

Wisconsin Retirement System

GASB Statement No. 67 Plan Reporting and
Accounting Schedules

December 31, 2020



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August 23, 2021

Employee Trust Funds Board
Wisconsin Department of Employee Trust Funds
4822 Madison Yards Way
Madison, WI 53705-9100

This report provides certain information requested by the Wisconsin Retirement System (“WRS”) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 “Accounting and Financial Reporting for Pension Plans.”

The actuarial calculations in connection with this report were prepared for the purpose of complying with the requirements of GASB Statement No. 67. These calculations have been made on a basis that is consistent with our understanding of this Statement.

The calculation of the plan’s liability for this report is not applicable for funding purposes of the plan. A calculation of the plan’s liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. This report may be provided to parties other than the WRS only in its entirety and only with the permission of the WRS. GRS is not responsible for unauthorized use of this report.

The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of any data provided by DETF.

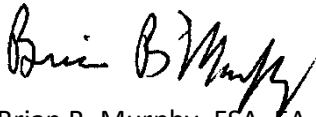
This report complements the actuarial valuation report that we provided to the Board and should be considered in conjunction with that report. Please see the actuarial valuation report as of December 31, 2020 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

This report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor’s review. Please let us know if the plan’s auditor recommends any changes.

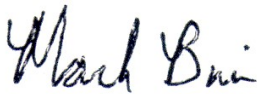
This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the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

To the best of our knowledge, the information contained in this report is accurate, and fairly represents the actuarial position of WRS. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board. 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 Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

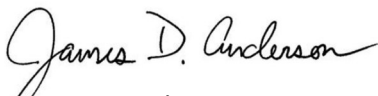
Respectfully submitted,



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



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BBM/MB/JDA:rmn



SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2020

	2020
Actuarial Valuation Date	December 31, 2020
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	December 31, 2020
 Membership	
Number of	
- Retirees and Beneficiaries	222,723
- Inactive, Nonretired Members	169,166
- Active Members	258,338
- Total	650,227
Covered Payroll ⁽¹⁾	\$ 15,359,928,023
 Net Pension Liability/(Asset)	
Total Pension Liability	\$ 119,448,382,025
Plan Fiduciary Net Position	124,966,393,931
Net Pension Liability/(Asset)	\$ (5,518,011,906)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability/(Asset)	104.62%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	-35.92%
 Development of the Single Discount Rate	
Single Discount Rate	7.00%
Long-Term Expected Rate of Return	7.00%
Long-Term Municipal Bond Rate ⁽²⁾	2.00%
Last year ending December 31 in the 2021 to 2120 projection period for which projected benefit payments are fully funded	2120

⁽¹⁾ Covered Payroll is for 2020 and was provided by DETF.

⁽²⁾ Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-year Municipal GO AA Index" as of December 31, 2020. In describing this index, Fidelity notes that the Municipal Curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities. The municipal bond rate is used as the discount rate in years where assets are not projected to be sufficient to meet benefit payments.

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, “Financial Reporting for Pension Plans,” replaces the requirements of GASB Statement No. 25, “Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans,” and GASB Statement No. 50, “Pension Disclosures.” GASB Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability of employers and non-employer contributing entities for benefits provided through the pension plan.

The following discussion provides a summary of the information that is required to be disclosed under this accounting standard. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report, and your internal staff will be responsible for preparing that information to comply with this accounting standard.

Financial Statements

GASB Statement No. 67 requires defined benefit pension plans to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position.

The *statement of fiduciary net position* presents the following items as of the end of the pension plan’s reporting period, such as:

- assets;
- deferred inflows and outflows of resources;
- liabilities; and
- fiduciary net position (assets, plus deferred outflows, minus liabilities, minus deferred inflows).

The *statement of changes in fiduciary net position* presents the following for the plan’s reporting period:

- additions, such as contributions and investment income;
- deductions, such as benefit payments and expenses; and
- net increase or decrease in the fiduciary net position (the difference between additions and deductions).

