555	57,838	(5.8)	725	0.7	30,614.5	103.6	527,428	352,415	175,013
2019	522	31,811	60,941	5.4	734	0.7	31,814.9	100.0	541,925	362,591	179,334
2020	511	32,346	63,299	3.9	740	0.7	33,344.1	103.1	561,662	373,511	188,151
2021	478	29,780	62,302	(1.6)	761	0.6	35,443.9	119.0	573,134	403,748	169,386
2022	478	33,759	70,625	13.4	785	0.6	37,420.2	110.8	604,084	419,219	184,865
2023	507	34,846	68,729	(2.7)	792	0.6	38,778.1	111.3	657,219	429,909	227,310

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, 2023 upon which the valuation was based. Detailed tabulations of the data are given in Schedule D.

Active Members

				Group Averages		
Employers	Number of Employers	Number	Payroll	Salary	Age	Benefit Service
State Agencies	1	507	$ 34,845,681	$68,729	39.8	10.8

Of the 507 active members, 332 are vested and 175 are non-vested.

Retired Lives

			Group Averages	
Type of Benefit Payment	No.	Annual Benefits	Benefit	Age
Retirement	600	$33,395,307	$55,659	67.9
Disability	13	355,052	27,312	67.0
Survivor	179	5,027,733	28,088	73.8
Total in HSPRS	792	$38,778,092	$48,962	69.2

Deferred Vested/Inactive Lives

Type of Member	No.	Annual Deferred Benefits	Outstanding Balance
Deferred Vested – Benefit Included	45	$1,005,645	N/A
Inactive	34	N/A	$483,584
Total in HSPRS	79	$1,005,645	$483,584

For the liability in this valuation, deferred vested participants with benefits provided are valued assuming a retirement age of 55 and for inactive members, account balances are multiplied by 1.50 to estimate liabilities and interest in the future.

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, 2023 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2022. 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.

VALUATION BALANCE SHEET
SHOWING THE ASSETS AND LIABILITIES OF THE
MISSISSIPPI HIGHWAY SAFETY PATROL RETIREMENT SYSTEM

	JUNE 30, 2023	JUNE 30, 2022
ASSETS		
Current actuarial value of assets:		
Annuity Savings Account	$ 22,994,515	$ 23,950,718
Annuity Reserve	52,715,398	50,372,349
Employers' Accumulation Account	354,199,087	344,895,933
Total current assets	$ 429,909,000	$ 419,219,000
Future member contributions to Annuity Savings Account	$ 23,726,003	$ 21,756,251
Prospective contributions to Employer's Accumulation Account		
Normal contributions	$ 61,467,175	$ 45,802,044
Unfunded actuarial accrued liability contributions	227,309,721	184,865,201
Total prospective contributions	$ 288,776,896	$ 230,667,245
Total assets	$ 742,411,899	$ 671,642,496
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	$ 480,925,045	$ 442,965,246
Present value of benefits payable on account of inactive members for service rendered before the valuation date	11,683,975	6,591,320
Present value of benefits payable on account of active members	$ 249,802,879	$ 222,085,930
Total liabilities	$ 742,411,899	$ 671,642,496

Section III: Valuation Balance Sheet

BREAKDOWN OF TOTAL AND ACTUARIAL ACCRUED LIABILITIES
AS OF JUNE 30, 2023

	Total Liability	Actuarial Accrued Liability
Active Members		
Retirement	$ 237,073,239	$ 163,077,845
Death	3,983,082	345,855
Disability	917,249	103,415
Termination	7,829,309	1,082,586
Total	$ 249,802,879	$ 164,609,701
Retirees		
Retirement	$ 433,069,855	$ 433,069,855
Survivor	44,149,583	44,149,583
Disability	3,705,607	3,705,607
Total	$ 480,925,045	$ 480,925,045
Deferred Vested Members	10,958,599	10,958,599
Inactive Members	725,376	725,376
Total Actuarial Values	$ 742,411,899	$ 657,218,721
Actuarial Value of Assets		429,909,000
Unfunded Actuarial Accrued Liability		$ 227,309,721

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, 2023.

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 system. 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 $22,994,515. The assets credited to the Annuity Reserve were $52,715,398 and the assets credited to the Employer's Accumulation Account totaled $354,199,087. Current actuarial assets as of the valuation date equaled the sum of these three funds, $429,909,000. Future member contributions to the Annuity Savings Account were valued to be $23,726,003. Prospective contributions to the Employer's Accumulation Account were calculated to be $288,776,896 of which $61,467,175 is attributable to service rendered after the valuation date (normal contributions) and $227,309,721 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 $742,411,899 as of June 30, 2023.

Total Liabilities

The present value of benefits payable on account of presently retired members and beneficiaries totaled $480,925,045 as of the valuation date. The present value of future benefit payments on behalf of active members amounted to $249,802,879. In addition, the present value of benefits for inactive members, due to service rendered before the valuation date, was calculated to be $11,683,975.

Therefore, the balance sheet shows the present value for all prospective benefit payments under the System to be $742,411,899 as of June 30, 2023.

Section 25-11-7 of State law requires that active members contribute the current rate of 7.25% 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. Based on the funding policy adopted by the PERS Board in 2023, the PERS Board and the MHSPRS Administrative Board adopted an employer contribution rate of 49.08% of annual compensation effective July 1, 2018 and the amortization period is calculated on an open basis. The amortization period for the June 30, 2023 valuation is 30.6 years, compared to 19.9 years for the previous valuation. The primary reason for the increase in the amortization period is due to the decrease in the investment return assumption from 7.55% to 7.00%.

The assumption changes increased the actuarial accrued liability by approximately $42,719.5 thousand (shown on next page). The majority of this increase was due to the change in the long-term investment return assumption from 7.55% to 7.00%.

There was a loss on the unfunded actuarial accrued liability for the fiscal year ending June 30, 2023 of approximately $2,052.9 thousand (shown on the next page) which was primarily due to the fiscal year's negative investment experience (actuarial value of assets basis less than expected) and more retirements than expected. These losses were offset by gains in withdrawal experience and salary experience (increases in salaries less than expected).

See page 16 for a reconciliation of the amortization period. 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) match 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. Details on the derivation of the experience gain/(loss) for the years ended June 30, 2023 and June 30, 2022 are shown below.

		2023 Valuation $ Thousands	2022 Valuation $ Thousands
(1)	UAAL* as of beginning of year	$ 184,865.2	$ 169,385.9
(2)	Total normal cost from last valuation	7,492.7	7,213.4
(3)	Total contributions	23,458.0	21,832.0
(4)	Interest Rate (Beginning of Year)	7.55%	7.55%
(5)	Interest accrual: [[(1) + (2)] x (4)] - [(3) x ((4) / 2)]	13,637.5	12,509.1
(6)	Expected UAAL before changes: (1) + (2) – (3) + (5)	$ 182,537.3	$ 167,276.4
(7)	Change due to plan amendments	0.0	13,327.6
(8)	Change due to actuarial assumptions or methods	42,719.5	0.0
(9)	Expected UAAL after changes: (6) + (7) + (8)	$ 225,256.8	$ 180,604.0
(10)	Actual UAAL as of end of year	$ 227,309.7	$ 184,865.2
(11)	Gain/(loss): (9) – (10)	$ (2,052.9)	$ (4,261.2)
(12)	Gain/(loss) as percent of actuarial accrued liabilities at start of year.	(0.3)%	(0.7)%

*Unfunded actuarial accrued liability.

Valuation Date June 30	Actuarial Gain/(Loss) as a % of Beginning Accrued Liabilities
2018	(2.9)%
2019	(0.6)
2020	(1.9)
2021	3.8
2022	(0.7)
2023	(0.3)

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	2023 Valuation	2022 Valuation
Investment Return Assumption	**7.00%**	**7.55%**
Total Normal Cost:		
Service retirement benefits	24.32%	20.93%
Disability benefits	0.24	0.44
Survivor benefits	1.05	0.94
Total	25.61%	22.31%
Less Member Contributions:	7.25%	7.25%
Employer Normal Cost	18.36%	15.06%
Administrative Expense Load	1.00%	1.00%
Total Employer Normal Cost Rate	19.36%	16.06%
Unfunded Actuarial Accrued Liabilities (30.6 year level % of payroll amortization*)	29.72%	33.02%
Total Employer Fixed Contribution Rate (FCR)	49.08%	49.08%

* Amortization period a year ago was 19.9 years.

1. The current funding policy has set the employer contribution rate to 49.08% of payroll and kept the amortization period 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 Schedule F for the current funding policy.

Section VI: Fixed Contribution Rate (FCR)

2. The components of the change in the computed unfunded actuarial accrued liability amortization period from 19.9 years to 30.6 years are as follows:

Previously Reported Period	19.9 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	0.3
MVR fee assumption change	0.4
Assumption changes	11.6
Contribution Shortfall/(Excess)	(0.6)
Computed Period	30.6 years

Section VI: Fixed Contribution Rate (FCR)

The table below shows the development of the amortization period of 30.6 years ($ in thousands):

Year	UAAL BOY	Amortization Payment	MVR Fees	UAAL EOY
1	$227,310	$10,808	$3,400	$228,610
2	228,610	11,094	3,400	229,708
3	229,708	11,388	3,400	230,581
4	230,581	11,690	3,400	231,205
5	231,205	11,999	3,400	231,555
6	231,555	12,317	3,400	231,603
7	231,603	12,644	3,400	231,320
8	231,320	12,979	3,400	230,672
9	230,672	13,323	3,400	229,626
10	229,626	13,676	3,400	228,145
11	228,145	14,038	3,400	226,187
12	226,187	14,410	3,400	223,711
13	223,711	14,792	3,400	220,670
14	220,670	15,184	3,400	217,013
15	217,013	15,587	3,400	212,687
16	212,687	16,000	3,400	207,635
17	207,635	16,424	3,400	201,793
18	201,793	16,859	3,400	195,096
19	195,096	17,306	3,400	187,472
20	187,472	17,764	3,400	178,843
21	178,843	18,235	3,400	169,127
22	169,127	18,718	3,400	158,234
23	158,234	19,214	3,400	146,070
24	146,070	19,723	3,400	132,532
25	132,532	20,246	3,400	117,509
26	117,509	20,783	3,400	100,885
27	100,885	21,333	3,400	82,531
28	82,531	21,899	3,400	62,312
29	62,312	22,479	3,400	40,082
30	40,082	23,075	3,400	15,685
31	15,685	23,686	3,400	(11,048)

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 principal 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 with each valuation. The Funding Policy provides that the unfunded actuarial accrued liability as of June 30, 2023 (Transitional UAAL) will be amortized as a level percentage of payroll over a closed 25-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

Date Established	Original UAAL Balance	Remaining UAAL Balance	Remaining Amortization Period	Amortization Payment*
June 30, 2023	$227,309,721	$227,309,721	25 years	$11,731,202
Total		$227,309,721		$11,731,202
Estimated Payroll				$36,364,545
UAAL Amortization Contribution Rate				32.26%

** The amortization payment reflects the impact of the additional contributions from Senate Bill No. 2659 and House Bill No. 1015.*

Section VII: Actuarially Determined Contribution Rate (ADC)

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	**2023**	**2022**
Actuarially Determined Contribution (ADC) rate		
Normal Cost*	19.36%	16.06%
Accrued liability	32.26	24.72
Total	51.62%	40.78%
Fixed Contribution Rate (FCR)	49.08%	49.08%
Ratio of ADC to FCR	105.18%	83.09%
Funding Policy Metric Status	**Yellow**	**Green**
Anticipated accrued liability payment period	25 years	30 years

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

Since the Ratio of ADC to FCR is between 100% and 110% and the Metric Status is in the "Yellow Status" for the 2023 valuation, per the Funding Policy, we recommend no change in the Fixed Contribution Rate of 49.08% of annual compensation at this time. However, if there is any negative experience in the near future, the Fixed Contribution Rate may need to be increased. The Board should continue to review the Sensitivity Analysis section of this report during the fiscal year to understand the volatility that may occur in the projections if investment experience is less than expected going forward.

