



**STATE OF WISCONSIN**  
**Department of Employee Trust Funds**  
 Robert J. Conlin  
 SECRETARY

Wisconsin Department  
 of Employee Trust Funds  
 PO Box 7931  
 Madison WI 53707-7931  
 1-877-533-5020 (toll free)  
 Fax 608-267-4549  
 etf.wi.gov

**Correspondence Memorandum**

**Date:** May 28, 2020  
**To:** Employee Trust Funds Board  
**From:** Cindy Klimke-Armatoski, CPA  
 Chief Trust Finance Officer  
**Subject:** Accumulated Sick Leave Actuarial Valuation

**ETF requests the Employee Trust Funds Board (Board) approve the Accumulated Sick Leave Conversion Credit Programs Actuarial Valuation as of December 31, 2019.**

Gabriel Roeder Smith & Company (GRS) has completed the actuarial valuation of the Accumulated Sick Leave Conversion Credit programs. The results of the study are summarized below (millions \$):

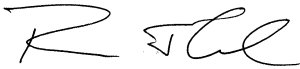
	December 31,	
	2019	2018
Actuarial Accrued Liability	\$2,623.0	\$2,551.6
Actuarial Value of Assets	\$2,622.9	\$2,551.4
Unfunded Actuarial Accrued Liability	0.1	0.2
Funded Ratio	100.0%	100.0%

GRS is recommending the following contribution rates for 2021, which reflects a decrease in the basic program and total rate.

Employer Normal Cost	Base ASLCC Program		Supplemental Plan		Total	
	2021	2020	2021	2020	2021	2020
	0.8%	0.9%	0.3%	0.3%	1.1 %	1.2%

Actuaries from GRS will be at the Board meeting to present the report and to answer any questions.

Attachment: Accumulated Sick Leave Conversion Credit Programs Annual Actuarial Valuation as of December 31, 2019

Reviewed and approved by Robert J. Conlin, Secretary  
  
 Electronically Signed 6/4/20

Board	Mtg Date	Item #
ETF	6.18.20	5B

# Wisconsin Accumulated Sick Leave Conversion Credit Programs

Presented to the Wisconsin Department of Employee Trust Funds  
Annual Actuarial Valuation  
December 31, 2019





May 29, 2020

Employee Trust Funds Board  
Wisconsin Retirement System  
4822 Madison Yards Way  
Madison, Wisconsin 53705

Ladies and Gentlemen:

The results of the **Annual Actuarial Valuation** of benefit liabilities and costs of the Accumulated Sick Leave Conversion Credit (ASLCC) Programs are presented in this report. This report should not be relied upon for any other purpose. The recommended contribution rates are shown below:

	Wiscraft	Other State Employers	Weighted Average
Base Rate	1.1%	0.8%	0.8%
Supplemental Rate	0.5%	0.3%	0.3%
Total	1.6%	1.1%	1.1%

The date of the valuation was **December 31, 2019**.

The valuation was based upon data, furnished by the Department of Employee Trust Funds, concerning retired and non-retired participants and pertinent financial information.

Future actuarial measurements may differ significantly from those presented in this report due to such factors as experience differing from that anticipated by actuarial assumptions, changes in plan provisions, actuarial assumptions/methods 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 valuation was completed in accordance with standards of practice prescribed by the Actuarial Standards Board and in conformance with Chapter 40 of the Wisconsin Statutes. To the best of our knowledge, this report is complete and accurate, and the actuarial methods and assumptions produced results which are reasonable. Brian B. Murphy, Mark Buis, and James D. Anderson are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

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

Mark Buis  
FSA, EA, FCA, MAAA

James D. Anderson  
FSA, EA, FCA, MAAA

BBM/MB/JDA:ah

## **COMBINED RESULTS AND DISCUSSION**

---

# ASLCC Program Base Plus Supplemental Computed Total Employer Contribution Rates

The financial objectives of the ASLCC Program are to establish and receive contributions to support benefits that will remain approximately level from year to year. Combined program valuation results for the last 10 years are presented below:

Valuation Date December 31	Fiscal Year Ending December 31	Base	Supplemental	Total	UAAL* Amortization Years
2010^	2012	0.8%	0.4%	1.2%	15
2011	2013	0.9%	0.4%	1.3%	14
2012^	2014	0.9%	0.5%	1.4%	13
2013	2015	0.8%	0.4%	1.2%	12
2014	2016	0.8%	0.4%	1.2%	11
2015^	2017	0.9%	0.4%	1.3%	10
2016	2018	0.8%	0.4%	1.2%	9
2017	2019	0.8%	0.3%	1.1%	8
2018^	2020	0.9%	0.3%	1.2%	7
2019	2021	0.8%	0.3%	1.1%	6

