



OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

TIER 1/TIER 2 AND OPSRP PENSION BENEFITS RHIA/RHIPA RETIREE MEDICAL BENEFITS

December 31, 2019 Actuarial Valuation

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September 17, 2020

Retirement Board
Oregon Public Employees Retirement System

Dear Members of the Board,

As part of our engagement with the Board, we performed an actuarial valuation of the Oregon Public Employees Retirement System (“PERS” or “the System”) as of December 31, 2019. Our findings are set forth in this actuarial valuation report. This report reflects the benefit provisions in effect as of December 31, 2019.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System’s staff. This information includes, but is not limited to, System benefit provisions as defined by statute, member census data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer a reasonable estimate of anticipated experience affecting the System.

This valuation report is only an estimate of the System’s financial condition as of a single date. It can neither predict the System’s future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: System 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 System benefit provisions or applicable law. Due to the limited scope of this assignment, we did not perform an analysis of the potential range of future measurements. The Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated herein in October 2019.



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Some of the actuarial computations presented in this report are for purposes of determining contribution rates effective from July 2021 to June 2023 for System employers. Other actuarial computations presented in this report are for purposes of assisting the System and participating employers in fulfilling their financial reporting requirements. The computations prepared for these two purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. The calculations in this report have been made on a basis consistent with our understanding of the System benefit provisions as summarized in this report. This report does not include results determined under GASB Statements Nos. 67 and 68, or under GASB Statements Nos. 74 and 75, which will be provided separately. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the use and benefit of the Oregon Public Employees Retirement System.

Milliman does not intend to benefit or create a legal duty to any third party recipient of this report. No third party recipient of Milliman's work product should rely upon this report. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the System. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the *Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* published by the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Assumptions related to the healthcare trend (cost inflation) rates for the RHIPA program discussed in this report were determined by Milliman actuaries qualified in such matters.

Sincerely,



Matt Larrabee, FSA, EA, MAAA
Principal and Consulting Actuary



Scott Preppernau, FSA, EA, MAAA
Principal and Consulting Actuary



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Executive Summary

Executive Summary

Milliman prepared this report for the Oregon Public Employees Retirement System to:

- Present Milliman’s actuarial estimates of the system-wide liabilities and expenses of the Oregon Public Employees Retirement System (PERS), including pension benefits provided through Tier 1/Tier 2 and the Oregon Public Service Retirement Plan (OPSRP), and retiree medical benefits provided through the Retiree Health Insurance Account (RHIA) and the Retiree Health Insurance Premium Account (RHIPA), as of December 31, 2019 for PERS to incorporate, as PERS deems appropriate, in its financial statements; and
- Provide information on system-wide average employer contribution rates and employer contribution rates for the School District rate pool and the State and Local Government Rate Pool (SLGRP) for the biennium beginning July 1, 2021.

This valuation does not cover the defined contribution Individual Account Program (IAP). Except where otherwise explicitly noted, contribution rates in this valuation do not include contributions to the IAP. In addition, the valuation does not include an allowance for employer debt service payments on pension obligation bonds.

Summarizing a key result of this report, the system-average collared “net” employer contribution rate for the 2021-2023 biennium decreased by less than 1% of payroll compared to the rate currently in effect for the 2019-2021 biennium. The decrease is primarily due to changes made by Senate Bill 1049 (discussed below), which was passed in June 2019. Further discussion and explanation of the change in collared rates can be found in our July 2020 presentation materials to the PERS Board.

For more information on projections of future rate increases, we encourage readers of this report to review our financial modeling presentations to the PERS Board. The most recent such presentation was given at the December 2019 PERS Board meeting.

Projected Benefit Payments and the Fundamental Cost Equation

The actuarial liabilities contained in this report are calculated from a projection of benefit payments. This projection reflects the current plan provisions, assumptions, and demographic information documented herein. The stream of projected future benefit payments is converted to a net present value as of the valuation date based on the valuation’s investment return assumption, which currently is 7.20%. The total net present value is then assigned to past, present, and future service according to the actuarial cost method. The portion assigned to the past is called the **actuarial accrued liability**¹, while the portion assigned to the current year is referred to as the **normal cost**.

Actuarial valuations provide a tool for measuring a System’s progress towards funding its benefit obligations and adjusting budgeted contributions as appropriate to reflect changing circumstances. Even though they affect actuarial funded status and contribution rate calculations, assumptions regarding plan investment returns and participant experience do not affect the ultimate long-term cost of the program, which is governed by the **fundamental cost equation**:

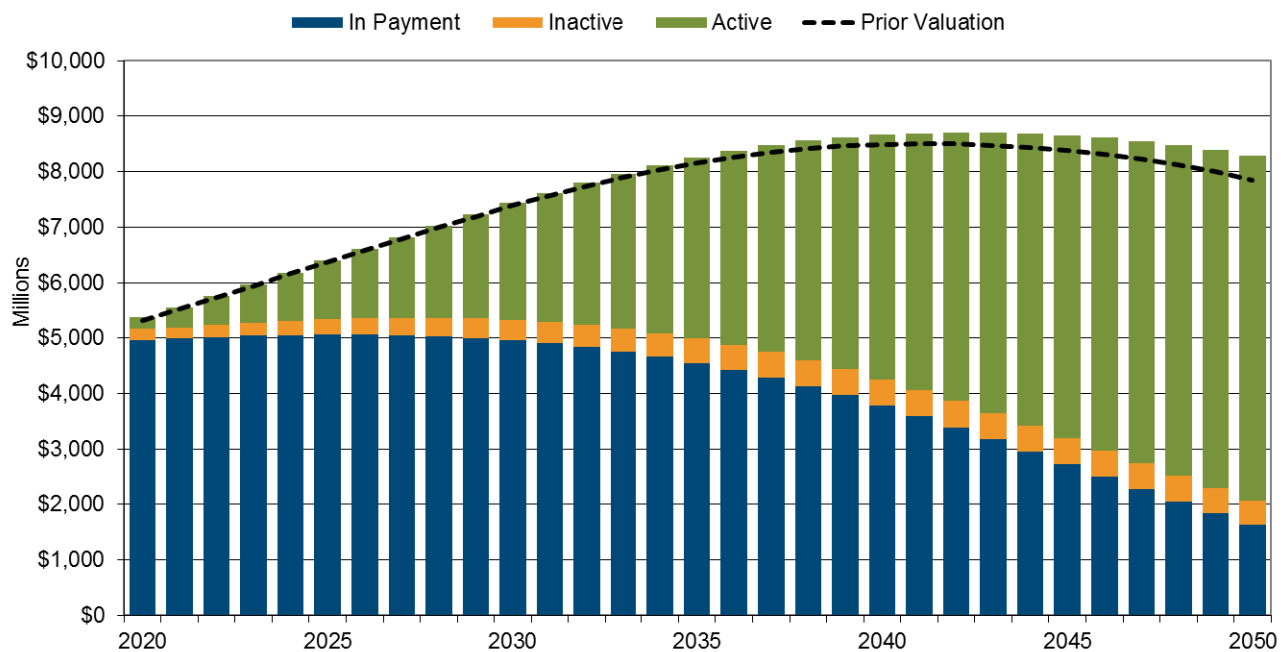
$$\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Earnings}$$

¹ *Bolded terms from the Executive Summary are defined in the report glossary.*

From a plan funding perspective, contributions are the balancing item in the equation. To the extent actual plan investment earnings underperform compared to assumption, contributions must increase to fund the defined level of benefits; if investments outperform the assumption, contributions can decrease.

The graph below illustrates projected benefit payments from the System calculated in both the current valuation and the prior valuation, organized by member status as of the actuarial valuation date. The graph includes the estimated effects on projected benefits of anticipated future service by current active members, including the assumed effects of future salary increases. The graph does not include expected benefit payments for members hired after the valuation date. The dotted line illustrates the shape of the graph from the prior valuation, which was performed as of December 31, 2018. As shown in the graph, there was little change in the projected benefits calculated in the current valuation.

Tier 1/Tier 2 & OPSRP Expected Benefit Payments
by status as of 12/31/2019



Retirement System Risks

Oregon PERS, like all defined benefit plans, is subject to various risks that will affect the future plan liabilities and contribution requirements, including investment risk, demographic risk, and contribution risk. While the results of an actuarial valuation are based on one set of reasonable assumptions, it is almost certain that future experience will not exactly match the assumptions. The section of this report titled *Risk Disclosure* discusses the System's risks in more detail. In addition, our annual financial modeling work provides analysis of the effect of different possible future experience with a key source of risk: future investment performance.

Employer Contribution Rates

Pension Contribution Rates

This report presents system average employer contribution rates calculated as of December 31, 2019. When adopted by the PERS Board, the employer contribution rates presented will be first effective July 1, 2021. The December 31, 2017 valuation presented the employer contribution rates effective from July 1, 2019 through June 30, 2021 that were adopted on October 5, 2018 by the PERS Board.

Employer pension contribution rates consist of a normal cost rate and a rate to amortize the Unfunded Accrued Liability (UAL). Normal cost rates are calculated and charged separately to the Tier 1/Tier 2, OPSRP general service and OPSRP police and fire payrolls. UAL rates are calculated separately for Tier 1/Tier 2 and OPSRP, but each UAL rate so developed is then charged across all payrolls. Rates for individual employers are adjusted if the employer maintains a side account or has a **pre-SLGRP liability or surplus**. The table below compares the average employer contribution rates for each type of payroll calculated for this valuation to the rates in effect from July 1, 2019 through June 30, 2021. In the table below, redirected member contributions under Senate Bill 1049 fund a portion of the normal cost rate effective July 1, 2021, and serve as a partial offset to the employer contribution rate otherwise payable absent that redirection.

Collared Pension Contribution Rates (Excludes IAP)						
Payroll	Effective July 1, 2021			Effective July 1, 2019		
	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire
Normal Cost Rate	14.92%	8.64%	13.00%	15.27%	8.40%	13.03%
Tier 1/Tier 2 UAL Rate ¹	13.04%	13.04%	13.04%	12.19%	12.19%	12.19%
OPSRP UAL Rate	1.69%	1.69%	1.69%	1.45%	1.45%	1.45%
Total Pension Rate	29.65%	23.37%	27.73%	28.91%	22.04%	26.67%
Average Adjustment ²	(6.64%)	(6.64%)	(6.64%)	(6.91%)	(6.91%)	(6.91%)
Member Redirect Offset ³	(2.45%)	(0.70%)	(0.70%)	N/A	N/A	N/A
Net Employer Pension Rate	20.56%	16.03%	20.39%	22.00%	15.13%	19.76%

¹ Includes Multnomah Fire District #10

² Adjustments shown are for side accounts and pre-SLGRP liabilities and are shown on system-wide average basis. For this purpose, adjustments are not assumed to be limited when an individual employer reaches a 0% contribution rate.

³ Redirected member contributions under Senate Bill 1049 (2.50% of payroll for Tier 1/Tier 2 and 0.75% of payroll for OPSRP) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

Average collared UAL rates calculated in this valuation increased compared to the contribution rates calculated in the December 31, 2017 valuation, which produced rates effective July 1, 2019. This is primarily due to continued systematic UAL rate increases via the rate collar methodology, the mechanics of which are detailed later in this report. The Tier 1/Tier 2 UAL rate effective July 1, 2021 reflects a reamortization of the Tier 1/Tier 2 UAL over 22 years, as directed by Senate Bill 1049. The reamortization resulted in smaller increase in the UAL rate, but means the UAL rate will be expected to be paid over a longer period of time, if all assumptions are met. A portion of the Total Pension Rate for each payroll category will be paid by the redirected member contributions, as shown in the table.

Pension contribution rates differ for each Tier 1/Tier 2 rate pool. This report calculates the specific rates for each rate pool. Tier 1/Tier 2 rates for independent employers (employers that do not participate in a Tier 1/Tier 2 rate pool) are calculated in separate reports for each employer. Changes from biennium to biennium in pension contribution rates for each rate pool (or independent employer) are confined to a **rate collar** depending on **funded status**. The table below shows the employer pension contribution rates for each Tier 1/Tier 2 rate pool calculated in this valuation compared to the rates in effect as of July 1, 2019, along with the average adjustment to those rates for side account rate offsets and for pre-SLGRP and Transition Liability/(Surplus) charges and credits and the effect of the offset for redirected member contributions.

Tier 1/Tier 2 Collared Pension Contribution Rates (Excludes IAP, OPSRP UAL Rates)				
	Effective July 1, 2021		Effective July 1, 2019	
	SLGRP	School Districts	SLGRP	School Districts
Tier 1/Tier 2 Normal Cost Rate	15.41%	13.45%	15.83%	13.79%
Tier 1/Tier 2 UAL Rate ¹	12.67%	14.09%	10.43%	16.73%
Total Tier 1/Tier 2 Pension Rate²	28.08%	27.54%	26.26%	30.52%
Average Adjustment ³	(5.68%)	(9.93%)	(5.68%)	(10.66%)
Member Redirect Offset ⁴	(2.45%)	(2.45%)	N/A	N/A
Net Employer Tier 1/Tier 2 Pension Rate²	19.95%	15.16%	20.58%	19.86%

¹ Includes Multnomah Fire District #10

² Excludes OPSRP UAL rate, which is also charged on Tier 1/Tier 2 payroll

³ Adjustments shown are for side accounts and pre-SLGRP liabilities and are shown on a rate pool average basis. For this purpose, adjustments are not assumed to be limited when an individual employer reaches a 0% contribution rate.

⁴ Redirected member contributions under Senate Bill 1049 (2.50% of payroll for Tier 1/Tier 2) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

The Tier 1/Tier 2 contribution rates shown here are after reflecting the effects of the rate collar. In recent rate-setting valuations, due to the impact of the *Moro* decision and assumption changes (primarily lower investment return), both the SLGRP and the School District rate pool had “before collar” (or “uncollared”) contribution rates that exceeded the maximum single biennium rate increase allowed by the collar. In the December 31, 2019 valuation, the contribution rate increases calculated for both the SLGRP and the School District rate pool are no longer limited by the collar, as shown below. In general, any contribution rate increases deferred by the rate collar will be reflected in future rate-setting periods. For both the SLGRP and School District pools, since the rate collar is not limiting the contribution rate calculated in this valuation, there currently are not any deferred increases beyond the July 1, 2021 contribution rates shown in this valuation. As noted in the table above, the “average adjustment” in the table below quantifies the effects of side accounts and pre-SLGRP liabilities on a rate pool average basis.

Collar Impact on Tier 1/Tier 2 Pension Contribution Rates (Excludes IAP, OPSRP UAL Rates)		
	Effective July 1, 2021	
	SLGRP	School Districts
Total Tier 1/Tier 2 Pension Rate Before Collar¹	28.08%	27.54%
Collar Adjustment	0.00%	0.00%
Total Tier 1/Tier 2 Pension Rate After Collar¹	28.08%	27.54%
Average Adjustment	(5.68%)	(9.93%)
Member Redirect Offset	(2.45%)	(2.45%)
Net Employer Tier 1/Tier 2 Pension Rate¹	19.95%	15.16%

¹ Excludes OPSRP UAL rate, which is also charged on Tier 1/Tier 2 payroll

Retiree Healthcare Contribution Rates

In addition to the pension contribution rates, all employers contribute to the Retirement Health Insurance Account (RHIA). Further, State Agencies and State Judiciary also contribute to the Retiree Health Insurance Premium Account (RHIPA). Only Tier 1 and Tier 2 members are eligible for these benefits, so the normal cost rates are only charged to Tier 1/Tier 2 payroll, but the UAL rates are charged to all payrolls. For each type of payroll used in this valuation the table below compares the employer contribution rates calculated in this valuation to the rates in effect from July 1, 2019 through June 30, 2021. The funded status for both retiree healthcare programs has historically lagged those of the defined benefit pension programs. In response to this, the UAL on the retiree healthcare programs is amortized over a ten-year period, which is shorter than the pension program amortization periods, in an effort to more rapidly improve funded status. Funded status for both programs have materially improved since the amortization change was implemented, with the funded status for the larger RHIA program above 100%. With its funded status over 100%, the RHIA UAL contribution rate was set to 0.00% of payroll for 2021-2023.

Retiree Healthcare Contribution Rates						
Payroll	Effective July 1, 2021			Effective July 1, 2019		
	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire
RHIA Normal Cost Rate	0.05%	0.00%	0.00%	0.06%	0.00%	0.00%
RHIA UAL Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total RHIA rate	0.05%	0.00%	0.00%	0.06%	0.00%	0.00%
RHIPA Normal Cost Rate	0.11%	0.00%	0.00%	0.12%	0.00%	0.00%
RHIPA UAL Rate	0.17%	0.17%	0.17%	0.27%	0.27%	0.27%
Total RHIPA rate	0.28%	0.17%	0.17%	0.39%	0.27%	0.27%

System-Average Total Pension Contribution Rates

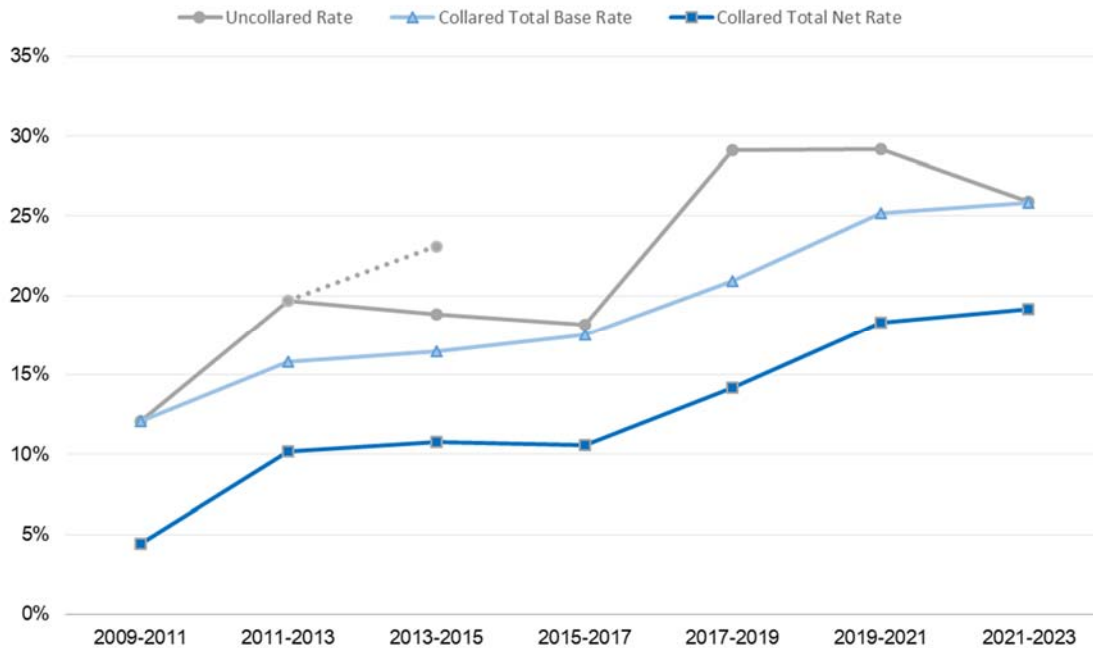
The system-wide weighted average pension contribution rates are shown below for each period since the July 1, 2009 to June 30, 2011 biennium, the rates for which were based on the December 31, 2007 rate-setting valuation. The rates shown reflect a blend of Tier 1/Tier 2 and OPSRP normal costs based on the relative proportions of system-wide payroll between those categories at the relevant rate-setting valuation. Rates shown are for illustration only, as no employer pays the system-wide average contribution rate, but instead each employer pays a rate determined based on its own experience or that of its rate pool.

The graph shows the average level of uncollared rates, collared base rates, and collared net rates over the depicted period. All rates are “Total Pension Rates”, and do not reflect the offset to employer contribution rates beginning with the July 1, 2021 to June 30, 2023 biennium due to redirected member contributions.

The uncollared rate is calculated based on the normal cost and UAL rates initially calculated in a valuation and is the starting point of the rate-setting process. If the uncollared rate is well above (or below) the current (collared) rate being paid, the contribution rate stabilization method (the “rate collar”) limits the increase (or decrease) in the rate paid in the next biennium. As a result, the collared rate may temporarily be below (or above) the uncollared rate, as the rate collar methodology systematically spreads large adjustments over multiple periods.

For an individual employer, collared base pension rates are adjusted for side account rate offsets to develop collared net pension rates paid by the employer. Side accounts are the result of employer supplemental deposits, often financed through a pension obligation bond. When a supplemental deposit is made, a side account is established (after any Transition Liabilities related to joining the SLGRP have been paid) and used to offset the otherwise required contribution rate. This occurs by having the employer pay part of its collared contribution rate via a transfer from its side account. As of December 31, 2019, the system has approximately \$5.5 billion in unamortized side accounts, slightly more than last year. At a system-average level, side accounts now offset employer contribution rates by 6.24% of payroll, but there is wide variation between employers.

For individual employers in the SLGRP, collared base pension rates are also adjusted for amortization charges (or credits) on pre-SLGRP liabilities (or assets). The average adjustment to individual employer rates due to side accounts and pre-SLGRP charges or credits is shown on a combined basis in the table on page 4.



The system-average total pension contribution rates shown above reflect significant recent events affecting the System:

- The 2009-2011 contribution rates were set before the financial crisis (based on the December 31, 2007 rate-setting valuation). Rates increased in 2011-2013, reflecting the asset losses during 2008 and 2009.
- The dotted line shown for the uncollared rate in 2013-2015 illustrates the basis for the initially adopted contribution rates for that biennium. However, legislative changes to the system made in 2013 (most notably to the COLA) reduced projected future benefits. At legislative direction, contribution rates were reduced to reflect the legislated changes, and these rates are shown in the solid lines for 2013-2015.
- The 2015 Oregon Supreme Court ruling in *Moro v. State of Oregon* reversed the majority of the effect of the 2013 legislation. The decision first affected contribution rates for the 2017-2019 biennium, leading to a significant increase in the uncollared rate and the first of multiple scheduled increases in the collared rate to reflect the change.
- The valuation assumed return was 8.00% for contribution rates effective through the 2013-2015 biennium. The rate was lowered to 7.75% for the 2015-2017 biennium, to 7.50% for the 2017-2019 biennium, and then to 7.20% for the 2019-2021 and 2021-2023 biennia. A lower assumed return increases the estimated present value of liabilities and increases near-term calculated contribution rates.
- The contribution rates based on this valuation are shown for the 2021-23 biennium. Based on this valuation at a system-average level, the increase in the collared total base rate is projected to result in a rate equal to the uncollared rate for employers comprising the substantial majority of PERS payroll.

As noted above, rates shown in the graph do not reflect the offset to employer contribution rates beginning with the July 1, 2021 to June 30, 2023 biennium due to redirected member contributions.

Limits on Future Pension Contribution Rates

The minimum and maximum of the sum of the Tier 1/Tier 2 Normal Cost Rate and the Tier 1/Tier 2 UAL Rate that can be effective July 1, 2021 for each Tier 1/Tier 2 rate pool (prior to adjustments discussed below) are shown in the next table. The limits are calculated and applied on an individual employer basis for independent employers. The contribution rates for employers in Tier 1/Tier 2 pooling arrangements (i.e., the SLGRP and School Districts rate pool) are adjusted from the rates of the pool to reflect side account rate offsets, charges or credits for pre-SLGRP liabilities, and adjustments to the normal cost rates of SLGRP employers to reflect the employer’s ratio of general service to police and fire payroll. These adjustments are not limited by the rate collar.

The size of the rate collar depends on the funded status of a rate pool or employer. When funded status excluding side accounts is less than 60 percent or above 140 percent, the size of the rate collar is twice the size of the “single collar” that applies when funded status excluding side accounts is between 70 percent and 130 percent. The rate collar provides a graded schedule between the single and double rate collars if the funded status excluding side accounts is between 60% and 70% or 130% and 140%.

	Limits on Sum of Tier 1/Tier 2 Normal Cost and UAL Rates	
	Effective July 1, 2023	
	SLGRP	School Districts
Between 70% and 130% Funded		
Minimum Rate	22.46%	22.03%
Maximum Rate	33.70%	33.05%
Less than 60% or Greater than 140% Funded		
Minimum Rate	16.84%	16.52%
Maximum Rate	39.32%	38.56%

For Rate Pools funded between 60% and 70% or between 130% and 140% the limits vary linearly between the rates shown above. Rates shown exclude OPSRP UAL rate, which is also charged on Tier 1/Tier 2 payroll

Funded Status

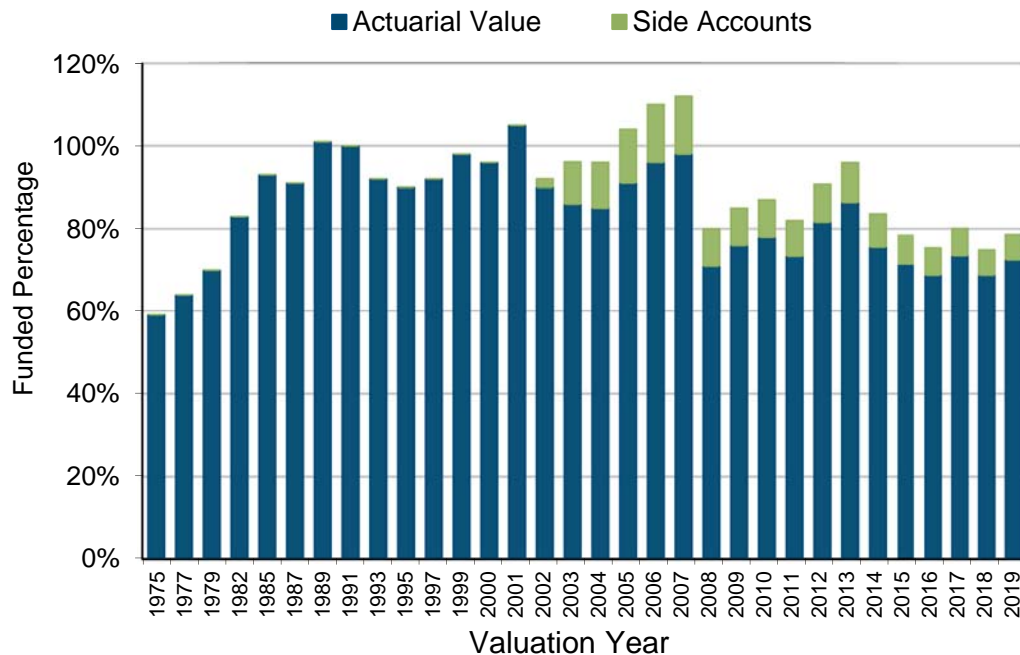
The table below shows the funded status of the various pension rate pools both on the basis used to calculate the contribution rate for each rate pool and after adjustment for side accounts (assuming side accounts offset Tier 1/Tier 2 liabilities). For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	OPSRP	Pension System Totals ¹
December 31, 2019					
Actuarial accrued liability	\$44,122.1	\$30,274.5	\$6,916.0	\$8,082.2	\$89,445.7
Actuarial value of assets	\$31,384.1	\$22,394.1	\$4,964.6	\$6,190.4	\$64,842.2
Funded status	71.1%	74.0%	71.8%	76.6%	72.5%
Side accounts	\$2,675.9	\$2,697.4	\$96.7	\$0.0	\$5,470.0
Funded status reflecting side accounts	77.2%	82.9%	73.2%	76.6%	78.6%
December 31, 2018					
Actuarial accrued liability	\$43,149.3	\$29,898.4	\$6,736.3	\$6,738.0	\$86,574.7
Actuarial value of assets	\$29,383.7	\$20,846.8	\$4,673.1	\$4,783.0	\$59,593.0
Funded status	68.1%	69.7%	69.4%	71.0%	68.8%
Side accounts	\$2,415.1	\$2,711.0	\$83.1	\$0.0	\$5,209.3
Funded status reflecting side accounts	73.7%	78.8%	70.6%	71.0%	74.9%

Amounts in millions

¹ Includes Multnomah Fire District #10

As shown in the graph below, the funded status of the system generally improved until the market decline of 2000-2002. After the decline, funded status generally improved for several years due to better than expected investment returns until 2008, when it decreased significantly due to investment losses. Funded status then improved through the December 31, 2013 valuation due to legislative changes in plan provisions and investment gains during 2012 and 2013. Funded status declined in the December 31, 2014 valuation due to the combined effects of the *Moro* decision and assumption changes. It continued decreasing in subsequent years due to the combined effects of investment losses and adoption of a lower assumed rate of return, then improved in the December 31, 2017 valuation due to 2017 investment gains, decreased in the December 31, 2018 valuation due to lower than expected investment returns in 2018, and increased in the current valuation due to 2019 investment gains.