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, 2023

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	792
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	79
Active Participants	507
Total	1,378

2. Another such item is the schedule of funding progress as shown below. As can be seen in the table below, the funded ratio has remained in a narrow range over the previous 9 years with a decrease this year due to the assumption changes, including the change in the investment return assumption from 7.55% to 7.00%. Since the Highway Safety Patrol fluctuates with its active member counts and annual covered compensation from year to year, the UAAL as a percentage of payroll, shown in column 6, experiences more volatility from year to year than other PERS plans.

SCHEDULE OF FUNDING PROGRESS
($ Thousands)

Plan Year Ended	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Funded Status (1)/(2)	(4) Unfunded AAL (2) – (1)	(5) Annual Covered Payroll	(6) Unfunded AAL as a Percentage of Covered Payroll (4)/(5)
06/30/2014	$295,298	$445,822	66.2%	$150,524	$25,554	589.0%
06/30/2015#	316,149	477,803	66.2	161,654	25,505	633.8
06/30/2016	324,894	494,101	65.8	169,207	27,380	618.0
06/30/2017#	339,114	497,992	68.1	158,878	28,845	550.8
06/30/2018	352,415	527,428	66.8	175,013	29,555	592.2
06/30/2019#	362,591	541,925	66.9	179,334	31,811	563.7
06/30/2020	373,511	561,662	66.5	188,151	32,346	581.7
06/30/2021#	403,748	573,134	70.4	169,386	29,780	568.8
06/30/2022	419,219	604,084	69.4	184,865	33,759	547.6
06/30/2023#	429,909	657,219	65.4	227,310	34,846	652.3

After change in actuarial assumptions.

Section VIII: Supplemental Disclosure Information

3. Additional information as of the latest valuation that went into the calculation of the Actuarially Determined Contribution (ADC) are as follows:

Valuation date	6/30/2023
Actuarial cost method	Entry age
Amortization method	Level percentage of payroll, closed
Remaining amortization period on ADC Basis	25.0 years
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return (discount rate)*	7.00%
Projected salary increases*	3.50 - 5.00%
Cost-of-living adjustments	3.00% per annum

** Includes price inflation at 2.40%*

Solvency Tests
($ in Thousands)

	Actuarial Accrued Liabilities for				Portions of Accrued Liabilities Covered by Assets		
Valuation Date	(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	(1)	(2)	(3)
6/30/2014	$24,411	$317,825	$103,586	$295,298	100.0%	85.2%	0.0%
6/30/2015	24,827	338,459	114,517	316,149	100.0	86.1	0.0
6/30/2016	25,791	343,635	124,675	324,894	100.0	87.0	0.0
6/30/2017	26,922	349,850	121,219	339,114	100.0	89.2	0.0
6/30/2018	27,581	358,342	141,506	352,415	100.0	90.6	0.0
6/30/2019	27,244	372,526	142,156	362,591	100.0	90.0	0.0
6/30/2020	26,382	389,269	146,010	373,511	100.0	89.2	0.0
6/30/2021	24,844	417,468	130,821	403,748	100.0	90.8	0.0
6/30/2022	23,951	442,965	137,168	419,219	100.0	89.2	0.0
6/30/2023	22,995	480,925	153,300	429,909	100.0	84.6	0.0

As can be seen from the table above, the HSPRS plan assets currently cover 100% of the active member contribution account balances as of the valuation date but only cover about 84.6% of the retiree liability. There remains zero assets to cover any employer financed active liabilities.

Schedule of Active Member Valuation Data

		Active Members			
Valuation Date	Number of Employers	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
2014	1	495	$25,553,765	$51,624	4.0%
2015	1	518	25,504,676	49,237	(4.6)
2016	1	484	27,380,162	56,571	14.9
2017	1	470	28,845,478	61,373	8.5
2018	1	511	29,555,411	57,838	(5.8)
2019	1	522	31,811,231	60,941	5.4
2020	1	511	32,345,730	63,299	3.9
2021	1	478	29,780,428	62,302	(1.6)
2022	1	478	33,758,750	70,625	13.4
2023	1	507	34,845,681	68,729	(2.7)

Schedule of Number of Retirants Added To and Removed From Rolls
Last Ten Fiscal Years

	Fiscal Year Ended June 30									
Item	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Beginning of Year	713	720	724	724	726	725	734	740	761	785
Added	28	22	26	22	17	28	21	39	35	26
Removed	(21)	(18)	(26)	(20)	(18)	(19)	(15)	(18)	(11)	(19)
End of Year	720	724	724	726	725	734	740	761	785	792

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

Section VIII: Supplemental Disclosure Information

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

Year Ending	2017	2018	2019	2020	2021	2022	2023
Beginning of Year	$28,782,015	$29,563,842	$30,614,457	$31,814,897	$33,344,108	$35,443,890	$37,420,188
Added	717,225	787,728	1,186,864	1,202,084	2,196,435	2,117,341	1,372,960
Removed	(694,187)	(494,512)	(812,457)	(613,918)	(1,029,029)	(1,072,205)	(1,073,822)
Benefit increase due to annual COLA	758,789	757,399	826,033	941,045	932,376	931,161	1,058,766
Benefit increase due to plan amendments	0	0	0	0	0	0	0
End of Year	$29,563,842	$30,614,457	$31,814,897	$33,344,108	$35,443,890	$37,420,188	$38,778,092

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, 2022 to June 30, 2023									
Average Monthly Benefit	$957.08		$2,656.24	$3,894.76		$4,182.44	$5,379.02		$3,854.25
Average Final Salary	$56,835.36		$66,853.44	$55,733.13		$70,713.58	$99,199.52		$64,061.35
Number of Active Retirants	1		2	12		10	1		26
July 1, 2021 to June 30, 2022									
Average Monthly Benefit			$2,755.98	$3,826.83	$4,384.68	$5,445.38		$5,345.90	$4,418.34
Average Final Salary			$68,698.46	$54,434.52	$54,702.08	$77,452.96		$84,017.5	$67,728.47
Number of Active Retirants			6	8	6	10		5	35
July 1, 2020 to June 30, 2021									
Average Monthly Benefit		$2,073.24	$2,071.18	$3,751.11	$5,041.93	$4,935.28	$4,757.01	$6,336.18	$4,693.24
Average Final Salary		$63,446.28	$85,505.28	$46,027.48	$61,917.84	$70,663.19	$24,044.20	$59,803.05	$58,435.91
Number of Active Retirants		1	2	10	3	12	3	8	39
July 1, 2019 to June 30, 2020									
Average Monthly Benefit		$2,246.54	$2,672.54	$3,796.62	$3,751.11			$6,126.68	$4,770.17
Average Final Salary		$70,328.04	$72,279.84	$73,364.66	$72,571,38			$91,719.95	$81,757.91
Number of Active Retirants		1	1	5	4			10	21
July 1, 2018 to June 30, 2019									
Average Monthly Benefit		$455.07	$2,111.54	$3,374.59	$3,943.38	$4,902.10	$5,823.91	$5,690.03	$3,532.33
Average Final Salary		$56,573.88	$53,477.12	$77,543.75	$75,695.64	$84,403.44	$93,541.20	$82,712.42	$72,182.33
Number of Active Retirants		3	6	9	1	1	1	7	28

Section VIII: Supplemental Disclosure Information

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-15	16-20	21-24	25	26-29	30	31+	TOTAL
July 1, 2017 to June 30, 2018									
Average Monthly Benefit		$1,307.49	$2,490.53	$3,100.20		$3,562.34	$4,826.30	$5,100.57	$3,976.96
Average Final Salary		$31,379.76	$68,832.18	$60,334.20		$68,125.68	$77,928.36	$75,940.20	$68,584.98
Number of Active Retirants		1	2	4		1	2	7	17
July 1, 2016 to June 30, 2017									
Average Monthly Benefit	$337.90	$996.04	$556.17	$2,927.97	$1,186.14	$2,670.20	$4,606.06	$3,493.16	$2,716.76
Average Final Salary	$19,659.72	$45,533.40	$22,015.92	$67,682.80	$28,912.20	$54,518.06	$72,101.25	$47,949.84	$55,208.79
Number of Active Retirants	1	1	1	6	2	6	4	1	22
July 1, 2015 to June 30, 2016									
Average Monthly Benefit	$314.65			$2,078.23		$3,012.97	$1,729.45	$5,059.27	$2,672.66
Average Final Salary	$53,305.68			$45,947.58		$37,841.45	$50,692.08	$51,223.20	$43,534.73
Number of Active Retirants	3			6		13	1	3	26
July 1, 2014 to June 30, 2015									
Average Monthly Benefit			$1,831.19	$1,719.04	$1,978.03	$4,054.02		$4,758.40	$3,371.84
Average Final Salary			$45,652.04	$30,832.33	$36,844.69	$51,499.73		$67,377.63	$49,438.65
Number of Active Retirants			3	3	2	10		4	22
July 1, 2013 to June 30, 2014									
Average Monthly Benefit			$401.76	$2,013.42		$2,756.37	$3,898.78	$4,528.45	$3,313.21
Average Final Salary			$15,019.06	$54,344.38		$51,232.69	$69,760.18	$68,010.73	$59,196.43
Number of Active Retirants			1	5		8	5	9	28