\* *Unfunded actuarial accrued liabilities.*

^ *Assumption change.*

## Comments

- Based on the policy established at the June 2002 ETF Board meeting, the amortization period for Unfunded Actuarial Accrued Liabilities (UAAL) was closed. Therefore, the remaining period will decline one year at a time until the UAAL is fully amortized.
- The State of Wisconsin issued Pension Obligation Bonds in 2003 that paid off the majority of unfunded liabilities of the ASLCC Program.
- In computing the rates in this report, we used the Frozen Initial Liability (FIL) method. This method was used because the Pension Obligation Bond paid off unfunded liabilities for some, but not all employers, requiring separate contribution rates for some of the employers. It was reported to us that Health and Education Facility paid off their remaining UAAL during fiscal year 2019. This method is described further on page 14. For comparison purposes, we have also calculated the funded status using the Entry Age Normal method. On this basis, the Base Plan is 108.9% funded and the Supplemental Plan is 114.0% funded.
- In total, during 2019, investment return on a market value basis was above the assumed level of 7.0%. Under the asset valuation method, gains and losses are phased-in over a five-year period, resulting in a 7.4% return on an actuarial value of assets basis. Overall, contribution rates for the December 31, 2019 valuation decreased from the prior year primarily due to favorable investment performance and lower than expected post-65 premiums.
- The Market Value of Assets exceeds the Actuarial Value of Assets by approximately 6.0% as of the valuation date. The statutory asset valuation method will recognize all of the differences between actuarial value and market value over four future years. Given realization of the actuarial assumptions, including the 7.0% investment return assumption, the result will be downward pressure on contribution rates.
- This valuation reflects the inclusion of terminated vested members of the accumulated sick leave conversion credit programs. Prior to this valuation, a load was applied to active liabilities to account for terminated vested member liabilities.

# ASLCC Program Summary of Participant Data December 31, 2019

## Active Participants

	State Employees			
	(Non-University)	University	University Hospital	Total
Number	32,307	31,536	9,316	73,159
Annual Payroll	\$1,902,377,085	\$ 2,641,849,124	\$633,238,868	\$ 5,177,465,077
Accrued Unused Sick Days	2,636,678 days	2,777,033 days	358,822 days	5,772,533 days
Averages: Age	44.7 years	46.3 years	40.6 years	44.9 years
Service	11.4 years	10.7 years	8.0 years	10.7 years
Sick Leave Days	81.6 days	88.1 days	38.5 days	78.9 days

## Terminated Vested Participants

Number	Base Sick Leave Balance	Supplemental Sick Leave Balance	Total Sick Leave Balance
414	\$16,393,605	\$10,617,579	\$27,011,184

Members noted above terminated with 20 or more years of service and are eligible to begin using sick leave credits to cover health care costs upon reaching retirement age.

## Retirees and Beneficiaries Provided by ETF

Status	Number	Base Sick Leave Balance	Supplemental Sick Leave	Total Sick Leave Balance
Premium > \$0 and account status of active	17,593	\$580,695,137	\$946,189,682	\$1,526,884,819
Premium > \$0, sick leave balance > \$0, and account status other than active	4,910	49,712,437	58,651,054	108,363,491
Premium = \$0, sick leave balance > \$0	6,293	234,640,331	163,942,329	398,582,660
Sick leave balance = \$0	8,462	0	0	0
Total	37,258	\$865,047,905	\$1,168,783,065	\$2,033,830,970



# ASLCC Program

## Average Premium Development

### December 31, 2019

	Rate Category		
	Total	Pre-65	Post-65
1. Number*	17,559	4,275	13,284
2. Monthly Premium Amounts for Retirees Currently in Pay Status*	\$ 12,660,218	\$5,253,731	\$7,406,487
3. Annual Premiums for Retirees Currently in Pay Status: (2)x12	\$151,922,616		
4. Reported Premiums from Financial Statements	\$164,580,396		
5. Ratio of Reported to Annualized Premium Amounts: (4)/(3)	1.0833		
<b>6. Adjusted Monthly Premiums: (2)/(1)x(5)</b>		<b>\$ 1,331.31</b>	<b>\$ 603.99</b>
First Prior Year		\$ 1,227.59	\$ 663.64
Second Prior Year		\$ 1,191.82	\$ 711.16

\* Retirees with an account status of active and a premium amount populated in the data provided. Excludes pre-65 retirees currently enrolled in a Medicare health care plan. These members were excluded from the average premium calculation because the averages are used to project future premiums of people not covered by Medicare.

For retirees provided with both a premium amount and a sick leave account balance, the premium amounts supplied in the data were used directly. In the case of individuals under age 65, they were assumed to convert to the average post-65 premium upon attainment of age 65 pro-rated for the ratio of their pre-65 premium to the average pre-65 premium. For non-retired members, the average projected pre-65 premium was applied to age 65 and the average projected post-65 premium was applied after age 65.