The retiree medical benefits are funded using a 401(h) account within the pension trust. The table below shows the funded status of the retiree medical programs. The funded status of the RHIA and RHIPA programs improved since the prior valuation due the effects of employer contributions and actual member plan coverage election experience.

	December 31, 2019			December 31, 2018		
	RHIA	RHIPA	Total	RHIA	RHIPA	Total
Actuarial accrued liability	\$403.9	\$59.3	\$463.2	\$411.7	\$62.7	\$474.4
Actuarial value of assets	\$644.1	\$51.9	\$696.0	\$570.7	\$38.5	\$609.2
Funded status	159.5%	87.5%	150.3%	138.6%	61.3%	128.4%

Amounts in millions

Asset Changes

Since December 31, 2018, contributions (including supplemental deposits but excluding side account rate offset transfers) for pension benefits have increased assets by 3.1% while benefit payments decreased assets by about 7.4%. On the whole, assets increased by 8.7%, since the investment returns of approximately 13.0% of beginning of year market value were enough to offset the system's negative non-investment-related cash flow position.

	Amount	Percentage of Beginning Market Value
Market Value of Assets, December 31, 2018	\$66,537.2	
Contributions	2,073.5	3.1%
Investment Income (less administrative expenses)	8,643.8	13.0%
Benefit Payments	(4,955.8)	(7.4%)
Market Value of Assets, December 31, 2019	\$72,298.6	108.7%

Amounts in millions

The Tier 1 Rate Guarantee Reserve that is used to pay for the interest crediting rate guarantee on active Tier 1 member accounts when actual investment earnings are below the assumed rate has increased from a reserve of \$258 million as of December 31, 2018 to a reserve of \$492 million as of December 31, 2019 due to investment performance and Tier 1 retirement patterns in 2019. Tier 1 non-retired member accounts that are linked to the Rate Guarantee Reserve decreased from \$3.8 billion on December 31, 2018 to \$3.4 billion on December 31, 2019 due to retirements during the year of Tier 1 active members.

Market values of assets are reported to Milliman by PERS. It is our understanding that the December 31 market values of select real estate and private equity investments are reported on a three-month lag basis. This valuation report does not attempt to quantify the impact of any such lag effects.

Liability Changes

Since December 31, 2018, the system-wide actuarial accrued liability has increased primarily due to interest on the liability as current active members get closer to retirement. The normal cost for 2019, or the present value of projected future benefits for active members allocated to that year of service, was about one-quarter of the value of benefits paid out during the year. The remaining increase in the actuarial accrued liability was attributable to demographic experience, which includes actual experience differing from assumption, data corrections, and the effect of new members joining the system during the year. The largest demographic experience effects in descending order of magnitude resulted from pay increases differing from assumption, active retirement levels differing from assumption, new members entering the system, and interest crediting on member account balances differing from assumption.

	Amount	Percentage of Beginning AAL
Actuarial Accrued Liability, December 31, 2018	\$87,049.1	
Normal Cost	1,207.1	1.4%
Benefit Payments	(4,955.8)	(5.7%)
Interest	6,132.6	7.0%
Assumption & Method Changes	0.0	0.0%
Plan Changes	0.0	0.0%
Demographic Experience	475.9	0.5%
Actuarial Accrued Liability, December 31, 2019	\$89,909.0	103.3%

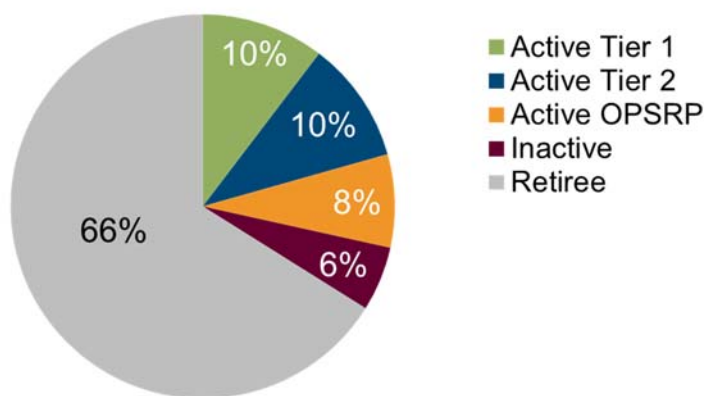
Amounts in millions

The Oregon Public Employees Retirement System is a mature system. There are currently 1.18 active members in the system for every annuitant (including retired members and beneficiaries). By comparison, the average ratio in NASRA’s December 2019 Public Fund Survey is 1.35. Since contributions to the system are based on active payroll, a lower active-to-annuitant ratio generally means there will be a larger change in contribution rates for any given level of actuarial gain or loss, such as for investment experience varying from assumption by a certain percentage, compared to peer systems. The ratio of active members to annuitants may decline further as a significant portion of active members are currently eligible to retire.

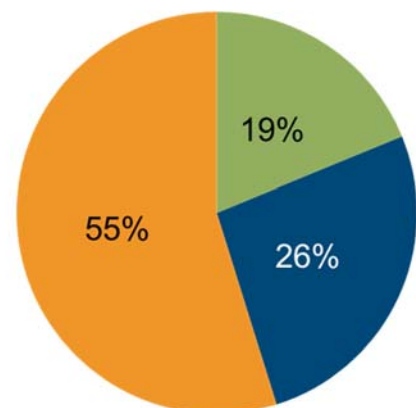
The left-hand chart below illustrates the system’s actuarial accrued liability by member pension tier and status. Actuarial accrued liability for active members is divided fairly evenly amongst tiers, but 72% of the system’s actuarial accrued liability is due to members who are no longer actively working in covered employment.

The right-hand chart below illustrates the system’s normal cost. Active Tier 2 members account for 26% of the system’s normal cost compared to about 10% of the system’s actuarial accrued liability. Active OPSRP members account for 55% of the normal cost compared to just 8% of the actuarial accrued liability.

Actuarial Accrued Liability by Member Category



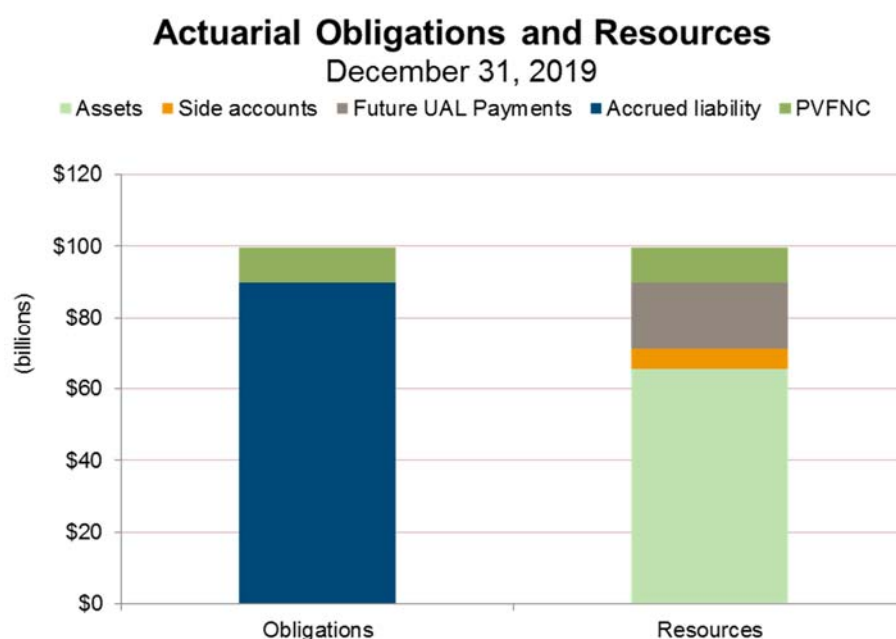
Normal Cost by Member Category



Actuarial Obligations and Resources

The actuarial accrued liability discussed above is the present value of benefits allocated to past service by the actuarial cost allocation method. The **total actuarial present value of benefits** (also referred to as “total liability”) is a broader measure that reflects both the actuarial accrued liability and the **present value of future normal cost (PVFNC)** for current members. Conceptually, the total actuarial present value of benefits can be thought of as the total expected benefit obligation, in today’s dollars, associated with members as of the valuation date for service throughout their working careers, including assumed service subsequent to the valuation date. As of December 31, 2019, the total actuarial present value of benefits for the system was \$99.5 billion.

The resources to fund this expected obligation include assets the system has set aside as of the valuation date, plus the present value of expected future contributions to normal cost and UAL payments. By design, the resources and obligations are equal in this “actuarial balance sheet”, as shown in the graph below.



Contributions to future normal costs and UAL payments are made as a percent of subject member salary, known as valuation payroll. The table below shows the amount of projected salary in the year following the valuation date as well as the present value of all future projected salary amounts for members included in the valuation.

	Projected Valuation Payroll for Year Subsequent to Valuation Date	Present Value of Future Valuation Payroll ¹
Tier 1/Tier 2	\$3,873.9	\$22,407.8
OPSRP General Service	6,740.9	66,002.0
OPSRP Police & Fire	919.0	10,979.7
Total	\$11,533.7	\$99,389.5

Amounts in millions

¹ For members as of the valuation date.

Principal Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in actuarial assumptions, methods or plan provisions between the two valuations are described after the summary. **Combined valuation payroll** is the projected Tier 1/Tier 2 payroll plus OPSRP payroll for the calendar year subsequent to the actuarial valuation date.

	Actuarial Valuation as of		Percent Change
	December 31, 2019	December 31, 2018	
Tier 1/Tier 2 Pension			
Actuarial accrued liability	\$81,363.5	\$79,836.8	2%
Actuarial value of assets	\$58,651.8	\$54,810.0	7%
Unfunded actuarial accrued liability	\$22,711.7	\$25,026.7	(9%)
Funded status	72%	69%	
UAL as a percentage of combined payroll	197%	231%	
Normal cost	\$578.1	\$619.3	(7%)
Tier 1/Tier 2 valuation payroll	\$3,873.9	\$4,076.1	(5%)
Normal cost rate	14.92%	15.19%	
OPSRP Pension			
Actuarial accrued liability	\$8,082.2	\$6,738.0	20%
Actuarial value of assets	\$6,190.4	\$4,783.0	29%
Unfunded actuarial accrued liability	\$1,891.8	\$1,955.0	(3%)
Funded status	77%	71%	
UAL as a percentage of combined payroll	16%	18%	
Normal cost	\$701.6	\$624.8	12%
OPSRP valuation payroll	\$7,659.8	\$6,775.9	13%
Normal cost rate	9.16%	9.22%	
Combined Pension			
Actuarial accrued liability	\$89,445.7	\$86,574.7	3%
Actuarial value of assets	\$64,842.2	\$59,593.0	9%
Unfunded actuarial accrued liability	\$24,603.5	\$26,981.7	(9%)
Funded status	72%	69%	
Combined valuation payroll	\$11,533.7	\$10,852.0	6%
UAL as a percentage of combined payroll	213%	249%	
Normal cost	\$1,279.6	\$1,244.1	3%
Combined valuation payroll	\$11,533.7	\$10,852.0	6%
Normal cost rate	11.09%	11.46%	

Amounts in millions

	Actuarial Valuation as of		
	December 31, 2019	December 31, 2018	Percent Change
RHIA			
Actuarial accrued liability	\$403.9	\$411.7	(2%)
Actuarial asset value	\$644.1	\$570.7	13%
Unfunded actuarial accrued liability	(\$240.3)	(\$159.1)	51%
Funded status	159%	139%	
Combined valuation payroll	\$11,533.7	\$10,852.0	6%
UAL as a percentage of payroll	(2%)	(1%)	
Normal cost	\$1.9	\$2.2	(10%)
Tier 1/Tier 2 valuation payroll	\$3,873.9	\$4,076.1	(5%)
Normal cost rate	0.05%	0.05%	
RHIPA			
Actuarial accrued liability	\$59.3	\$62.7	(5%)
Actuarial asset value	\$51.9	\$38.5	35%
Unfunded actuarial accrued liability	\$7.4	\$24.3	(69%)
Funded status	87%	61%	
Combined valuation payroll	\$3,479.8	\$3,211.6	8%
UAL as a percentage of payroll	0%	1%	
Normal cost	\$1.2	\$1.3	(7%)
Tier 1/Tier 2 valuation payroll	\$1,120.6	\$1,159.5	(3%)
Normal cost rate	0.11%	0.11%	

Amounts in millions

Data Summary

A brief summary of the data underlying the current and prior valuations follows. As shown below, the active member count increased about 2.3%, while the system's total member population increased by about 2.4%. The data section of this report provides additional detail. State Judiciary is included in the Tier 1 counts.

	December 31, 2019			December 31, 2018	
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
Count	17,317	32,191	131,249	180,757	176,763
Average age	56.9	52.2	43.0	46.0	46.1
Average total service	26.5	18.8	6.7	10.7	10.9
Average prior year covered salary	\$84,259	\$76,946	\$55,279	\$61,914	\$59,632
Inactive Members¹					
Count	11,237	14,189	21,366	46,792	45,945
Average age	60.8	54.7	47.8	53.0	53.1
Average monthly deferred benefit	\$2,192	\$833	\$439	\$980	\$983
Retired Members and Beneficiaries¹					
Count	129,711	16,718	6,549	152,978	148,893
Average age	73.0	68.2	67.6	72.2	72.0
Average monthly benefit	\$2,995	\$1,138	\$550	\$2,687	\$2,634
Total Members	158,265	63,098	159,164	380,527	371,601

¹ Inactive and Retiree counts are shown by lives within the system. In other words, a member is counted once for purposes of this exhibit, regardless of their service history for different rate pools. This contrasts with the method used to count inactive participants in some of the later exhibits of this report.

Effects of Changes

Effective with the December 31, 2019 actuarial valuation the following changes were made:

Assumption Changes

There were no changes to actuarial assumptions since the December 31, 2018 actuarial valuation.

Method Changes

There were no changes to actuarial methods since the December 31, 2018 actuarial valuation.

Plan Changes

There were no changes to plan provisions since the December 31, 2018 actuarial valuation.

System-Wide Assets

System-Wide Assets

The table below reconciles the market value of assets, as provided by PERS, to the asset values used in this valuation.

	Tier 1/Tier 2	OPSRP	Side Accounts	Contingency and Capital Preservation Reserve	Rate Guarantee Reserve	RHIA and RHIPA	System Totals
Amount reported by PERS December 31, 2019	\$59,400.19	\$6,190.4	\$5,470.0	\$50.0	\$492.0	\$696.0	\$72,298.6
Adjustment for Recognized Transition Liability Receivable	(428.5)	0.0	0.0	0.0	0.0	0.0	(428.5)
Adjustment for Negative Rate Guarantee Reserve	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Pre-SLGRP Liabilities	(319.8)	0.0	0.0	0.0	0.0	0.0	(319.8)
December 31, 2019 Actuarial Value of Assets	\$58,651.8	\$6,190.4	\$5,470.0	\$50.0	\$492.0	\$696.0	\$71,550.3

Amounts in millions

PERS calculates the amount that should be transferred from side accounts to employer reserves in Tier 1/ Tier 2 and OPSRP for rate relief on a monthly basis. PERS does not track net Pre-SLGRP liabilities.

Employer supplemental deposits establish individual side accounts within the pension trust. The side accounts are treated as prepaid contributions. Employer contribution rates are first determined excluding side accounts. Then, an amortized portion of the side account is used to offset the contribution otherwise required for the individual employers that have side accounts. While side accounts are excluded from valuation assets in determining contribution rates for each of the rate pools, side accounts are included in valuation assets for financial reporting purposes such as the reporting of funded status.

In addition, pension assets are held in the Contingency Reserve, the Capital Preservation Reserve, and the Tier 1 Rate Guarantee Reserve (RGR). As shown below, at December 31, 2019 the RGR was in surplus status of \$492 million. It is possible for the RGR to be in deficit at its year-end measurement date, which occurred most recently at December 31, 2012. It is our understanding that if a RGR deficit arose and then persisted for five years, employers may be required to restore the Tier 1 Rate Guarantee Reserve.

Tier 1/Tier 2 assets are adjusted by the net outstanding balance of pre-SLGRP liabilities to arrive at the actuarial value of assets. These notional employer-specific balances, created at the formation of the SLGRP and at later dates when additional employers join the pool, are treated akin to receivables to the SLGRP from individual employers (for pre-SLGRP liabilities) or payables – in the form of future rate offsets – from the SLGRP assets to individual employers (for pre-SLGRP surpluses). For accounting purposes, PERS recognizes outstanding pre-SLGRP liabilities as receivables in the system financial statements. However, for funding purposes, future contributions associated with pre-SLGRP liabilities are not current assets of the system. The resulting adjustment for Transition Liability receivables is shown above.

Finally, assets are held in separate accounts established under Internal Revenue Code Section 401(h) (the Retirement Health Insurance Account (RHIA) and the Retiree Health Insurance Premium Account (RHIPA)) to provide retiree medical benefits.

Reconciliation of Pension and Retiree Healthcare Assets

The following table reconciles the changes in the system-wide assets from December 31, 2018 to December 31, 2019. The reconciliation of assets is provided by PERS.

	Tier 1/Tier 2	OPSRP	Side Accounts	Contingency Reserve	Capital Preservation Reserve	Rate Guarantee Reserve	RHIA and RHIPA	System Totals
Additions								
1. Contributions								
a. Employer	\$906.1	\$785.7	\$327.4	-	-	-	\$42.9	\$2,062.1
b. Transfer from side accounts ¹	\$739.4	-	(\$739.4)	-	-	-	-	-
c. Judge member contributions	\$1.9	-	-	-	-	-	-	\$1.9
d. Member service purchases	\$9.5	-	-	-	-	-	-	\$9.5
e. Total	\$1,656.9	\$785.7	(\$412.0)	-	-	-	\$42.9	\$2,073.5
2. Net investment income								
a. Transfers	-	-	-	-	-	-	-	-
b. From investments	\$7,026.7	\$672.7	\$672.9	-	-	\$234.4	\$82.0	\$8,688.7
c. Total	\$7,026.7	\$672.7	\$672.9	-	-	\$234.4	\$82.0	\$8,688.7
3. Other ²	\$1.3	\$0.0	-	-	-	-	-	\$1.3
4. Total additions	\$8,684.9	\$1,458.4	\$260.9	-	-	\$234.4	\$124.9	\$10,763.5
Deductions								
5. Retirement and survivor benefits	(\$4,863.0)	(\$42.6)	-	-	-	-	(\$36.4)	(\$4,942.1)
6. Death Benefits	(\$3.0)	-	-	-	-	-	-	(\$3.0)
7. Refund of contributions	(\$10.7)	-	-	-	-	-	-	(\$10.7)
9. Administrative expenses	(\$36.1)	(\$8.4)	(\$0.2)	-	-	-	(\$1.6)	(\$46.3)
10. Total deductions	(\$4,912.9)	(\$51.0)	(\$0.2)	-	-	-	(\$38.0)	(\$5,002.1)
11. Net change	\$3,772.1	\$1,407.4	\$260.8	-	-	\$234.4	\$86.8	\$5,761.5
12. Net assets held in trust for pension benefits								
a. Beginning of year	\$55,628.1	\$4,783.0	\$5,209.3	\$50.0	-	\$257.6	\$609.2	\$66,537.2
b. End of year	\$59,400.2	\$6,190.4	\$5,470.0	\$50.0	-	\$492.0	\$696.0	\$72,298.6

Amounts in millions

¹ Side account transfers shown in this exhibit are all credited to Tier 1/Tier 2 assets. We understand the portion to be credited to OPSRP is credited through the employer contribution line of the exhibit.

² Includes TRFA transfer from Metlife and adjustments by PERS.

Reconciliation of Side Accounts

Side accounts are established for employers who make supplemental payments (a lump sum payment in excess of the required employer contribution). For SLGRP employers, this supplemental payment is first applied toward the employer's Transition Liability, if any, and any excess is established in a Side Account. A reconciliation of the side accounts from December 31, 2018 to December 31, 2019, is shown below on a rate pool basis. For this exhibit, all independent employers are grouped together.

	SLGRP	School Districts	Independent Employers	System Totals
Side Accounts, December 31, 2018	\$2,415.1	\$2,711.0	\$83.1	\$5,209.3
Deposits during 2019	289.8	21.9	15.7	327.4
Interest	314.3	347.6	11.1	672.9
Administrative expenses	(0.1)	(0.1)	(0.0)	(0.2)
Transfers to employer reserves	(344.7)	(383.0)	(11.6)	(739.4)
Side Accounts, December 31, 2019	\$2,674.4	\$2,697.4	\$98.2	\$5,470.0
Side accounts for new SLGRP employers	1.5		(1.5)	0.0
Side Accounts, January 1, 2020	\$2,675.9	\$2,697.4	\$96.7	\$5,470.0

Amounts in millions

Development of Side Account Rate Relief

The rate relief attributable to an employer's side account is determined by amortizing the side account balance on the valuation date over a fixed period and expressing the result as a percentage of combined valuation payroll. For side accounts established on or before December 31, 2009, the fixed period ends December 31, 2027. For side accounts established at a later date, the default fixed period ends 18 years after the first rate-setting valuation following its creation, though employers can select a shorter period under certain specified circumstances. The table below shows the average rate relief attributable to side accounts for each rate pool. While results are shown at a rate pool level, the rate relief provided by side accounts varies from employer to employer.

	December 31, 2019			
	SLGRP	School Districts	Independent Employers	System Totals
1. Side Account	\$2,675.9	\$2,697.4	\$96.7	\$5,470.0
2. Combined valuation payroll	\$6,768.8	\$3,740.7	\$1,024.2	\$11,533.7
3. Average Amortization Factor ¹	7.919	7.260	8.510	7.605
4. Average Side Account Rate Relief (1. ÷ 2. ÷ 3.)	4.99%	9.93%	1.11%	6.24%

Amounts in millions

¹ Weighted average

Pension Plan Valuation

Tier 1/Tier 2 Pension Assets

Summary of Actuarial Value of Assets

This section summarizes the Tier 1/Tier 2 pension valuation assets as of the current and prior actuarial valuation. For valuation purposes, Tier 1/Tier 2 pension assets are divided among the State & Local Government Rate Pool (SLGRP), the School Districts rate pool, and various independent employers to determine employer contribution rates. For this system-wide report, all independent employers, including State Judiciary, have been grouped together as if they were a rate pool.

	SLGRP	School Districts	Independent Employers	Tier 1/Tier 2 Totals ¹
December 31, 2019				
Member reserves	\$2,924.6	\$1,584.7	\$398.1	\$4,907.4
Employer reserves	17,348.1	12,291.4	2,777.7	32,307.2
Benefit in force reserves	11,431.3	8,518.0	1,788.9	21,757.1
Net outstanding pre-SLGRP liabilities	(319.8)			(319.8)
Total actuarial value of assets	\$31,384.1	\$22,394.1	\$4,964.6	\$58,651.8
December 31, 2018				
Member reserves	\$3,065.6	\$1,673.7	\$414.3	\$5,153.6
Employer reserves	15,371.1	10,589.4	2,491.0	28,337.7
Benefit in force reserves	11,292.8	8,583.7	1,767.8	21,664.5
Net outstanding pre-SLGRP liabilities	(345.7)			(345.7)
Total actuarial value of assets	\$29,383.7	\$20,846.8	\$4,673.1	\$54,810.0

Amounts in millions

¹ Includes Multnomah Fire District #10.

Pre-SLGRP liabilities and surpluses are notional balances specific to individual employers or groups of employers. For contribution rate calculations, pre-SLGRP liabilities are treated akin to receivables to the SLGRP from the individual employers and pre-SLGRP surpluses are treated akin to payables (in the form of future rate offsets) from the SLGRP assets to individual employers. The assets of the SLGRP used to calculate the pooled contribution rate reflect the net outstanding balance of these items.

Side accounts are treated as pre-paid contributions. Consequently, they are not reflected in the actuarial value of assets shown above. The actuarial value of assets for each rate pool is used to develop the contribution rate for that pool. Side accounts are used by employers to pay a portion of the base contribution rate via a side account rate offset and deduction mechanism. The net impact of side accounts is shown in a separate section of this report.

Reconciliation of Actuarial Value of Assets

The table below shows a reconciliation of the actuarial value of assets from the prior valuation to the current valuation for each of the rate pools. Again, independent employers, including State Judiciary, are treated as if they were a single rate pool for purposes of the system-wide report.

	SLGRP	School Districts	Independent Employers	Tier 1/Tier 2 Totals ¹
Actuarial value of assets, December 31, 2018	\$29,383.7	\$20,846.8	\$4,673.1	\$54,810.0
Contributions				
Employer	\$567.9	\$303.9	\$101.3	\$973.1
Side account transfers	344.7	383.0	11.6	739.4
Member	0.0	0.0	1.9	1.9
Total contributions	\$912.7	\$686.9	\$114.8	\$1,714.4
Investment income	3,709.4	2,637.2	588.6	6,919.3
Benefit payments and expenses	(2,580.9)	(1,923.5)	(404.4)	(4,913.0)
Adjustments ²	(45.9)	146.7	(4.0)	119.5
Actuarial value of assets, December 31, 2019	\$31,378.9	\$22,394.1	\$4,968.1	\$58,650.1
Employers joining the SLGRP	5.2		(3.5)	1.7
Actuarial value of assets, January 1, 2020	\$31,384.1	\$22,394.1	\$4,964.6	\$58,651.8

Amounts in millions

¹ Includes Multnomah Fire District #10.

² Adjustments include a reallocation of the benefits in force reserve, transfers to Multnomah Fire District #10, member service purchases, and other adjustments made by PERS.

Employers Joining the SLGRP

Effective January 1, 2020, one independent employer joined the State & Local Government Rate Pool (SLGRP). The employer's experience through December 31, 2019 was maintained independently, but its liabilities and assets are included with the SLGRP in this report in order to develop contribution rates that will become effective July 1, 2021. The table below summarizes the changes to assets and liabilities for the SLGRP due to this employer joining the SLGRP. Note that, by design, the UAL as a percentage of payroll does not change for the SLGRP, ensuring the SLGRP's UAL rate is not affected by employers joining the pool. This is accomplished by calculating a Transition Liability/(Surplus) for each new employer joining the pool.

Tier 1/Tier 2 Pension	State & Local Government Rate Pool		
	December 31, 2019	Employers Joining Pool	January 1, 2020
Actuarial Accrued Liability			
Active Members			
Tier 1 General Service	\$4,499.1	\$0.0	\$4,499.1
Tier 1 Police & Fire	907.7	0.9	908.6
Tier 1 Total	5,406.7	0.9	5,407.7
Tier 2 General Service	3,739.8	0.2	3,740.0
Tier 2 Police & Fire	1,487.6	0.9	1,488.5
Tier 2 Total	5,227.4	1.1	5,228.5
Total Active Members	\$10,634.2	\$2.0	\$10,636.2
Inactive Members	2,713.8	0.4	2,714.2
Retired Members and Beneficiaries	30,766.9	4.9	30,771.7
Total Actuarial Accrued Liability	\$44,114.9	\$7.2	\$44,122.1
Actuarial Value of Assets			
Member reserves	\$2,924.4	\$0.2	\$2,924.6
Employer reserves	17,346.6	1.5	17,348.1
Benefit in force reserves	11,429.5	1.8	11,431.3
Net outstanding pre-SLGRP liabilities	(321.5)	1.7	(319.8)
Total Actuarial Value of Assets	\$31,378.9	\$5.2	\$31,384.1
Unfunded Accrued Liability	\$12,735.9	\$2.1	\$12,738.0
Funded Percentage	71.1%	71.7%	71.1%
Combined Valuation Payroll	\$6,767.7	\$1.1	\$6,768.8
Unfunded Accrued Liability as % of Combined Valuation Payroll	188.2%	188.2%	188.2%

Amounts in millions

Outstanding Balance of Pre-SLGRP Liabilities

In the valuation, pre-SLGRP liabilities are treated as assets of the SLGRP. That is, a pre-SLGRP liability is treated as a receivable owed to the SLGRP by the employer. Pre-SLGRP surpluses are treated as payables from the SLGRP to employers.

Prior to the formation of the SLGRP, the State and Community Colleges were pooled together and some employers participated in the Local Government Rate Pool (LGRP). The UAL attributable to the State and Community Colleges or the LGRP at the time the SLGRP was formed is maintained separately from the SLGRP, and is reduced by contributions and increased for interest charges at the assumed interest rate.

Similarly, when an independent employer joins the SLGRP, a Transition Liability or Surplus is calculated to ensure that each employer enters the pool on a comparable basis. The Transition Liability for each employer is maintained separately from the SLGRP, and is reduced by contributions and increased for interest charges at the assumed interest rate. The Transition Surplus for each employer is also maintained separately from the SLGRP, and is amortized over time through contribution rate offsets and credited with interest at the assumed interest rate. The table below shows the reconciliation of the pre-SLGRP pooled liability attributable to the State and Community Colleges and the LGRP from the last valuation to the current valuation. It also shows the reconciliation of the total Transition Liability or Surplus from the last valuation to the current valuation.