Section IX: Projection Results

Annual actuarial valuations are performed for HSPRS 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. HSPRS 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

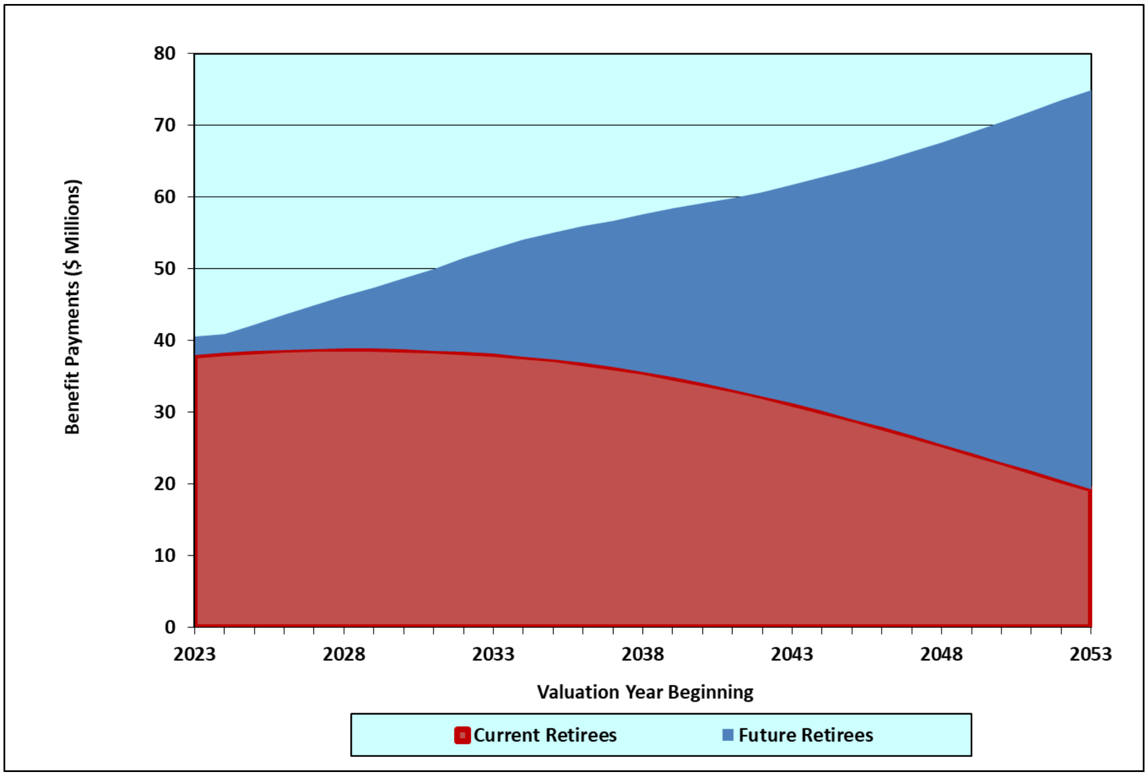
In addition to the regular valuation assumptions used in performing the annual actuarial valuations of HSPRS, additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection study, 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 in the last three years prior to the projection start date of June 30, 2023. The new entrant profile is summarized in the table below.

Age	Average Pay	Percent Male	Weight
22	$52,000	100%	11%
25	$52,000	92%	31%
28	$52,000	91%	19%
32	$52,000	85%	21%
37	$52,000	100%	7%
43	$52,000	89%	7%
49	$52,000	100%	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, 2023 would remain in place for the following 30 years. The following graph shows the projection of benefit payments of HSPRS members. The red area of the graph represents the benefit payments for current retirees and the blue area represents the benefit payments for any future retirees. HSPRS currently pays approximately $41 million 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, 2023 and those who are hired after June 30, 2023. For baseline projection purposes, we have continued the active membership at its current population of 507 active members over the projected period. In Section XI of this report, we provide some sensitivity analysis around this static assumption.

Member	2023	2028	2033	2042	2047	2053
Active – Existing Employees	507	379	267	123	53	9
Active – New Entrants	0	128	240	384	454	498
Retirees	600	664	776	920	976	1,053
Beneficiaries	179	187	209	207	211	212
Disableds	13	10	10	12	14	16
Vested Terminations	45	34	47	61	69	75
Total	1,344	1,402	1,549	1,707	1,777	1,863

Section IX: Projection Results

Projection Results

The baseline projection results shown below use the same actuarial assumptions as used the June 30, 2023 actuarial valuation report. Please note that contributions from SB 2659 and HB 1015 are assumed to continue to provide an additional $3,400,000 annually throughout the projection period under all scenarios. These dollars are in addition to the employer contributions as a percentage of payroll shown below. In addition, the projection results using a different long-term investment return assumptions for future valuations (6.50%) is included.

Baseline Projection Results (7.00%)
($ in Thousands)

	2023	2028	2033	2042	2047	2053
Total Payroll	$34,846	$39,259	$43,291	$53,661	$60,533	$69,763
UAL	$227,310	$248,991	$254,082	$246,995	$224,363	$168,608
Normal Cost Rate	19.36%	20.08%	20.59%	20.93%	21.08%	21.28%
UAL Rate	29.72%	29.00%	28.49%	28.15%	28.00%	27.80%
FCR Rate	49.08%	49.08%	49.08%	49.08%	49.08%	49.08%
Funded Ratio	65.4%	66.0%	68.4%	73.9%	78.6%	85.9%
Amortization Period	31 years	29 years	27 years	19 years	15 years	9 years
ADC	51.62%	57.18%	61.52%	70.91%	78.10%	47.39%
ADC Ratio	105.18%	116.51%	125.35%	144.47%	159.12%	96.56%
Cash Flow %	(3.90)%	(4.12)%	(4.37)%	(3.67)%	(3.31)%	(2.96)%

Projection Results Assuming 6.50% (Long-Term Investment Return)
($ in Thousands)

	2023	2028	2033	2042	2047	2053
Total Payroll	$34,846	$39,259	$43,291	$53,661	$60,533	$69,763
UAL	$227,310	$302,127	$330,256	$390,197	$427,442	$476,858
Normal Cost Rate	19.36%	24.45%	24.72%	24.85%	24.99%	25.19%
UAL Rate	29.72%	24.63%	24.36%	24.23%	24.09%	23.89%
FCR Rate	49.08%	49.08%	49.08%	49.08%	49.08%	49.08%
Funded Ratio	65.4%	60.9%	61.2%	61.1%	61.6%	62.4%
Amortization Period	31 years	52 years	56 years	56 years	57 years	56 years
ADC	51.62%	68.45%	76.76%	96.94%	113.43%	79.68%
ADC Ratio	105.18%	139.47%	156.40%	197.52%	231.10%	162.35%
Cash Flow %	(3.90)%	(4.17)%	(4.57)%	(4.21)%	(4.01)%	(3.86)%

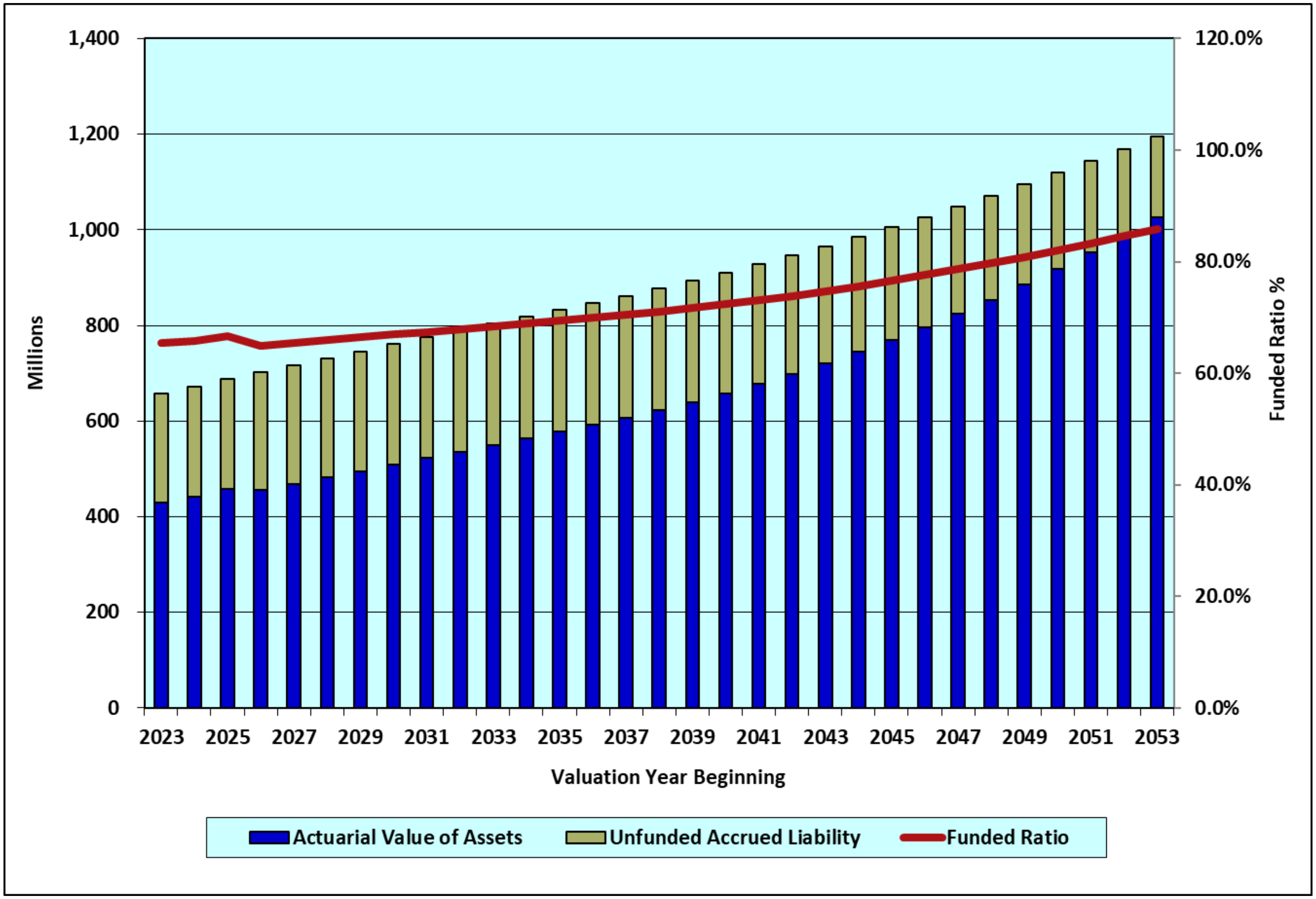
Section IX: Projection Results

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 7.00%) from the amounts shown in the baseline table on the previous page. As you can see from the graph, under the current assumptions, the funded ratio is expected to slightly increase during the projection period reaching 86% by the 2053 valuation year.