# ASLCC Program Summary of Assets December 31, 2019

	Base Program	Supplemental Program	Total
Beginning Balance	\$1,552,453,297	\$ 998,973,301	\$2,551,426,598
Adjustment	1,052	3,932	4,984
Adjusted Beginning Balance	\$1,552,454,349	\$ 998,977,233	\$2,551,431,582
<b>Revenues</b>			
Contributions	\$ 38,356,314	\$ 14,368,898	\$ 52,725,212
Investment Income	111,957,710	72,389,678	184,347,388
Total Revenues	\$ 150,314,024	\$ 86,758,576	\$ 237,072,600
<b>Expenses</b>			
Insurance Premiums	\$ 110,339,837	\$ 54,240,559	\$ 164,580,396
Other	127,630	54,861	182,491
Administration	528,131	339,791	867,922
Total Expenses	\$ 110,995,598	\$ 54,635,211	\$ 165,630,809
Ending Balance - December 31, 2019	<u>\$1,591,772,775</u>	<u>\$1,031,100,598</u>	<u>\$2,622,873,373</u>
Internal Rate of Return	7.4%	7.4%	7.4%

The amounts shown above are based on the Market Recognition Account (MRA) and were provided by ETF.



**ASLCC Program**  
**Unfunded Actuarial Accrued Liability (UAAL)**  
**December 31, 2019**

	<b>Health and Education Facility</b>	<b>Wiscraft</b>	<b>Other State Employers</b>	<b>Totals/Weighted Average</b>
Balance December 31, 2018	\$ 44,746	\$ 95,442	\$ 0	\$ 140,188
<b>Balance December 31, 2019</b>	<b>\$ 0</b>	<b>\$ 83,440</b>	<b>\$ 0</b>	<b>\$ 83,440</b>
Base UAAL	\$ 0	\$ 45,326	\$ 0	\$ 45,326
Supplemental UAAL	\$ 0	\$ 38,114	\$ 0	\$ 38,114
Annual Payroll	\$ 0	\$2,910,092	\$5,174,554,985	\$5,177,465,077
Base Contribution Rate				
Normal Cost	0.8%	0.8%	0.8%	0.8%
UAAL	<u>0.0%</u>	<u>0.3%</u>	<u>0.0%</u>	<u>0.0%</u>
Total	0.8%	1.1%	0.8%	0.8%
Supplemental Contribution Rate				
Normal Cost	0.3%	0.3%	0.3%	0.3%
UAAL	<u>0.0%</u>	<u>0.2%</u>	<u>0.0%</u>	<u>0.0%</u>
Total	0.3%	0.5%	0.3%	0.3%
<b>Total Contribution Rate</b>	<b>1.1%</b>	<b>1.6%</b>	<b>1.1%</b>	<b>1.1%</b>

Annual payroll and UAAL balances for Health and Education Facility and Wiscraft were provided by ETF.

# BASE PLAN RESULTS

---

## Section 40.05(4)(b)

# Accumulated Sick Leave Conversion Credit Program Summary of Accumulation and Payment Conditions

**Accumulation.** The average annual sick leave balance of Wisconsin State employees (other than University employees) in 2019 was 81.6 days. Based upon an average of 11.4 years of service, this would correspond to an average annual addition of 7.2 days per year to sick leave accounts for past years. For University and University Hospital employees, the average balance was 76.8 days. Based upon an average of 10.1 years of service, this would correspond to an average annual addition of 7.6 days per year to the sick leave accounts for past years. For purposes of estimating sick leave balances at retirement, each individual was assumed to continue using sick leave at the same rate as in the past but not less than 25% nor more than 75% of the person's annual accrual rate (usually 16.25 days).

**Eligibility for Payment of Accrued Sick Leave.** Termination of employment with 20 or more years of service or eligibility for an immediate annuity from the Wisconsin Retirement System. State elected officials and certain State administrative officials terminating before their minimum service retirement age retain eligibility for benefits at their minimum service retirement age providing they do not elect a WRS separation benefit.

**Amount of Payment for Unused Sick Leave.** A conversion credit is computed at the time of retirement or death by multiplying the number of days of unused sick leave by the highest basic pay rate. The conversion credit is then used to cover the cost of health insurance premiums for the employee and eligible dependents. Unused portions are carried forward from year to year without interest and when total health insurance premiums paid on behalf of the retired employee equal or exceed the conversion credit, no further payments are made under the ASLCC Program. Payments from the sick leave account may be escrowed indefinitely after retirement for participants who provide evidence of comparable health insurance coverage from another source.

**Method for Calculating Active Member Sick Leave Credits.** The process for projecting active members' sick leave balances to retirement and converting it to a credit is outlined below:

1. Start with the members current unused sick leave balance in the data provided.
2. Accumulate sick leave accruals from current age to retirement age using the members historical accrual rate subject to a minimum and maximum value which depends on what group they are in (See Accumulation section above).
3. Calculate total unused sick leave balance at time of retirement (1. + 2.).
4. Project pay from valuation date to retirement using actuarial assumptions.
5. Convert total unused sick leave days into sick leave credits by taking 3. x 4. where 3. is converted into hours and 4. is an hourly rate.