	State and Community Colleges	Local Government Rate Pool	Transition	Total
Pre-SLGRP liability/(surplus), January 1, 2019	\$448.8	(\$191.8)	(\$602.7)	(\$345.7)
Employer contributions	(67.6)	28.6	87.8	48.9
Supplemental payments	0.0	0.0	(3.3)	(3.3)
Interest	27.4	(11.7)	(37.1)	(21.4)
Employer mergers/adjustments	0.0	0.0	0.0	0.0
Pre-SLGRP liability/(surplus), December 31, 2019	\$408.7	(\$174.9)	(\$555.2)	(\$321.5)
Employers joining the SLGRP			1.7	1.7
Pre-SLGRP liability/(surplus), January 1, 2020	\$408.7	(\$174.9)	(\$553.5)	(\$319.8)

Amounts in millions

Tier 1/Tier 2 Pension Liabilities

Normal Cost

The normal cost represents the present value of benefits allocated to the next year of service by the actuarial cost method. If all current actuarial assumptions are met in both past and future years, the normal cost represents the percent of payroll that would need to be contributed each year to fully fund plan benefits during each member's working career.

A summary of the normal cost by assumed cause of future termination of service is shown below on a system-wide basis for the Tier 1/Tier 2 pension benefits.

	December 31, 2019	December 31, 2018	Percent Change
Normal Cost			
Service Retirement	\$399.8	\$429.0	(6.8%)
Withdrawal	128.5	139.3	(7.8%)
Duty Disability	2.5	2.7	(6.7%)
Nonduty Disability	11.4	12.1	(5.3%)
Death	3.3	3.7	(10.5%)
Administrative Expenses	32.5	32.5	(0.0%)
Total Normal Cost	\$578.1	\$619.3	(6.7%)

Amounts in millions

Reconciliation of Change in Normal Cost

The decrease in normal cost since the prior valuation is primarily due to the reduction in active Tier 1/Tier 2 members as members retire from the closed Tier 1/Tier 2 group.

The table below reconciles the normal cost from the prior valuation to the current valuation.

	Tier 1/Tier 2 Pension
Normal Cost, December 31, 2018	\$619.3
Expected increase (decrease)	(39.9)
Assumption and method changes	0.0
Plan changes	0.0
Deviations from expected experience	
Pay increases	\$1.6
Interest crediting experience	3.1
All other sources	(6.1)
Total demographic (gains) and losses	(\$1.3)
Normal Cost, December 31, 2019	\$578.1

Amounts in millions

Summary of Normal Cost by Group and Tier

A summary of the normal cost by tier and employment category for each rate pool is shown below. Again, independent employers, including State Judiciary, are treated as if they were a single rate pool for purposes of the system-wide report.

	December 31, 2019				December 31, 2018	
	SLGRP	School Districts	Independent Employers	Tier 1/ Tier 2 Totals	Tier 1/ Tier 2 Totals	Percent Change
Normal Cost¹						
Tier 1 General Service	\$114.9	\$71.5	\$18.3	\$204.8	\$232.1	(11.8%)
Tier 2 General Service	135.0	106.8	16.8	258.6	264.5	(2.2%)
Tier 1 Police & Fire	26.7	0.3	9.0	36.0	43.5	(17.3%)
Tier 2 Police & Fire	60.0	0.4	18.4	78.7	79.3	(0.7%)
Total Normal Cost	\$336.6	\$178.9	\$62.6	\$578.1	\$619.3	(6.7%)

Amounts in millions

¹ Includes assumed administrative expenses. Assumed expenses allocated pro-rata based on normal cost.

Actuarial Accrued Liability

The actuarial accrued liability represents the present value of benefits allocated to prior years of service by the actuarial cost method. A summary of the actuarial accrued liability is shown below on a system-wide basis for the Tier 1/Tier 2 pension benefits.

	December 31, 2019	December 31, 2018	Percent Change
Active Members	\$18,446.1	\$18,849.3	(2.1%)
Inactive Members	4,349.7	4,452.6	(2.3%)
Retired Members and Beneficiaries	58,567.8	56,534.9	3.6%
Total Actuarial Accrued Liability	\$81,363.5	\$79,836.8	1.9%

Amounts in millions

Actuarial Accrued Liability

A summary of actuarial accrued liabilities based on member status, tier and employment category is shown in the table below. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2019			December 31, 2018		Percent Change
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹	Tier 1 / Tier 2 Totals ¹	
Active Members						
Tier 1 General Service	\$4,499.1	\$2,985.2	\$532.1	\$8,016.3	\$8,673.5	(7.6%)
Tier 1 Police & Fire	907.7	5.3	333.7	1,246.7	1,447.6	(13.9%)
Tier 1 Total	5,406.7	2,990.4	865.8	9,263.0	10,121.1	(8.5%)
Tier 2 General Service	3,739.8	3,006.2	480.7	7,226.7	6,888.5	4.9%
Tier 2 Police & Fire	1,487.6	6.0	462.7	1,956.4	1,839.7	6.3%
Tier 2 Total	5,227.4	3,012.3	943.4	9,183.1	8,728.2	5.2%
Total Active Members	\$10,634.2	\$6,002.7	\$1,809.2	\$18,446.0	\$18,849.3	(2.1%)
Inactive Members	2,713.8	1,342.1	293.8	4,349.7	4,452.6	(2.3%)
Retired Members and Beneficiaries	30,766.9	22,929.7	4,820.3	58,567.8	56,534.9	3.6%
Total Tier 1/ Tier 2 Pension Liability, December 31,	\$44,114.9	\$30,274.5	\$6,923.3	\$81,363.5	\$79,836.8	1.9%
Employers joining the SLGRP	7.2		(7.2)	0.0	0.0	
Total Tier 1/ Tier 2 Pension Liability, January 1,	\$44,122.1	\$30,274.5	\$6,916.0	\$81,363.5	\$79,836.8	1.9%

Amounts in millions

¹ Includes Multnomah Fire District #10.

Reconciliation of Change in Actuarial Accrued Liability

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year.

The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	Tier 1/Tier 2 Pension
Actuarial Accrued Liability December 31, 2018	\$79,836.8
Expected change	1,303.9
Assumption and method changes	0.0
Plan changes	0.0
Deviations from expected experience	
Retirements from active status	\$115.7
Disability retirements	3.3
Active mortality and withdrawal	14.6
Pay increases	75.5
Interest crediting experience	85.7
Inactive mortality	(7.9)
Data corrections	13.6
Other	(82.0)
Total demographic (gains) and losses	\$218.6
New Entrants	4.3
Actuarial Accrued Liability December 31, 2019	\$81,363.5

Amounts in millions

Tier 1/Tier 2 Pension Unfunded Accrued Liability (UAL)**Calculation of UAL**

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. To determine uncollared and collared base employer contribution rates, the UAL is calculated excluding side accounts. The calculated collared base contribution rate is later offset by an amortized portion of the side accounts for individual employers with such accounts. A summary of the UAL by rate pool is shown on the following table. All independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
December 31, 2019				
1. Actuarial accrued liability	\$44,122.1	\$30,274.5	\$6,916.0	\$81,363.5
2. Actuarial value of assets	\$31,384.1	\$22,394.1	\$4,964.6	\$58,651.8
3. Unfunded accrued liability (2. - 1.)	\$12,738.0	\$7,880.4	\$1,951.4	\$22,711.7
4. Funded percentage (2. ÷ 1.)	71.1%	74.0%	71.8%	72.1%
5. Combined valuation payroll	\$6,768.8	\$3,740.7	\$1,024.2	\$11,533.7
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	188.2%	210.7%	190.5%	196.9%
December 31, 2018				
1. Actuarial accrued liability	\$43,149.3	\$29,898.4	\$6,736.3	\$79,836.8
2. Actuarial value of assets	\$29,383.7	\$20,846.8	\$4,673.1	\$54,810.0
3. Unfunded accrued liability (2. - 1.)	\$13,765.6	\$9,051.6	\$2,063.2	\$25,026.7
4. Funded percentage (2. ÷ 1.)	68.1%	69.7%	69.4%	68.7%
5. Combined valuation payroll	\$6,346.1	\$3,543.5	\$962.4	\$10,852.0
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	216.9%	255.4%	214.4%	230.6%

Amounts in millions

¹ Includes Multnomah Fire District #10.

Reconciliation of UAL Bases

Beginning with the December 31, 2013 actuarial valuation, the PERS Board established a policy to amortize the Tier 1/Tier 2 UAL over a 20-year period, with each subsequent odd-year valuation establishing a new 20-year closed-period amortization schedule for new Tier 1/Tier 2 UAL amounts based on the total Tier 1/Tier 2 UAL as of that valuation date less the remaining unamortized balance of previously established Tier 1/Tier 2 UAL bases. As part of Senate Bill 1049, passed in 2019, the Legislature directed the PERS Board to enact a one-time re-amortization of Tier 1/Tier 2 UAL over 22 years. This means that, effective with the December 31, 2019 rate-setting valuation, the entire unamortized Tier 1/Tier 2 UAL for each rate pool and independent employer will be re-amortized over a 22 year period as a level percentage of projected future payroll. For the December 31, 2021 and subsequent odd-year valuations, the PERS Board will again have authority to set the amortization schedule. It is anticipated that the policy of 20-year closed-period amortization schedules will be reintroduced at that point.

The UAL amortization schedules are shown for the SLGRP and School District rate pools below. UAL bases for independent employers are developed individually for each employer, and are shown in each employer’s individual valuation report.

SLGRP					
Amortization Base	UAL December 31, 2018	Payment	Interest	UAL December 31, 2019	Next Year's Payment
December 31, 2019	N/A	N/A	N/A	12,738.0	843.2
Total				\$12,738.0	\$843.2

Amounts in millions

School Districts					
Amortization Base	UAL December 31, 2018	Payment	Interest	UAL December 31, 2019	Next Year's Payment
December 31, 2019	N/A	N/A	N/A	7,880.4	521.7
Total				\$7,880.4	\$521.7

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than assumed (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of financially unfavorable experience to the system.

The table below shows the development of the actuarial gain (or loss) for the Tier 1/Tier 2 pension benefits for the year ending December 31, 2019. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School District	Independent Employers	Tier 1/Tier 2 Totals ¹
1. Expected actuarial accrued liability				
a. Actuarial accrued liability at January 1, 2019	\$43,149.3	\$29,898.4	\$6,736.3	\$79,836.8
b. Normal cost (excluding expenses) at January 1, 2019	343.9	180.9	62.0	586.8
c. Benefit payments (excluding expenses) for year ending December 31, 2019	(2,561.9)	(1,909.3)	(401.4)	(4,876.7)
d. Interest	3,026.9	2,090.5	472.8	5,593.8
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$43,958.2	\$30,260.5	\$6,869.8	\$81,140.6
f. Change in actuarial accrued liability at December 31, 2019, due to assumption, method, and plan changes	0.0	0.0	0.0	0.0
g. Expected actuarial accrued liability at December 31, 2019 (e. + f.)	\$43,958.2	\$30,260.5	\$6,869.8	\$81,140.6
2. Actuarial accrued liability at December 31, 2019	\$44,114.9	\$30,274.5	\$6,923.3	\$81,363.5
3. Liability gain/(loss) (1.g. - 2)	(\$156.6)	(\$14.0)	(\$53.5)	(\$222.9)
4. Expected actuarial value of assets				
a. Actuarial value of assets at January 1, 2019	\$29,383.7	\$20,846.8	\$4,673.1	\$54,810.0
b. Actual contributions for 2019	912.7	686.9	114.8	1,714.4
c. Benefit payments and expenses for year ending December 31, 2019	(2,580.9)	(1,923.5)	(404.4)	(4,913.0)
d. Assumed investment return	2,055.6	1,456.5	326.0	3,831.2
e. Expected actuarial value of assets before changes (a. + b. + c. + d.)	\$29,771.1	\$21,066.7	\$4,709.6	\$55,442.5
f. Change in actuarial value of assets at December 31, 2019, due to assumption changes	0.0	0.0	0.0	0.0
g. Expected actuarial value of assets at December 31, 2019 (e. + f.)	\$29,771.1	\$21,066.7	\$4,709.6	\$55,442.5
5. Actuarial value of assets as of December 31, 2019	\$31,378.9	\$22,394.1	\$4,968.1	\$58,650.1
6. Asset gain/(loss) (5. - 4.g.)	\$1,607.9	\$1,327.4	\$258.6	\$3,207.6
7. Net actuarial gain/(loss) (3. + 6.)	\$1,451.2	\$1,313.4	\$205.1	\$2,984.7

Amounts in millions

¹ Includes Multnomah Fire District #10.

Reconciliation of the UAL

The table below reconciles the UAL from the last valuation to this valuation. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
UAL, December 31, 2018	\$13,765.6	\$9,051.6	\$2,063.2	\$25,026.7
Normal cost	343.9	180.9	62.0	586.8
Administrative expenses	19.1	14.2	3.0	36.3
Contributions	(912.7)	(686.9)	(114.8)	(1,714.4)
Liability (gain) or loss	156.6	14.0	53.5	222.9
Asset (gain) or loss	(1,607.9)	(1,327.4)	(258.6)	(3,207.6)
Assumption, method, and plan changes	0.0	0.0	0.0	0.0
Interest at 7.20%	971.3	634.0	146.8	1,762.6
UAL, December 31, 2019	\$12,735.9	\$7,880.4	\$1,955.1	\$22,713.4
Employers joining SLGRP	2.1		(3.7)	(1.7)
UAL, January 1, 2020	\$12,738.0	\$7,880.4	\$1,951.4	\$22,711.7

Amounts in millions

¹ Includes Multnomah Fire District #10.

Tier 1/Tier 2 Pension Contribution Rate Development

Normal Cost Rates

The table below shows the development of the system-wide weighted average Tier 1/ Tier 2 normal cost rate.

	December 31, 2019	December 31, 2018	Percent Change
Normal Cost			
a. Service Retirement	\$399.8	\$429.0	(6.8%)
b. Withdrawal	128.5	139.3	(7.8%)
c. Duty Disability	2.5	2.7	(6.7%)
d. Nonduty Disability	11.4	12.1	(5.3%)
e. Death	3.3	3.7	(10.5%)
f. Administrative Expenses	32.5	32.5	(0.0%)
g. Total Normal Cost	\$578.1	\$619.3	(6.7%)
Tier 1/Tier 2 Valuation Payroll	\$3,873.9	\$4,076.1	(5.0%)
Average Normal Cost Rate			
a. Service Retirement	10.32%	10.53%	
b. Withdrawal	3.32%	3.42%	
c. Duty Disability	0.06%	0.07%	
d. Nonduty Disability	0.29%	0.30%	
e. Death	0.09%	0.09%	
f. Administrative Expenses	0.84%	0.80%	
g. Average Normal Cost Rate	14.92%	15.19%	

Amounts in millions

The table below shows the development of the Tier 1/Tier 2 normal cost rate for the various rate pools. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

Normal cost rates shown below are before any offset for redirected member contributions under Senate Bill 1049.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Normal Cost				
Tier 1 General Service	\$114.9	\$71.5	\$18.3	\$204.8
Tier 2 General Service	135.0	106.8	16.8	258.6
Tier 1 Police & Fire	26.7	0.3	9.0	36.0
Tier 2 Police & Fire	60.0	0.4	18.4	78.7
Total Normal Cost	\$336.6	\$178.9	\$62.6	\$578.1
Tier 1/Tier 2 Valuation Payroll				
Tier 1 General Service	\$690.5	\$466.9	\$95.1	\$1,252.5
Tier 2 General Service	1,065.7	860.3	130.9	2,056.9
Tier 1 Police & Fire	122.7	1.3	40.4	164.3
Tier 2 Police & Fire	304.6	1.8	93.9	400.3
Total Valuation Payroll	\$2,183.5	\$1,330.2	\$360.3	\$3,873.9
Average Normal Cost Rates				
Tier 1 General Service	16.64%	15.32%	19.28%	16.35%
Tier 2 General Service	12.67%	12.41%	12.84%	12.57%
Tier 1 Police & Fire	21.76%	21.13%	22.34%	21.90%
Tier 2 Police & Fire	19.69%	19.57%	19.60%	19.66%
Average Rates				
Tier 1 Average	17.41%	15.34%	20.20%	16.99%
Tier 2 Average	14.23%	12.43%	15.66%	13.73%
General Service Average	14.23%	13.44%	15.55%	14.00%
Police & Fire Average	20.28%	20.22%	20.42%	20.31%
System Average	15.41%	13.45%	17.37%	14.92%
Judiciary Member Contributions			0.50%	0.05%
Adjusted System Average	15.41%	13.45%	16.87%	14.87%

Amounts in millions

UAL Rates Prior to Application of the Rate Collar

The Tier 1/Tier 2 UAL rate prior to application of the rate collar is determined by calculating the sum of next year's scheduled amortization payments to the Tier 1/Tier 2 UAL as a percentage of combined (Tier 1/Tier 2 plus OPSRP) valuation payroll.

The following table develops the Tier 1/Tier 2 UAL rate separately for each of the rate pools. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
December 31, 2019				
1. Total UAL	\$12,738.0	\$7,880.4	\$1,951.4	\$22,711.7
2. Next year's UAL payment	\$843.2	\$521.7	\$129.2	\$1,494.1
3. Combined valuation payroll	\$6,768.8	\$3,740.7	\$1,024.2	\$11,533.7
4. UAL rate (2 ÷ 3)	12.46%	13.95%	12.61%	12.95%
December 31, 2018				
1. Total UAL	\$13,765.6	\$9,051.6	\$2,063.2	\$25,026.7
2. Next year's UAL payment	\$911.3	\$599.2	\$136.6	\$1,647.1
3. Combined valuation payroll	\$6,346.1	\$3,543.5	\$962.4	\$10,852.0
4. UAL rate (2 ÷ 3)	14.36%	16.91%	14.19%	15.18%

Amounts in millions

¹ While the Tier 1/Tier 2 Total UAL amount includes the UAL for Multnomah Fire District #10 (MFD), the UAL rate for MFD is developed separately in this report and is added to the rates shown in this table.

Pre-SLGRP Pooled Rate

Prior to the formation of the SLGRP, the State and Community Colleges were pooled together and some employers participated in the Local Government Rate Pool (LGRP). The Tier 1/Tier 2 UAL attributable to the State and Community Colleges and the LGRP at the time the SLGRP was formed is maintained separately from the Tier 1/Tier 2 UAL for the SLGRP. The balance of the pre-SLGRP pooled liability attributable to the State and Community Colleges or the LGRP on the valuation date is amortized over the period ending December 31, 2027 and expressed as a percentage of the pool's combined (Tier 1/Tier 2 plus OPSRP) valuation payroll.

The following table develops the Pre-SLGRP pooled rate separately for the State and Community College Pool and the LGRP.

	December 31, 2019	December 31, 2018
State and Community College Pool		
1. Total pre-SLGRP pooled liability	\$408.7	\$448.8
2. Combined valuation payroll	\$3,913.0	\$3,633.6
3. Amortization Factor	6.875	7.606
4. Pre-SLGRP pooled rate (1. ÷ 2. ÷ 3.)	1.52%	1.62%
Local Government Rate Pool		
1. Total pre-SLGRP pooled liability	(\$174.9)	(\$191.8)
2. Combined valuation payroll	\$1,716.0	\$1,614.5
3. Amortization Factor	6.875	7.606
4. Pre-SLGRP pooled rate (1. ÷ 2. ÷ 3.)	(1.48%)	(1.56%)

Amounts in millions

Transition Liability or Surplus Rate

When an employer joins the SLGRP, a Transition Liability or Surplus is calculated to ensure that each employer enters the pool on a comparable basis. The Transition Liability or Surplus for each employer is maintained separately from the Tier 1/Tier 2 UAL for the SLGRP. The Transition Liability is amortized over a fixed period, and is expressed as a percentage of the employer’s combined (Tier 1/Tier 2 plus OPSRP) valuation payroll. The Transition Surplus for each employer is also maintained separately from the SLGRP, and is amortized over a fixed period via contribution rate offsets as a percentage of the employer’s combined valuation payroll. For employers joining the SLGRP prior to December 31, 2009, the fixed period ends December 31, 2027. For all others, the fixed period ends 18 years after the date the employer joined the SLGRP.

The following table develops the average rate impact across all employers with outstanding Transition Liabilities or Surpluses as of the valuation date. The amortization factor below reflects the weighted average of the amortization periods for all such employers.

	December 31, 2019	December 31, 2018
1. Total transition liability/(surplus)	(\$553.5)	(\$602.7)
2. Combined valuation payroll	\$2,464.2	\$2,511.6
3. Average Amortization Factor ¹	6.964	7.670
4. Average transition liability/(surplus) rate (1. ÷ 2. ÷ 3.)	(3.23%)	(3.13%)

Amounts in millions

¹ *Weighted average*

Multnomah Fire District #10 UAL Rate

The Multnomah Fire District #10 UAL rate is determined by amortizing Multnomah Fire District #10's unfunded accrued liability over the period ending December 31, 2027, and expressing the result as a percentage of combined valuation payroll.

As part of 2003 legislation, the Multnomah Fire District #10 UAL was allocated to all Tier 1/Tier 2 employers. Multnomah Fire District #10 was allocated \$50,000 of the outstanding UAL, which was fully paid in November, 2003. Of the remaining UAL, City of Portland is allocated 21.8743%, while all Tier 1/Tier 2 employers, including City of Portland, share in the remaining 78.1257%. Four employers (City of Gresham, City of Fairview, City of Wood Village, and City of Troutdale) are required to pay twice the rate that is determined under item 6.b. below. Thus, the combined valuation payroll for all Tier 1/Tier 2 employers, shown below in item 4.b., includes twice the valuation payroll for those four employers.

	December 31, 2019	December 31, 2018
1. Actuarial accrued liability		
a. Active members	\$0.0	\$0.0
b. Inactive members	0.0	0.0
c. Retired members and beneficiaries	50.9	52.7
d. Total actuarial accrued liability	\$50.9	\$52.7
2. Actuarial value of assets		
a. Employer reserve	(\$110.0)	(\$113.8)
b. Members reserve	0.0	0.0
c. Benefits in force reserve	18.9	20.2
d. Total actuarial value of assets	(\$91.1)	(\$93.6)
3. Multnomah FD #10 UAL (1.d. - 2.d.)	\$141.9	\$146.4
a. Portion allocated to City of Portland (21.8743% x 3.)	\$31.0	\$32.0
b. Portion allocated to all T1/T2 employers (78.1257% x 3.)	\$110.9	\$114.3
4. Combined valuation payroll		
a. City of Portland	\$477.1	\$434.2
b. All employers ¹	\$11,595.0	\$10,909.3
5. Amortization factor	6.875	7.606
6. Multnomah FD #10 UAL Rate		
a. City of Portland (3.a. ÷ 4.a. ÷ 5.)	0.95%	0.97%
b. All Tier 1 / Tier 2 employers (3.b. ÷ 4.b. ÷ 5.)	0.14%	0.14%
7. Total Multnomah FD #10 UAL Rate		
a. City of Portland (6.a. + 6.b.)	1.09%	1.11%
b. City of Gresham, City of Fairview, City of Wood Village, City of Troutdale (2 x 6.b.)	0.28%	0.28%
c. All other Tier 1 / Tier 2 employers (6.b.)	0.14%	0.14%

Amounts in millions

¹ For weighting purposes, includes double valuation payroll for each of the four employers listed in 7.b.

Calculated Employer Contribution Rate Summary (Pre-Rate Collar)

The following table summarizes the development of the total Tier 1/Tier 2 contribution rate for each rate pool as of the valuation date. The normal cost rates apply to Tier 1/Tier 2 payroll only, but all other rates are applied to combined (Tier 1/Tier 2 plus OPSRP) valuation payroll. These rates are adjusted on an individual employer basis for side accounts and pre-SLGRP liabilities, if applicable. Weighted average adjustments for side accounts and pre-SLGRP liabilities are shown in the table. For individual employers, these adjustments cannot reduce the pension contribution rate below 0.00%. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.00% that is not taken into account in the average rates below.

July 1, 2021 Rates Calculated as of December 31, 2019				
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Tier 1/Tier 2 pension contribution rates				
Normal cost rate	15.41%	13.45%	16.87%	14.87%
Judiciary member contributions			0.50%	0.05%
Uncollared UAL rate	12.46%	13.95%	12.61%	12.95%
Multnomah FD #10 rate	0.21%	0.14%	0.15%	0.18%
Uncollared total Tier 1/Tier 2 pension rate	28.08%	27.54%	30.13%	28.05%
Average adjustments				
Pre-SLGRP liability/(surplus) rate	(0.69%)	N/A	N/A	(0.40%)
Side account rate	(4.99%)	(9.93%)	(1.11%)	(6.24%)
Total average adjustment	(5.68%)	(9.93%)	(1.11%)	(6.64%)
Member redirect offset¹	(2.45%)	(2.45%)	(2.45%)	(2.45%)
Uncollared net employer Tier 1/Tier 2 pension rate	19.95%	15.16%	26.57%	18.96%

¹ Redirected member contributions under Senate Bill 1049 (2.50% of payroll for Tier 1/Tier 2) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

Calculation of Rate Collar

Due to the rate collar, employer base contribution rates will not generally change by more than the greater of 3 percent of payroll or 20% of the current contribution rate. However, if the funded percentage is below 60% or above 140%, the size of the rate collar is doubled. If the funded percentage is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. All rate collar calculations are performed excluding amounts and contribution rates attributable to pre-SLGRP liabilities, side accounts and member IAP contributions. Retiree medical rates are also excluded from the rate collar calculation.

The table below develops the impact of the collar for each of the Tier 1/Tier 2 rate pools. Although the calculation is performed individually for independent employers, the table shows the calculation as if independent employers were a single rate pool. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.00% that is not taken into account in the calculation below.

July 1, 2021 Tier 1/Tier 2 Rates Calculated as of December 31, 2019				
Calculation of Collar Adjustments	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
1. Current total Tier 1/Tier 2 pension rate	26.26%	30.52%	23.87%	27.43%
2. Size of rate collar				
a. Preliminary size of rate collar <i>(greater of 3% or 20% x 1.)</i>	5.25%	6.10%	4.77%	5.49%
b. Funded percentage	71%	74%	72%	72%
c. Size of rate collar <i>(If b. < 60% or b. > 140%, 2 x a. If b. is 70%-130%, a. Otherwise, graded rate between a. and 2 x a.)</i>	5.25%	6.10%	4.77%	
3. July 1, 2021 Minimum total contribution rate <i>(1. - 2.c.)</i>	21.01%	24.42%	19.10%	
4. July 1, 2021 Maximum total contribution rate <i>(1. + 2.c.)</i>	31.51%	36.62%	28.64%	
5. July 1, 2021 total contribution rate before collar	28.08%	27.54%	29.63%	
6. July 1, 2021 total contribution rate after collar <i>(5., but not less than 3. or more than 4.)</i>	28.08%	27.54%	28.64%	
7. Impact of collar (6. - 5.)²	0.00%	0.00%	(0.99%)	(0.09%)

¹ The average Tier 1/Tier 2 rate has been recalculated based on current valuation payroll.

² The impact of collar shown for the system-wide column is the weighted average of the impact shown for each rate pool.

Calculated Employer Contribution Rate Summary (Post-Rate Collar)

Any needed adjustment to reflect the effects of the rate collar is made to the UAL rate. The table below summarizes the average rates effective July 1, 2021 by pool and component. Although the rate collar is applied individually for independent employers, the table shows the average rates as if independent employers were a single rate pool. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.00% that is not taken into account in the average rates below.

July 1, 2021 Rates Calculated as of December 31, 2019				
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Tier 1/Tier 2 pension contribution rates				
Normal cost rate	15.41%	13.45%	16.87%	14.87%
Judiciary member contributions			0.50%	0.05%
Collared UAL rate	12.46%	13.95%	11.62%	12.86%
Multnomah FD #10 rate	0.21%	0.14%	0.15%	0.18%
Collared total Tier 1/Tier 2 pension rate	28.08%	27.54%	29.14%	27.96%
Average adjustments				
Pre-SLGRP liability/(surplus) rate	(0.69%)	N/A	N/A	(0.40%)
Side account rate	(4.99%)	(9.93%)	(1.11%)	(6.24%)
Total average adjustment	(5.68%)	(9.93%)	(1.11%)	(6.64%)
Member redirect offset¹	(2.45%)	(2.45%)	(2.45%)	(2.45%)
Collared net employer Tier 1/Tier 2 pension rate	19.95%	15.16%	25.58%	18.87%

¹ Redirected member contributions under Senate Bill 1049 (2.50% of payroll for Tier 1/Tier 2) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

OPSRP Assets

Information on OPSRP assets is shown in the section of this report covering the system-wide assets. As of December 31, 2019, the actuarial value of assets for OPSRP is \$6,190.4 million.