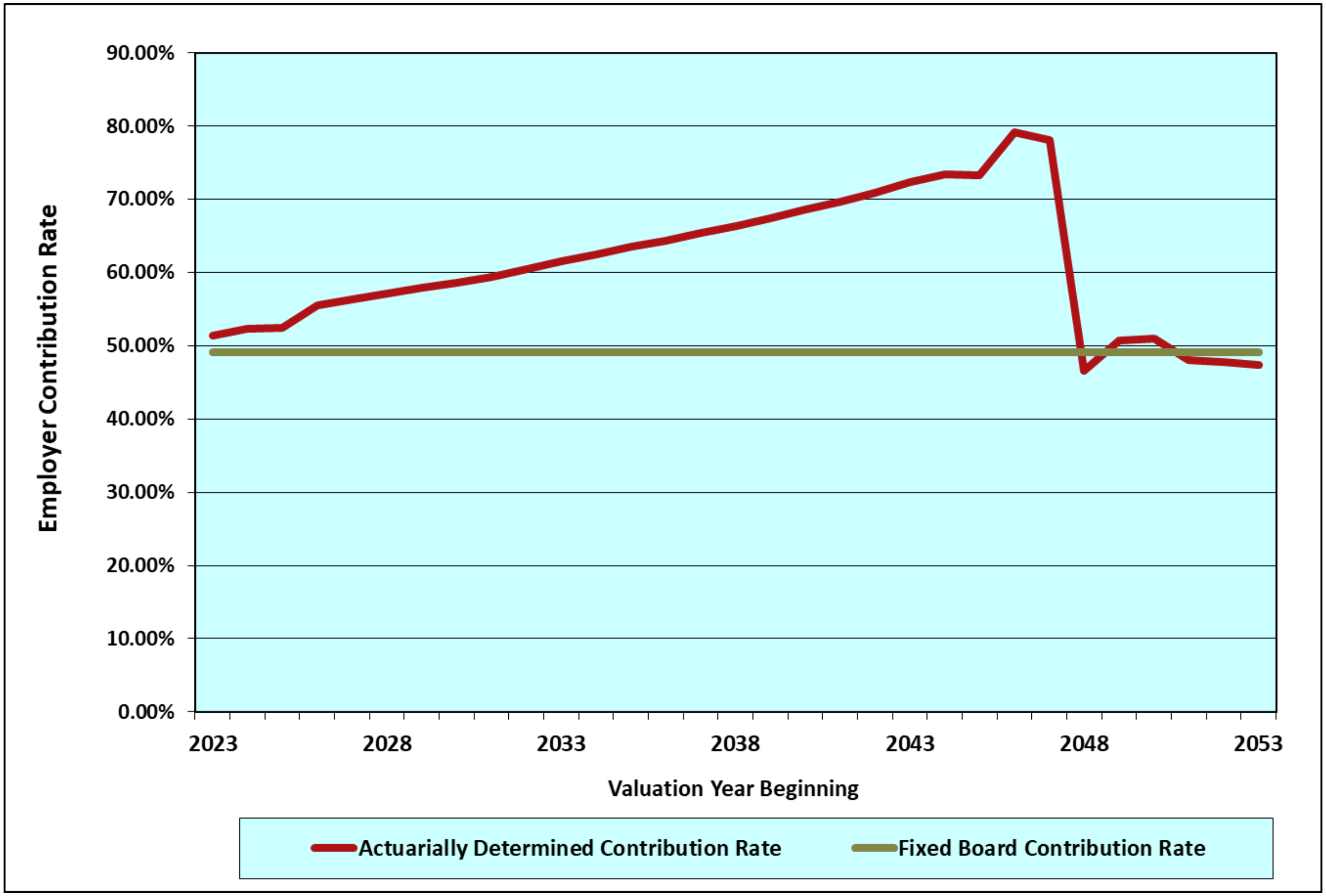
The second graph shows the projection of the calculated Actuarially Determined Contribution (ADC) based on the Board's Funding Policy and the current Fixed Contribution Rate (FCR) of 49.08% under the baseline valuation. As you can see from the graph, the ADC is expected to increase over the next five years as the investment losses from the past valuations are fully recognized. After this initial period, the ADC is then expected to increase even further for the remaining projection period, as the valuation results continue to include contribution deficiency shortfalls due to the difference between the ADC and FCR. The drop in the ADC near the end of the projection period is a result of the initial 2023 UAL base of $227 Million being paid off, based on the closed amortization period per the Board's Funding Policy.

Section IX: Projection Results

Mississippi PERS – HSPRS Plan
30 Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2023 Valuation Results



Mississippi PERS – HSPRS Plan
30 Year Projection of Employer Contribution Rates
Based on June 30, 2023 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 HSPRS, have negative cash flow, where benefit payments paid out of the trust are more than the contributions being collected by employers and employees.

Section X: Cash Flow Projections

For the fiscal year ending June 30, 2024, we are projecting HSPRS to have a negative cash flow of approximately $17 Million (benefit payments of $41 Million and contributions of $24 Million). With a market value of assets of $417 Million as of June 30, 2023, the cash flow as a percentage of assets is estimated to be negative 3.90% for the 2024 fiscal year. While the market value of assets is assumed to earn 7.00% 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 2024 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 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 pages demonstrate the open group projection of cash flow on (1), the baseline assumption, and then (2), a sensitivity analysis, using a one-year return of negative 5.00% for the fiscal year ending June 30, 2024. These results demonstrate the projection of this metric if HSPRS 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 38, the cash flow as a percentage of market value of assets does not at any point get less than negative 4.40% on the baseline assumptions, meaning that HSPRS assets should continue to increase as long as all baseline actuarial assumptions are met.

If there is a significant negative investment experience in one of the next five years (as seen on the table on page 39), the negative cash flow will be less than the baseline cash flow, however, HSPRS will not have a decrease in their assets at any point during the remaining 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 HSPRS assets during the projection period.

Section X: Cash Flow Projections

Mississippi PERS
30-year Open Group Projection of Cash Flow
HSPRS Plan
Based on June 30, 2023 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
2023	7.00%	36,364,545	416,724,000	24,293,831	(40,533,379)	-3.90%	28,611,909	12,372,361	429,096,361	2024
2024	7.00%	37,071,581	429,096,361	24,700,070	(40,887,849)	-3.77%	29,479,755	13,291,976	442,388,337	2025
2025	7.00%	37,822,505	442,388,337	25,131,525	(42,161,732)	-3.85%	30,381,208	13,351,001	455,739,338	2026
2026	7.00%	38,576,405	455,739,338	25,564,691	(43,552,362)	-3.95%	31,282,833	13,295,162	469,034,500	2027
2027	7.00%	39,259,318	469,034,500	25,957,069	(44,876,672)	-4.03%	32,181,429	13,261,827	482,296,327	2028
2028	7.00%	39,942,149	482,296,327	26,349,401	(46,218,361)	-4.12%	33,077,091	13,208,131	495,504,458	2029
2029	7.00%	40,692,551	495,504,458	26,780,556	(47,357,470)	-4.15%	33,977,301	13,400,387	508,904,845	2030
2030	7.00%	41,685,045	508,904,845	27,350,810	(48,616,933)	-4.18%	34,891,613	13,625,489	522,530,334	2031
2031	7.00%	42,596,376	522,530,334	27,874,429	(49,989,030)	-4.23%	35,816,203	13,701,602	536,231,936	2032
2032	7.00%	43,291,289	536,231,936	28,273,703	(51,413,905)	-4.32%	36,740,026	13,599,823	549,831,759	2033
2033	7.00%	44,084,979	549,831,759	28,729,730	(52,736,772)	-4.37%	37,662,188	13,655,146	563,486,905	2034
2034	7.00%	45,000,926	563,486,905	29,256,002	(54,043,031)	-4.40%	38,591,210	13,804,182	577,291,087	2035
2035	7.00%	45,997,067	577,291,087	29,828,351	(54,994,036)	-4.36%	39,544,474	14,378,789	591,669,876	2036
2036	7.00%	47,199,910	591,669,876	30,519,463	(55,909,795)	-4.29%	40,543,260	15,152,929	606,822,804	2037
2037	7.00%	48,364,384	606,822,804	31,188,531	(56,694,467)	-4.20%	41,599,987	16,094,051	622,916,855	2038
2038	7.00%	49,701,077	622,916,855	31,956,549	(57,544,381)	-4.11%	42,723,753	17,135,921	640,052,777	2039
2039	7.00%	50,940,196	640,052,777	32,668,505	(58,351,896)	-4.01%	43,919,979	18,236,587	658,289,364	2040
2040	7.00%	52,239,472	658,289,364	33,415,024	(59,082,195)	-3.90%	45,197,098	19,529,927	677,819,291	2041
2041	7.00%	53,660,904	677,819,291	34,231,731	(59,839,666)	-3.78%	46,566,231	20,958,296	698,777,588	2042
2042	7.00%	55,080,823	698,777,588	35,047,568	(60,686,649)	-3.67%	48,032,241	22,393,160	721,170,748	2043
2043	7.00%	56,417,039	721,170,748	35,815,312	(61,733,731)	-3.59%	49,590,150	23,671,731	744,842,479	2044
2044	7.00%	57,720,665	744,842,479	36,564,332	(62,738,711)	-3.51%	51,238,364	25,063,985	769,906,463	2045
2045	7.00%	59,143,544	769,906,463	37,381,870	(63,786,354)	-3.43%	52,984,926	26,580,442	796,486,905	2046
2046	7.00%	60,532,930	796,486,905	38,180,163	(65,039,583)	-3.37%	54,829,903	27,970,484	824,457,389	2047
2047	7.00%	61,894,074	824,457,389	38,962,231	(66,263,101)	-3.31%	56,772,648	29,471,778	853,929,167	2048
2048	7.00%	63,415,509	853,929,167	39,836,395	(67,532,228)	-3.24%	58,822,082	31,126,250	885,055,417	2049
2049	7.00%	64,903,177	885,055,417	40,691,159	(68,990,168)	-3.20%	60,980,166	32,681,157	917,736,573	2050
2050	7.00%	66,443,885	917,736,573	41,576,397	(70,398,792)	-3.14%	63,249,838	34,427,443	952,164,017	2051
2051	7.00%	68,099,592	952,164,017	42,527,710	(71,970,968)	-3.09%	65,638,396	36,195,138	988,359,154	2052
2052	7.00%	69,762,547	988,359,154	43,483,188	(73,463,460)	-3.03%	68,153,578	38,173,305	1,026,532,459	2053
2053	7.00%	71,545,506	1,026,532,459	44,507,615	(74,934,598)	-2.96%	70,810,339	40,383,356	1,066,915,815	2054