## 40.05(4)(B) - Base ASLCC Program Development of Normal Cost

Actuarial Present Value of	December 31	
	2019	2018
(1) Future amount to be paid on behalf of present retirees and beneficiaries currently using sick leave credits to pay for health benefits <sup>(1)</sup>	\$ 393,002,134	\$ 389,744,544
(2) Future amount to be paid on behalf of present retirees and beneficiaries with sick leave credits currently in escrow <sup>(2)</sup>	73,138,518	81,135,564
(3) Future amount to be paid on behalf of terminated vested members	12,018,955	0
(4) Future amount to be paid on behalf of current active members	<u>1,504,211,027</u>	<u>1,466,611,640</u>
(5) Total Actuarial Present Value	\$ 1,982,370,634	\$ 1,937,491,748
(6) Assets	1,591,772,775	1,552,453,297
(7) Unfunded Actuarial Accrued Liabilities (UAAL)	<u>\$ 45,326</u>	<u>\$ 76,534</u>
(8) Present Value of Future Normal Cost: (5) - (6) - (7)	\$ 390,552,533	\$ 384,961,917
(9) Present Value of Future Salary	\$47,393,481,846	\$45,159,348,076
(10) Normal Cost: (8) / (9) (not to exceed last year's rate + 0.2%)	0.8%	0.9%
(11) Actuarial Accrued Liability (EAN)	\$ 1,461,598,531	\$ 1,439,275,353
(12) Funded Status (EAN)	108.9%	107.9%

<sup>(1)</sup> Includes liability for any retirees and beneficiaries who were provided with both a premium amount and sick leave credit balance in the data provided by ETF for the valuation.

<sup>(2)</sup> Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance but a \$0 premium amount in the data provided by ETF for the valuation. See the Miscellaneous & Technical Assumptions for additional details.



## 40.05(4)(B) - Base ASLCC Program Computed Employer Contributions December 31, 2019

Contributions for	Computed Employer Contribution Rate as a % of Covered Payroll
Normal Cost	0.8%
UAAL*	0.0%
<b>Total</b>	<b>0.8%</b>

\* *Unfunded actuarial accrued liabilities of \$0.0 million were amortized over 6 years. Although this results in a 0.0% of pay contribution due to rounding, unfunded liabilities are allocated to individual employers as shown on page 6 and employers having an unfunded liability will make a separate contribution towards this unfunded liability.*

### Discussion

The financial objective of the ASLCC Program is to establish and receive contributions to support benefits that will remain approximately level from year to year. In 2003, the State of Wisconsin issued Pension Obligation Bonds which paid off the majority of unfunded liabilities of the ASLCC Program. Since unfunded liabilities remained for certain employers, the funding method was changed to the Frozen Initial Liability Actuarial Cost Method. Under this method, gains and losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. Separate amortization schedules are established for employers with unfunded liabilities (see page 6), resulting in separate contribution rates for each participating employer.

## 40.05(4)(B) - Base ASLCC Program Comparative Statement of Results

Valuation Date	No. Active	Covered Payroll \$ Millions	Average			\$ Millions		Average Computed Employer Rate
			Age	Service	Accr. Sick Days	Assets	UAAL	
2000^	63,008	\$2,753.3	44.6	12.0	80.6	\$ 515.6	\$ 214.2	1.7%
2001	64,510	2,980.6	44.5	11.8	80.9	611.7	218.7	1.7%
2002	66,442	3,096.7	44.8	11.8	80.9	619.0	262.6	1.8%
2003^&	68,366	3,349.0	45.0	11.8	80.9	1,085.1	10.9	0.9%
2004	68,269	3,400.0	45.4	12.0	83.1	1,154.0	9.5	0.9%
2005	67,460	3,410.0	45.6	12.2	84.3	1,196.0	9.3	0.8%
2006^	67,892	3,592.5	45.8	12.2	85.5	1,272.7	9.2	0.7%
2007	68,789	3,726.4	45.9	12.2	87.1	1,394.4	7.2	0.6%
2008	69,720	3,878.0	45.9	12.1	85.1	1,402.8	8.9	0.6%
2009^	69,964	3,950.5	46.1	12.3	86.5	1,409.7	9.1	0.8%
2010^	69,920	3,962.1	46.3	12.3	86.9	1,416.1	9.0	0.8%
2011	66,533	3,905.5	45.9	11.9	86.2	1,373.1	8.8	0.9%
2012^	66,846	3,991.4	45.8	11.8	85.2	1,335.3	8.5	0.9%
2013	68,511	4,234.1	45.8	11.7	86.2	1,414.4	8.2	0.8%
2014	71,314	4,538.8	45.7	11.6	85.5	1,467.1	7.3	0.8%
2015^	71,520	4,613.4	45.5	11.4	84.5	1,490.1	0.1	0.9%
2016	71,587	4,677.2	45.2	11.0	82.0	1,517.3	0.1	0.8%
2017	71,945	4,781.0	45.0	10.9	80.7	1,565.2	0.1	0.8%
2018^	71,670	4,948.6	45.0	10.8	80.0	1,552.5	0.1	0.9%
2019	73,159	5,177.5	44.9	10.7	78.9	1,591.8	0.0	0.8%

^ Assumption change.