OPSRP Liabilities

Normal Cost

The normal cost represents the present value of projected future benefits allocated to the next year of service by the actuarial cost method. If all current actuarial assumptions are met in past and future years, the normal cost represents the percent of payroll that would need to be contributed each year to fully fund each member's plan benefits during his or her working career.

A summary of the normal cost by assumed cause of future termination of service is shown below for the current and prior year.

	December 31, 2019			December 31, 2018		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Pre-Retirement Disability						
Duty	\$0.7	\$1.4	\$2.1	\$0.6	\$1.3	\$1.9
Non-Duty	10.1	1.2	11.3	8.9	1.0	9.9
Total Pre-Retirement Disability	\$10.8	\$2.6	\$13.4	\$9.5	\$2.3	\$11.8
Other Benefits						
Service Retirement	\$498.5	\$107.4	\$605.9	\$444.9	\$94.2	\$539.1
Withdrawal	53.6	5.5	59.1	47.5	4.9	52.4
Death	4.8	0.7	5.4	4.3	0.6	4.9
Duty Disability Retirement	0.4	1.1	1.5	0.3	1.0	1.4
Non-Duty Disability Retirement	7.0	1.2	8.2	6.2	1.0	7.2
Total Other Benefits	\$564.3	\$115.9	\$680.2	\$503.3	\$101.7	\$605.0
Assumed Administrative Expenses	7.0	1.0	8.0	7.1	0.9	8.0
Total Normal Cost	\$582.1	\$119.5	\$701.6	\$519.9	\$104.9	\$624.8

Amounts in millions

Reconciliation of Change in Normal Cost

The increase in the normal cost since the prior valuation is primarily attributable to the effect of new entrants to the OPSRP program. The table below reconciles the normal cost from the prior valuation to the current valuation.

	OPSRP
Normal Cost, December 31, 2018	\$624.8
Expected increase (decrease)	(12.9)
Assumption and method changes	0.0
Plan changes	0.0
New entrants	71.0
Deviations from expected experience	
Pay increases	\$16.2
All other sources	2.5
Total demographic (gains) and losses	\$18.7
Normal Cost, December 31, 2019	\$701.6

Amounts in millions

Actuarial Accrued Liability

The actuarial accrued liability represents the present value of projected future benefits allocated to prior years of service by the actuarial cost method. For active members, a summary of the actuarial accrued liability by assumed cause of future termination of service is shown below for the current and prior year.

	December 31, 2019			December 31, 2018		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Active Members						
Pre-retirement Duty Disability	\$1.6	\$3.3	\$4.9	\$1.3	\$2.7	\$4.1
Pre-retirement Non-Duty Disability	89.2	9.2	98.4	77.6	8.0	85.6
Service Retirement	5,409.5	1,069.0	6,478.4	4,546.3	881.5	5,427.8
Withdrawal	262.1	22.2	284.3	228.9	19.8	248.7
Death	47.0	5.9	52.9	39.8	5.0	44.8
Duty Disability Retirement	2.6	6.8	9.5	2.2	5.8	8.0
Non-Duty Disability Retirement	69.3	10.1	79.4	59.1	8.7	67.8
Total Active Members	\$5,881.4	\$1,126.5	\$7,007.9	\$4,955.3	\$931.4	\$5,886.7
Inactive Members			520.1			432.2
Retired Members and Beneficiaries			554.3			419.0
Total Actuarial Accrued Liability			\$8,082.2			\$6,738.0

Amounts in millions

Reconciliation of Change in Actuarial Accrued Liability

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year. The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	OPSRP
Actuarial Accrued Liability December 31, 2018	\$6,738.0
Expected change	1,080.0
Assumption and method changes	0.0
Plan changes	0.0
Deviations from expected experience	
Retirements from active status	\$6.0
Disability retirements	(5.7)
Active mortality and withdrawal	23.8
Pay increases	137.9
Inactive mortality	(4.2)
Data corrections	(0.6)
Other	1.1
Total demographic (gains) and losses	\$158.3
New entrants	106.0
Actuarial Accrued Liability December 31, 2019	\$8,082.2

Amounts in millions

OPSRP Unfunded Accrued Liability (UAL)

Calculation of UAL

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. The UAL is amortized over combined (Tier 1/Tier 2 and OPSRP) valuation payroll. The table below shows the OPSRP UAL, funded status, and UAL as a percentage of combined valuation payroll.

	December 31, 2019	December 31, 2018
1. Actuarial accrued liability	\$8,082.2	\$6,738.0
2. Actuarial value of assets	\$6,190.4	\$4,783.0
3. Unfunded accrued liability (2. - 1.)	\$1,891.8	\$1,955.0
4. Funded percentage (2. ÷ 1.)	76.6%	71.0%
5. Combined valuation payroll	\$11,533.7	\$10,852.0
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	16.4%	18.0%

Amounts in millions

Reconciliation of UAL Bases

Beginning with the December 31, 2007, actuarial valuation, each odd-year valuation establishes a 16-year closed-period amortization base for outstanding OPSRP UAL amounts. For odd-year valuations subsequent to December 31, 2007, this amortization base is calculated based on the total OPSRP UAL as of that valuation date less the remaining unamortized balance of any OPSRP UAL bases established at previous odd-year valuation dates. In other words, OPSRP experience from December 31, 2017 to December 31, 2019 is amortized based on a 16-year amortization schedule beginning December 31, 2019.

Reconciliation of UAL Bases					
Amortization Base	UAL December 31, 2018	Payment	Interest	UAL December 31, 2019	Next Year's Payment
December 31, 2007	(\$40.7)	(\$9.0)	(\$2.6)	(\$34.3)	(\$9.3)
December 31, 2009	113.5	18.5	7.5	102.4	19.2
December 31, 2011	46.0	6.0	3.1	43.0	6.3
December 31, 2013	419.3	46.6	28.4	401.0	48.2
December 31, 2015	719.3	69.9	49.1	698.5	72.4
December 31, 2017	218.6	19.0	15.0	214.6	19.7
December 31, 2019	N/A	N/A	N/A	466.6	38.7
Total				\$1,891.8	\$195.1

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than anticipated (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of experience that is financially unfavorable to the system.

The table below develops the actuarial gain or loss for OPSRP for the year ending December 31, 2019.

	OPSRP
1. Expected actuarial accrued liability	
a. Actuarial accrued liability at January 1, 2019	\$6,738.0
b. Normal cost (excluding expenses) at January 1, 2019	616.8
c. Benefit payments (excluding expenses) for year ending December 31, 2019	(42.6)
d. Interest	505.8
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$7,818.0
f. Change in actuarial accrued liability at December 31, 2019, due to assumption and method changes	0.0
g. Change in actuarial accrued liability at December 31, 2019, due to plan changes	0.0
h. Expected actuarial accrued liability at December 31, 2019 (e. + f. + g.)	\$7,818.0
2. Actuarial accrued liability at December 31, 2019	\$8,082.2
3. Liability gain/(loss) (1.h. - 2)	(\$264.3)
4. Expected actuarial value of assets	
a. Actuarial value of assets at January 1, 2019	\$4,783.0
b. Actual contributions for 2019	785.7
c. Benefit payments and expenses for year ending December 31, 2019	(51.0)
d. Assumed investment return	370.8
e. Expected actuarial value of assets at December 31, 2019 (a. + b. + c. + d.)	\$5,888.6
5. Actuarial value of assets as of December 31, 2019	\$6,190.4
6. Asset gain/(loss) (5. - 4.e.)	\$301.8
7. Net actuarial gain/(loss) (3. + 6.)	\$37.5

Amounts in millions

Reconciliation of the UAL

The table below summarizes the changes in UAL since the prior valuation.

The 2019 liability loss shown is primarily due to pay increases differing from assumption and the accrued liability associated with new entrants to the OPSRP program. For a full assessment of the new entrant effect on UAL, the accrued liability associated with new entrants would need to be combined with contributions associated with new entrants.

	OPSRP
UAL, December 31, 2018	\$1,955.0
Normal cost (including actual administrative expenses)	625.2
Contributions	(785.7)
Liability (gain) or loss	264.3
Asset (gain) or loss	(301.8)
Assumption and method changes	0.0
Plan changes	0.0
Interest at 7.20%	135.0
UAL, December 31, 2019	\$1,891.8

Amounts in millions

OPSRP Contribution Rate Development

Normal Cost Rates

The table below shows the development of the OPSRP normal cost rates. Total normal cost rates shown below are before any offset for redirected member contributions under Senate Bill 1049.

	December 31, 2019			December 31, 2018		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Normal Cost						
Pre-retirement Disability Benefits	\$10.8	\$2.6	\$13.4	\$9.5	\$2.3	\$11.8
All Other Benefits	564.3	115.9	680.2	503.3	101.7	605.0
Assumed Administrative Expenses	7.0	1.0	8.0	7.1	0.9	8.0
Total Normal Cost	\$582.1	\$119.5	\$701.6	\$519.9	\$104.9	\$624.8
OPSRP Valuation Payroll	\$6,740.9	\$919.0	\$7,659.8	\$5,973.4	\$802.5	\$6,775.9
Normal Cost Rate						
Pre-retirement Disability Benefits	0.16%	0.29%	0.17%	0.16%	0.29%	0.17%
All Other Benefits	8.37%	12.61%	8.88%	8.43%	12.67%	8.93%
Assumed Administrative Expenses	0.10%	0.10%	0.10%	0.12%	0.12%	0.12%
Total Normal Cost Rate	8.64%	13.00%	9.16%	8.70%	13.07%	9.22%

Amounts in millions

UAL Rates

The UAL rate is determined by calculating the sum of next year's scheduled amortization payments to the UAL as a percentage of combined (Tier 1/Tier 2 and OPSRP) valuation payroll.

	December 31, 2019	December 31, 2018
1. Total UAL	\$1,891.8	\$1,955.0
2. Next year's UAL payment	\$195.1	\$190.8
3. Combined valuation payroll	\$11,533.7	\$10,852.0
4. UAL rate (2 ÷ 3)	1.69%	1.76%

Amounts in millions

Calculated Employer Contribution Rates (Pre-Rate Collar)

The following table summarizes the OPSRP contribution rate for general service and police & fire members as of the valuation date, prior to application of the rate collar.

The normal cost rates apply to OPSRP payroll only, but the UAL rate is applied to combined (Tier 1/Tier 2 and OPSRP) valuation payroll. These rates, after the application of the rate collar, are combined with each employer's Tier 1/Tier 2 rates (other than Tier 1/Tier 2 normal cost rate) to determine each employer's pension contribution rate on OPSRP payroll.

July 1, 2021 Rates Calculated as of December 31, 2019			
	General Service	Police & Fire	Average Rate
OPSRP pension contribution rates			
Normal cost rate	8.64%	13.00%	9.16%
Uncollared UAL rate	1.69%	1.69%	1.69%
Uncollared total OPSRP pension rate	10.33%	14.69%	10.85%
Member redirect offset¹	(0.70%)	(0.70%)	(0.70%)
Uncollared net employer OPSRP pension rate	9.63%	13.99%	10.15%

¹ Redirected member contributions under Senate Bill 1049 (0.75% of payroll for OPSRP) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

Calculation of Rate Collar

The rate collar restricts the average OPSRP contribution rate so it generally cannot change by more than the greater of 3 percent of payroll or 20% of the current average OPSRP contribution rate. However, if the funded percentage is below 60% or above 140%, the size of the collar is doubled. If the funded percentage is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. All collar calculations are performed based on the weighted average OPSRP contribution rate, and any adjustment due to the collar is applied to the OPSRP UAL rate.

The table below shows the calculation of and any adjustment for the rate collar.

July 1, 2021 Rates Calculated as of December 31, 2019			
	General Service	Police & Fire	Average Rate
1. Current total OPSRP pension rate	9.85%	14.48%	10.37%
2. Size of rate collar			
a. Preliminary size of rate collar <i>(greater of 3% or 20% x 1.)</i>			3.00%
b. Funded percentage			77%
c. Size of rate collar <i>(If b. < 60% or b. > 140%, 2 x a. If b. is 70%-130%, a. Otherwise, graded rate between a. and 2 x a.)</i>			3.00%
3. July 1, 2021 Minimum total contribution rate <i>(1. - 2.c.)</i>			7.37%
4. July 1, 2021 Maximum total contribution rate <i>(1. + 2.c.)</i>			13.37%
5. July 1, 2021 total contribution rate before collar	10.33%	14.69%	10.85%
6. July 1, 2021 total contribution rate after collar <i>(5., but not less than 3. or more than 4.)</i>	10.33%	14.69%	10.85%
7. Impact of collar (6. - 5.)	0.00%	0.00%	0.00%

Calculated Employer Contribution Rates (Post-Rate Collar)

The table below summarizes the OPSRP contribution rate for general service and police & fire members as of the valuation date, after adjustments for the rate collar.

July 1, 2021 Rates Calculated as of December 31, 2019			
	General Service	Police & Fire	Average Rate
OPSRP pension contribution rates			
Normal cost rate	8.64%	13.00%	9.16%
Collared UAL rate	1.69%	1.69%	1.69%
Collared total OPSRP pension rate	10.33%	14.69%	10.85%
Member redirect offset¹	(0.70%)	(0.70%)	(0.70%)
Collared net employer OPSRP pension rate	9.63%	13.99%	10.15%

¹ Redirected member contributions under Senate Bill 1049 (0.75% of payroll for OPSRP) will offset employer contribution rates beginning July 1, 2021. Redirect does not apply to members with monthly pay below a threshold. The values shown in the table incorporate an estimate of the effect of this limitation.

Retiree Healthcare Valuation

Retiree Healthcare Assets

Assets

A reconciliation of retiree healthcare assets is shown below. The reconciliation of assets is provided by PERS.

	RHIA	RHIPA	Retiree Healthcare Totals
Additions			
1. Employer contributions	\$30.1	\$12.8	\$42.9
2. Net investment income	76.7	5.3	82.0
3. Other	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
4. Total additions	\$106.8	\$18.1	\$124.9
Deductions			
4. Healthcare Premium Subsidies	(\$32.1)	(\$4.4)	(\$36.4)
5. Administrative expenses	<u>(1.3)</u>	<u>(0.3)</u>	<u>(1.6)</u>
6. Total deductions	(\$33.4)	(\$4.7)	(\$38.0)
7. Net change	\$73.4	\$13.4	\$86.8
8. Net assets held in trust for benefits			
a. Beginning of year	\$570.7	\$38.5	\$609.2
b. End of year	\$644.1	\$51.9	\$696.0

Amounts in millions

Retiree Healthcare Liabilities

Normal Cost

A summary of the normal cost by assumed cause of future termination of service is shown below for the current and prior year.

	RHIA			RHIPA		
	December 31, 2019	December 31, 2018	Percent Change	December 31, 2019	December 31, 2018	Percent Change
Normal Cost						
Service Retirement	\$1.4	\$1.5		\$1.2	\$1.2	
Withdrawal	0.5	0.5		0.0	0.0	
Disability	0.1	0.1		0.1	0.1	
Death	<u>0.0</u>	<u>0.0</u>		<u>0.0</u>	<u>0.0</u>	
Total Normal Cost	\$1.9	\$2.2	(10.5%)	\$1.2	\$1.3	(6.7%)

Amounts in millions

The table below reconciles the normal cost from the prior valuation to the current valuation.

	RHIA	RHIPA
Normal Cost December 31, 2018	\$2.2	\$1.3
Expected increase (decrease)	(0.1)	(0.0)
Assumption and method changes	0.0	0.0
Plan changes	0.0	0.0
Deviations from expected experience		
Demographic (gains) or losses	(0.1)	(0.0)
Normal Cost December 31, 2019	\$1.9	\$1.2

Amounts in millions

Actuarial Accrued Liability

A summary of the actuarial accrued liability by status is shown below for the current and prior year.

	RHIA			RHIPA		
	December 31, 2019	December 31, 2018	Percent Change	December 31, 2019	December 31, 2018	Percent Change
Actives	\$58.3	\$62.2	(6.3%)	\$47.2	\$48.8	(3.2%)
Inactive Members	18.7	19.6	(4.5%)	0.0	0.0	0.0%
Retired Members and Beneficiaries	326.9	329.8	(0.9%)	12.1	14.0	(13.5%)
Total Actuarial Accrued Liability	\$403.9	\$411.7	(1.9%)	\$59.3	\$62.7	(5.5%)

Amounts in millions

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year. The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	RHIA	RHIPA	Total
Actuarial Accrued Liability December 31, 2018	\$411.7	\$62.7	\$474.4
Expected change	(1.4)	1.3	(0.0)
Assumption and method changes	0.0	0.0	0.0
Plan changes	0.0	0.0	0.0
Deviations from expected experience			
Demographic (gains) or losses	(6.4)	(4.8)	(11.2)
Actuarial Accrued Liability December 31, 2019	\$403.9	\$59.3	\$463.2

Amounts in millions

Retiree Healthcare Unfunded Accrued Liability (UAL)

Calculation of UAL

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. A summary of the UAL by program is shown on the following table.

	RHIA			RHIPA		
	December 31, 2019	December 31, 2018	Percent Change	December 31, 2019	December 31, 2018	Percent Change
1. Actuarial accrued liability	\$403.9	\$411.7	(1.9%)	\$59.3	\$62.7	(5.5%)
2. Actuarial value of assets	\$644.1	\$570.7	12.9%	\$51.9	\$38.5	34.9%
3. Unfunded accrued liability	(\$240.3)	(\$159.1)	51.0%	\$7.4	\$24.3	(69.4%)
4. Funded percentage (2. ÷ 1.)	159.5%	138.6%	15.0%	87.5%	61.3%	42.7%
5. Combined valuation payroll	\$11,533.7	\$10,852.0	6.3%	\$3,479.8	\$3,211.6	8.3%
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	(2.1%)	(1.5%)		0.2%	0.8%	

Amounts in millions

Reconciliation of UAL Bases

Beginning with the December 31, 2007 actuarial valuation, each rate-setting valuation establishes a 10-year amortization base for outstanding RHIA and RHIPA UAL amounts. For odd-year valuations subsequent to December 31, 2007, this amortization base is calculated based on the total UAL as of that valuation date less the remaining unamortized balance of any UAL bases established at previous odd-year valuation dates. In other words, RHIA and RHIPA experience from December 31, 2017 to December 31, 2019 is amortized based on a 10-year amortization schedule beginning December 31, 2019.

RHIA					
Amortization Base	UAL December 31, 2018	Payment	Interest	UAL December 31, 2019	Next Year's Payment
December 31, 2009	\$10.2	\$10.5	\$0.3	\$0.0	\$0.0
December 31, 2011	(13.6)	(4.8)	(0.8)	(9.5)	(5.0)
December 31, 2013	(29.6)	(6.6)	(1.9)	(25.0)	(6.8)
December 31, 2015	(5.2)	(0.8)	(0.3)	(4.7)	(0.9)
December 31, 2017	(74.3)	(9.8)	(5.0)	(69.5)	(10.1)
December 31, 2019	N/A	N/A	N/A	(131.6)	(15.8)
Total				(\$240.3)	(\$38.6)

Amounts in millions

RHIPA					
Amortization Base	UAL December 31, 2018	Payment	Interest	UAL December 31, 2019	Next Year's Payment
December 31, 2009	\$0.3	\$0.4	\$0.0	\$0.0	\$0.0
December 31, 2011	6.3	2.3	0.4	4.4	2.3
December 31, 2013	20.3	4.5	1.3	17.1	4.7
December 31, 2015	9.1	1.5	0.6	8.2	1.5
December 31, 2017	(2.1)	(0.3)	(0.1)	(1.9)	(0.3)
December 31, 2019	N/A	N/A	N/A	(20.4)	(2.5)
Total				\$7.4	\$5.8

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than anticipated (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of experience that is financially unfavorable to the system.

The table below shows the development of the actuarial gain (or loss) for RHIA and RHIPA for the plan year ending December 31, 2019.

	RHIA	RHIPA	Retiree Healthcare Totals
1. Expected actuarial accrued liability			
a. Actuarial accrued liability at January 1, 2019	\$411.7	\$62.7	\$474.4
b. Normal cost at January 1, 2019	2.2	1.3	3.5
c. Benefit payments for year ending December 31, 2019	(32.1)	(4.4)	(36.4)
d. Interest	28.6	4.4	33.0
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$410.3	\$64.1	\$474.4
f. Change in actuarial accrued liability at December 31, 2019, due to assumption and method changes	0.0	0.0	0.0
g. Change in actuarial accrued liability at December 31, 2019, due to plan changes	0.0	0.0	0.0
h. Expected actuarial accrued liability at December 31, 2019 (e. + f. + g.)	\$410.3	\$64.1	\$474.4
2. Actuarial accrued liability at December 31, 2019	\$403.9	\$59.3	\$463.2
3. Liability gain/(loss) (1.h. - 2.)	\$6.4	\$4.8	\$11.2
4. Expected actuarial value of assets			
a. Actuarial value of assets at January 1, 2019	\$570.7	\$38.5	\$609.2
b. Actual contributions for 2019	30.1	12.8	42.9
c. Benefit payments and expenses for year ending December 31, 2019	(33.4)	(4.7)	(38.0)
d. Assumed investment return	41.0	3.1	44.0
e. Expected actuarial value of assets before changes (a. + b. + c. + d.)	\$608.4	\$49.6	\$658.0
f. Change in actuarial value of assets at December 31, 2019, due to assumption changes	0.0	0.0	0.0
g. Change in actuarial value of assets at December 31, 2019, due to plan changes	0.0	0.0	0.0
h. Expected actuarial value of assets at December 31, 2019 (e. + f. + g.)	\$608.4	\$49.6	\$658.0
5. Actuarial value of assets at December 31, 2019	\$644.1	\$51.9	\$696.0
6. Actuarial asset gain/(loss) (5. - 4.h.)	\$35.7	\$2.3	\$38.0
7. Net actuarial gain/(loss) (3. + 6.)	\$42.1	\$7.0	\$49.2

Amounts in millions

Reconciliation of UAL

The table below summarizes the changes in UAL since the prior valuation.

The significant decrease in both the RHIA and RHIPA UAL is primarily due to employer contributions, and lower participation than assumed.

	RHIA	RHIPA
UAL, December 31, 2018	(\$159.1)	\$24.3
Normal Cost (including actual administrative expenses)	3.5	1.6
Contributions	(30.1)	(12.8)
Liability (gain) or loss	(6.4)	(4.8)
Asset (gain) or loss	(35.7)	(2.3)
Assumption and method changes	0.0	0.0
Interest	(12.4)	1.3
UAL, December 31, 2019	(\$240.3)	\$7.4

Amounts in millions

Retiree Healthcare Contribution Rate Development

Normal Cost Rate

The table below shows the development of the retiree healthcare normal cost rates. For RHIA, valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

	RHIA		RHIPA	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Normal Cost	\$1.9	\$2.2	\$1.2	\$1.3
Tier 1/Tier 2 Valuation Payroll	\$3,873.9	\$4,076.1	\$1,120.6	\$1,159.5
Normal Cost Rate	0.05%	0.05%	0.11%	0.11%

Amounts in millions

The table below shows the development of the retiree healthcare normal cost rates for the various rate pools. For RHIA, valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2019			
	SLGRP	School Districts	Independent Employers	Retiree Healthcare Total
1. Tier 1/ Tier 2 Valuation Payroll				
a. All Employers' Payroll	\$2,183.5	\$1,330.2	\$360.3	\$3,873.9
b. RHIPA Employers' Payroll	\$1,094.8	\$0.0	\$25.9	\$1,120.6
2. Normal Cost Rate				
a. RHIA	0.05%	0.05%	0.05%	0.05%
b. RHIPA	0.11%	0.00%	0.11%	0.11%
3. Weighted Average Normal Cost Rate [(1.a. x 2.a + 1.b. x 2.b.) / 1.a]	0.11%	0.05%	0.06%	0.08%

Amounts in millions

UAL Rate

The UAL rate is determined by calculating the sum of next year's scheduled amortization payments to the UAL as a percentage of combined (Tier 1/Tier 2 and OPSRP) valuation payroll. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

For RHIA, the UAL rate calculated under this method was less than 0.00% in this valuation. As a result, the PERS Board decided to apply a minimum UAL rate of 0.00% for the current valuation.

	RHIA		RHIPA	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
1. Total UAL	(\$240.3)	(\$159.1)	\$7.4	\$24.3
2. Next year's UAL payment	(\$38.6)	(\$17.1)	\$5.8	\$7.2
3. Combined valuation payroll	\$11,533.7	\$10,852.0	\$3,479.8	\$3,211.6
4. UAL rate				
a. Preliminary UAL rate (2 ÷ 3)	(0.33%)	(0.16%)	0.17%	0.22%
b. Final UAL rate (greater of a. or 0.00%)	0.00%	0.00%	0.17%	0.22%

Amounts in millions

The table below shows the development of the retiree healthcare UAL rates for the various rate pools. For RHIA, combined valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2019			
	SLGRP	School Districts	Independent Employers	Retiree Healthcare Total
1. Combined Valuation Payroll				
a. All Employers' Payroll	\$6,768.8	\$3,740.7	\$1,024.2	\$11,533.7
b. RHIPA Employers' Payroll	\$3,454.0	\$0.0	\$25.9	\$3,479.8
2. UAL Rate				
a. RHIA	0.00%	0.00%	0.00%	0.00%
b. RHIPA	0.17%	0.00%	0.17%	0.17%
3. Weighted Average UAL Rate [(1.a. x 2.a + 1.b. x 2.b.) / 1.a]	0.09%	0.00%	0.00%	0.05%

Amounts in millions

Calculated Employer Contribution Rate Summary

The following table summarizes the calculated employer contribution rates for the retiree healthcare programs. The normal cost rates are applied against Tier 1/Tier 2 payroll, but the UAL rates are applied against all payroll. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

July 1, 2021 Rates Calculated as of December 31, 2019			
	State Agencies and Judiciary	All Other Employers	Retiree Healthcare Total
Normal Cost Rates			
RHIA	0.05%	0.05%	0.05%
RHIPA	0.11%	0.00%	0.03%
Total normal cost rate	0.16%	0.05%	0.08%
UAL Rates			
RHIA	0.00%	0.00%	0.00%
RHIPA	0.17%	0.00%	0.05%
Total UAL rate	0.17%	0.00%	0.05%
Total retiree healthcare rate	0.33%	0.05%	0.13%

Accounting / CAFR Exhibits

Accounting/CAFR Exhibits

The following information as of December 31, 2019 has been prepared and provided to Oregon PERS for inclusion in the Actuarial Section of the 2020 Comprehensive Annual Financial Report (CAFR):

- Schedule of Active Member Valuation Data
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Schedules of Funding Progress by Rate Pool
- Solvency Test
- Analysis of Financial Experience
- Schedules of Funding Progress

These exhibits do not reflect GASB Statements No. 74 and 75, which were issued by GASB in June 2015 to replace Statements No. 43 and 45, and govern financial reporting for postemployment benefits other than pensions. GASB 74 governs plan reporting effective for fiscal years beginning after June 15, 2016, while GASB 75 governs employer reporting for fiscal years beginning after June 15, 2017. Milliman provided results for Oregon PERS under GASB 74 and 75 determined as of a June 30, 2019 measurement date in letters dated December 6, 2019 and March 4, 2020, respectively. The results for a measurement date of June 30, 2020 will be provided separately.

These exhibits do not reflect GASB Statements No. 67 and 68, issued by GASB in June 2012 to replace Statements No. 25 and 27. GASB 67 governs plan financial reporting effective for fiscal years beginning after June 15, 2013, while GASB 68 governs employer financial reporting for fiscal years beginning after June 15, 2014. Milliman provided results for Oregon PERS under GASB 67 and 68 determined as of a June 30, 2019 measurement date in letters dated December 6, 2019 and March 4, 2020, respectively. The results for a measurement date of June 30, 2020 will be provided separately.

Some employers have made supplemental deposits in addition to their regularly scheduled contributions. These deposits are placed in a side account within the pension trust and used to offset future contribution requirements of that employer. The Schedules of Funding Progress and Solvency Test include side accounts as part of the Plan's assets since those amounts are in a restricted trust available exclusively for the benefit of plan members.

Milliman is not an accounting or audit firm and cannot provide accounting advice. Milliman is not responsible for the interpretation of, or compliance with, accounting standards; citations to, and descriptions of accounting standards provided in this report are for reference purposes only. The information provided in this section is intended to assist Oregon PERS in completing its financial statements, but any accounting determination should be reviewed by your auditor.

The exhibits are provided on the following pages.