Section X: Cash Flow Projections

Mississippi PERS
30-year Open Group Projection of Cash Flow
HSPRS Plan
Based on June 30, 2023 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
2023	-5.00%	36,364,545	416,724,000	24,293,831	(40,533,379)	-3.90%	(20,425,005)	(36,664,553)	380,059,447	2024
2024	7.00%	37,071,581	380,059,447	24,700,070	(40,887,849)	-4.26%	26,047,172	9,859,393	389,918,840	2025
2025	7.00%	37,822,505	389,918,840	25,131,525	(42,161,732)	-4.37%	26,708,343	9,678,136	399,596,976	2026
2026	7.00%	38,576,405	399,596,976	25,564,691	(43,552,362)	-4.50%	27,352,868	9,365,197	408,962,173	2027
2027	7.00%	39,259,318	408,962,173	25,957,069	(44,876,672)	-4.63%	27,976,366	9,056,764	418,018,937	2028
2028	7.00%	39,942,149	418,018,937	26,349,401	(46,218,361)	-4.75%	28,577,674	8,708,714	426,727,651	2029
2029	7.00%	40,692,551	426,727,651	26,780,556	(47,357,470)	-4.82%	29,162,924	8,586,010	435,313,661	2030
2030	7.00%	41,685,045	435,313,661	27,350,810	(48,616,933)	-4.89%	29,740,231	8,474,107	443,787,768	2031
2031	7.00%	42,596,376	443,787,768	27,874,429	(49,989,030)	-4.98%	30,304,224	8,189,623	451,977,391	2032
2032	7.00%	43,291,289	451,977,391	28,273,703	(51,413,905)	-5.12%	30,842,208	7,702,005	459,679,396	2033
2033	7.00%	44,084,979	459,679,396	28,729,730	(52,736,772)	-5.22%	31,351,522	7,344,480	467,023,876	2034
2034	7.00%	45,000,926	467,023,876	29,256,002	(54,043,031)	-5.31%	31,838,798	7,051,770	474,075,646	2035
2035	7.00%	45,997,067	474,075,646	29,828,351	(54,994,036)	-5.31%	32,319,393	7,153,708	481,229,354	2036
2036	7.00%	47,199,910	481,229,354	30,519,463	(55,909,795)	-5.28%	32,812,423	7,422,092	488,651,445	2037
2037	7.00%	48,364,384	488,651,445	31,188,531	(56,694,467)	-5.22%	33,327,992	7,822,056	496,473,501	2038
2038	7.00%	49,701,077	496,473,501	31,956,549	(57,544,381)	-5.15%	33,872,718	8,284,886	504,758,388	2039
2039	7.00%	50,940,196	504,758,388	32,668,505	(58,351,896)	-5.09%	34,449,372	8,765,980	513,524,368	2040
2040	7.00%	52,239,472	513,524,368	33,415,024	(59,082,195)	-5.00%	35,063,549	9,396,378	522,920,746	2041
2041	7.00%	53,660,904	522,920,746	34,231,731	(59,839,666)	-4.90%	35,723,333	10,115,398	533,036,145	2042
2042	7.00%	55,080,823	533,036,145	35,047,568	(60,686,649)	-4.81%	36,430,340	10,791,259	543,827,404	2043
2043	7.00%	56,417,039	543,827,404	35,815,312	(61,733,731)	-4.77%	37,176,116	11,257,697	555,085,101	2044
2044	7.00%	57,720,665	555,085,101	36,564,332	(62,738,711)	-4.72%	37,955,348	11,780,969	566,866,069	2045
2045	7.00%	59,143,544	566,866,069	37,381,870	(63,786,354)	-4.66%	38,772,098	12,367,614	579,233,683	2046
2046	7.00%	60,532,930	579,233,683	38,180,163	(65,039,583)	-4.64%	39,622,178	12,762,759	591,996,442	2047
2047	7.00%	61,894,074	591,996,442	38,962,231	(66,263,101)	-4.61%	40,500,381	13,199,511	605,195,953	2048
2048	7.00%	63,415,509	605,195,953	39,836,395	(67,532,228)	-4.58%	41,410,757	13,714,925	618,910,878	2049
2049	7.00%	64,903,177	618,910,878	40,691,159	(68,990,168)	-4.57%	42,350,048	14,051,039	632,961,916	2050
2050	7.00%	66,443,885	632,961,916	41,576,397	(70,398,792)	-4.55%	43,315,612	14,493,217	647,455,134	2051
2051	7.00%	68,099,592	647,455,134	42,527,710	(71,970,968)	-4.55%	44,308,774	14,865,516	662,320,649	2052
2052	7.00%	69,762,547	662,320,649	43,483,188	(73,463,460)	-4.53%	45,330,883	15,350,610	677,671,259	2053
2053	7.00%	71,545,506	677,671,259	44,507,615	(74,934,598)	-4.49%	46,390,055	15,963,072	693,634,331	2054

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 changing 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.
- Liquidation Risk - the potential that the plan (or all covered employment) ended on the valuation date and all of the accrued benefits had to be paid with cash-flow matched bonds.

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 7.00% (6.50%). In this section, we keep the long-term investment return assumption at 7.00% but review the sensitivity of short-term investment returns as a single year event (and then 7.00% for all years thereafter) and simulate the next 10-year periods of returns (and then 7.00% for all years thereafter).

Projected Funded Ratios in 2047

Single Year Event	2023 Valuation	2022 Valuation*
• 1.00% for the next fiscal year	67.5%	80.2%
• 3.00% for the next fiscal year	71.2%	83.7%
• 5.00% for the next fiscal year	74.9%	87.2%
• **7.00% for the next fiscal year (Baseline)**	**78.6%**	**90.6%**
• 9.00% for the next fiscal year	82.3%	94.1%
• 11.00% for the next fiscal year	86.0%	97.6%
• 13.00% for the next fiscal year	89.7%	101.1%
• Simulate 2008 loss using -15% for the next fiscal year	38.0%	51.3%
Average Returns over next 10-Year Period (Simulated returns using mean and standard deviations from PERS' Investment Consultant's Capital Market Assumptions)**	**2023 Valuation**	**2022 Valuation**
• 6.00%	63.4%	68.8%
• 7.00%	78.8%	82.8%
• 8.00%	98.6%	100.6%

* *2022 valuation numbers were the Projected Funded Ratios in 2042 based on 7.55% expected return and sensitivity around that assumption.*

** *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 does have a significant impact to the funding of HSPRS 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 HSPRS, there have been significant fluctuations in active membership since 2008. In the baseline projections we assume a static population of 507 active members. 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 HSPRS, a 0.50% decrease in active population each year of the projection results in the active population dropping to 436. In the table below, we review these alternatives to the static active membership growth:

Projected Funded Ratio in 2047

Active Membership Growth	2023 Valuation	2022 Valuation*
• Increase 0.50% each year	82.2%	92.9%
• Increase 0.25% each year	80.4%	91.7%
• **Static Population (Baseline Assumption)**	**78.6%**	**90.6%**
• Decrease 0.25% each year	76.9%	89.6%
• Decrease 0.50% each year	75.1%	88.5%

* *2022 valuation numbers were the Projected Funded Ratios in 2042 based on 7.55% expected return.*

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 2023, the Board kept the wage inflation assumption at 2.65%, which is 0.25% above the price inflation of 2.40%. Wage inflation is a 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 6.75% 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 6.75%.

Projected Funded Ratios in 2047

Scenario	Price Inflation	Discount Rate	Wage Inflation	2023 Valuation	2022 Valuation*
1 - Baseline	2.40%	7.00%	2.65%	**78.6%**	**90.6%**
2	2.40%	6.75%	2.65%	69.7%	82.4%
3	2.10%	6.75%	2.35%	68.9%	80.3%

* *2022 valuation numbers were the Projected Funded Ratios in 2042 based on 7.55% expected return and sensitivity around that assumption.*

Section XI: Sensitivity Analysis

Contribution Risk

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

Projected Funded Ratios in 2047

Change in Fixed Contribution Rate (FCR)	2023 Valuation	2022 Valuation*
• Baseline	**78.6%**	**90.6%**
• 1.00% increase in FCR	81.0%	92.6%
• 1.00% decrease in FCR	76.2%	88.7%

** 2022 valuation numbers were the Projected Funded Ratios in 2042 based on 7.55% expected return.*

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 XI: Sensitivity Analysis

Liquidation Risk

Under the revised Actuarial Standards of Practice (ASOP) No. 4 effective for valuations after February 15, 2023, we must now include a low-default-risk obligation measure of the Fund's liability in our funding valuation report. This is an informational disclosure as described below and would not be appropriate for assessing the funding progress or health of this plan.

This measure uses the unit credit cost method and reflects all the assumptions and provisions of the funding valuation except that the discount rate is derived from considering low-default-risk fixed income securities. We considered the FTSE Pension Discount Curve based on market bond rates published by the Society of Actuaries as of June 30, 2023 and with the 30-year spot rate used for all durations beyond 30. Using these assumptions, we calculate a low-default-risk obligation measure liability of approximately $793,664,000.

This amount approximates the termination liability if the plan (or all covered employment) ended on the valuation date and all of the accrued benefits had to be paid with cash-flow matched bonds. This assurance of funded status and benefit security is typically more relevant for corporate plans than for governmental plans since governments rarely have the need or option to completely terminate a plan.

Section XII: Projection Summary

Utilizing the metrics based on the funding policy for HSPRS and with a fixed contribution rate as a percentage of annual compensation of 49.08% of payroll, the projection results for 2023 for HSPRS show that none of the funding policy metrics are in the Red Status. Therefore, we do not recommend an increase in the Fixed Contribution Rate (FCR) of 49.08% of annual compensation at this time. However, if there is any negative experience in the near future, the Fixed Contribution Rate may need to be increased.