& Method change.



## **SUPPLEMENTAL PLAN RESULTS**

---



# Accumulated Sick Leave Conversion Credit Program Supplemental Plan December 31, 2019

This supplemental plan provides matching credits for participants retiring with 15 or more years of State service as follows:

- Protective: Match up to 78 hours (9.75 days) per full year of service through 24 years, plus 104 hours (13 days) per full year of service over 24 years.
- Others: Match up to 52 hours (6.5 days) per full year of service through 24 years, plus up to 104 hours (13 days) per full year of service over 24 years.

The results below are for the supplemental program only. (The results on page 8 are for the ASLCC base program only.) The supplemental plan accrued liabilities are offset by supplemental plan assets which are accounted for separately by DETF.

Contributions for	Computed Employer Contribution Rate as a % of Covered Payroll
Normal Cost	0.3%
UAAL*	0.0%
<b>Total</b>	<b>0.3%</b>

\* *Unfunded actuarial accrued liabilities of \$0.0 million were amortized over 6 years. Although this results in a 0.0% of pay contribution due to rounding, unfunded liabilities are allocated to individual employers as shown on page 6 and employers having an unfunded liability will make a separate contribution towards this unfunded liability.*

The contribution rate shown above was developed based upon the active participant data as shown on page 4. This is the same data that was used in the development of the base plan rates.

## Development of Supplemental Present Value of Future Benefits (PVFB)

For purposes of developing the PVFB associated with the supplemental plan, the PVFB was first calculated in total then the PVFB associated with the base plan was calculated and subtracted from the total to develop the PVFB for the supplemental plan.

## 40.05(4)(B) – Supplemental ASLCC Program Development of Normal Cost

Actuarial Present Value of	December 31	
	2019	2018
(1) Future amount to be paid on behalf of present retirees and beneficiaries currently using sick leave credits to pay for health benefits <sup>(1)</sup>	\$ 440,585,886	\$ 448,806,995
(2) Future amount to be paid on behalf of present retirees and beneficiaries with sick leave credits currently in escrow <sup>(2)</sup>	35,941,356	42,120,207
(3) Future amount to be paid on behalf of terminated vested members	6,660,764	0
(4) Future amount to be paid on behalf of current active members	667,919,152	664,079,644
(5) Total Actuarial Present Value	\$ 1,151,107,158	\$ 1,155,006,846
(6) Assets	1,031,100,598	998,973,301
(7) Unfunded Actuarial Accrued Liabilities (UAAL)	\$ 45,326	\$ 63,654
(8) Present Value of Future Normal Cost: (5) - (6) - (7)	\$ 119,961,234	\$ 155,969,891
(9) Present Value of Future Salary	\$47,393,481,846	\$45,159,348,076
(10) Normal Cost: (8) / (9) (not to exceed last year's rate + 0.2%)	0.3%	0.3%
(11) Actuarial Accrued Liability (EAN)	\$ 904,662,640	\$ 915,820,653
(12) Funded Status (EAN)	114.0%	109.1%

<sup>(1)</sup> Includes liability for any retirees and beneficiaries who were provided with both a premium amount and sick leave credit balance in the data provided by ETF for the valuation.

<sup>(2)</sup> Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance but a \$0 premium amount in the data provided by ETF for the valuation. See the Miscellaneous & Technical Assumptions for additional details.



## ASLCC Supplemental Plan Comparative Statement of Results

Valuation Date	No. Active	Covered Payroll \$ Millions	Average		Accr. Sick Days	\$ Millions		Average Computed Employer Rate
			Age	Service		Assets	UAAL	
2009^	69,964	\$3,950.5	46.1	12.3	86.5	\$ 769.7	\$ 7.2	0.4%
2010^	69,920	3,962.1	46.3	12.3	86.9	782.3	7.2	0.4%
2011	66,533	3,905.5	45.9	11.9	86.2	771.5	7.4	0.4%
2012^	66,846	3,991.4	45.8	11.8	85.2	774.3	7.3	0.5%
2013	68,511	4,234.1	45.8	11.7	86.2	837.7	7.4	0.4%
2014	71,314	4,538.8	45.7	11.6	85.5	887.0	6.5	0.4%
2015^	71,520	4,613.4	45.5	11.4	84.5	919.7	0.1	0.4%
2016	71,587	4,677.2	45.2	11.0	82.0	951.5	0.1	0.4%
2017	71,945	4,781.0	45.0	10.9	80.7	993.3	0.1	0.3%
2018^	71,670	4,948.6	45.0	10.8	80.0	999.0	0.1	0.3%
2019	73,159	5,177.5	44.9	10.7	78.9	1,031.1	0	0.3%

^ Assumption change.