Actuarial Schedules

Schedule of Active Member Valuation Data

Valuation Date	Count	Annual Payroll (Thousands)	Average Annual Pay	% Increase in Average Pay	Number of Participating Employers ¹	
12/31/1993	137,513	\$4,466,797	\$32,483		N/A	
12/31/1995	141,471	\$4,848,058	\$34,269	5.5%	N/A	
12/31/1997	143,194	\$5,161,562	\$36,045	5.2%	N/A	
12/31/1999	151,262	\$5,676,606	\$37,528	4.1%	N/A	
12/31/2000	156,869	\$6,195,862	\$39,497	5.2%	N/A	
12/31/2001	160,477	\$6,520,225	\$40,630	2.9%	N/A	Old Basis
12/31/2001	160,477	\$6,253,965	\$38,971	—	N/A	New Basis ²
12/31/2002	159,287	\$6,383,475	\$40,075	2.8%	N/A	
12/31/2003	153,723	\$6,248,550	\$40,648	1.4%	N/A	
12/31/2004	142,635	\$6,306,447	\$44,214	8.8%	806	
12/31/2005 ³	156,501	\$6,791,891	\$43,398	(1.8%)	810	
12/31/2006	163,261	\$7,326,798	\$44,878	3.4%	758	
12/31/2007	167,023	\$7,721,819	\$46,232	3.0%	760	
12/31/2008	170,569	\$8,130,136	\$47,665	3.1%	766	
12/31/2009	178,606	\$8,512,192	\$47,659	(0.0%)	776	
12/31/2010	193,569	\$8,750,064	\$45,204	(5.2%)	787	
12/31/2011	170,972	\$8,550,511	\$50,011	10.6%	791	
12/31/2012	167,103	\$8,590,879	\$51,411	2.8%	798	
12/31/2013	162,185	\$8,671,835	\$53,469	4.0%	799	
12/31/2014	164,859	\$9,115,767	\$55,294	3.4%	802	
12/31/2015	168,177	\$9,544,132	\$56,751	2.6%	804	
12/31/2016	172,483	\$9,872,557	\$57,238	0.9%	805	
12/31/2017	173,002	\$10,098,889	\$58,374	2.0%	802	
12/31/2018	176,763	\$10,851,980	\$61,393	5.2%	798	
12/31/2019	180,757	\$11,533,740	\$63,808	3.9%	802	

¹ Effective in 2006, participating employers are defined for this purpose as any employer with covered payroll during the prior year. In prior years, employers with liabilities but without covered payroll were included as well.

² Effective in 2001, the Annual Payroll excludes the member pick-up, if any.

³ Effective with the 12/31/2005 valuation, OPSRP members and payroll are included.

Actuarial Schedules

Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

Annual Allowances are shown in thousands.

Valuation Date	Added to Rolls		Removed from Rolls		Rolls - End of Year		% Increase in Annual Allowances ²	Average Annual Allowances
	Count	Annual Allowances ¹	Count	Annual Allowances	Count	Annual Allowances		
12/31/1993					60,841	\$564,341	27.6%	\$9,276
12/31/1995					64,796	\$700,171	24.1%	\$10,806
12/31/1997					69,624	\$919,038	31.3%	\$13,200
12/31/1999					82,819	\$1,299,380	41.4%	\$15,689
12/31/2000					82,458	\$1,385,556	6.6%	\$16,803
12/31/2001					85,216	\$1,514,491	9.3%	\$17,772
12/31/2002					89,482	\$1,722,865	13.8%	\$19,254
12/31/2003					97,777	\$2,040,533	8.4%	\$20,869
12/31/2004 ³	6,754	\$149,474	2,863	\$35,151	101,668	\$2,154,856	5.6%	\$21,195
12/31/2005 ³	4,472	\$149,127	3,217	\$36,784	102,923	\$2,267,198	5.2%	\$22,028
12/31/2006 ³	5,060	\$151,240	3,263	\$39,735	104,720	\$2,378,704	4.9%	\$22,715
12/31/2007 ³	5,385	\$183,232	3,304	\$40,590	106,801	\$2,521,345	6.0%	\$23,608
12/31/2008 ³	5,963	\$171,484	3,626	\$47,062	109,138	\$2,645,767	4.9%	\$24,242
12/31/2009 ³	6,377	\$226,713	3,374	\$46,228	112,141	\$2,826,252	6.8%	\$25,203
12/31/2010 ³	6,359	\$217,424	3,512	\$51,627	114,988	\$2,992,048	5.9%	\$26,021
12/31/2011 ³	8,715	\$282,098	3,679	\$55,633	120,024	\$3,218,514	7.6%	\$26,816
12/31/2012 ³	7,023	\$235,917	4,875	\$59,353	122,172	\$3,395,079	5.5%	\$27,789
12/31/2013	9,724	\$307,551	3,644	\$66,607	128,252	\$3,636,023	7.1%	\$28,351
12/31/2014 ⁴	6,910	\$235,250	3,524	\$66,621	131,638	\$3,804,651	4.6%	\$28,902
12/31/2015 ⁴	8,566	\$304,818	3,781	\$73,305	136,423	\$4,036,165	6.1%	\$29,586
12/31/2016 ⁴	6,413	\$242,372	3,931	\$80,903	138,905	\$4,197,633	4.0%	\$30,219
12/31/2017 ⁴	10,075	\$385,197	3,878	\$83,921	145,102	\$4,498,910	7.2%	\$31,005
12/31/2018	7,856	\$297,542	3,933	\$90,107	149,025	\$4,706,345	4.6%	\$31,581
12/31/2019	8,200	\$322,057	4,124	\$95,486	153,101	\$4,932,915	4.8%	\$32,220

¹ Additions to annual allowances reflect the combined effects of new retirements and COLA increases since the previous valuation date.

² Since last valuation date.

³ Annual allowances reflect estimated adjustments to retiree benefits due to the implementation of the *Strunk v. PERB, et al.* and *City of Eugene v. State of Oregon, PERB, et al.* decisions.

⁴ Annual allowances reflect estimated adjustments to retiree benefits for the *Moro v. State of Oregon* decision for records that were not already adjusted in the data provided.

Actuarial Schedules

Schedule of Funding Progress by Rate Pool

The liabilities and assets resulting from the last six actuarial valuations are as follows (*dollar amounts in millions*)

Actuarial Valuation Date	Actuarial Value of Assets ^{1,2} (a)	Actuarial Accrued Liability (AAL) ² (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll ³ (c)	UAAL as a % of Covered Payroll ((b-a)/c)
Tier 1/Tier 2 State & Local Government Rate Pool						
12/31/2014 ⁵	\$31,162.6	\$37,169.9	\$6,007.3	83.8%	\$2,827.9	212.4%
12/31/2015 ⁴	\$30,185.3	\$38,396.8	\$8,211.5	78.6%	\$2,691.8	305.1%
12/31/2016	\$30,417.6	\$40,351.3	\$9,933.7	75.4%	\$2,546.7	390.1%
12/31/2017 ⁴	\$33,366.0	\$42,150.7	\$8,784.7	79.2%	\$2,410.6	364.4%
12/31/2018	\$31,798.9	\$43,149.3	\$11,350.4	73.7%	\$2,299.5	493.6%
12/31/2019 ⁴	\$34,060.0	\$44,122.1	\$10,062.1	77.2%	\$2,183.5	460.8%
Tier 1/Tier 2 School District Rate Pool						
12/31/2014 ⁵	\$23,361.2	\$27,059.9	\$3,698.7	86.3%	\$1,626.0	227.5%
12/31/2015	\$22,728.9	\$27,670.7	\$4,941.8	82.1%	\$1,578.8	313.0%
12/31/2016	\$22,870.2	\$29,152.2	\$6,282.0	78.5%	\$1,532.7	409.9%
12/31/2017	\$24,934.4	\$29,677.4	\$4,743.1	84.0%	\$1,443.7	328.5%
12/31/2018	\$23,557.9	\$29,898.4	\$6,340.6	78.8%	\$1,401.2	452.5%
12/31/2019	\$25,091.5	\$30,274.5	\$5,183.0	82.9%	\$1,330.2	389.6%
Tier 1/Tier 2 Independent Employers and Judiciary						
12/31/2014 ⁵	\$4,967.4	\$6,104.9	\$1,137.4	81.4%	\$479.2	237.4%
12/31/2015 ⁴	\$4,807.6	\$6,327.1	\$1,519.5	76.0%	\$460.3	330.1%
12/31/2016	\$4,856.6	\$6,690.8	\$1,834.3	72.6%	\$437.3	419.5%
12/31/2017 ⁴	\$5,018.2	\$6,536.3	\$1,518.1	76.8%	\$392.6	386.7%
12/31/2018	\$4,756.2	\$6,736.3	\$1,980.1	70.6%	\$375.4	527.5%
12/31/2019 ⁴	\$5,061.3	\$6,916.0	\$1,854.7	73.2%	\$360.3	514.8%
OPSRP Rate Pool						
12/31/2014 ⁵	\$2,024.6	\$3,064.1	\$1,039.5	66.1%	\$4,182.7	24.9%
12/31/2015	\$2,389.1	\$3,742.5	\$1,353.5	63.8%	\$4,813.3	28.1%
12/31/2016	\$3,021.4	\$4,717.0	\$1,695.6	64.1%	\$5,355.8	31.7%
12/31/2017	\$4,116.5	\$5,634.7	\$1,518.2	73.1%	\$5,852.0	25.9%
12/31/2018	\$4,783.0	\$6,738.0	\$1,955.0	71.0%	\$6,775.9	28.9%
12/31/2019	\$6,190.4	\$8,082.2	\$1,891.8	76.6%	\$7,659.8	24.7%
Postemployment Healthcare Benefits - Retirement Health Insurance Account						
12/31/2014	\$395.9	\$468.4	\$72.5	84.5%	\$4,933.1	1.5%
12/31/2015	\$419.3	\$465.6	\$46.3	90.0%	\$4,730.8	1.0%
12/31/2016	\$465.0	\$463.7	(\$1.3)	100.3%	\$4,516.7	(0.0%)
12/31/2017	\$553.3	\$437.6	(\$115.7)	126.4%	\$4,246.9	(2.7%)
12/31/2018	\$570.7	\$411.7	(\$159.1)	138.6%	\$4,076.1	(3.9%)
12/31/2019	\$644.1	\$403.9	(\$240.3)	159.5%	\$3,873.9	(6.2%)
Postemployment Healthcare Benefits - Retiree Health Insurance Premium Account						
12/31/2014	\$7.2	\$70.5	\$63.3	10.2%	\$1,406.3	4.5%
12/31/2015	\$11.2	\$67.8	\$56.6	16.5%	\$1,339.4	4.2%
12/31/2016	\$19.1	\$67.9	\$48.8	28.1%	\$1,276.0	3.8%
12/31/2017	\$29.8	\$69.4	\$39.5	43.0%	\$1,212.2	3.3%
12/31/2018	\$38.5	\$62.7	\$24.3	61.3%	\$1,159.5	2.1%
12/31/2019	\$51.9	\$59.3	\$7.4	87.5%	\$1,120.6	0.7%

Notes:

¹ Side account assets are included with Tier 1/Tier 2 assets.

² Excludes effect of Multnomah Fire District (net UAAL of \$142 million as of 12/31/2019).

³ Covered payroll shown is for members of the rate pool benefiting from the specified program. For example, Tier 1/Tier 2 School District payroll is only payroll for Tier 1/Tier 2 members and excludes OPSRP. However, UAAL is amortized using combined Tier 1/Tier 2 and OPSRP payroll.

⁴ Reflects the transfer in assets and liabilities for new employers that joined the SLGRP effective January 1 following the valuation date.

⁵ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Actuarial Schedules

Solvency Test

Pension and Retiree Healthcare Plans Combined

(dollar amounts in millions)

The schedule below shows results from the defined benefit pension plans and retiree healthcare plans on a consolidated basis. Results are also shown separately for each program: Tier 1/Tier 2, OPSRP, and retiree healthcare. Note that the defined benefit pension plan constitutes over 99% of the consolidated assets and liabilities.

Valuation Date ²	Actuarial Accrued Liability ¹			Valuation Assets ^{1,3}	Portion of Actuarial Accrued Liabilities Covered by Assets		
	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)		(1)	(2)	(3)
	12/31/2010	\$8,407.9	\$34,432.5		\$17,070.2	\$51,821.6	100%
12/31/2011 ⁴	\$7,779.7	\$37,362.4	\$16,551.8	\$50,412.4	100%	100%	32%
12/31/2012 ⁵	\$7,704.9	\$36,759.3	\$16,473.1	\$55,080.1	100%	100%	64%
12/31/2013 ⁴	\$7,120.1	\$39,531.5	\$16,476.8	\$60,372.9	100%	100%	83%
12/31/2014 ⁶	\$6,950.4	\$46,576.7	\$20,470.8	\$61,798.3	100%	100%	40%
12/31/2015 ⁴	\$6,476.8	\$49,158.7	\$21,094.5	\$60,430.6	100%	100%	23%
12/31/2016	\$6,168.1	\$52,232.7	\$23,101.0	\$61,543.2	100%	100%	14%
12/31/2017 ⁴	\$5,585.9	\$55,636.9	\$23,340.3	\$67,909.2	100%	100%	29%
12/31/2018	\$5,153.6	\$57,297.7	\$24,597.8	\$65,411.5	100%	100%	12%
12/31/2019 ⁴	\$4,907.4	\$59,461.0	\$25,540.5	\$71,008.3	100%	100%	26%

¹ Includes effect of Multnomah Fire District (net UAAL of \$142 million as of 12/31/2019).

² An extensive revision of the actuarial assumptions occurs prior to each even-year valuation; therefore, the figures are not directly comparable.

³ Includes the value of UAL Lump Sum Side Accounts.

⁴ Reflects the transfer in assets and liabilities for newemployers that joined the SLGRP effective January 1 following the valuation date.

⁵ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

⁶ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Actuarial Schedules

Solvency Test

Tier 1/Tier 2 Pension

(dollar amounts in millions)

Valuation Date ²	Actuarial Accrued Liability ¹			Valuation Assets ^{1,3}	Portion of Actuarial Accrued Liabilities Covered by Assets		
	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)		(1)	(2)	(3)
	12/31/2012 ⁴	\$7,704.9	\$36,377.3		\$14,527.4	\$53,594.0	100%
12/31/2013 ⁵	\$7,120.1	\$39,116.2	\$14,114.1	\$58,384.0	100%	100%	86%
12/31/2014 ⁶	\$6,950.4	\$46,113.5	\$17,331.0	\$59,370.6	100%	100%	36%
12/31/2015 ⁵	\$6,476.8	\$48,641.5	\$17,335.7	\$57,611.0	100%	100%	14%
12/31/2016	\$6,168.1	\$51,655.5	\$18,429.6	\$58,037.6	100%	100%	1%
12/31/2017 ⁵	\$5,585.9	\$54,967.4	\$17,868.1	\$63,209.7	100%	100%	15%
12/31/2018	\$5,153.6	\$56,534.9	\$18,148.3	\$60,019.3	100%	97%	0%
12/31/2019 ⁵	\$4,907.4	\$58,567.8	\$17,888.4	\$64,121.8	100%	100%	4%

¹ Includes effect of Multnomah Fire District (net UAAL of \$142 million as of 12/31/2019).

² An extensive revision of the actuarial assumptions occurs prior to each even-year valuation; therefore, the figures are not directly comparable.

³ Includes the value of UAL Lump Sum Side Accounts.

⁴ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

⁵ Reflects the transfer in assets and liabilities for newemployers that joined the SLGRP effective January 1 following the valuation date.

⁶ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

OPSRP Pension

(dollar amounts in millions)

Valuation Date ¹	Actuarial Accrued Liability			Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)		(1)	(2)	(3)
	12/31/2012 ²	\$0.0	\$28.6		\$1,766.9	\$1,190.0	100%
12/31/2013	\$0.0	\$51.2	\$2,192.1	\$1,630.2	100%	100%	72%
12/31/2014 ³	\$0.0	\$92.4	\$2,971.6	\$2,024.6	100%	100%	65%
12/31/2015	\$0.0	\$144.6	\$3,597.9	\$2,389.1	100%	100%	62%
12/31/2016	\$0.0	\$201.1	\$4,515.9	\$3,021.4	100%	100%	62%
12/31/2017	\$0.0	\$310.1	\$5,324.5	\$4,116.5	100%	100%	71%
12/31/2018	\$0.0	\$419.0	\$6,318.9	\$4,783.0	100%	100%	69%
12/31/2019	\$0.0	\$554.3	\$7,527.9	\$6,190.4	100%	100%	75%

¹ An extensive revision of the actuarial assumptions occurs prior to each even-year valuation; therefore, the figures are not directly comparable.

² The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

³ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Retiree Healthcare (RHIA and RHIPA)

(dollar amounts in millions)

Retiree Health Insurance Account (RHIA)							
Actuarial Accrued Liability							
Valuation Date ¹	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
12/31/2012 ²	\$0.0	\$338.3	\$133.5	\$291.6	100%	86%	0%
12/31/2013	\$0.0	\$348.0	\$125.6	\$353.5	100%	100%	4%
12/31/2014	\$0.0	\$355.1	\$113.3	\$395.9	100%	100%	36%
12/31/2015	\$0.0	\$357.7	\$107.9	\$419.3	100%	100%	57%
12/31/2016	\$0.0	\$361.7	\$102.0	\$465.0	100%	100%	101%
12/31/2017	\$0.0	\$343.9	\$93.7	\$553.3	100%	100%	224%
12/31/2018	\$0.0	\$329.8	\$81.8	\$570.7	100%	100%	294%
12/31/2019	\$0.0	\$326.9	\$77.0	\$644.1	100%	100%	412%

¹ An extensive revision of the actuarial assumptions occurs prior to each even-year valuation; therefore, the figures are not directly comparable.

² The 12/31/2012 valuation reflects a change in cost method to Entry Age Normal.

Retiree Health Insurance Premium Account (RHIPA)							
Actuarial Accrued Liability							
Valuation Date ¹	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
12/31/2012 ²	\$0.0	\$15.1	\$45.3	\$4.4	100%	29%	0%
12/31/2013	\$0.0	\$16.1	\$45.1	\$5.2	100%	33%	0%
12/31/2014	\$0.0	\$15.7	\$54.9	\$7.2	100%	46%	0%
12/31/2015	\$0.0	\$14.9	\$52.9	\$11.2	100%	75%	0%
12/31/2016	\$0.0	\$14.4	\$53.5	\$19.1	100%	100%	9%
12/31/2017	\$0.0	\$14.4	\$53.5	\$19.1	100%	100%	9%
12/31/2018	\$0.0	\$14.0	\$48.8	\$38.5	100%	100%	50%
12/31/2019	\$0.0	\$12.1	\$47.2	\$51.9	100%	100%	84%

¹ An extensive revision of the actuarial assumptions occurs prior to each even-year valuation; therefore, the figures are not directly comparable.

² The 12/31/2012 valuation reflects a change in cost method to Entry Age Normal.

Actuarial Schedules

Analysis of Financial Experience

The schedule below shows results from the defined benefit pension plans and retiree healthcare plans on a consolidated basis. Results are also shown separately for each program on subsequent pages.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences Between Assumed Experience and Actual Experience and Assumption Changes

(dollar amounts in millions)

Pension and Retiree Healthcare Plans	\$ Gain (or Loss) for Year	
	2019	2018
<i>Type of Activity</i>		
Retirements from Active Status	(\$119.4)	(\$87.6)
Active Mortality and Withdrawal	(38.4)	(38.0)
Pay Increases	(213.4)	(155.9)
Contributions	111.8	208.3
Interest Crediting Experience	(85.7)	88.5
Investment Income	3,547.4	(3,982.7)
Retirement, Mortality and Lump Sums from Inactive Status	7.0	(4.3)
Retiree and Beneficiary Mortality	5.1	(41.5)
New Entrants ¹	(110.3)	(82.6)
Other	79.1	15.2
Gain (or Loss) During Year from Financial Experience	\$3,183.2	(\$4,080.5)
<i>Non-Recurring Items</i>		
Assumption Changes	0.0	67.3
Plan Changes	0.0	52.1
Composite Gain (or Loss) During Year	\$3,183.2	(\$3,961.1)

¹ Accrued liability associated with newentrants is shown. For a full assessment of the newentrant effect on UAL, this would need to be combined with contributions associated with newentrants.

The schedules below show results from the Tier 1/Tier 2 and OPSRP pension programs separately.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences between Assumed Experience and Actual Experience and Assumption Changes

(dollar amounts in millions)

Tier 1/Tier 2 Pension Program	\$ Gain (or Loss) for Year	
	2019	2018
Type of Activity		
Retirements from Active Status	(\$119.0)	(\$82.2)
Active Mortality and Withdrawal	(14.6)	(10.8)
Pay Increases	(75.5)	(74.4)
Contributions	60.8	143.1
Interest Crediting Experience	(85.7)	88.5
Investment Income	3,207.6	(3,641.3)
Retirement, Mortality and Lump Sums from Inactive Status	4.4	(8.0)
Retiree and Beneficiary Mortality	3.5	(42.3)
New Entrants	(4.3)	(1.1)
Other	68.4	5.8
Gain (or Loss) During Year from Financial Experience	\$3,045.5	(\$3,622.6)
Non-Recurring Items		
Assumption Changes	0.0	60.0
Plan Changes	0.0	41.0
Composite Gain (or Loss) During Year	\$3,045.5	(\$3,521.6)

OPSRP Pension Program	\$ Gain (or Loss) for Year	
	2019	2018
Type of Activity		
Retirements from Active Status	(\$0.3)	(\$5.4)
Active Mortality and Withdrawal	(\$23.8)	(27.2)
Pay Increases	(\$137.9)	(81.4)
Contributions	\$45.7	61.0
Investment Income	\$301.8	(300.2)
Retirement, Mortality and Lump Sums from Inactive Status	\$2.5	3.7
Retiree and Beneficiary Mortality	\$1.6	0.8
New Entrants ¹	(\$106.0)	(81.5)
Other	(\$0.5)	(4.3)
Gain (or Loss) During Year from Financial Experience	\$83.2	(\$434.6)
Non-Recurring Items		
Assumption Changes	\$0.0	(13.7)
Plan Changes	\$0.0	11.1
Composite Gain (or Loss) During Year	\$83.2	(\$437.2)

Accrued liability associated with newentrants is shown. For a full assessment of the newentrant effect on UAL, this would need to be combined with contributions associated with newentrants.

The schedule below shows results from the retiree healthcare programs.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences Between Assumed Experience and Actual Experience and Assumption Changes

(dollar amounts in millions)

Retiree Healthcare Programs	\$ Gain (or Loss) for Year			
	RHIA		RHIPA	
	2019	2018	2019	2018
Type of Activity				
Contributions	\$4.3	\$3.2	\$1.0	\$0.9
Investment Income	35.7	(38.6)	2.3	(2.5)
Other	6.4	11.7	4.8	1.9
Gain (or Loss) During Year from Financial Experience	\$46.4	(\$23.7)	\$8.1	\$0.4
Non-Recurring Items				
Assumption Changes	0.0	14.7	0.0	6.4
Plan Changes	0.0	0.0	0.0	0.0
Composite Gain (or Loss) During Year	\$46.4	(\$9.0)	\$8.1	\$6.8

Actuarial Schedules

Schedules of Funding Progress

(dollar amounts in millions)

Actuarial Valuation Date	Actuarial Value of Assets ¹ (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
Pension Benefits - Tier 1/Tier 2 and OPSRP²						
12/31/2010	\$51,583.6	\$59,329.5	\$7,746.0	86.9%	\$8,750.1	88.5%
12/31/2011 ³	\$50,168.2	\$61,198.4	\$11,030.2	82.0%	\$8,550.5	129.0%
12/31/2012 ⁴	\$54,784.1	\$60,405.2	\$5,621.1	90.7%	\$8,590.9	65.4%
12/31/2013 ³	\$60,014.1	\$62,593.6	\$2,579.5	95.9%	\$8,671.8	29.7%
12/31/2014 ⁵	\$61,395.2	\$73,458.9	\$12,063.7	83.6%	\$9,115.8	132.3%
12/31/2015 ³	\$60,000.1	\$76,196.6	\$16,196.5	78.7%	\$9,544.1	169.7%
12/31/2016	\$61,059.0	\$80,970.3	\$19,911.2	75.4%	\$9,872.6	201.7%
12/31/2017 ³	\$67,326.1	\$84,056.1	\$16,730.0	80.1%	\$10,098.9	165.7%
12/31/2018	\$64,802.3	\$86,574.7	\$21,772.4	74.9%	\$10,852.0	200.6%
12/31/2019 ³	\$70,312.3	\$89,445.7	\$19,133.5	78.6%	\$11,533.7	165.9%
Postemployment Healthcare Benefits - Retirement Health Insurance Account						
12/31/2010	\$232.3	\$547.1	\$314.8	42.5%	\$8,750.1	3.6%
12/31/2011	\$239.6	\$461.1	\$221.5	52.0%	\$8,550.5	2.6%
12/31/2012	\$291.6	\$471.8	\$180.2	61.8%	\$8,590.9	2.1%
12/31/2013	\$353.5	\$473.6	\$120.0	74.7%	\$8,671.8	1.4%
12/31/2014	\$395.9	\$468.4	\$72.5	84.5%	\$9,115.8	0.8%
12/31/2015	\$419.3	\$465.6	\$46.3	90.0%	\$9,544.1	0.5%
12/31/2016	\$465.0	\$463.7	(\$1.3)	100.3%	\$9,872.6	(0.0%)
12/31/2017	\$553.3	\$437.6	(\$115.7)	126.4%	\$10,098.9	(1.1%)
12/31/2018	\$570.7	\$411.7	(\$159.1)	138.6%	\$10,852.0	(1.5%)
12/31/2019	\$644.1	\$403.9	(\$240.3)	159.5%	\$11,533.7	(2.1%)
Postemployment Healthcare Benefits - Retiree Health Insurance Premium Account						
12/31/2010	\$5.7	\$33.9	\$28.2	16.8%	\$2,379.7	1.2%
12/31/2011	\$4.5	\$34.4	\$29.9	13.2%	\$2,376.9	1.3%
12/31/2012	\$4.4	\$60.3	\$55.9	7.4%	\$2,432.4	2.3%
12/31/2013	\$5.2	\$61.2	\$55.9	8.6%	\$2,531.5	2.2%
12/31/2014	\$7.2	\$70.5	\$63.3	10.2%	\$2,718.9	2.3%
12/31/2015	\$11.2	\$67.8	\$56.6	16.5%	\$2,831.8	2.0%
12/31/2016	\$19.1	\$67.9	\$48.8	28.1%	\$2,881.4	1.7%
12/31/2017	\$29.8	\$69.4	\$39.5	43.0%	\$2,984.5	1.3%
12/31/2018	\$38.5	\$62.7	\$24.3	61.3%	\$3,211.6	0.8%
12/31/2019	\$51.9	\$59.3	\$7.4	87.5%	\$3,479.8	0.2%

Notes:

¹ Side account assets are included with pension assets.² Includes UAAL for Multnomah Fire District (\$142 million as of 12/31/2019).³ Reflects the transfer in assets and liabilities for newemployers that joined the SLGRP effective January 1 following the valuation date.⁴ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.⁵ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Data Exhibits

This valuation is based upon the membership of the System as of December 31, 2019.

System Wide Data Exhibits

Valuation Pay and Census Exhibit

The following tables illustrate the breakdown of member counts and valuation payroll for the SLGRP, School District Pool, and independent employers.