Metrics	2023 Projection with 49.08% FCR (7.00%)	2023 Status
Funding Ratio in 2047	78.6%	Yellow
Cash Flow as a Percentage of Assets	(4.40)%	Green
ADC/FCR Ratio from 2023 Valuation	105.2%	Yellow
ADC/FCR Ratio from 2024 Valuation	106.5%	Yellow

Schedule A: Development of Assets

($ thousands)

	Valuation Date June 30:	2022	2023	2024	2025	2026	2027
A.	Actuarial Value Beginning of Year	$403,748	$419,219				
B.	Market Value End of Year	405,372	416,724				
C.	Market Value Beginning of Year	463,984	405,372				
D.	Cash Flow						
	D1. Contributions	18,331	20,299				
	D2. Other Revenue	3,501	3,159				
	D3. Benefit Payments	(40,522)	(41,122)				
	D4. Refunds	(134)	(161)				
	D5. Administrative Expenses	(319)	(359)				
	D6. Net	(19,143)	(18,184)				
E.	Investment Income						
	E1. Market Total: B.-C.-D6.	(39,469)	29,536				
	E2. Assumed Rate	7.55%	7.55%				
	E3. Amount for Immediate Recognition	35,217	29,919				
	E4. Amount for Phased-In Recognition	(74,686)	(383)				
F.	Phased-In Recognition of Investment Income						
	F1. Current Year: 0.20*E4.	(14,937)	(77)				
	F2. First Prior Year	17,632	(14,937)	(77)			
	F3. Second Prior Year	(3,334)	17,632	(14,937)	(77)		
	F4. Third Prior Year	(329)	(3,334)	17,632	(14,937)	(77)	
	F5. Fourth Prior Year	367	(329)	(3,334)	17,632	(14,937)	(77)
	F6. Total Recognized Investment Gain	(601)	(1,045)	(716)	2,618	(15,014)	(77)
G.	Actuarial Value End of Year: A + D6. + E3. + F6.	$419,219	$429,909				
H.	Difference Between Market & Actuarial Values	$(13,847)	$(13,185)	$(12,469)	$(15,087)	$(73)	$4

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, 2023 ($ in Thousands)	
	Market Value	**Actuarial Value**
(1) Assets at June 30, 2022	$405,372	$419,219
(2) Contributions and Misc. Revenue	23,458	23,458
(3) Investment Increment	29,536	28,874
(4) Benefit Payments	(41,122)	(41,122)
(5) Refunds	(161)	(161)
(6) Administrative Expenses	(359)	(359)
(7) Assets at June 30, 2023 (1)+(2)+(3)+(4)+(5)+(6)	$416,724	$429,909
(8) Net Investment Return [2 x (3)] / [(7) + (1) – (3)]	7.45%	7.37%

Schedule B: Statement of Actuarial Assumptions & Methods

The assumptions and methods used in the valuation are based on the results of the experience investigation for the four-year period ending June 30, 2022, dated April 21, 2023, and adopted by the Board in August 22, 2023.

INTEREST RATE: 7.00% per annum, compounded annually (net of investment expenses only). The expected return on assets consists of 2.40% price inflation and 4.60% real rate of return.

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

	Withdrawal		Death*		Disability		
Age	Less than 20 years of service	20 or more years of service	Males	Females	Duty and Non-Duty	Service	Service Retirement**
25	7.000%		0.0567%	0.0189%	0.0191%	5	7.5%
30	4.000		0.0630	0.0259	0.0259	10	7.5%
35	2.750	1.375%	0.0714	0.0350	0.0383	15	7.5%
40	2.000	1.000	0.0893	0.0483	0.0506	20	9.0%
45	2.000	1.000	0.1218	0.0665	0.0675	25	24.0%
50	2.000	1.000	0.1764	0.0917	0.1035	30	25.0%
55	0.000	0.000	0.2594	0.1274	0.1744	35	35.0%
60	0.000	0.000	0.3980	0.1757	0.2914	40+	100.0%

* Adjusted Base Rates.
** The annual rate of service retirement is 100% at age 63.

It is assumed that a member will be granted 1¾ years of service credit for unused leave at termination of employment. In addition, it is assumed that, on average, ½ year of service credit for peace-time military service will be granted to each member.

Schedule B: Statement of Actuarial Assumptions & Methods

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
0-4	2.35%	2.65%	5.00%
5-7	2.10	2.65	4.75
8-13	1.60	2.65	4.25
14-20	1.35	2.65	4.00
21-24	1.10	2.65	3.75
25	0.85	2.65	3.50

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.

Schedule B: Statement of Actuarial Assumptions & Methods

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: 1.00% of payroll.

TIMING OF DECREMENT AND PAY INCREASES: Middle of Year.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%

MARRIAGE ASSUMPTION: 100% married with the husband three years older than his wife.

SURVIVING CHILD BENEFITS ASSUMPTION: A small load is applied for surviving children.

MAXIMUM COVERED EARNINGS ASSUMPTION GROWTH: 2.65%

MODIFIED CASH REFUND: Benefits were valued with a twelve-year certain period for retirees and five years certain for active members to estimate the value of the modified cash refund feature.

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.

AMORTIZATION METHOD FOR ACTUARIALLY DETERMINED CONTRIBUTION (ADC): Level Percentage of Payroll Method using closed amortization periods as follows:

a. Existing UAAL on June 30, 2023 – 25 years.

b. Annual future actuarial experience gains and losses, assumption changes or benefit enhancements or reductions – 25 years from the date of the valuation.

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 7.00%). 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 HSPRS are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.

Under the entry age normal cost method, the actuarial present value of each member's projected benefits is allocated on a level basis over the member's compensation between the entry age of the member and the assumed exit ages. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses. 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 June 30, 2023, as interpreted in preparing the actuarial valuation.

DEFINITIONS

Average Compensation	Average annual covered earnings of an employee during the four highest consecutive years of service.
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 July 1, 1958, active duty military service, and retroactive service

Schedule C: Summary of Main Benefit & Contribution Provisions

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	Employee Rate	Maximum Covered Earnings*
7/1/2013	6/30/2018	37.00%	7.25%	
7/1/2018	6/30/2024	49.08	7.25	

* Maximum covered earnings equal wages paid, not to exceed wages paid to the Commissioner of the Department of Public Safety (currently $175,664).

Effective July 1, 2023, additional contributions from SB 2659 and HB 1015 are estimated to be $3,400,000 combined.

BENEFITS

Superannuation Retirement

Condition for Retirement

A retirement allowance is payable to any member who retires and has attained age 55 and completed at least five years of membership service or has attained age 45 and completed at least 20 years of creditable service, or has completed 25 years of creditable service regardless of age.

Any member who has attained age 63 shall be retired forthwith. Effective July 1, 2011, the Commissioner of Public Safety is authorized to allow a member who has attained age 63 to continue in active service. Such continued service may be authorized annually until the member attains age 65.

Amount of Allowance

The annual retirement allowance payable to a retired member 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. An employer's annuity which, together with the member's annuity, is equal to 2-1/2% of his or her average compensation for each year of membership service, plus

3. A prior service annuity equal to 2-1/2% of average compensation for each year of prior service.

The aggregate amounts of (2) and (3) above shall not exceed 100% of average compensation, regardless of service, for retirements on or after January 1, 2000.

The minimum allowance for both service and disability retirement based on the following table for each year of creditable service, reduced if necessary, as indicated below.

Service	Monthly Benefit
Less than 10 years	$250
10-15 years	$300
15 or more years	$500

The annual retirement allowance payable to a member who retires under condition (a) above prior to age 55 is computed in accordance with the above formula except that the employer's annuity and prior service annuity are reduced actuarially based on mortality table and interest rate used in the valuation.

Deferred Vested

Condition for Vesting

Any member who withdraws from service prior to his or her attainment of age 55 but after having completed five or more years of creditable service is entitled to receive, in lieu of a refund of his or her accumulated contributions, a retirement allowance commencing at age 55.

Amount of Allowance

The annual retirement allowance payable at age 55 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. An employer's annuity which, together with the member's annuity, is equal to 2-1/2% of his or her average compensation for each year of membership service, plus

3. A prior service annuity equal to 2-1/2% of average compensation for each year of prior service.

The aggregate amounts of (2) and (3) above shall not exceed 100% of average compensation, regardless of service, for retirements on or after January 1, 2000; 85% for retirements prior to January 1, 2000.

The minimum allowance for both service and disability retirement based on the following table for each year of creditable service, reduced if necessary as indicated below.

Service	Monthly Benefit
Less than 10 years	$250
10-15 years	$300
15 or more years	$500

Disability Retirement

Non-Duty-Related	Non-duty related disability benefits are available to vested members under the age of 55. Vested members age 55 or older are not eligible for disability benefits but may apply for service retirement benefits. For purposes of disability benefits, average annual compensation is calculated using the last two years of salary before retirement.
Duty-Related	If the member becomes permanently disabled due to sickness or injury caused or sustained as a direct result of duty, they may be eligible for duty-related disability retirement. They are covered for this benefit from the first day of employment if they have not reached age 55, regardless of their years of service. Duty-related disability retirement benefits are calculated at either 50 percent of average compensation of the last two years of salary before retirement (this portion is not taxable) or the non-duty-related disability retirement amount, whichever provides the higher benefit.

Death Benefits

Non-Duty-Related	If the member is vested, their spouse and dependent children may be eligible to receive certain statutory benefits. Claims for non-duty-related death benefits are calculated at 2.5 percent of average compensation for each year of service credit, as calculated under Option 9, Maximum Benefit. Under this option, 50 percent of the accrued benefit is payable to the member's spouse until death, with 25 percent of the accrued benefit payable to one dependent child and 50 percent of the accrued benefit payable for two or more dependent children (under age 19 and never married or under age 23 if a full-time student and never married). Upon application and approval by the Medical Board, benefits to a physically or mentally disabled child may continue as long as the disability exists.
Duty-Related	Coverage for duty-related death benefits begins on the first day of employment and is available to the member's spouse and dependent children regardless of their vesting status. If they are vested, their spouse and dependent children may be eligible to receive benefits under either non-duty or duty-related death benefit provisions, whichever provided the higher benefit. Claims for duty-related death benefits are calculated at 50 percent of average compensation, payable to the member's spouse until death, with 25 percent of average compensation payable to one dependent child and 50 percent of average compensation payable for two or more dependent children (under age 19 and never married or

	under age 23 if a full-time student and never married). Upon application and approval by the Medical Board, benefits to a physically or mentally disabled child may continue as long as the disability exists.
Death After Retirement	Upon the death of a highway patrolman who has retired for service or disability and who has not elected any other optional form of benefit, his widow or her widower is eligible for a benefit equal to 50% of his or her retirement allowance and each child (but not more than 2) who has not attained age 19 (23 if a full-time student) is eligible for a benefit equal to 25% of his or her retirement allowance. The benefit to the widow is payable for life and to children until they attain age 19 (23 if a full-time student) or for life if they are totally and permanently disabled.
Refund of Contributions	Upon a member's termination of employment for any reason before retirement, his or her accumulated contributions, together with regular interest thereon, are refunded. Upon the death of a member who is not eligible for any other death benefit, his or her accumulated contributions, together with regular interest thereon, are paid to his or her beneficiary. 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	For single retirees, the normal form of benefit is an allowance payable during the life of the member. For married retirees, the normal form of benefit is an allowance payable as described in Option 9 below. Upon death the benefits described above are payable.
Optional Benefits	A member upon retirement may elect to receive his 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 HSPRS 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.