For the year 2000 and subsequent valuations, retiree liabilities were separately calculated for the supplemental plan.



# **ACTUARIAL METHODS AND ASSUMPTIONS**

---

## Actuarial Valuation Method

The actuarial funding method prescribed in the statute for WRS is the **Frozen Initial Liability Actuarial Cost Method**. This funding method is also used for the ASLCC valuation. Under this method, the amount of remaining unfunded actuarial accrued liabilities at any valuation date is affected only by the monthly amortization payments, compound interest, the added liability created by new employer units, and any added liabilities caused by changes in benefit provisions.

Actuarial gains or losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. In this manner, experience gains or losses in any year are amortized (spread) over the average future working lifetime of the active participant group.

## Asset Valuation Method

The asset valuation method used for ASLCC valuations is referred to as the “Market Recognition Account” or MRA. It is a statutory method. The MRA recognizes assumed returns fully each year. Differences between actual and assumed returns are phased-in over a closed 5-year period. The objective is to give recognition to long-term changes in asset values while minimizing the effect of short-term fluctuations in the capital markets. In accordance with its smoothing objective, the MRA will tend to exceed the market value when the markets are doing poorly, and will fall short of the market value when markets are doing well.

# Actuarial Methods and Assumptions Used in Valuations

The principal areas of risk assumption are:

- long-term **rates of investment return** likely to be generated by system assets;
- **rates of mortality** among participants, retirees and beneficiaries;
- **rates of withdrawal** of active participants;
- **rates of disability** among participants;
- **patterns of salary increases** to be experienced by participants;
- the age and service **distribution of actual retirements; and**
- future **rates of sick leave usage** by plan participants.

In an actuarial valuation, the actuary projects the monetary effect of each risk assumption for each distinct experience group, for the next year and for each year over the next half-century or longer.

Once actual risk experience has occurred and been observed, it will not coincide exactly with assumed risk experience, regardless of the skill of the actuary, the completeness of the data, and the precision of the calculations. Each valuation provides a complete recalculation of assumed future risk experience and takes into account all past differences between assumed and actual risk experience. The result is a continual series of small adjustments to the computed contribution rate. From time to time it becomes necessary to adjust the package of risk measurements to reflect basic experience trends -- but not random year to year fluctuations.

The adjusted premiums shown on page 4 were the basis for the development of liabilities for both the base and supplemental programs. An increase of 10% was applied to those premiums to account for secular trend, aging, etc. In addition, premiums were assumed to increase 3.0% in each future year. Because of the nature of this program and the objectives of this report, a more refined development of aging and trend assumptions was not deemed appropriate.

# Annual Actuarial Valuations Assumptions Adopted by ETF Board After Consulting with Actuary

## Economic Assumptions

The rationale for these assumptions is based upon an experience study covering the period 2015-2017.

**The long-term rates of investment return** used in making the valuation was 7.0% a year, compounded yearly.

The **Wage Inflation Rate** assumed in this valuation was 3.00% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that is due to macro-economic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes related to individual merit and seniority effects.

No specific **Price Inflation** assumption is required to perform this valuation. The price inflation assumption used to evaluate the investment return assumption is 2.5%.

**Salary adjustment factors** used to project earnings for each participant between the valuation date and the participant's retirement age are shown below for sample years of service. This assumption is used to project a participant's current earnings to the earnings upon which benefits will be based.

Sick leave extracts were provided for State employees, University and University Hospital units of government. These extracts were then matched to our pension valuation data where assumptions are developed for the groups shown below:

% Merit and Longevity Increase Next Year						
Service	General	Exec. & Elec.	University Teachers	Public School Teachers	Protective	
					With S.S.	W/O S.S.
1	3.5 %	2.5 %	3.0 %	5.6 %	4.8 %	5.5 %
2	3.5 %	2.5 %	3.0 %	5.6 %	4.8 %	5.5 %
3	3.1 %	2.0 %	2.9 %	5.2 %	4.1 %	4.7 %
4	2.8 %	1.6 %	2.8 %	4.7 %	3.5 %	3.8 %
5	2.5 %	1.1 %	2.7 %	4.3 %	2.8 %	3.0 %
10	1.5 %	0.2 %	2.2 %	2.6 %	1.1 %	0.9 %
15	1.1 %	0.2 %	1.7 %	1.4 %	0.8 %	0.5 %
20	0.9 %	0.2 %	1.2 %	0.6 %	0.7 %	0.4 %
25	0.6 %	0.2 %	0.9 %	0.3 %	0.6 %	0.3 %
30	0.4 %	0.2 %	0.7 %	0.2 %	0.5 %	0.2 %

## Decrement Probabilities

The mortality table used was the Wisconsin 2018 Mortality Table adopted by the Board in connection with the 2015-2017 Experience Study. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2018 fully generational improvement scale. In accordance with the experience study's in-depth review of Wisconsin-specific mortality experience, the MP-2018 fully generational improvement scale was multiplied by a 60% factor. This approach will be reviewed in the next experience study covering 2018-2020. Sample retirement values from this table are shown below. This assumption is used to measure the probabilities of participants dying before retirement and the probabilities of each benefit payment being made after retirement.