SLGRP

	General Service	Police & Fire	Total
Tier 1	\$690.5	\$122.7	\$813.2
Tier 2	1,065.7	304.6	1,370.3
Tier 1/Tier 2 Valuation Payroll	1,756.2	427.3	2,183.5
OPSRP Valuation Payroll	3,853.7	731.6	4,585.3
Combined Valuation Payroll	\$5,609.9	\$1,158.9	\$6,768.8

Amounts in millions

	December 31				
	2019				2018
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members in the Pool					
General Service	8,000	13,333	59,889	81,222	79,351
Police & Fire	1,165	3,083	8,806	13,054	12,908
Total	9,165	16,416	68,695	94,276	92,259
Average Age	57.2	52.5	43.1	46.1	46.2
Average Service	27.1	19.0	6.7	10.8	10.9
Average prior year Covered Salary	\$91,916	\$83,988	\$63,110	\$69,546	\$66,670
Active Members outside the Pool with previous Segments in the Pool					
General Service	1,937	2,282		4,219	4,570
Police & Fire	194	322		516	545
Total	2,131	2,604		4,735	5,115
Average Age	55.9	50.0		52.7	52.3
Average Service in the Pool	3.2	2.9		3.0	3.0
Inactive Members¹					
General Service	6,959	7,607	11,042	25,608	25,742
Police & Fire	488	656	913	2,057	1,970
Total	7,447	8,263	11,955	27,665	27,712
Average Age	60.4	54.6	47.2	52.9	53.1
Average Monthly Benefit	\$2,073	\$847	\$488	\$1,022	\$1,009
Retired Members and Beneficiaries¹					
General Service	69,077	8,990	3,813	81,880	79,563
Police & Fire	10,142	1,366	350	11,858	11,402
Total	79,219	10,356	4,163	93,738	90,965
Average Age	72.5	68.3	67.6	71.8	71.5
Average Monthly Benefit	\$2,542	\$1,155	\$588	\$2,302	\$2,247
Grand Total Number of Members	97,962	37,639	84,813	220,414	216,051

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

School District Pool

	General Service	Police & Fire	Total
Tier 1	\$466.9	\$1.3	\$468.1
Tier 2	860.3	1.8	862.1
Tier 1/Tier 2 Valuation Payroll	1,327.1	3.0	1,330.2
OPSRP Valuation Payroll	2,408.6	1.9	2,410.6
Combined Valuation Payroll	\$3,735.8	\$5.0	\$3,740.7

Amounts in millions

	December 31				
	2019				2018
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	6,800	13,238	52,733	72,771	71,152
Police & Fire	17	23	30	70	72
Total	6,817	13,261	52,763	72,841	71,224
Average Age	56.6	51.9	43.2	46.0	46.2
Average Service	26.1	18.4	6.8	10.7	10.8
Average prior year Covered Salary	\$69,832	\$65,535	\$43,507	\$49,981	\$48,495
Active Members outside the Pool with previous Segments in the Pool					
General Service	850	1,224		2,074	2,218
Police & Fire	4	8		12	9
Total	854	1,232		2,086	2,227
Average Age	56.9	51.2		53.5	53.3
Average Service	5.8	4.6		5.1	5.1
Inactive Members¹					
General Service	4,342	6,113	8,017	18,472	18,598
Police & Fire	8	17	8	33	33
Total	4,350	6,130	8,025	18,505	18,631
Average Age	61.2	54.5	48.6	53.5	53.5
Average Monthly Benefit	\$1,753	\$636	\$358	\$778	\$759
Retired Members and Beneficiaries¹					
General Service	63,162	6,214	1,865	71,241	69,763
Police & Fire	195	39	9	243	244
Total	63,357	6,253	1,874	71,484	70,007
Average Age	73.7	67.6	67.5	73.0	72.7
Average Monthly Benefit	\$2,471	\$854	\$444	\$2,277	\$2,241
Grand Total Number of Members	75,378	26,876	62,662	164,916	162,089

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

Independents

	General Service	Police & Fire	Total
Tier 1	\$95.1	\$40.4	\$135.5
Tier 2	130.9	93.9	224.7
Tier 1/Tier 2 Valuation Payroll	226.0	134.3	360.3
OPSRP Valuation Payroll	478.5	185.4	663.9
Combined Valuation Payroll	\$704.5	\$319.7	\$1,024.2

Amounts in millions

	December 31				
	2019				2018
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	1,011	1,689	7,744	10,444	10,142
Police & Fire	324	825	2,047	3,196	3,138
Total	1,335	2,514	9,791	13,640	13,280
Average Age	55.7	51.4	41.6	44.8	45.0
Average Service	24.5	18.9	6.5	10.5	10.6
Average prior year Covered Salary	\$105,366	\$91,149	\$63,781	\$72,895	\$70,464
Active Members outside the Pool with previous Segments in the Pool					
General Service	710	1,073		1,783	1,891
Police & Fire	171	292		463	489
Total	881	1,365		2,246	2,380
Average Age	55.5	49.9		52.1	51.8
Average Service	4.9	4.2		4.5	4.4
Inactive Members¹					
General Service	855	1,132	1,233	3,220	3,375
Police & Fire	159	172	153	484	501
Total	1,014	1,304	1,386	3,704	3,876
Average Age	59.3	54.2	48.2	53.4	53.3
Average Monthly Benefit	\$1,554	\$712	\$484	\$857	\$789
Retired Members and Beneficiaries¹					
General Service	9,516	1,558	468	11,542	11,177
Police & Fire	3,334	223	44	3,601	3,505
Total	12,850	1,781	512	15,143	14,682
Average Age	70.9	67.6	67.6	70.4	70.1
Average Monthly Benefit ²	\$2,375	\$967	\$610	\$2,150	\$2,105
Grand Total Number of Members	16,080	6,964	11,689	34,733	34,218

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

Total

	General Service	Police & Fire	Total
Tier 1	\$1,252.5	\$164.3	\$1,416.8
Tier 2	2,056.9	400.3	2,457.1
Tier 1/Tier 2 Valuation Payroll	3,309.3	564.6	3,873.9
OPSRP Valuation Payroll	6,740.9	919.0	7,659.8
Combined Valuation Payroll	\$10,050.2	\$1,483.5	\$11,533.7

Amounts in millions

	December 31				
	2019				2018
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	15,811	28,260	120,366	164,437	160,645
Police & Fire	1,506	3,931	10,883	16,320	16,118
Total	17,317	32,191	131,249	180,757	176,763
Average Age	56.9	52.2	43.0	46.0	46.1
Average Service	26.5	18.8	6.7	10.7	10.9
Average prior year Covered Salary	\$84,259	\$76,946	\$55,279	\$61,914	\$59,632
Inactive Members¹					
General Service	12,156	14,852	20,292	47,300	47,715
Police & Fire	655	845	1,074	2,574	2,504
Total	12,811	15,697	21,366	49,874	50,219
Average Age	60.6	54.5	47.8	53.2	53.3
Average Monthly Benefit	\$1,923	\$753	\$439	\$919	\$900
Retired Members and Beneficiaries¹					
General Service	141,755	16,762	6,146	164,663	160,503
Police & Fire	13,671	1,628	403	15,702	15,151
Total	155,426	18,390	6,549	180,365	175,654
Average Age	72.8	68.0	67.6	72.2	71.8
Average Monthly Benefit	\$2,499	\$1,035	\$549	\$2,279	\$2,233
Grand Total Number of Members	185,554	66,278	159,164	410,996	402,636

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool are counted more than once in this exhibit.

Age/Service and Prior Year Covered Payroll by Tier and Job Class

Tier 1 General Service Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
35-39	4	0	0	0	0	0	0	0	0	4
\$	66,140	0	0	0	0	0	0	0	0	66,140
40-44	10	2	4	3	69	5	0	0	0	93
\$	144,666	111,414	64,376	104,304	76,515	66,411	0	0	0	84,425
45-49	12	26	45	79	770	349	9	0	0	1,290
\$	151,300	53,619	62,138	75,592	84,378	87,473	84,314	0	0	83,904
50-54	17	54	76	168	1,346	2,010	283	4	0	3,958
\$	125,075	83,908	77,877	70,671	83,903	86,716	83,595	100,570	0	84,826
55-59	10	46	100	175	1,189	2,211	1,115	132	4	4,982
\$	111,019	71,367	62,299	71,773	78,200	83,262	86,124	80,836	86,079	81,754
60-64	2	30	65	103	918	1,572	809	293	50	3,842
\$	153,446	79,089	79,995	66,417	69,584	78,077	84,123	87,348	74,172	77,744
65-69	2	10	25	50	297	534	279	109	54	1,360
\$	71,376	97,159	123,653	90,096	68,181	75,221	89,396	95,295	78,686	79,931
70-74	0	1	3	2	46	74	54	24	15	219
\$	0	153,446	89,712	116,167	58,779	90,402	82,557	120,131	142,127	89,140
75+	0	0	0	1	10	22	9	9	12	63
\$	0	0	0	65,889	52,998	75,984	70,937	92,370	103,561	79,048
Total	57	169	318	581	4,645	6,777	2,558	571	135	15,811
\$	126,543	76,500	74,725	72,912	78,262	82,709	85,433	88,909	86,493	81,670

Tier 2 General Service Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	3	5	0	0	0	0	0	8
\$	0	0	81,500	59,257	0	0	0	0	0	67,598
35-39	1	13	71	399	18	0	0	0	0	502
\$	6,597	52,026	66,220	68,509	71,569	0	0	0	0	67,745
40-44	8	99	380	3,066	539	0	0	0	0	4,092
\$	34,083	43,090	66,581	80,272	78,694	0	0	0	0	77,803
45-49	5	129	378	3,579	2,334	0	0	0	0	6,425
\$	23,292	48,586	65,188	80,438	83,743	0	0	0	0	80,057
50-54	9	83	252	3,220	2,212	0	0	0	0	5,776
\$	21,241	44,861	65,844	75,587	81,002	0	0	0	0	76,710
55-59	1	45	163	3,182	2,158	0	0	0	0	5,549
\$	9,284	44,549	62,308	67,694	73,142	0	0	0	0	69,457
60-64	6	36	103	2,320	1,711	0	0	0	0	4,176
\$	21,667	39,153	57,629	63,457	66,792	0	0	0	0	64,410
65-69	3	20	37	786	551	0	0	0	0	1,397
\$	22,557	36,267	54,723	64,191	66,550	0	0	0	0	64,381
70-74	2	11	11	155	93	0	0	0	0	272
\$	43,982	40,326	37,108	60,083	55,847	0	0	0	0	56,788
75+	1	2	3	40	17	0	0	0	0	63
\$	10,360	23,649	30,926	60,713	53,701	0	0	0	0	55,426
Total	36	438	1,401	16,752	9,633	0	0	0	0	28,260
\$	24,783	44,666	64,310	73,415	76,117	0	0	0	0	73,377

Tier 1 Police and Fire Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	11	0	0	0	0	11
\$	0	0	0	0	98,922	0	0	0	0	98,922
45-49	0	0	0	8	262	127	0	0	0	397
\$	0	0	0	86,186	119,455	121,809	0	0	0	119,537
50-54	0	2	4	8	255	280	25	0	0	574
\$	0	45,773	76,395	97,973	113,073	117,346	99,551	0	0	113,868
55-59	0	2	5	4	77	158	87	6	0	339
\$	0	166,490	58,276	123,103	108,492	111,151	106,096	85,695	0	108,487
60-64	1	0	2	1	42	56	32	12	3	149
\$	87,697	0	76,167	126,159	86,868	95,729	94,346	119,042	84,291	94,469
65-69	0	1	0	0	6	9	8	2	1	27
\$	0	13,788	0	0	78,823	85,813	85,610	88,189	78,147	81,424
70-74	0	0	0	0	0	2	2	0	2	6
\$	0	0	0	0	0	82,140	65,431	0	144,229	97,267
75+	0	0	0	0	1	2	0	0	0	3
\$	0	0	0	0	75,178	104,573	0	0	0	94,775
Total	1	5	11	21	654	634	154	20	6	1,506
\$	87,697	87,663	68,118	99,612	112,797	114,188	100,999	105,952	103,246	111,437

Tier 2 Police and Fire Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
35-39	0	1	8	73	4	0	0	0	0	86
\$	0	70,329	91,362	106,477	108,105	0	0	0	0	104,726
40-44	0	3	30	632	178	0	0	0	0	843
\$	0	47,040	95,110	107,748	108,970	0	0	0	0	107,340
45-49	0	0	18	651	712	0	0	0	0	1,381
\$	0	0	93,510	103,862	108,272	0	0	0	0	106,001
50-54	0	2	13	395	527	0	0	0	0	937
\$	0	62,342	74,670	99,581	105,834	0	0	0	0	102,673
55-59	0	1	7	189	222	0	0	0	0	419
\$	0	79,032	92,233	94,174	93,225	0	0	0	0	93,602
60-64	0	0	1	106	93	0	0	0	0	200
\$	0	0	68,129	79,243	86,155	0	0	0	0	82,402
65-69	0	0	2	30	26	0	0	0	0	58
\$	0	0	72,965	88,773	80,262	0	0	0	0	84,413
70-74	0	0	1	0	5	0	0	0	0	6
\$	0	0	48,853	0	106,459	0	0	0	0	96,858
75+	0	0	0	1	0	0	0	0	0	1
\$	0	0	0	66,840	0	0	0	0	0	66,840
Total	0	7	80	2,077	1,767	0	0	0	0	3,931
\$	0	59,309	89,333	101,948	104,143	0	0	0	0	102,602

All Tier 1/Tier 2 Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	3	5	0	0	0	0	0	8
\$	0	0	81,500	59,257	0	0	0	0	0	67,598
35-39	5	14	79	472	22	0	0	0	0	592
\$	54,232	53,333	68,766	74,381	78,212	0	0	0	0	73,106
40-44	18	104	414	3,701	797	5	0	0	0	5,039
\$	95,518	44,517	68,627	84,983	85,546	66,411	0	0	0	82,912
45-49	17	155	441	4,317	4,078	476	9	0	0	9,493
\$	113,651	49,431	66,033	83,893	90,440	96,634	84,314	0	0	86,005
50-54	26	141	345	3,791	4,340	2,290	308	4	0	11,245
\$	89,133	60,076	68,950	77,916	86,802	90,461	84,890	100,570	0	83,626
55-59	11	94	275	3,550	3,646	2,369	1,202	138	4	11,289
\$	101,770	60,634	62,993	69,368	76,761	85,122	87,570	81,047	86,079	76,952
60-64	9	66	171	2,530	2,764	1,628	841	305	53	8,367
\$	58,288	57,306	66,409	64,264	68,676	78,684	84,512	88,595	74,745	71,498
65-69	5	31	64	866	880	543	287	111	55	2,842
\$	42,085	55,184	82,219	66,538	67,589	75,397	89,291	95,167	78,676	72,393
70-74	2	12	15	157	144	76	56	24	17	503
\$	43,982	49,752	48,412	60,797	58,541	90,184	81,945	120,131	142,374	71,834
75+	1	2	3	42	28	24	9	9	12	130
\$	10,360	23,649	30,926	60,982	54,217	78,366	70,937	92,370	103,561	67,869
Total	94	619	1,810	19,431	16,699	7,411	2,712	591	141	49,508
\$	87,158	53,870	67,269	76,478	81,116	85,402	86,317	89,486	87,206	79,504

Age/Service and Prior Year Covered Payroll by Rate Pool

Tier 1/Tier 2 SLGRP Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	1	2	0	0	0	0	0	3
\$	0	0	99,435	71,702	0	0	0	0	0	80,947
35-39	0	3	36	271	22	0	0	0	0	332
\$	0	92,263	78,742	77,958	78,212	0	0	0	0	78,189
40-44	2	26	164	1,607	509	4	0	0	0	2,312
\$	76,613	52,440	75,533	87,290	86,683	66,656	0	0	0	85,885
45-49	0	54	173	2,074	2,075	322	7	0	0	4,705
\$	0	57,723	70,404	87,441	94,008	99,861	82,538	0	0	90,213
50-54	7	49	157	1,890	2,391	1,140	217	1	0	5,852
\$	24,888	59,665	77,275	85,505	90,991	94,676	88,296	158,856	0	89,139
55-59	0	48	144	1,734	1,948	1,230	641	94	4	5,843
\$	0	66,873	72,958	81,274	87,010	91,987	90,935	84,262	86,079	86,230
60-64	3	32	83	1,248	1,430	900	541	190	33	4,460
\$	57,180	65,664	77,001	75,698	82,569	91,945	90,519	90,370	82,341	83,591
65-69	2	10	34	488	517	313	198	77	35	1,674
\$	29,402	39,250	98,531	75,602	78,584	88,870	98,666	104,602	82,238	83,398
70-74	1	6	4	95	79	51	40	18	14	308
\$	44,622	53,745	83,337	73,469	68,621	107,110	91,686	140,086	155,614	87,439
75+	1	1	0	33	17	17	6	7	10	92
\$	10,360	19,473	0	65,975	53,676	97,159	82,068	109,620	107,033	77,188
Total	16	229	796	9,442	8,988	3,977	1,650	387	96	25,581
\$	38,298	59,941	75,646	83,240	88,229	93,331	91,329	94,556	95,717	86,828

Tier 1/Tier 2 School District Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	1	2	0	0	0	0	0	3
\$	0	0	80,044	29,769	0	0	0	0	0	46,528
35-39	1	8	37	143	0	0	0	0	0	189
\$	6,597	41,273	56,122	61,370	0	0	0	0	0	59,202
40-44	5	72	232	1,783	185	0	0	0	0	2,277
\$	16,281	40,272	61,217	80,032	73,081	0	0	0	0	76,153
45-49	5	93	238	1,893	1,629	81	0	0	0	3,939
\$	23,292	39,604	59,139	77,288	81,890	74,375	0	0	0	77,077
50-54	3	70	159	1,590	1,591	998	71	1	0	4,483
\$	11,390	38,247	55,388	66,694	77,154	82,685	71,944	76,116	0	73,169
55-59	2	34	108	1,582	1,424	986	478	36	0	4,650
\$	15,576	27,937	43,448	54,055	60,366	74,846	81,396	70,625	0	62,881
60-64	4	22	69	1,128	1,170	632	247	99	16	3,387
\$	11,539	25,051	44,879	50,170	49,883	58,262	67,977	79,853	60,108	53,477
65-69	1	14	20	316	299	199	70	27	17	963
\$	8,866	32,163	39,995	47,966	46,719	51,991	61,478	70,025	70,843	49,979
70-74	1	4	10	48	51	21	12	5	2	154
\$	43,343	13,369	23,640	34,883	38,115	45,767	33,481	50,917	52,540	36,844
75+	0	1	3	7	10	6	3	2	1	33
\$	0	27,826	30,926	42,595	57,787	32,673	48,673	31,993	18,953	43,080
Total	22	318	877	8,492	6,359	2,923	881	170	36	20,078
\$	16,734	36,550	54,913	66,312	67,697	72,072	74,526	74,902	63,614	66,994

Tier 1/Tier 2 Independent Employers Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	1	1	0	0	0	0	0	2
\$	0	0	65,021	93,343	0	0	0	0	0	79,182
35-39	4	3	6	58	0	0	0	0	0	71
\$	66,140	46,564	86,883	89,747	0	0	0	0	0	86,351
40-44	11	6	18	311	103	1	0	0	0	450
\$	134,972	61,133	101,203	101,451	102,318	65,435	0	0	0	101,841
45-49	12	8	30	350	374	73	2	0	0	849
\$	151,300	107,689	95,517	98,586	107,880	107,099	90,532	0	0	104,115
50-54	16	22	29	311	358	152	20	2	0	910
\$	131,817	130,446	98,235	89,179	101,696	109,896	93,903	83,654	0	99,691
55-59	9	12	23	234	274	153	83	8	0	796
\$	120,924	128,319	92,386	84,664	89,095	96,144	97,133	90,165	0	91,042
60-64	2	12	19	154	164	96	53	16	4	520
\$	153,446	94,151	98,324	74,836	81,612	88,815	100,259	121,598	70,627	85,158
65-69	2	7	10	62	64	31	19	7	3	205
\$	71,376	123,989	111,207	89,851	76,278	89,607	94,058	88,356	81,515	87,821
70-74	0	2	1	14	14	4	4	1	1	41
\$	0	110,540	156,438	63,660	76,069	107,574	129,930	107,020	136,696	86,036
75+	0	0	0	2	1	1	0	0	1	5
\$	0	0	0	42,947	27,719	33,053	0	0	153,446	60,022
Total	56	72	137	1,497	1,352	511	181	34	9	3,849
\$	128,784	111,062	97,692	91,499	96,941	99,932	98,020	104,697	90,799	96,080

OPSRP Active General Service Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	103	0	0	0	0	0	0	0	0	103
\$	11,179	0	0	0	0	0	0	0	0	11,179
20-24	2,619	54	0	0	0	0	0	0	0	2,673
\$	26,630	30,339	0	0	0	0	0	0	0	26,705
25-29	8,922	1,379	12	0	0	0	0	0	0	10,313
\$	39,443	45,459	45,986	0	0	0	0	0	0	40,255
30-34	9,643	5,252	1,013	25	0	0	0	0	0	15,933
\$	45,790	54,542	58,658	49,926	0	0	0	0	0	49,499
35-39	9,011	6,035	5,020	647	0	0	0	0	0	20,713
\$	48,332	60,008	67,621	68,686	0	0	0	0	0	57,045
40-44	7,451	5,328	4,887	1,243	0	0	0	0	0	18,909
\$	48,565	60,521	69,873	74,674	0	0	0	0	0	59,157
45-49	5,723	4,590	4,252	1,104	0	0	0	0	0	15,669
\$	47,305	59,183	69,238	71,174	0	0	0	0	0	58,418
50-54	4,408	3,713	3,924	1,095	0	0	0	0	0	13,140
\$	47,935	57,036	63,014	63,922	0	0	0	0	0	56,342
55-59	3,380	2,906	3,260	1,188	0	0	0	0	0	10,734
\$	46,429	54,053	59,016	56,932	0	0	0	0	0	53,478
60-64	2,386	2,116	2,472	907	0	0	0	0	0	7,881
\$	43,588	53,290	57,908	57,602	0	0	0	0	0	52,298
65-69	1,016	914	915	342	0	0	0	0	0	3,187
\$	38,100	48,028	56,826	52,372	0	0	0	0	0	47,855
70-74	324	233	226	79	0	0	0	0	0	862
\$	26,911	34,959	48,254	57,161	0	0	0	0	0	37,454
75+	82	80	70	17	0	0	0	0	0	249
\$	19,827	29,074	33,775	31,479	0	0	0	0	0	27,515
Total	55,068	32,600	26,051	6,647	0	0	0	0	0	120,366
\$	44,558	56,534	64,618	64,679	0	0	0	0	0	53,255

OPSRP Active Police and Fire Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	309	3	0	0	0	0	0	0	0	312
\$	54,020	27,084	0	0	0	0	0	0	0	53,761
25-29	1,318	243	2	0	0	0	0	0	0	1,563
\$	63,927	75,839	65,039	0	0	0	0	0	0	65,780
30-34	1,121	869	225	3	0	0	0	0	0	2,218
\$	66,121	85,374	89,749	109,833	0	0	0	0	0	76,120
35-39	676	704	946	126	0	0	0	0	0	2,452
\$	65,753	82,718	93,095	97,671	0	0	0	0	0	82,813
40-44	379	431	715	189	0	0	0	0	0	1,714
\$	66,201	81,616	92,649	94,409	0	0	0	0	0	84,220
45-49	266	254	449	142	0	0	0	0	0	1,111
\$	64,543	79,109	88,248	94,729	0	0	0	0	0	81,311
50-54	147	182	268	70	0	0	0	0	0	667
\$	69,968	74,955	84,842	93,095	0	0	0	0	0	79,732
55-59	143	105	168	56	0	0	0	0	0	472
\$	75,709	79,873	80,219	89,013	0	0	0	0	0	79,819
60-64	63	61	117	26	0	0	0	0	0	267
\$	72,632	77,598	74,228	76,205	0	0	0	0	0	74,814
65-69	18	20	32	10	0	0	0	0	0	80
\$	72,161	73,071	79,999	68,987	0	0	0	0	0	75,127
70-74	2	8	7	7	0	0	0	0	0	24
\$	49,687	89,915	94,906	60,473	0	0	0	0	0	79,431
75+	0	1	2	0	0	0	0	0	0	3
\$	0	251,241	60,977	0	0	0	0	0	0	124,398
Total	4,442	2,881	2,931	629	0	0	0	0	0	10,883
\$	65,030	81,707	89,561	93,047	0	0	0	0	0	77,671

All OPSRP Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	103	0	0	0	0	0	0	0	0	103
\$	11,179	0	0	0	0	0	0	0	0	11,179
20-24	2,928	57	0	0	0	0	0	0	0	2,985
\$	29,520	30,168	0	0	0	0	0	0	0	29,533
25-29	10,240	1,622	14	0	0	0	0	0	0	11,876
\$	42,595	50,010	48,708	0	0	0	0	0	0	43,615
30-34	10,764	6,121	1,238	28	0	0	0	0	0	18,151
\$	47,907	58,919	64,309	56,344	0	0	0	0	0	52,752
35-39	9,687	6,739	5,966	773	0	0	0	0	0	23,165
\$	49,547	62,381	71,660	73,410	0	0	0	0	0	59,772
40-44	7,830	5,759	5,602	1,432	0	0	0	0	0	20,623
\$	49,418	62,100	72,780	77,279	0	0	0	0	0	61,240
45-49	5,989	4,844	4,701	1,246	0	0	0	0	0	16,780
\$	48,071	60,228	71,053	73,858	0	0	0	0	0	59,934
50-54	4,555	3,895	4,192	1,165	0	0	0	0	0	13,807
\$	48,646	57,874	64,410	65,675	0	0	0	0	0	57,472
55-59	3,523	3,011	3,428	1,244	0	0	0	0	0	11,206
\$	47,618	54,953	60,055	58,376	0	0	0	0	0	54,588
60-64	2,449	2,177	2,589	933	0	0	0	0	0	8,148
\$	44,335	53,971	58,646	58,121	0	0	0	0	0	53,036
65-69	1,034	934	947	352	0	0	0	0	0	3,267
\$	38,693	48,564	57,609	52,844	0	0	0	0	0	48,523
70-74	326	241	233	86	0	0	0	0	0	886
\$	27,050	36,784	49,655	57,430	0	0	0	0	0	38,591
75+	82	81	72	17	0	0	0	0	0	252
\$	19,827	31,817	34,531	31,479	0	0	0	0	0	28,668
Total	59,510	35,481	28,982	7,276	0	0	0	0	0	131,249
\$	46,087	58,578	67,141	67,131	0	0	0	0	0	55,279

Inactive Member Data Exhibits

For the following exhibits, inactive members are counted by lives, not by segments.

Total Tier 1/Tier 2

Inactive Members			Retirees and Beneficiaries		
	Count	Average Deferred Monthly Benefit		Count	Average Monthly Benefit
<20	0	\$0	<45	539	\$1,139
20-24	0	0	45-49	339	1,862
25-29	0	0	50-54	1,243	3,492
30-34	16	132	55-59	5,177	3,206
35-39	323	562	60-64	16,922	2,991
40-44	1,917	916	65-69	33,056	2,972
45-49	3,497	1,248	70-74	35,356	2,932
50-54	4,497	1,450	75-79	24,029	2,793
55-59	5,363	1,444	80-84	14,928	2,499
60-64	4,516	1,561	85-89	8,722	2,134
65-69	2,848	1,798	90-94	4,445	1,736
70-74	1,178	1,404	95-99	1,479	1,232
75+	1,271	1,620	100+	194	949
Total	25,426	\$1,434	Total	146,429	\$2,783

OPSRP

Inactive Members			Retirees and Beneficiaries		
	Count	Average Deferred Monthly Benefit		Count	Average Monthly Benefit
<20	0	\$0	<45	21	\$1,796
20-24	19	96	45-49	13	1,905
25-29	338	215	50-54	38	1,722
30-34	1,695	339	55-59	319	444
35-39	3,839	451	60-64	1,083	466
40-44	3,771	502	65-69	2,857	580
45-49	2,977	513	70-74	1,780	542
50-54	2,802	472	75-79	375	465
55-59	2,467	471	80-84	55	473
60-64	1,750	449	85-89	8	291
65-69	841	275	90-94	0	0
70-74	426	135	95-99	0	0
75+	441	64	100+	0	0
Total	21,366	\$439	Total	6,549	\$550

System-Wide Totals

Inactive Members			Retirees and Beneficiaries		
	Count	Average Deferred Monthly Benefit		Count	Average Monthly Benefit
<20	0	\$0	<45	560	\$1,163
20-24	19	96	45-49	352	1,864
25-29	338	215	50-54	1,281	3,439
30-34	1,711	337	55-59	5,496	3,046
35-39	4,162	460	60-64	18,005	2,839
40-44	5,688	641	65-69	35,913	2,782
45-49	6,474	910	70-74	37,136	2,818
50-54	7,299	1,075	75-79	24,404	2,757
55-59	7,830	1,138	80-84	14,983	2,491
60-64	6,266	1,251	85-89	8,730	2,132
65-69	3,689	1,451	90-94	4,445	1,736
70-74	1,604	1,067	95-99	1,479	1,232
75+	1,712	1,219	100+	194	949
Total	46,792	\$980	Total	152,978	\$2,687

Retiree Healthcare Member Data Exhibits

For the following exhibits, inactive members are counted by lives, not by pool or employer segments.