Option 9. Upon his or her death, spouse will receive 50% of the benefit member was receiving for life. Each dependent child (under age 19 and never married or under age 23 if a full-time student and never married) will receive 25% of the benefit member was receiving with a maximum of 50% for the support and care of two or more children. Any contribution and interest remaining after member death and after all monthly benefits due to spouse and children have been paid will be refunded to designated beneficiaries. If the member marries after retirement while receiving benefits under this option, they may apply to Pop-Down to Option 2 to provide 100% beneficiary protection to new spouse, or Pop-down to Option 4 or Option 4A for other beneficiary protections for the new spouse. PLSO is available with this option, if eligible.

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 who qualifies for an unreduced retirement allowance may 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 either 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 this 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.

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 60*, plus (b) 3% compounded for each year thereafter beginning with the fiscal year in which the member turns age 60*.

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.

Those members who retired on or before July 1, 1999 received an ad hoc benefit increase in the amount of $3.50 per month per each full fiscal year of retirement through June 30, 1999 plus $1.00 per month for each year of credited service. The benefits were increased on July 1, 1999.

*this age will be reduced in five phases to age 55 if the actuary certifies that reducing the age will not result in the amortization period of the unfunded actuarial accrued liability exceeding 20 years.

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	Inactives	Deferred Vested	Retirees	Disableds	Survivors	
From PERS	547	37	44	613	13	190	1,444
Refunded	(7)	(4)					(11)
Deceased	(1)			(17)		(13)	(31)
Retiree Deceased						2	2
Certain Period End							(1)
Inactive	(1)	1					
Deferred Vested			1				1
Duplicate*	(27)						(27)
Retired	(4)			4			
For Valuation	507	34	45	600	13	179	1,378

*Also included in Pensioner File

STATUS RECONCILIATION FROM 2022 TO 2023

Reconciliation of Data from Last Year to This Year	Actives	Retirees	Disableds	Survivors	Deferred Vested	Inactives	Total
As of June 30, 2022	478	591	13	181	42	24	1,329
Retirement	(22)	26			(4)		
Disabled							
Death with Survivor		(11)		11			
Terminated Def Vested	(15)				15		
Inactives	(8)				(5)	13	
Return to Active Svc	2					(2)	
Refunded	(4)				(2)	(2)	(8)
Death No Survivor		(6)		(13)	(1)		(20)
Benefit Ended							
Removed/Cleanup							
New / Pick-up	76					1	77
As of June 30, 2023	507	600	13	179	45	34	1,378

Schedule D: Detailed Tabulations of the Data

Retirants & Beneficiaries as of June 30, 2023
Tabulated by Year of Retirement

Valuation Year of Retirement Ending June 30	No.	Total Annual Benefits, excluding COLA	COLA	Total Annual Benefits	Average Monthly Total Benefit
2023	26	$1,202,526	$0	$1,202,526	$3,854
2022	45	2,460,414	34,376	2,494,790	4,620
2021	29	1,520,076	74,829	1,594,905	4,583
2020	23	1,301,690	98,129	1,399,819	5,072
2019	26	1,172,818	126,628	1,299,446	4,165
2018	16	764,989	101,162	866,151	4,511
2017	18	802,918	130,453	933,371	4,321
2016	10	396,469	79,892	476,361	3,970
2015	15	703,343	167,379	870,722	4,837
2014	21	941,868	246,101	1,187,969	4,714
2013	16	644,831	189,319	834,150	4,345
2012	18	775,830	256,305	1,032,135	4,778
2011	20	883,693	321,003	1,204,696	5,020
2010	45	1,797,873	733,943	2,531,816	4,689
2009	29	1,232,432	531,922	1,764,354	5,070
2008	14	516,933	255,921	772,854	4,600
2007	20	671,391	328,954	1,000,345	4,168
2006	18	574,517	311,032	885,549	4,100
2005	20	600,369	348,617	948,986	3,954
2004	18	672,565	419,584	1,092,149	5,056
2003	9	198,337	125,162	323,499	2,995
2002	24	679,602	488,496	1,168,098	4,056
2001	21	611,286	453,760	1,065,046	4,226
2000	13	421,153	332,830	753,983	4,833
1999	14	400,097	337,289	737,386	4,389
1998	29	849,354	755,658	1,605,012	4,612
1997	26	655,771	623,319	1,279,090	4,100
1996	19	440,675	414,251	854,926	3,750
1995	15	372,059	376,915	748,974	4,161
1994	13	286,984	307,400	594,384	3,810
1993	17	325,355	332,226	657,581	3,223
1992	3	53,655	60,012	113,667	3,157
1991	4	46,882	54,192	101,074	2,106
1990	10	143,659	185,394	329,053	2,742
1989	1	20,314	27,095	47,409	3,951
1988	2	25,192	39,183	64,375	2,682
1987	77	1,194,822	1,646,952	2,841,774	3,076
1986 and Prior	48	403,099	696,568	1,099,667	1,909
TOTAL	792	$26,765,841	$12,012,251	$38,778,092	$4,080

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Type of Retirement

Benefits Payable June 30, 2023

Amount of Original Monthly Benefit	Number of Rets.	Ret Type 1*	Ret Type 2*	Ret Type 3*
$1 – $500	21	2	2	17
501 – 1,000	91	7	3	81
1,001 – 1,500	68	20	1	47
1,501 – 2,000	82	65	5	12
2,001 – 2,500	101	91	1	9
2,501 – 3,000	93	89	1	3
3,001 – 3,500	101	96		5
3,501 – 4,000	71	68		3
4,001 – 4,500	55	53		2
4,501 – 5,000	28	28		
Over 5,000	81	81		
Totals	792	600	13	179

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

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Type of Option

Benefits Payable June 30, 2023

Amount of Original Monthly Benefit	Number of Rets.	Life	Option 1	Option 2	Option 3	Option 4	Option 4A	Option 4B	Option 4C*	Option 9	PLSO* 1 Year	PLSO* 2 Years	PLSO* 3 Years
$1 – $500	21	17		1						3			
501 – 1,000	91	79		1	1			2	1	8		1	1
1,001 – 1,500	68	46		3				1	4	18	2		7
1,501 – 2,000	82	19		8	2		1	2	2	50	1	1	9
2,001 – 2,500	101	13		8				2	1	78	11	2	14
2,501 – 3,000	93	8		10	1		2	4	2	68	6	6	33
3,001 – 3,500	101	13	1	11		1		1		74	9	6	34
3,501 – 4,000	71	6		2	1	2	3	3		54	9	9	22
4,001 – 4,500	55	2	2	5			2	2		42	5	7	17
4,501 – 5,000	28		1	1						26	5	1	12
Over 5,000	81	1		1	1					78	9	9	22
Totals	792	204	4	51	6	3	8	17	10	499	57	42	171

Option Selected		
Life	-	Return of Contributions
Opt. 1	-	Return of Value 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. 9	-	Maximum Benefit with Pop-Down Provision
PLSO	-	Partial Lump Sum* (Reflects reduced monthly benefit)

*Included in other options

Schedule D: Detailed Tabulations of the Data

Retirant and Beneficiary Information June 30, 2023
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					5	$56,841	5	$56,841
20 – 24					1	$12,758	1	$12,758
25 – 29								$0
30 – 34								$0
35 – 39					5	$96,652	5	$96,652
40 – 44					2	$43,179	2	$43,179
45 – 49	12	$509,347	2	$30,500	1	$25,148	15	$564,995
50 – 54	57	$2,845,018	1	$25,720	7	$158,971	65	$3,029,709
55 – 59	56	$2,921,140	2	$75,595	5	$122,842	63	$3,119,577
60 – 64	100	$5,723,179	2	$63,548	5	$241,084	107	$6,027,811
65 – 69	132	$7,929,852			15	$473,966	147	$8,403,818
70 – 74	94	$5,332,991	2	$69,231	24	$724,312	120	$6,126,534
75 – 79	77	$4,198,697	1	$36,742	38	$1,208,496	116	$5,443,935
80 – 84	53	$2,879,377	1	$24,117	33	$869,782	87	$3,773,276
85 – 89	15	$886,005	1	$13,833	22	$587,026	38	$1,486,864
90 – 94	4	$169,701	1	$15,766	12	$304,809	17	$490,276
95					1	$34,941	1	$34,941
96					1	$30,084	1	$30,084
97								$0
98								$0
99					1	$19,271	1	$19,271
100 & Over					1	$17,571	1	$17,571
Totals	600	$33,395,307	13	$355,052	179	$5,027,733	792	$38,778,092

Average Age: 69.2 years
Average Age at Retirement: 50.3 years

Schedule D: Detailed Tabulations of the Data

Total Active Member Data as of June 30, 2023
Tabulated by Attained Ages and Years of Service

Attained Age	Completed Years of Service									Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Over	No.	Payroll
Under 25	20	4								24	$ 1,287,502
25 to 29	26	48	13							87	4,908,000
30 to 34	14	25	25	5						69	4,010,009
35 to 39	6	13	23	15	13					70	4,425,369
40 to 44	5	6	12	13	49	3				88	6,337,041
45 to 49	4	1	6	4	41	21	3			80	6,298,341
50 to 54	1	2	7	4	21	15	13	1		64	5,335,706
55 to 59					4	8	7	1	1	21	1,893,054
60 to 64						2	2			4	350,659
65 to 69											0
70 & Over											0
Total Count	76	99	86	41	128	49	25	2	1	507	$ 34,845,681

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

Age: 39.8 years
Service: 10.8 years
Annual Pay: $68,729

Schedule E: Analysis of Financial Experience

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

Type of Activity	$ Gain (or Loss) For Year Ending 6/30/2023	$ Gain (or Loss) For Year Ending 6/30/2022
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$ (427.3)	$ (1,070.2)
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	59.5	61.0
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	112.6	89.9
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	770.3	(82.6)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	1,386.4	(4,679.6)
New Members / Rehires. Additional unfunded actuarial accrued liability will produce a loss.	(382.6)	(454.4)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(2,090.6)	4,065.3
Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	1,136.6	706.5
Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	(2,617.8)	(2,897.4)
Gain (or Loss) During Year From Financial Experience	$ (2,052.9)	$ (4,261.2)
Non-Recurring Items. Adjustments for plan amendments, software changes, assumption changes, or method changes.	(42,719.5)	(13,327.6)
Composite Gain (or Loss) During Year	$ (44,772.4)	$ (17,588.8)

Schedule F: Funding Policy of HSPRS

The purpose of the funding policy is to state the overall funding goals and objectives for the Mississippi Highway Safety Patrol Retirement System (HSPRS), 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 HSPRS 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 HSPRS 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, HSPRS will strive to meet the following goals:

- Preservation of the defined benefit structure for providing lifetime benefits to the HSPRS 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 HSPRS 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 HSPRS' 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 HSPRS must consider contribution increases

Schedule F: Funding Policy of HSPRS

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 beginning July 1st, 18 months following the completion of the projection report (e.g., if the projection report in 2024 deems an increase to be considered, then it would be effective for July 1, 2026).