### Single Life Expectancy Wisconsin 2018 Mortality Table

Sample Attained Ages in 2019	Future Life Expectancy (Years)*	
	Males	Females
40	45.3	48.2
45	40.3	43.1
50	35.3	38.1
55	30.4	33.2
60	25.8	28.4
65	21.3	23.7
70	17.1	19.2
75	13.2	15.0
80	9.7	11.1
85	6.8	7.9

*\* Based on retirements in 2019. Retirements in future years will reflect improvements in life expectancy.*

The values shown above are for non-disabled participants.



## Active Participant Mortality Rates

Sample Attained Ages in 2019	Mortality Rates*	
	Males	Females
20	0.000135	0.000081
25	0.000165	0.000090
30	0.000213	0.000123
35	0.000376	0.000222
40	0.000495	0.000307
45	0.000619	0.000461
50	0.000807	0.000670
55	0.001881	0.001208
60	0.002719	0.001759
65	0.004162	0.002634
70	0.006748	0.004373
75	0.011331	0.007914
80	0.020799	0.014897

*\* Based on mortality improvements to 2019. Future years will reflect improvements in mortality.*

This assumption is used to measure the probability of participants dying while in service.

# Rates of Retirement for Those Eligible to Retire

## Normal Retirement Pattern

Age	General		Exec. & Elected	University		Public School		Protective*	
	Males	Females		Males	Females	Males	Females	With S.S.	W/O S.S.
50								6%	2%
51								8%	4%
52								10%	4%
53								25%	17%
54								20%	23%
55								20%	25%
56								20%	25%
57	19%	17%	8%	12%	15%	33%	27%	20%	25%
58	19%	17%	8%	12%	15%	29%	27%	20%	33%
59	19%	17%	8%	12%	10%	24%	27%	20%	33%
60	19%	17%	20%	12%	12%	25%	27%	20%	20%
61	19%	17%	12%	12%	16%	25%	27%	20%	20%
62	26%	27%	12%	12%	15%	35%	37%	30%	40%
63	29%	27%	12%	12%	20%	32%	30%	30%	40%
64	28%	27%	15%	12%	20%	29%	28%	30%	40%
65	30%	30%	15%	15%	20%	29%	37%	40%	40%
66	35%	35%	15%	20%	24%	35%	39%	40%	100%
67	30%	30%	15%	20%	20%	33%	33%	40%	100%
68	19%	25%	15%	18%	17%	27%	30%	40%	100%
69	19%	25%	20%	16%	17%	23%	28%	40%	100%
70	19%	25%	20%	20%	18%	25%	38%	100%	100%
71	19%	20%	20%	18%	18%	20%	20%	100%	100%
72	19%	20%	20%	16%	18%	15%	20%	100%	100%
73	19%	20%	20%	16%	15%	15%	20%	100%	100%
74	19%	20%	20%	16%	15%	15%	20%	100%	100%
75	100%	100%	100%	100%	100%	100%	100%	100%	100%

\* Includes reduced retirements.

## Reduced Retirement Pattern

Age	% Retiring Next Year						
	General		Exec. & Elected	University		Public School	
	Males	Females		Males	Females	Males	Females
55	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
56	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
57	4.8%	5.5%	3.0%	3.0%	5.0%	12.0%	12.0%
58	5.7%	6.5%	3.0%	3.0%	5.0%	13.0%	12.0%
59	6.8%	7.0%	3.0%	4.0%	5.0%	14.0%	13.0%
60	8.5%	9.5%	5.0%	5.5%	9.0%	14.0%	17.0%
61	9.0%	9.5%	5.0%	5.5%	9.0%	15.0%	17.0%
62	17.0%	16.0%		7.4%	12.0%	21.0%	23.0%
63	18.0%	18.0%		7.4%	12.0%	21.0%	23.0%
64	17.0%	18.0%		10.0%	15.0%	21.0%	23.0%

The assumed rates of separation from employment prior to service retirement due to disability and other causes are shown below for sample ages. For other terminations it was assumed that a percentage, depending on age of participants terminating after age 35 with 5 or more years of service, will leave their contributions on deposit and be paid a benefit at normal retirement age and that the remaining participants would take a separation benefit. The percentage taking a separation benefit is 25% at age 35, grading downward to 0% at retirement eligibility. All participants terminating prior to normal retirement age with less than 5 years of service were assumed to take a separation benefit.