RHIA Members

	As of December 31, 2019	As of December 31, 2018
Dormant members		
Number	12,149	12,954
Average Age	55.2	54.9
Retired members eligible for deferred RHIA benefits		
Number	23,497	22,873
Average Age	60.6	60.2
Retired members receiving RHIA benefits		
Number	44,386	46,328
Average Age	76.9	76.2

RHIPA Members

	As of December 31, 2019	As of December 31, 2018
Active Tier 1/Tier 2 employees of RHIPA employers		
Number	13,452	14,688
Average Age	54.6	54.3
Average Service	22.1	21.5
Retired members receiving RHIPA benefits		
Number	842	984
Average Age	61.9	61.8
Average Monthly Subsidy Amount	399	382

Actuarial Methods and Assumptions

Tier 1/Tier 2 (including Retiree Healthcare)

Actuarial Methods and Valuation Procedures

In October 2019 the Board adopted the following actuarial methods and valuation procedures for the December 31, 2018 and 2019 actuarial valuations of PERS Tier 1/Tier 2 benefits.

Actuarial cost method

Entry Age Normal. Under the Entry Age Normal (EAN) cost method, each active member's **entry age present value of projected benefits** is allocated over the member's service from the member's date of entry until their assumed date of exit, taking into consideration expected future compensation increases. Thus, the total pension to which each member is expected to become entitled at retirement is broken down into units, each associated with a year of past or projected future credited service. Typically, when this method is introduced, there will be an initial liability for benefits credited for service prior to that date, and to the extent that the liability is not covered by assets of the plan, there is an unfunded accrued liability to be funded over a stipulated period in accordance with an amortization schedule.

A detailed description of the calculation follows:

- An individual member's **entry age present value of projected benefits** is the sum of the present value of the benefit described under the plan at each possible separation date, determined at the member's entry age using the projected compensation and service at each separation date.
 - An individual member's **entry age present value of projected salaries** is the sum of the present value of the projected compensation over the member's working career associated with each possible future separation date, determined at the member's entry age.
 - An individual member's **present value of projected benefits** is the sum of the present value of the benefit described under the plan at each possible separation date, determined at the valuation date using the projected compensation and service at each separation date.
 - An individual member's **normal cost** for a certain year is the member's **entry age present value of projected benefits** divided by the member's **entry age present value of projected salaries** and multiplied by the member's projected compensation for the year following the valuation date.
 - An individual member's **actuarial accrued liability** is the member's **present value of projected benefits** less the sum of the present value of the member's **normal costs** for each future year, determined at the valuation date using the projected compensation and service at each future year.
 - The plan's **normal cost** is the sum of the individual member normal costs, and the plan's **actuarial accrued liability** is the sum of the individual members' actuarial accrued liabilities.
-

<i>Tier 1/Tier 2 UAL amortization</i>	<p>The Tier 1/Tier 2 UAL amortization period was reset to 20 years as of December 31, 2013. Gains and losses between subsequent odd-year valuations have been amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed 20 year period from the valuation in which they are first recognized.</p> <p>Senate Bill 1049 was signed into law in June 2019 and requires a one-time re-amortization of Tier 1/Tier 2 UAL over a closed 22 year period at the December 31, 2019 rate-setting actuarial valuation, which will set actuarially determined contribution rates for the 2021-2023 biennium.</p>
<i>Retiree Healthcare UAL amortization</i>	<p>The UAL for Retiree Health Care as of December 31, 2007 is amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed 10 year period. Gains and losses between subsequent odd-year valuations are amortized as a level percentage of combined valuation payroll over a closed 10 year period from the valuation in which they are first recognized.</p>
<i>Asset valuation method</i>	<p>The actuarial value of assets equals the market value of assets, excluding the Contingency and Capital Preservation Reserves, and the Rate Guarantee Reserve when it is in positive surplus status.</p> <p>Market values are reported to Milliman by PERS. It is our understanding that select real estate and private equity investments are reported on a three-month lag basis. This valuation report does not attempt to quantify any effects of the reporting lag.</p>
<i>Contribution rate stabilization method</i>	<p>Contribution rates for a rate pool (e.g. Tier 1/Tier 2 SLGRP, Tier 1/Tier 2 School Districts rate pool, OPSRP) are confined to a collared range based on the prior contribution rate (prior to application of side accounts, pre-SLGRP liabilities, and 6 percent Independent Employer minimum). The new contribution rate will generally not increase or decrease from the prior contribution rate by more than the greater of 3 percent of payroll or 20 percent of the prior contribution rate. If the funded percentage excluding side accounts drops below 60% or increases above 140%, the size of the collar doubles. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale.</p>
<i>Offset for Member Redirect Contributions</i>	<p>Under Senate Bill 1049, a portion of the 6% of pay member contribution otherwise made to the IAP is redirected to fund Tier 1/Tier 2 and OPSRP defined benefits beginning July 1, 2020. For Tier 1/Tier 2 members, the redirected amount will be 2.50% of pay, and for OPSRP it will be 0.75% of pay. Members with less than \$2,500 in monthly pay (indexed in future years) will be exempt from the redirection. For employer contribution rates shown in this valuation, member redirect contributions are assumed to offset total contribution rates beginning with the July 2021 – June 2023 biennium. Reflecting the effect of the monthly pay level-based exemption noted above, the offset is assumed to be 2.45% of total payroll for Tier 1/Tier 2 and 0.70% of total payroll for OPSRP.</p>
<i>Allocation of Liability for Service Segments</i>	<p>For active Tier 1/Tier 2 members who have worked for multiple PERS employers over their career, the calculated actuarial accrued liability is allocated among the employers based on a weighted average of the Money Match methodology, which uses account balance, and the Full Formula methodology, which uses service. The allocation is 10% (0% for police & fire) based on account balance with each employer and 90% (100% for police & fire) based on service with each employer. The entire normal cost is allocated to the current employer.</p>

<i>Allocation of Benefits-In-Force (BIF) Reserve</i>	The BIF reserve is allocated to each rate pool in proportion to the retiree liability attributable to the rate pool.
<i>Census Data</i>	<p>PERS staff provided the data on plan members and beneficiaries upon which this valuation is based. Milliman did not audit the data, but did review it for reasonableness and consistency with data provided for previous years, in accordance with Actuarial Standard of Practice No. 23.</p> <p>PERS staff assisted in resolving questions and inconsistencies discovered in the data review, and provided updated records or direction for adjusting data as needed.</p> <p>The final census data is expected to be sufficiently accurate and complete for purposes of the actuarial valuation, and we are not aware of any significant concerns or unresolved issues that would materially affect results.</p>
<i>Internal Revenue Code 415 Benefit Limits</i>	<p>Annual benefit limits under Internal Revenue Code 415 are not explicitly reflected in the valuation.</p> <p>In accordance with ORS 238.488, we understand that members whose benefits are restricted by IRC 415 benefit limits are paid the difference between the unrestricted benefit and the IRC 415-restricted benefit from the Public Employee Benefit Equalization Fund.</p>

Economic Assumptions

The Board adopted the following economic assumptions for the December 31, 2018 and 2019 actuarial valuations. All assumptions were reviewed and adopted in conjunction with the 2018 Experience Study, published in July 2019. The assumption selection process and rationale is described in detail in that report.

<i>Investment return</i>	7.20% compounded annually
<i>Pre-2014 Interest crediting</i>	8.00% compounded annually on members' regular account balances 8.25% compounded annually on members' variable account balances
<i>Post-2013 Interest crediting</i>	7.20% compounded annually on members' regular account balances 7.20% compounded annually on members' variable account balances
<i>Inflation</i>	2.50% compounded annually
<i>Administrative expenses</i>	\$32.5 million per year is added to the normal cost.
<i>Payroll growth</i>	3.50% compounded annually. This assumption represents the sum of the inflation assumption and a real wage growth assumption of 100 basis points.
<i>Healthcare cost trend</i>	Healthcare cost trend rates are used to estimate increases in the RHIPA Maximum Subsidy. These rates were developed with consideration of the excise tax scheduled to be introduced in 2022 by the Affordable Care Act. The excise tax was repealed in December 2019, and this will be reflected in the trend rates developed with the 2020 Experience Study, and we do not anticipate that update will materially affected calculated rates.

Year ¹	Rate	Year	Rate
2020	5.8%	2046 – 2047	5.5%
2021	5.2	2048 – 2050	5.4
2022 – 2024	5.0	2051 – 2053	5.3
2025	5.1	2054 – 2058	5.2
2026 – 2029	5.0	2059 – 2063	5.1
2030	5.4	2064	5.0
2031 – 2033	5.9	2065	4.9
2034	5.8	2066 – 2067	4.8
2035	5.9	2068	4.7
2036 – 2039	5.8	2069	4.6
2040	5.7	2070	4.5
2041	5.8	2071 – 2072	4.4
2042	5.7	2073	4.3
2043	5.8	2074 – 2093	4.2
2044	5.7	2094+	4.1
2045	5.6		

¹ For valuation purposes, the health cost trend rates are assumed to be applied at the beginning of the plan year.

Demographic Assumptions

The Board adopted the following demographic assumptions for the December 31, 2018 and 2019 actuarial valuations. All assumptions were reviewed and adopted in conjunction with the 2018 Experience Study, published in July 2019. The study relied on data from an observation period of January 1, 2015 to December 31, 2018, with the exception of the merit scale assumption, which relied on data from 2010 through 2018. Assumptions selected from the study represent an estimate of future experience based on relevant recent experience and reasonable expectations about the future.

Mortality

Healthy Retired Members and Beneficiaries

The following healthy annuitant mortality tables were first adopted in the December 31 valuation of the years shown.

Basic Table	Pub-2010 Healthy Retiree, Sex Distinct, Generational Projection with Unisex Social Security Data Scale	Valuation Year Adopted
School District male	Teachers, no set back	2018
Other General Service male*	General Employees, set back 12 months	2018
Police & Fire male	Public Safety, no set back	2018
School District female	Teachers, no set back	2018
Other General Service female**	General Employees, no set back	2018
Police & Fire female	Public Safety, set back 12 months	2018

* including male beneficiaries of members of all classes

** including female beneficiaries of members of all classes

Disabled Retired Members

The following disabled retiree mortality rates were first adopted for the December 31, 2018 actuarial valuation.

Basic Table	Pub-2010 Disabled Retiree, Sex Distinct, Generational Projection with Unisex Social Security Data Scale
Police & Fire male	Blended 50% Public Safety, 50% Non-Safety, no set back
Other General Service male	Non-Safety, set forward 24 months
Police & Fire female	Blended 50% Public Safety, 50% Non-Safety, no set back
Other General Service female	Non-Safety, set forward 12 months

Non-Annuitant Members

The following non-annuitant mortality tables were first adopted in the December 31 valuation of the years shown.

Basic Table	Pub-2010 Employee, Sex Distinct, Generational Projection with Unisex Social Security Data Scale	Valuation Year Adopted
School District male	120% of Employee table with same job category and set back as Healthy Retiree assumption	2018
Other General Service male	115% of Employee table with same job category and set back as Healthy Retiree assumption	2018
Police & Fire male	100% of Employee table with same job category and set back as Healthy Retiree assumption	2018
School District female	100% of Employee table with same job category and set back as Healthy Retiree assumption	2018
Other General Service female	125% of Employee table with same job category and set back as Healthy Retiree assumption	2018
Police & Fire female	100% of Employee table with same job category and set back as Healthy Retiree assumption	2018

Retirement Assumptions

The retirement assumptions used in the actuarial valuation include the following:

- Retirement from active status/dormant status
- Probability a member will elect a lump sum option at retirement
- Percentage of members who elect to purchase credited service at retirement.

Rates of Retirement from Active Status

The following retirement rate assumptions were first adopted in the December 31, 2018 valuation.

Age	Police & Fire			General Service			School Districts			Judges
	< 13 yrs	13-24 yrs	25+ yrs	< 15 yrs	15-29 yrs	30+ yrs	< 15 yrs	15-29 yrs	30+ yrs	
Less than 50						15.00%			25.00%	
50	1.50%	2.50%	27.50%			15.00%			25.00%	
51	1.50%	2.50%	21.50%			15.00%			25.00%	
52	1.50%	2.50%	21.50%			15.00%			25.00%	
53	1.50%	2.50%	21.50%			15.00%			25.00%	
54	1.50%	3.50%	21.50%			15.00%			25.00%	
55	3.00%	12.00%	25.00%	1.50%	2.50%	15.00%	1.50%	3.50%	25.00%	
56	3.00%	8.00%	25.00%	1.50%	2.50%	15.00%	1.50%	3.50%	25.00%	
57	3.00%	8.00%	25.00%	1.50%	2.50%	15.00%	1.50%	3.50%	25.00%	
58	6.00%	8.00%	25.00%	1.50%	9.00%	21.00%	1.50%	11.00%	27.50%	
59	6.00%	8.00%	25.00%	3.50%	9.00%	21.00%	4.50%	11.00%	27.50%	

Age	Police & Fire			General Service			School Districts			Judges
	< 13 yrs	13-24 yrs	25+ yrs	< 15 yrs	15-29 yrs	30+ yrs	< 15 yrs	15-29 yrs	30+ yrs	
60	6.00%	11.00%	25.00%	6.00%	11.00%	21.00%	6.50%	12.50%	27.50%	8.50%
61	6.00%	14.00%	25.00%	6.00%	11.00%	21.00%	6.50%	12.50%	27.50%	8.50%
62	15.00%	25.00%	38.00%	13.00%	19.50%	31.00%	15.00%	23.50%	34.00%	8.50%
63	15.00%	15.00%	28.00%	11.50%	16.50%	23.00%	13.00%	19.50%	26.50%	8.50%
64	15.00%	15.00%	28.00%	12.50%	16.50%	23.00%	13.00%	19.50%	31.50%	8.50%
65	100.00%	100.00%	100.00%	19.50%	28.00%	35.50%	25.50%	33.50%	45.00%	8.50%
66				27.50%	36.00%	40.50%	23.00%	36.50%	45.00%	8.50%
67				22.50%	26.50%	28.50%	21.00%	34.50%	42.00%	16.00%
68				19.50%	26.50%	28.50%	21.00%	28.00%	28.50%	16.00%
69				19.50%	26.50%	28.50%	21.00%	28.00%	28.50%	16.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Retirement from Dormant Status

Dormant members are assumed to retire at Normal Retirement Age (age 58 for Tier 1, age 60 for Tier 2, age 60 for Judges, and age 55 for Police & Fire) or at the first unreduced retirement age (30 years of service, or age 50 with 25 years of service for Police & Fire).

Lump Sum Option at Retirement

Members retiring may elect to receive a full or partial lump sum at retirement. The probability that a retiring member will elect a lump sum at retirement is summarized in the table below. The total lump sum rates were first adopted effective December 31, 2016. The partial lump sum rate was first adopted effective December 31, 2018.

Lump Sum Option at Retirement	
Partial Lump Sum:	3.0% for all years
Total Lump Sum:	1.0% for 2019, declining by 0.5% per year until reaching 0.0%
No Lump Sum:	96.0% in 2019, increasing by 0.5% per year until reaching 97.0%

Purchase of Credited Service at Retirement

The following percentages of members are assumed to purchase service credit at time of retirement for the six-month waiting period that occurs prior to establishing membership in the system. These rates were first adopted effective December 31, 2018.

Purchase of Credited Service at Retirement	
Money Match Retirements:	0%
Non-Money Match Retirements:	70%

The cost of the service purchase is estimated based on assumed salary and contribution rates at entry age.

State Judiciary Member Plan Election

All State Judiciary members are assumed to elect to retire under the provisions of Plan B.

Disability Assumptions

There are two disability assumptions used in the valuation - duty disability and ordinary (non-duty) disability. Duty disability rates are separated between Police & Fire and General Service, while ordinary disability is the same for all members. The rates for ordinary disability and for duty disability for General Service were first adopted effective December 31, 2018. The rates for duty disability for Police & Fire were first adopted effective December 31, 2012.

Percentage of the 1985 Disability Class 1 Rates	
Duty Disability Police & Fire	20%
Duty Disability General Service	0.8%
Ordinary Disability	30% with 0.18% cap

Ordinary disability rates are not applied until the minimum service requirement for non-duty disability benefits is met. Disability decrement rates continue to be applied after retirement eligibility.

Termination Assumptions

The General Service termination assumptions were first adopted effective December 31, 2018. The School District termination assumptions were first adopted effective December 31, 2016. The Police & Fire termination assumption was first adopted effective December 31, 2014.

Sample termination rates are shown for each group below:

Duration from Hire Date	School District Male	School District Female	General Service Male	General Service Female	Police & Fire
0	16.63%	13.50%	15.00%	15.50%	10.00%
1	14.25%	12.50%	12.50%	14.50%	5.97%
5	6.86%	7.13%	7.19%	8.04%	3.31%
10	3.31%	3.85%	4.13%	4.77%	2.23%
15	2.30%	2.68%	2.93%	3.43%	1.50%
20	1.62%	1.95%	2.08%	2.47%	1.01%
25	1.20%	1.50%	1.47%	1.78%	0.80%
30+	1.20%	1.50%	1.40%	1.40%	0.80%

Termination rates are not applied after a member reaches retirement eligibility. For a complete table of rates, please refer to the 2018 Experience Study report for the System, published in July 2019.

Oregon Residency Post-Retirement

For purposes of determining eligibility for SB 656/HB 3349 benefit adjustments, 85% of retirees are assumed to remain Oregon residents after retirement. This assumption was first adopted effective December 31, 2012.

Police & Fire Unit Purchase

Police & Fire members retiring from active service prior to age 65 are assumed to purchase additional benefit units at an estimated employer matching cost of \$4,000.

Salary Increase Assumptions

The salary increase assumptions reflected in the actuarial valuation include:

- Merit scale increases in addition to the payroll growth increase
- Unused Sick Leave adjustments
- Vacation Pay adjustments

Merit Scale Increases

Merit scale increases are based on duration of service for the following groups with sample rates shown in the following table. These rates were first adopted effective December 31, 2018, except for the Police & Fire assumption, which was adopted December 31, 2016.

Duration	School District	Other General Service	Police & Fire
0	3.72%	3.70%	4.44%
1	3.43%	3.37%	3.95%
5	2.34%	2.24%	2.39%
10	1.14%	1.21%	1.23%
15	0.17%	0.54%	0.69%
20	-0.53%	0.16%	0.52%
25	-0.89%	0.01%	0.44%
30+	-0.95%	0.00%	0.21%

The assumed merit scale increase for active State Judiciary members is 0.0%.

For a complete table of rates, please refer to the 2018 Experience Study for the System, published in July 2019.

Unused Sick Leave

Members covered by the provision allowing unused sick leave to be used to increase final average salary at time of retirement are assumed to receive increases in their final average salary in accordance with the table below. This adjustment is not applied to disability benefits. Effective dates for the current assumption are shown in the table.

Unused Sick Leave	Valuation year adopted
Actives	
• State General Service Male	7.00% 2018
• State General Service Female	3.75% 2010
• School District Male	7.75% 2018
• School District Female	5.75% 2012
• Local General Service Male	5.25% 2018
• Local General Service Female	3.50% 2018
• State Police & Fire	4.00% 2018
• Local Police & Fire	7.25% 2016
Dormant Members	3.25% 2016

Vacation Pay

Members eligible to include a lump sum payment of unused vacation pay in their final average salary calculation at time of retirement are assumed to receive increases in their final average salary in accordance with the table below. This adjustment is not applied to disability benefits. These rates were adopted December 31, 2018, except the school district rates which were adopted effective December 31, 2012.

Vacation Pay	
Tier 1	
• State General Service	2.25%
• School District	0.25%
• Local General Service	3.25%
• State Police & Fire	2.75%
• Local Police & Fire	4.25%
Tier 2	
	0.00%

Retiree Healthcare Participation

The following percentages of eligible retiring members are assumed to elect RHIPA and RHIA coverage:

Retiree Healthcare Participation	
RHIPA	
• 8 – 9 years of service	10.0%
• 10 – 14 years of service	10.0%
• 15 – 19 years of service	15.0%
• 20 – 24 years of service	19.0%
• 25 – 29 years of service	26.0%
• 30+ years of service	34.0%
RHIA	
• Healthy Retired	32.0%
• Disabled Retired	20.0%

The RHIA disabled retired rate was first adopted December 31, 2008. The RHIA healthy retired rate and RHIPA rates for 15 or more years of service were adopted December 31, 2018. RHIPA Rates up through 14 years of service were first adopted effective December 31, 2012

Spouse Assumptions

Non-annuitant death benefits are valued assuming all members are married. Future participants in RHIA and RHIPA are assumed to have eligible spouses. For these purposes, the spouse is assumed to be three years younger than a male member or three years older than a female member.

Actuarial Equivalence Assumptions

Early retirement factors and optional form conversion factors are assumed to remain level in all future years.

For members with pop-up annuities, the future amount payable if the spouse predeceases the member is estimated based on an assumed 0.90 optional form conversion factor for 100% contingent annuities and an assumed 0.94 optional form conversion factor for 50% contingent annuities.

OPSRP

Most of the methods and assumptions adopted for the OPSRP valuation are the same as those used for Tier 1/Tier 2. The methods and assumptions that differ for OPSRP are summarized below. The Board adopted the following methods, procedures and assumptions for the December 31, 2018 and December 31, 2019 actuarial valuations.

Actuarial Methods and Valuation Procedures

<i>OPSRP UAL amortization</i>	The UAL as of December 31, 2007 is amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed period 16 year period. Gains and losses between subsequent odd-year valuations are amortized as a level percentage of combined valuation payroll over 16 years from the valuation in which they are first recognized.
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Economic Assumptions

<i>Administrative expenses</i>	\$8.0 million per year is added to the normal cost.
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Demographic Assumptions

Rates of Retirement from Active Status

Age	Police & Fire			General Service			School Districts		
	< 13 yrs	13-24 yrs	25+ yrs	< 15 yrs	15-29 yrs	30+ yrs	< 15 yrs	15-29 yrs	30+ yrs
50	0.50%	1.50%	5.50%						
51	0.50%	1.50%	5.50%						
52	0.50%	1.50%	5.50%						
53	0.50%	1.50%	25.00%						
54	0.50%	1.50%	21.50%						
55	2.00%	5.00%	25.00%	1.00%	2.50%	5.00%	1.00%	2.50%	5.00%
56	2.00%	5.00%	25.00%	1.00%	2.50%	5.00%	1.00%	2.50%	5.00%
57	2.00%	5.00%	25.00%	1.00%	2.50%	7.50%	1.00%	2.50%	7.50%
58	5.00%	5.00%	25.00%	1.50%	3.00%	30.00%	1.50%	3.00%	30.00%
59	5.00%	5.00%	25.00%	2.00%	3.00%	25.00%	1.50%	3.00%	25.00%
60	5.00%	15.00%	25.00%	3.00%	3.75%	20.00%	2.50%	3.75%	20.00%
61	5.00%	8.50%	25.00%	3.00%	5.00%	20.00%	3.00%	5.00%	20.00%
62	10.00%	25.00%	38.00%	8.00%	12.00%	30.00%	6.00%	12.00%	30.00%
63	7.00%	15.00%	28.00%	7.00%	10.00%	20.00%	6.00%	10.00%	20.00%
64	7.00%	15.00%	28.00%	7.00%	10.00%	20.00%	6.00%	10.00%	20.00%
65	100.00%	100.00%	100.00%	14.50%	35.00%	20.00%	11.50%	35.00%	20.00%
66				18.50%	33.00%	20.00%	12.50%	33.00%	20.00%
67				17.00%	22.00%	30.00%	11.00%	22.00%	30.00%
68				13.00%	17.00%	20.00%	9.00%	17.00%	20.00%
69				13.00%	17.00%	20.00%	9.00%	17.00%	20.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Retirement from Dormant Status

Dormant members are assumed to retire at their Normal Retirement Age.

Disability Assumptions

Assumed disability rates are not applied to OPSRP members after they reach Normal Retirement Age.

Cost of living increases for the adjusted salary used to calculate retirement benefits for disabled OPSRP members are estimated based on the valuation inflation assumption.

Changes in Actuarial Methods and Assumptions — Tier 1/Tier 2 and OPSRP

A summary of key changes implemented since the December 31, 2018 valuation are described briefly below.

Changes in Actuarial Methods and Allocation Procedures

There were no changes to actuarial methods and procedures since the December 31, 2018 actuarial valuation.

Changes in Economic Assumptions

There were no changes to economic assumptions since the December 31, 2018 actuarial valuation.

Changes in Demographic Assumptions

There were no changes to demographic assumptions since the December 31, 2018 actuarial valuation.

Summary of Plan Provisions

Summary of Plan Provisions

The following section summarizes the plan provisions considered in the actuarial valuation. A more detailed description of plan provisions is available from PERS.

<i>Membership</i>	All employees of public employers participating in this System who are in qualifying positions become members of the System after completing six months of service except those who are eligible for and have elected to participate in an optional retirement plan. Different benefit provisions of the plan apply based on date of hire.	
	Tier 1	Hired prior to 1996
	Tier 2	Hired after 1995 and before August 29, 2003
	OPSRP	Hired after August 28, 2003, and neither a judge nor a former Tier 1/Tier 2 member eligible to reestablish Tier 1/Tier 2 membership
	Judges	Members of the State Judiciary
<i>Member Contributions</i>	Judges	7% of salary
	All others	None as of valuation date Prior to January 1, 2004, Tier 1/Tier 2 members contributed 6% of salary to member accounts. Effective July 1, 2020: 2.50% of salary for Tier 1/Tier 2 members and 0.75% of salary for OPSRP members (only applicable to members earning at least \$2,500 per month, indexed for inflation) will be contributed to Employee Pension Stability Accounts (EPSA). EPSA balances will not affect the calculation of Money Match or Formula Plus Annuity benefits.
<i>Employer Contributions</i>	Set by the PERS Board based on actuarial calculations that follow Board rate-setting policies for employers.	

Summary of Chapter 238 Provisions — Tier 1/Tier 2 and Judges

<i>Normal Retirement Date</i>	Police and Fire	Age 55
	Judges	Age 65
	Tier 1 General Service	Age 58
	Tier 2 General Service	Age 60

Normal Retirement Allowance For Members who are not Judges, the greatest of the Full Formula benefit, the Money Match benefit, or the Formula Plus Annuity benefit (only available to Members who made contributions before August 21, 1981). For Members with 15 or more years of creditable service, the benefit will not be less than the minimum service retirement allowance of \$100 per month, as described in ORS 238.310.

Full Formula The percentage multiplier from the table below multiplied by final average salary and years of creditable service plus a prior service pension, if applicable.

Percentage Multiplier	Membership Classification
2.00%	Fire, Police and Legislators
1.67%	All other members

Money Match The Member’s account balance and a matching employer amount converted to an actuarially equivalent annuity.

Formula Plus Annuity The Member’s account balance converted to an actuarially equivalent cash refund annuity plus the percentage multiplier from the table below multiplied by final average salary and years of creditable service, plus a prior service pension, if applicable.

Percentage Multiplier	Membership Classification
1.35%	Fire, Police and Legislators
1.00%	All other members

Judges Final average salary multiplied by the first percentage multiplier from the table below for up to 16 years of service plus the second percentage multiplier for any service in excess of 16 years, but not to exceed the maximum percentage of final average salary also shown below. Judges must elect Plan A or Plan B no later than age 60. A “Plan B” judge must serve as a pro tem judge for a total of 175 days postretirement.

Plan	Percentage Factor (up to 16 years)	Percentage Factor (after 16 years)	Maximum Percentage of Final Average Salary
A	2.8125%	1.67%	65%
B	3.75%	2.00%	75%

Final Average Salary The greater of:

- Average salary earned during the three calendar years in which the member was paid the highest salary, even if one of those years is less than a full calendar year.
- Total salary earned over the last 36 months of employment divided by the actual months of service during that 36 month period.

Covered salary for this purpose includes the value of member contributions assumed and paid by employers, any payment due to an employer’s participation in the Unused Sick Leave program, and, for Tier 1 members, lump sum payment of unused vacation time.

For Tier 2 members, covered salary is limited by Internal Revenue Code 401(a)(17). The limit was \$280,000 in 2019. Tier 1 members are not subject to this limit.

Under Senate Bill 1049, passed during the 2019 legislative session, the salary included in the determination of Final Average Salary will be limited for all members beginning in 2020. The limit will be equal to \$195,000 in 2020, and will be indexed with inflation in later years. For this purpose, payment due to the unused sick leave program will not be affected by the Final Average Salary limit. However, lump sum payments of unused vacation time for Tier 1 members will be included in total salary subject to the limit.

Creditable Service The number of years and months an active Member is paid a salary by a participating PERS employer and PERS benefits are being funded.

Prior Service Pension Benefits payable on account of Prior Service Credit for a member’s service with a participating employer prior to the employer’s participation in PERS, as described in ORS 238.442.

SB 656/HB 3349 Adjustment All members receive an increase to their monthly retirement benefit equal to the greater of the increase under Senate Bill 656 (SB 656) or House Bill 3349 (HB 3349). The adjustment for SB 656 only applies to members who established membership prior to July 14, 1995. Senate Bill 822, enacted in 2013, limits eligibility for these adjustments to only PERS beneficiaries who pay Oregon state income tax.