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 90% in 2047
Yellow	Funded Ratio between 70% and 90% in 2047
Red	Funded Ratio below 70% 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 5.25% (-5.25%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.25% (-5.25%) and negative 7.00% (-7.00%) during the projection period
Red	Net Cash Flow Percentage below negative 7.00% (-7.00%) during the projection period

Schedule F: Funding Policy of HSPRS

- **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

If all of the metrics are in the Greed Signal Light status in conjunction with the annual valuation report and the projection report and the following additional criteria is met for two consecutive valuation and projection cycles, the actuary may recommend to the Board an employer contribution rate decrease to consider. The additional criteria is based on the actuary's long-term investment return assumption recommended by the actuary in the most recent experience study and is as follows:

- Funded Ratio in 2047 is above 110%,
- Cash Flow as a percentage of assets is above negative 3.5% during the projection period, and
- ADC Ratio is below 90% for all years of the projection period.

Schedule F: Funding Policy of HSPRS

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 HSPRS' 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, 2023 – 25 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 HSPRS 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, 2022 (State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2022). The long-term investment return assumption adopted by the PERS' Board in conjunction with the experience investigation is 7.00 percent.

Schedule F: Funding Policy of HSPRS

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 HSPRS' 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 HSPRS' 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.

Schedule F: Funding Policy of HSPRS

- **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. HSPRS' annual valuation date is June 30.

Schedule G: History of HSPRS Plan Provisions

Since 1958, the benefit structure of the Highway Safety Patrol Retirement System (HSPRS) of Mississippi has undergone significant changes as noted in the table below.

Fiscal Year Beginning	Benefit Modifications
July 1, 1958	• Mississippi Highway Safety Patrol Retirement System created.
July 1, 1966	• Removed limit of $200 per month for disability retirement payments. • Eliminated reduction in retirement benefits resulting from Social Security payments. • Provided same survivor benefits to disability retirant's beneficiaries as those provided for service retirant's beneficiaries.
July 1, 1974	• Authorized military service credit (not to exceed 4 years maximum unless proof furnished member was retained by causes beyond his control).
July 1, 1975	• Provided additional benefit payments (13th Checks) to retired patrolmen. • Authorized payment of benefits to spouses and families of patrolmen who die after serving minimum period or who are killed in line of duty.
July 1, 1976	• Provided benefits to widows of highway patrolmen who were killed in line of duty prior to enactment of highway patrol retirement system.
July 1, 1977	• Provided that a highway patrolman who reenters service with the highway safety patrol may receive retirement credit for prior years upon repayment of amount refunded and interest from date of refund to repayment.
July 1, 1979	• Provided guaranty of benefits and maximum retirement allowance in the highway safety patrol retirement system.
July 1, 1980	• Provided a minimum service and disability retirement benefit for members of MHSPRS. • Provided any member who served in maritime service during periods of hostility in WWII shall be allowed credit for maritime service. • Provided all members who served in armed forces during war or military conflict or in maritime service during periods of hostility in WWII shall be allowed credit regardless of when they retired.
July 1, 1982	• Provided employer pickup of member contributions. • Increases additional payment (13th check) to 1/2 of annual percentage change of CPI not to exceed 2 1/2%.
July 1, 1984	• Provided that unused leave shall be treated as creditable service under MHSPRS.
July 1, 1985	• Increased 13th check to an amount equal to 2 1/2% of annual percentage change in CPI for years thru 6-30-85; and for subsequent years 100% of annual percentage change in CPI not to exceed 2 1/2%; provided an additional amount could be paid in increments of 1/4 of 1% to a maximum of 1 1/2% provided there were sufficient gains in excess of accrued liability.
July 1, 1986	• Reduced to 5 years the required years to qualify to retire at age 55. • Provided full retirement with 30 years creditable service regardless of age.

Schedule G: History of HSPRS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
	• Reduced the number of years which determine average compensation to 4 highest consecutive years. • 3% reduction in retirement allowance shall apply to the lesser of: each year of age below age 55 or each year less 30 years of creditable service. • Provided retirement allowance shall not exceed 85% of average compensation. • Provided mandatory retirement and termination of membership at age 60. • Provided no monthly benefit payment may be made for a period of time in excess of that allowed by federal law. • Provided an ad hoc increase of 3% to retirees who retired prior to July 1, 1986, and average compensation was based on 5 consecutive years of earned compensation instead of 4. • Provided that a retiree may elect by an irrevocable agreement to receive additional payment (13th check) in equal installments not to exceed 6 months. • Amended section 25-13-13 on death benefits to conform to section 25-13-11 allowing 5-year vesting by deleting 10-year requirement. • Provided a one-time early retirement for any member who had at least 20 years of creditable service; exempted early service retirement allowance from the 3% reduction if member is below age 55; allowance was based on current fiscal year's salary.
July 1, 1989	• Provided survivor benefits from day one of employment to a spouse and/or dependent children of a member who is either killed in the line of performance of duty or dies as a direct result.
July 1, 1990	• Amended section 25-13-11 to reduce from 30 to 25 numbers of years required for full retirement regardless of age. • Provided a 10% ad hoc increase in annual retirement allowance to retired members and beneficiaries with minimum benefits of $500.00 if retired with 15 or more years of service credit; $300.00 per month if retired with 10 or more but less than 15 years credit; $250.00 per month to anyone with less than 10 years credit; beneficiaries to receive a minimum of $250.00 per month. • Established options for service and disability retirees retiring 7-1-90 or later. • Provided an active member qualified for retirement may pre-select an option. • Provided option selection will take precedence over automatic survivor benefits.
July 1, 1991	• Allowed sworn agents of MS Bureau of Narcotics, who were employed by such bureau prior to December 1, 1990, regardless of age, may be employed as enforcement officers, if they meet all other qualifications. Those employed retain all compensatory, personal, and sick leave accrued. • Provided cost-of-living payment (13th check) shall be cumulative to conform to PERS law. • Provided regular interest shall be credited annually to member's employee contribution account.

Schedule G: History of HSPRS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 1992	• Provided benefits to dependent children to age 23 if they remain in school.
July 1, 1997	• Allowed retired Highway Patrolmen to irrevocably elect to have COLA (13th check) paid in twelve (12) equal installments.
July 1, 1999	• Provide that if the member and beneficiary die before having received in benefits an amount equal to the total of the contributions and accrued interest of the member at the time of death, that the balance will be refunded to the designated beneficiary or by statutory succession. • Provided that payment of death benefits shall be in accordance with the statutory provisions set forth as of the date of death of the member. • Authorized a retiree who retired before or after July 1, 1999, to be eligible for the same "pop-up" and "pop-down" provisions of PERS; and recalculates the benefits of those retirees who selected Option 5 "pop-up" protection. • Authorized an ad hoc benefit adjustment to each member of the Mississippi Highway Safety Patrol Retirement System (MHSPRS) retired on or before July 1, 1999, in the amount of $3.50 per month for each full fiscal year of retirement through June 30, 1999, plus $1.00 per month for each year of service credit used in the calculation of benefits. • Removed from consideration in the base COLA the requirement that the Consumer Price Index (CPI) have increased by at least 2 ½%. • Provided that a prorated portion of the annual adjustment will be paid to the beneficiary or estate of any member or beneficiary who is receiving the annual adjustment in a lump sum, but who dies between July 1 and December 1 in those cases where no more monthly benefits will be paid after the member's or beneficiary's death. This prorated portion will be equal to the amount that such recipient would have received had he or she elected to receive the annual adjustment for the year on a monthly basis.
July 1, 2000	• Deleted the maximum option where no additional benefits are payable after death. The statute retains Option 9, which provides a maximum option with a 50% survivor benefit with no reduction in the member's retirement allowance. • Provided for a new retirement option that would allow a member who is eligible for an <u>unreduced retirement benefit</u> to select a partial lump-sum option at retirement. • Allowed the Cost of Living Adjustment to be calculated on <u>all</u> full fiscal years in retirement, not just the years since the retirant's last retirement. • Provided for the same service credit for active duty, as is allowed in PERS and is no longer limited to active duty service during times of conflict. This amendment applies to all persons who have retired from the Highway Patrol and who qualify for such credit, whether they retired before or after July 1, 2000. This provision, however, did not require any back payments. • Changed the maximum limitation on the retirement benefit from 85% of the average compensation regardless of the years of service to 100% of the average compensation.

Schedule G: History of HSPRS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 2002	• Provided that Option 4-C, Social Security Leveling Option, will no longer be available to members retiring on or after July 1, 2004. • Provided that any member who has five years of service (reduced from 10 years) may apply for a regular non-duty related disability retirement allowance. • Provided for a compounded COLA, based on 3% of the retirement allowance for each full fiscal year in retirement with the 3% compounding beginning at age 60; to further provide that the age at which the compounding begins will be reduced gradually to age 55 as such can be accomplished without causing the unfunded accrued liability amortization period to exceed 20 years; to further provide that a pro-rated share of the lump-sum COLA will be paid if a benefit terminates before December 1 of the fiscal year. Also, allows the Board to grant a change in the manner the COLA is paid if a hardship is shown.
July 1, 2004	• Conformed the MHSPRS COLA section (except for the age of compounding) to the provisions in PERS. • Eliminated the re-marriage penalty which terminates a spouse's benefit, currently provided in subsections (1) and (3), upon his/her remarriage. This amendment also allows those spouses whose benefits have been previously terminated to apply to have the benefits reinstated prospectively.
July 1, 2008	• Allowed a retroactive effective date (up to 3 months) for retirees who revert from Option 2 or Option 4A to the maximum option following the death of the named beneficiary.
July 1, 2011	• Option 4, a 75% joint and survivor annuity, made available to members who retire on or after July 1, 2011 • For members hired on or after July 1, 2011, the mandatory retirement age was increased from age 60 to age 63.
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. • The early retirement formula shall be reduced by an actuarially determined percentage or factor (rather than a fixed 3%) for each year of age below 55 or for each year of service below 25, whichever is less.