### Assumed Termination Rates by Attained Age and Years of Service

Age	Service	% of Active Participants Terminating								
		General		Exec. & Elected	University		Public Schools		Protective	
		Males	Females		Males	Females	Males	Females	With Soc. Sec.	Without Soc. Sec.
	0	17.0%	20.0%	14.0%	16.0%	14.5%	18.5%	15.0%	16.0%	4.0%
	1	12.3%	15.0%	13.0%	15.0%	14.0%	11.0%	11.0%	9.5%	3.5%
	2	9.3%	11.5%	12.0%	13.0%	13.0%	8.0%	8.0%	6.0%	1.5%
	3	7.6%	10.0%	10.0%	11.0%	10.0%	6.5%	6.0%	5.0%	1.3%
	4	7.5%	9.5%	10.0%	9.0%	9.5%	5.5%	5.5%	4.5%	1.2%
	5	5.8%	7.8%	5.0%	8.0%	9.0%	4.0%	5.0%	4.0%	1.1%
	6	4.8%	7.0%	5.0%	7.5%	7.0%	3.5%	4.0%	3.8%	1.0%
	7	4.7%	6.0%	5.0%	6.0%	6.0%	3.2%	3.7%	3.5%	0.9%
	8	4.1%	5.7%	5.0%	5.5%	5.0%	3.0%	3.3%	3.0%	0.8%
	9	4.0%	5.3%	5.0%	5.0%	4.0%	2.8%	3.0%	2.5%	0.7%
25	10 & Over	4.0%	5.0%	5.0%	5.0%	4.0%	2.5%	2.5%	2.5%	0.7%
30		3.7%	4.7%	5.0%	4.7%	4.0%	2.2%	2.4%	2.3%	0.7%
35		3.0%	3.9%	5.0%	4.2%	4.0%	1.8%	1.9%	2.0%	0.7%
40		2.4%	3.2%	5.0%	3.4%	3.7%	1.5%	1.5%	1.6%	0.6%
45		2.0%	2.7%	4.7%	2.7%	3.2%	1.4%	1.3%	1.4%	0.6%
50		1.7%	2.2%	4.2%	2.2%	2.7%	1.3%	1.2%	1.2%	0.5%
55		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%
60		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%

### Disability Rates

Age	% of Active Participants Becoming Disabled									
	General		Exec. & Elected		University		Public Schools		Protective	
	Males	Females	Males	Females	Males	Females	Males	Females	With SS	W/O SS
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
30	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
35	0.01%	0.02%	0.01%	0.01%	0.00%	0.02%	0.00%	0.01%	0.01%	0.03%
40	0.02%	0.03%	0.01%	0.01%	0.00%	0.02%	0.01%	0.01%	0.02%	0.04%
45	0.04%	0.04%	0.01%	0.01%	0.01%	0.02%	0.02%	0.04%	0.02%	0.08%
50	0.09%	0.06%	0.02%	0.02%	0.01%	0.04%	0.06%	0.07%	0.04%	0.46%
55	0.17%	0.12%	0.09%	0.09%	0.04%	0.06%	0.12%	0.10%	0.61%	0.34%
60	0.30%	0.16%	0.11%	0.11%	0.06%	0.09%	0.19%	0.15%	1.02%	0.10%

## Miscellaneous & Technical Assumptions

<b>Active Member Data:</b>	For purposes of determining eligibility for the accrued sick leave conversion credit programs, the active member data provided for the sick leave valuation was compared against the data provided for the active lives valuation. Only members with a corresponding record in the active lives data were included in the sick leave valuation. For each member, date of birth, gender and service credit were used as provided in the active lives data. Pay rate and sick leave specific information (sick leave balance, accrual rate, average usage) were used as provided in the sick leave data extract for purposes of calculating active member sick leave credits at retirement.
<b>Decrement Operation:</b>	Disability operates during the retirement pattern.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and total service (in all benefit groups) nearest whole year on the date the decrement is assumed to occur.
<b>Escrowed Liabilities:</b>	The actuarial accrued liability for annuitants with a sick leave account balance and a \$0 premium provided in the data was calculated by taking the balance on deposit for these annuitants multiplied by the ratio of the present value of future benefits for active status annuitants to the balance on deposit for active status annuitants multiplied by fifty percent. This methodology was utilized for both the base and supplemental program escrowed liabilities.
<b>Liability Adjustments:</b>	Active liabilities were loaded by 4% to account for general unknowns, including but not limited to, potential missing data, the possibility of continuation to a spouse after death of the retiree, etc. Supplemental plan retiree and deferred liabilities were loaded by 3% to account for potential continuation to a spouse after death of the retiree and other unknowns.
<b>Terminated Vested Members Usage:</b>	For purposes of developing the present value of future benefits for terminated vested members, it was assumed that 100% of the members would begin using their sick leave credits to cover health care costs immediately upon reaching eligibility to do so.