SB 656 Increase	Years of Service	General Service	Police & Fire
	0-9	0.0%	0.0%
	10-14	1.0	1.0
	15-19	1.0	1.0
	20-24	2.0	2.5
	25-29	3.0	4.0
	30 & Over	4.0	4.0

HB 3349 Increase

$$\left(\frac{1}{1 - \text{maximum Oregon personal income tax rate (limited to 9\%)}} - 1 \right) \times \frac{\text{Service prior to October 1, 1991}}{\text{All Service}}$$

<i>Early Retirement Eligibility</i>	Police and Fire Judges General Service	Age 50 or 30 years of service Age 60 Age 55 or 30 years of service
<i>Early Retirement Allowance</i>		Normal retirement allowance, actuarially reduced to early retirement age. However, there is no reduction applied if a member has completed 30 years of service (25 years for police & fire members) or for judges in Plan B.
<i>Vesting</i>		Contributions made in any part of five calendar years or attainment of age 50 (45 for police & fire) while working in a qualifying position.
<i>Termination Benefits</i>	Non-Vested Vested	Payment of member's account balance. Same as normal (or early) retirement allowance, but commencement is deferred to normal (or early) retirement date.
<i>Optional Forms of Retirement Allowance</i>		The normal form of benefit is a cash refund annuity (joint and two-thirds survivor contingent annuity for a married judge). All optional amounts are adjusted to be actuarially equivalent. Options Available <ul style="list-style-type: none"> • Life annuity • Cash refund annuity • Life annuity guaranteed 15 years • Joint and 50% or 100% survivor contingent annuity, with or without pop-up feature • Partial Lump Sum: Refund of member contribution account balance plus a pension (under any optional form) of employer-paid portion of the Full Formula or Money Match annuity. • Total Lump Sum: Refund of member contribution account plus a matching employer amount.
<i>Preretirement Death Benefit Eligibility</i>	Judges All others	Six or more years of service. Death occurring while the member is an employee of a participating employer or within 120 days of termination provided the employee does not withdraw the account balance or retire, or a result of injuries received while in the service of a participating employer.
<i>Preretirement Death Benefit</i>	Judges All others	The spouse shall receive a life pension equal to two-thirds of the service retirement allowance. The beneficiary of an unmarried judge shall receive the member's accumulated contributions with interest. The member's account balance plus a matching employer amount.
<i>Additional Police & Fire Death Benefits</i>		Upon the death of a retired police officer or firefighter, the surviving spouse or dependent children under age 18 will receive a monthly benefit based on 25% of the cash refund retirement allowance due to police and fire service.
<i>Disability Benefit Eligibility</i>	Duty Non-Duty	Disability occurring as a direct result of a job-related injury or illness, regardless of length of service. Disability occurring after ten years of service (six years, if a judge), but prior to normal retirement eligibility.

<i>Disability Benefits</i>	<p>The normal retirement allowance calculated based on the service credit that would have been earned if the member had continued working to age 58 (age 55 for police and fire, age 65 for judge members) payable commencing immediately.</p> <p>Fire and Police Members' Alternative</p> <p>In lieu of the above, firefighters and police officers who qualify for duty disability may elect to receive a benefit of 50% of final average monthly salary at the time of disablement.</p> <p>Minimum Monthly Retirement Allowance</p> <p>Judges 45% of final average monthly salary.</p> <p>All others \$100 for a member with at least 15 years of creditable service, actuarially reduced if an optional form of benefit is chosen.</p> <p>Reduction of Benefits</p> <p>Whenever a disabled employee's disability benefit and earned income for any month exceed the monthly salary received at the time of disablement or \$400, if greater, the disability benefit will be reduced by the excess.</p> <p>For Tier Two members, the disability benefit may not exceed the member's salary at the time of disablement.</p>
<i>Waiting Time Service Purchases</i>	<p>Members with at least 10 years of combined credited and/or prior service under PERS may elect to purchase service credit for the six-month "waiting time" period worked prior to establishing membership in the system. The waiting time purchase is interest-free and must be purchased in one payment prior to retirement.</p>
<i>Police & Fire Unit Purchases</i>	<p>Police & fire members may purchase 60-month annuity benefits (up to \$80 per month) that must be paid out by age 65 and cannot commence prior to the earliest retirement age. The amount purchased by the member is matched by the employer. In certain situations, such as termination of employment prior to retiring, or working beyond age 65, the employer's matching purchase is forfeited.</p>
<i>Automatic Postretirement Cost of Living Adjustments (COLAs)</i>	<p>All monthly pension and annuity benefits except unit purchases are eligible for postretirement adjustments. As a result of the Senate Bills 822 and 861 and the Oregon Supreme Court decision in <i>Moro v. State of Oregon</i>, automatic postretirement adjustments are based on a blended COLA as described below.</p> <p>Automatic COLA prior to SB 822 and SB 861</p> <p>Benefits were adjusted annually to reflect the increase or decrease in the Consumer Price Index (Portland area - all items) as published by the Bureau of Labor Statistics.</p> <p>The maximum adjustment to be made for any year was 2% of the previous year's benefit. Any CPI change in excess of the limit was accumulated for future benefit adjustments which would otherwise be less than the limit. No benefit was decreased below its original amount.</p> <p>Automatic Adjustments Provided by Senate Bills 822 and 861</p> <p>This legislation, passed in 2013, provided for that benefits would be increased annually based on a marginal rate schedule. The increase is calculated as 1.25% on the first \$60,000 of annual benefit and 0.15% on amounts above \$60,000 of annual benefit.</p>

	Blended COLA after <i>Moro</i> decision	The Supreme Court decision in <i>Moro</i> requires that members “will be entitled to receive during retirement a blended COLA rate that reflects the different COLA provisions applicable to benefits earned at different times.” The Supreme Court did not articulate a specific methodology for determining the blended COLA. For purposes of this valuation, we have determined the blend based on creditable service earned before and after October 2013. This approach is consistent with OAR 459-005-0510 adopted by the PERS Board in September 2015.
<i>Ad Hoc Adjustments</i>		From time to time, as granted by the Legislature, retired members and beneficiaries have received increases in their monthly benefits.
<i>Variable Annuity Program</i>	Contributions	Prior to January 1, 2004, members could elect to have 25, 50 or 75 percent of their contributions invested in the variable account.
	Benefit	At retirement, members may elect to receive a variable annuity with the funds accumulated in their variable account. Alternatively, members may elect to have all or a portion of the funds in their variable account transferred back to the regular account and receive an annuity from the System as though no variable annuity program existed. The employer-provided benefit, however, is based on the earnings the member would have received in the regular account.
<i>Interest Credit on Member Accounts</i>	Tier 1 Regular	Actuarially assumed rate of return until the rate guarantee reserve has been fully funded for three consecutive years and the Board elects to credit additional interest.
	Tier 2 Regular	Amount determined by the Board based on actual investment earnings of the regular account.
	Variable	Actual earnings in variable account.
<i>Retiree Healthcare – Medicare Supplement (RHIA)</i>	Retiree Eligibility	All of the following must be met: (a) Currently receiving a retirement allowance from the System, (b) Covered for eight years before retirement, (c) Enrolled in a PERS-sponsored health plan, and (d) Enrolled in both Medicare Part A and Part B.
	Surviving Spouse or Dependent Eligibility	A surviving spouse or dependent of a deceased RHIA-eligible retiree is eligible for RHIA benefits if they are enrolled in both Medicare Part A and Part B, and <i>either</i> of the following criteria are met: (a) Currently receiving a retirement allowance from the System, or (b) The surviving spouse or dependent was covered under the eligible retiree’s PERS-sponsored health insurance at the time of the retiree’s death and the deceased retiree retired before May 1, 1991.

	Benefit Amount	A monthly contribution of up to \$60 per retiree is applied to PERS-sponsored Medicare supplemental insurance costs.
<i>Retiree Healthcare – Under Age 65 (RHIPA)</i>	Retiree Eligibility	Retired PERS members who were state employees at the time of retirement, are enrolled in a PERS-sponsored health plan, and are not eligible for Medicare.
	Surviving Spouse or Dependent Eligibility	A surviving spouse or dependent of a deceased RHIPA-eligible retiree is eligible for RHIPA benefits if they are not yet eligible for Medicare, and <i>either</i> of the following criteria are met: (a) Currently receiving a retirement allowance from the System, or (b) The surviving spouse or dependent was covered under the eligible retiree’s PERS-sponsored health plan at the time of the retiree’s death and the deceased retiree retired on or after September 29, 1991.
	Benefit	A percentage (as shown in the table below) of the maximum monthly subsidy based on years of service. The maximum monthly subsidy is calculated annually as the average difference between the health insurance premiums paid by active state employees and the premium retirees would pay if they were rated separately from active state employees. The maximum monthly subsidy for 2020 is \$428.17 per month.

Years of Service with State Employer	Subsidized Amount
Under 8	0%
8-9	50%
10-14	60%
15-19	70%
20-24	80%
25-29	90%
30 & Over	100%

Changes in Plan Provisions There were no changes in the Tier 1/Tier 2 benefit provisions reflected since the December 31, 2018 actuarial valuation.

Summary of Chapter 238A Provisions — OPSRP

<i>Normal Retirement Date</i>	<p>Police & Fire Age 60 or age 53 with 25 years of retirement credit</p> <p>General Service Age 65 or age 58 with 30 years of retirement credit</p> <p>School Districts Age 65 or age 58 with 30 calendar years of active membership</p>
<i>Normal Retirement Allowance</i>	A single life annuity equal to final average salary times years of retirement credit attributable to service as fire and police times 1.8% plus final average salary times all other years of retirement credit times 1.5%.
<i>Final Average Salary</i>	<p>The greater of:</p> <ul style="list-style-type: none"> • Average salary earned during the three calendar years in which the member was paid the highest salary, even if one of those years is less than a full calendar year. • Total salary earned over the last 36 months of employment divided by the actual months of service during that 36 month period. <p>Covered salary for this purpose includes base pay, plus overtime up to an average amount, plus bonuses, plus member contributions paid by the employer on a salary reduction basis. Excludes payments of unused vacation or accumulated sick leave at retirement, and member contributions “assumed and paid” by the employer.</p> <p>For OPSRP members, covered salary is limited by Internal Revenue Code 401(a)(17) The limit was \$280,000 in 2019.</p> <p>Under Senate Bill 1049 passed during the 2019 legislative session, the salary included in the determination of Final Average Salary will be limited for all members beginning in 2020. The limit will be equal to \$195,000 in 2020, and will be indexed with inflation in later years.</p>
<i>Early Retirement Eligibility</i>	<p>Police & Fire Age 50 and 5 years of vesting service</p> <p>General Service Age 55 and 5 years of vesting service</p>
<i>Early Retirement Allowance</i>	Normal retirement allowance, actuarially reduced to early retirement age.
<i>Vesting</i>	Five years or attainment of normal retirement age.
<i>Vested Termination Benefit</i>	Same as normal (or early) retirement allowance, but commencement is deferred to normal (or early) retirement date.
<i>Optional Forms of Retirement Benefit</i>	<p>The normal form of benefit is a life annuity. All optional amounts are adjusted to be actuarially equivalent.</p> <p>Options Available</p> <ul style="list-style-type: none"> • Life annuity • Joint and 50% or 100% survivor contingent benefit, with or without pop-up feature • Lump sum if monthly normal retirement benefit is less than \$200 or if lump sum value is less than \$5,000.
<i>Preretirement Death Benefit Eligibility</i>	Death of a vested member before retirement benefits begin.

<i>Preretirement Death Benefit</i>	If member was eligible for early retirement, the actuarial equivalent of 50% of the early retirement benefit the participant was eligible to receive at date of death. If member was not eligible for early retirement, the actuarial equivalent of 50% of the early retirement benefit the participant would have been eligible to receive if he terminated employment on his date of death and retired at the earliest possible date.	
<i>Disability Benefit Eligibility</i>	Duty	Disablement occurring as a direct result of a job-related injury or illness, regardless of length of service.
	Non-Duty	Disablement occurring after ten years of service, but prior to normal retirement eligibility.
<i>Disability Benefit Amounts</i>	Preretirement Benefit	45% of salary during last full month of employment before disability, reduced if the total benefit exceeds 75% of salary. Benefit is payable monthly until normal retirement age.
	Retirement Benefit	Same formula as Normal Retirement Benefit, except: Final average salary is adjusted to reflect cost-of-living increases from date of disability to normal retirement age, and Retirement credits continue to accrue from date of disability to normal retirement age.
<i>Postretirement Adjustments</i>	All monthly pension and annuity benefits except unit purchases are eligible for postretirement adjustments. As a result of the Senate Bills 822 and 861 and the Oregon Supreme Court decision in <i>Moro v. State of Oregon</i> , automatic postretirement adjustments are based on a blended COLA as described below.	
	Automatic COLA prior to SB 822 and SB 861	Benefits were adjusted annually to reflect the increase or decrease in the Consumer Price Index (Portland area - all items) as published by the Bureau of Labor Statistics. The maximum adjustment to be made for any year was 2% of the previous year's benefit. Any CPI change in excess of the limit was accumulated for future benefit adjustments which would otherwise be less than the limit. No benefit was decreased below its original amount.
	Automatic Adjustments Provided by Senate Bills 822 and 861	This legislation, passed in 2013, provided for that benefits would be increased annually based on a marginal rate schedule. The increase is calculated as 1.25% on the first \$60,000 of annual benefit and 0.15% on amounts above \$60,000 of annual benefit.
<i>Changes in Plan Provisions</i>	There were no changes in the OPSRP benefit provisions reflected since the December 31, 2018 actuarial valuation.	

Risk Disclosure



This work product was prepared solely for Oregon Public Employees Retirement System for the purposes stated herein, and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Risk Disclosure

The purpose of this appendix is to identify, assess, and provide illustrations of risks that are significant to Oregon PERS, and in some cases to PERS members.

The results of any actuarial valuation are based on one set of assumptions. Although we believe the current assumptions for the System provide a reasonable estimate of future expectations, it is almost certain that future experience will differ from the assumptions to some extent. It is therefore important to consider the potential impacts of these potential differences between assumptions and experience when making decisions that may affect the future financial health of the System, or of the System's members.

Actuarial Standard of Practice No. 51 (ASOP 51) addresses these issues by providing actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. Specifically, it directs the actuary to:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

ASOP 51 states that if in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

This Section uses the framework of ASOP 51 to communicate important information about significant risks to the System, the System's maturity, and relevant historical data.

Identification of Risks

There are a number of factors that affect future valuation results. To the extent actual experience for these factors varies from the assumptions, this will likely cause either increases or decreases in the System's future funding level and calculated contribution rates. Examples of factors that can have a significant impact on valuation results are:

- Investment return, as this will impact the level of assets available to pay benefits
- Change in combined (Tier 1/Tier 2 and OPSRP) valuation payroll, as this will impact the size of contributions received and the ability to finance unfunded amounts as a percent of future pay
- Legislative changes and judicial rulings, as these can impact both benefit levels and contribution rates
- Individual member salary variation, as this will impact the size of benefits members receive as a percent of final earnings
- Mortality, as this will impact how long retirees receive benefits
- Service retirement, as this will impact how long retirees receive benefits, the size of retiree benefits, the amount of time over which employer and employee contributions are received, and the amount of time for investment earnings to accumulate on those contributions
- Termination (members leaving active employment for reasons other than death, disability or service retirement), as this will impact the size of benefits for those members

Investment Return

Of the factors listed above, we believe the factor with the greatest potential risk is future investment returns. For this reason, we prepare a financial modeling analysis for the PERS Board each year that illustrates a wide range of potential future investment returns. In that analysis, we perform both deterministic and stochastic projections to study the impact of various investment return scenarios on future system-average contribution rates and funded status compared to the case in which the actual investment rate of return matches the assumed investment rate of return.

System Payroll Growth

Under the current funding policy, UAL amounts are amortized as a level percentage of projected combined valuation payroll over the selected amortization period. If the System's payroll grows at the assumed rate, and all other assumptions are met, this would produce a UAL contribution rate that remains level as a percentage of payroll during the amortization period. However, if payroll grows less than assumed, the dollar amount of contributions will be less than projected, and the UAL contribution rate in subsequent valuations would have to increase to make up for those UAL losses.

Legislative Changes and Judicial Rulings

Legislative changes and judicial rulings can affect both benefit levels and contribution rates. Examples include 2013 legislative changes, which reduced COLA levels and directed the PERS Board to reduce previously-adopted contribution rates; a 2015 judicial ruling, which overturned much of the previous reduction to COLA levels; and 2019 legislative changes, which directed the PERS Board to re-amortize Tier 1/Tier 2 UAL over a new 22-year period and redirected a portion of Member IAP contributions to offset future employer contribution rates. If future legislative changes limit or reduce short-term contributions, then contribution rates may need to be increased in future to make up the shortfall. And if future judicial rulings overturn past benefit changes, then future contribution rates may need to be increased to cover the resulting impact on liabilities.

Demographic Experience

While future investment returns will likely cause the greatest deviation from expected experience, there are many other assumptions made in an actuarial valuation. For these assumptions, differences between actual and assumed experience will also result in actuarial gains and losses. The executive summary of this report provides a look at the impact in the past year of actual experience deviating from assumed.

Maturity Measures and Historical Information

The remainder of this section contains historical information concerning the System's Asset Volatility Ratio (AVR) and Liability Volatility Ratio (LVR). Additional historical information can be found in the executive summary and the *Accounting/CAFR Exhibits* section.

Asset Volatility Ratios and Liability Volatility Ratios

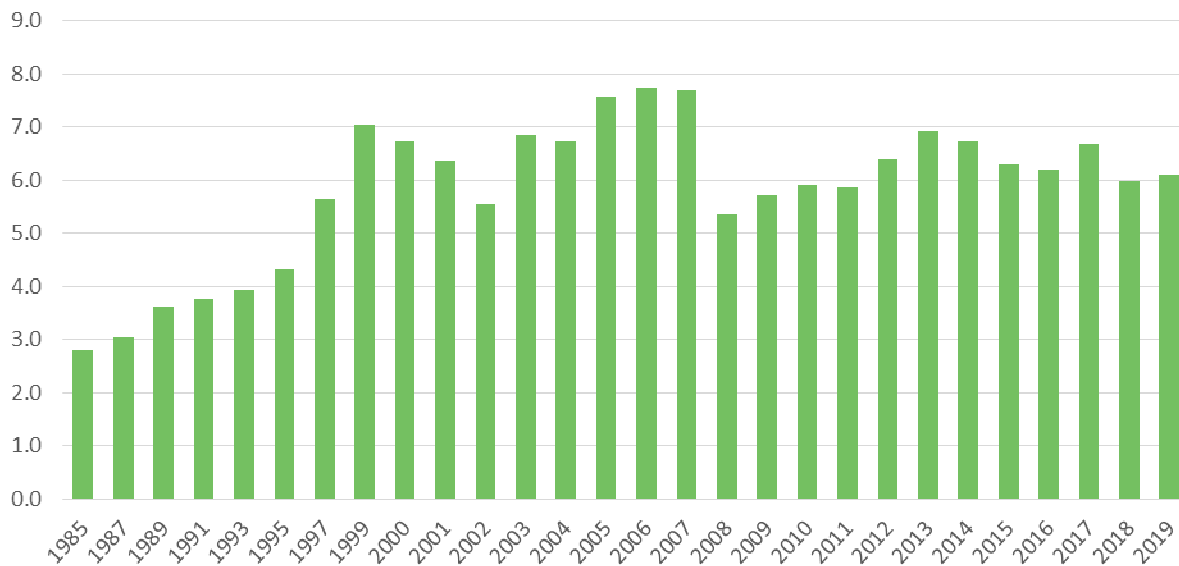
The magnitude of any contribution rate increase or decrease is affected by the System's maturity level. As a system matures, its liabilities and assets tend to grow relative to the size of its covered payroll. This creates more volatility in the contributions needed to fund the system.

One indicator of this potential volatility is the Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total valuation payroll. As assets grow compared to valuation payroll, any percentage gain or loss on those assets will be larger compared to valuation payroll. This causes any resulting changes in required contributions from those gains or losses to also be larger when measured as a percentage of valuation payroll. Therefore, plans with a high AVR will be subject to a greater level of volatility in required

contributions. The AVR is a current measure since it is based on the current level of assets and will vary from year to year.

The current AVR on a combined basis for Tier 1/Tier 2 and OPSRP (including side accounts) is 6.1. The AVR grew from 2.8 at December 31, 1985 to a high of 7.7 at December 31, 2006. The graph below shows how the System matured during the last 34 years, as represented by the increasing AVR.

Asset Volatility Ratio (Market Value of Assets ÷ Valuation Payroll)



The following chart provides an illustration of how increases in the AVR increase the volatility of contributions due to the larger relative size of asset gains and losses.

Illustrative effect of 10% asset loss (compared to assumed rate) with 20 year amortization using PERS assumptions	
Asset Volatility Ratio	Uncollared Contribution Rate Increase
3.0	2.12%
4.0	2.82%
5.0	3.53%
6.0	4.24%
7.0	4.94%

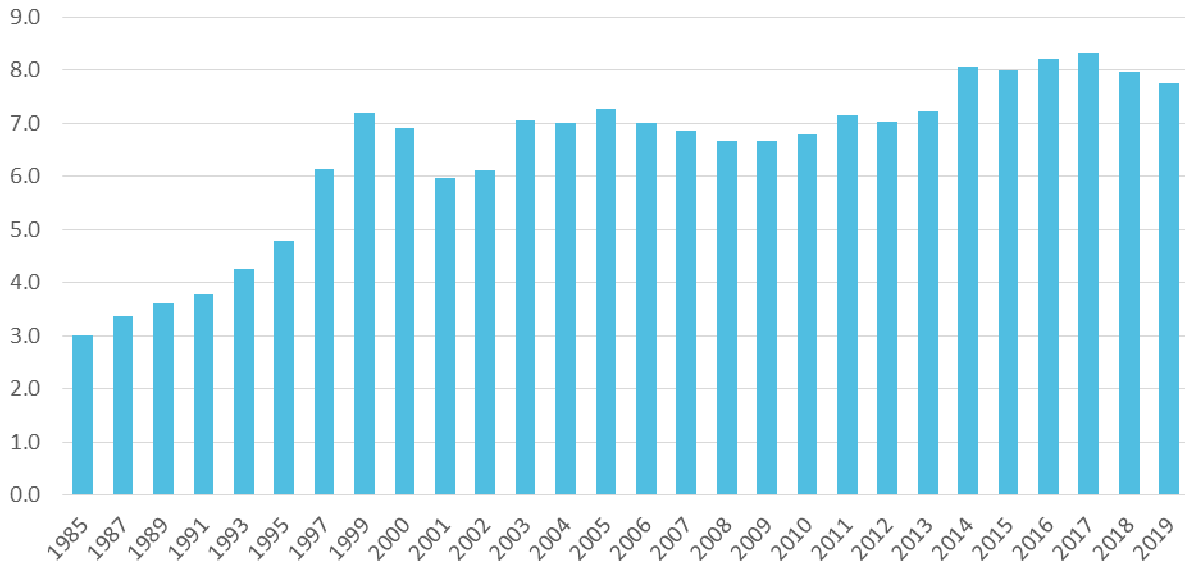
A one-year return of negative 2.80% is approximately a 10% asset loss for Oregon PERS because it is 10% below the 7.20% investment return assumption. As shown in the chart, if a return of negative 2.80% is not offset by future gains and the AVR was 3.0, the loss is expected to increase the uncollared contribution rate by 2.12% of pay if amortized over 20 years. However, with an AVR of 6.0, the same return is expected to increase contributions by 4.24% of valuation payroll if amortized over 20 years.

Another measure of a system’s maturity is the Liability Volatility Ratio (LVR), which is equal to the AL divided by the total valuation payroll. This ratio provides an indication of the longer-term potential for contribution

volatility for any given level of investment volatility. In addition, this ratio provides an indication of the potential contribution volatility due to demographic experience (gains and losses) and liability re-measurements (assumption changes). For Oregon PERS, the current LVR is 7.8.

The graph below shows the historical LVR since December 31, 1985. It follows a similar pattern to the Asset Volatility Ratio, except the increase is more gradual and the year-to-year variance is significantly less.

Liability Volatility Ratio (Actuarial Accrued Liability ÷ Valuation Payroll)



Glossary

Glossary

Actuarial Accrued Liability. The portion of the present value of prospective benefits allocated to service and compensation before the valuation date in accordance with the actuarial cost method.

Actuarial Value of Assets. The value of assets used in calculating the required contributions. The actuarial value of assets may be equal to the fair market value of assets, or it may spread the recognition of certain investment gains or losses over a period of years in accordance with an asset valuation method.

Actuarial Assumptions. Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement and retirement; rates of investment earnings and other relevant items.

Actuarial Cost Method. Sometimes called “funding method,” a particular technique used by actuaries to establish the amount and incidence of the annual actuarial cost of pension plan benefits, or normal cost, and the related unfunded accrued liability. Ordinarily, the annual contribution to the plan comprises the normal cost and an amount for amortization of the unfunded accrued liability.

Actuarial Gain or (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions, during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

Combined Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for Tier 1, Tier 2 and OPSRP active members. This payroll is used to calculate UAL rates.

Employer Contribution Rate. Consists of the normal cost rate and the UAL rates, plus adjustments for items such as side account rate offsets.

Fundamental Cost Equation. An expression of the long-term cost of a pension plan, which states that:

$$\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Earnings}$$

Funded Status. The actuarial value of assets expressed as a percentage of the actuarial accrued liability.

Normal Cost. The annual cost allocated to the current year, under the actuarial cost method in use. The normal cost divided by the applicable payroll is the normal cost rate.

OPSRP Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for OPSRP active members. This payroll is used to calculate OPSRP normal cost rates.

Pre-SLGRP Liability/(Surplus). The sum of Pre-SLGRP Pooled Liabilities and Transition Liabilities.

Pre-SLGRP Pooled Liability/(Surplus). The difference between the total UAL and the UAL attributable to the SLGRP for a pool of employers that joined the SLGRP. There are currently two pre-SLGRP pools. One was created for State Agencies and Community Colleges when the SLGRP was formed. The other one was created when the Local Government Rate Pool joined the SLGRP.

Present Value. Sometimes called “actuarial present value,” the estimated cost (as of the valuation date) of a series of future payments. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Present Value of Future Normal Cost (PVFNC). The present value (as of the valuation date) of all future annual normal costs for current members expected to be allocated to future years in accordance with the actuarial cost method in use. By definition, this is equal to the difference between the total actuarial present value of benefits less the actuarial accrued liability under the actuarial cost method.

Rate Collar. A methodology that defines the maximum permissible period-to-period change in the base employer contribution rate. The width of the rate collar is determined by the current contribution rate and funded status.

Required Supplementary Information (RSI). Schedules, statistical data, and other information that are an essential part of financial reporting and should be presented with, but are not part of, the basic financial statements of a governmental entity.

Statement No. 67 of the Governmental Accounting Standards Board (GASB 67). The accounting standard establishing financial reporting standards for defined benefit pension plans. The standard replaced GASB Statement 25 for plan fiscal years beginning after June 15, 2013.

Statement No. 68 of the Governmental Accounting Standards Board (GASB 68). The accounting standard governing a governmental employer's accounting for pensions. The standard replaced GASB Statement 27 for employer fiscal years beginning after June 15, 2014.

Statement No. 74 of the Governmental Accounting Standards Board (GASB 74). The accounting standard establishing financial reporting standards for post-employment benefits other than pensions. The standard replaced GASB Statement 43 for plan fiscal years beginning after June 15, 2016.

Statement No. 75 of the Governmental Accounting Standards Board (GASB 75). The accounting standard governing a governmental employer's accounting for post-employment benefits other than pensions. The standard replaced GASB Statement 45 for employer fiscal years beginning after June 15, 2017.

Tier 1/Tier 2 Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for Tier 1 and Tier 2 active members. This payroll is used to calculate Tier 1/Tier 2 normal cost rates.

Total Actuarial Present Value of Benefits. Sometimes referred to simply as "Present Value of Benefits" (PVB) or "Total Liability", the present value of all prospective benefits projected to be paid to current plan members. This amount is equal to the sum of the actuarial accrued liability and the present value of future normal costs, and is unaffected by the choice of actuarial cost method.

Transition Liability/(Surplus). The difference between the total UAL and the UAL attributable to the SLGRP for an individual employer that joined the SLGRP or the Local Government Rate Pool. The initial balance of liability or surplus is calculated at the time employer joins the pool. That balance is then amortized over time via employer contribution rate charges (for a liability) or rate offsets (for a surplus).

Unfunded Accrued Liability (UAL). The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. The UAL is divided by combined valuation payroll and an amortization factor to determine an initial, pre-collar UAL rate. The final UAL rate can be adjusted by the rate collar.