Notes to Financial Statements

GASB Statement No. 67 also requires the notes of the plan's financial statements to include additional disclosure information. This disclosure information should include:

- a description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs;
- the number and classes of employees covered by the benefit terms;
- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- a description of how fair value is determined;
- concentrations of investments greater than or equal to 5%;
- annual money-weighted rate of return on pension plan investments;
- the portion of the present value of benefits to be provided through the pension plan to current active and inactive plan members;
- the pension plan's fiduciary net position;
- the net pension liability/(asset);
- the pension plan's fiduciary net position as a percentage of the total pension liability;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability/(asset);
- information about the components of the net pension liability/(asset) and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability/(asset) as a percent of covered-employee payroll;
- comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy; and
- the annual money-weighted rate of return on pension plan investments for each year.

These tables may be built prospectively.

Measurement of the Net Pension Liability/(Asset)

The net pension liability/(asset) is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.0% on the actuarial value of assets), it is expected that:

1. The employer normal cost as a percentage of pay will decrease to the level of the future service normal cost as time passes.
2. The unfunded liability is expected to decrease in dollar amount until it is fully funded.
3. The funded status of the plan will remain very close to a 100% funded ratio.

This funding policy results in the expectation that the plan's assets will be able to fully pay for promised benefits through at least 2120. The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the total pension liability and the market value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the actuarial value of assets were used instead of the market value of assets.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. If the actuarial valuation is not calculated as of the plan's fiscal year end, the total pension liability is required to be rolled forward from the actuarial valuation date to the pension plan's fiscal year end.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2020 and a measurement date of December 31, 2020.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 2.00% (based on the weekly rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting single discount rate is 7.00%.

Actuarial Assumptions and Methods and Member Census Data

The asset values used in this study are taken from the December 31, 2020 actuarial valuation Report of the Wisconsin Retirement System. Therefore, the actuarial assumptions and methods employed for purposes of our Actuarial Study are the same actuarial assumptions and methods shown in the actuarial valuation report.

The member census data employed for purposes of our Actuarial Study was provided by DETF and is the same member census data used for the December 31, 2020 Actuarial Valuation Report of the Retirement System.

The Wisconsin Retirement System uses the Frozen Entry Age cost method for determining funding requirements. GASB Statement No. 67 requires the use of the Entry Age Normal cost method for accounting purposes. Therefore, we developed the Entry Age Normal Accrued Liability to reflect the Total Pension Liability for GASB purposes.

SECTION B

FINANCIAL STATEMENTS

Statement of Fiduciary Net Position as of December 31, 2020

	2020
Assets	
Cash and Deposits	\$ 7,226,289,550
Receivables	
Accounts Receivable - Sale of Investments	\$ 11,232,245,127
Accrued Interest and Other Dividends	387,888,898
Contributions	221,373,939
Accounts Receivable - Other	8,427,338
Total Receivables	\$ 11,849,935,302
Investments	
Fixed Income	\$ 42,385,338,174
Domestic and International Equities	72,347,224,214
Real Estate	1,379,939,201
Other	22,929,334,715
Total Investments	\$ 139,041,836,304
Total Assets	\$ 158,118,061,156
Liabilities	
Payables	
Accounts Payable - Purchase of Investments	\$ 32,590,359,109
Accrued Expenses	3,499,461
Accounts Payable - Other	557,808,655
Total Liabilities	\$ 33,151,667,225
Net Position Restricted for Pensions	\$ 124,966,393,931

Statement of Changes in Fiduciary Net Position for Year Ended December 31, 2020

	2020
Additions	
Contributions	
Employer	\$ 1,133,315,516
Employee	1,053,242,596
Other	-
Total Contributions	\$ 2,186,558,112
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 15,336,140,040
Interest and Dividends	2,106,774,299
Less Investment Expense	(744,357,571)
Net Investment Income	\$ 16,698,556,768
Other	\$ -
Total Additions	\$ 18,885,114,880
 Deductions	
Benefit payments, including refunds of employee contributions	\$ 5,978,223,363
Pension Plan Administrative Expense	33,256,008
Other Benefit Expenses	-
Total Deductions	\$ 6,011,479,371
Net Increase in Net Position	\$ 12,873,635,509
 Net Position Restricted for Pensions	
Beginning of Year	\$ 112,092,758,422
End of Year	\$ 124,966,393,931

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedules of Required Supplementary Information

Multiyear Schedule of Changes in Net Pension Liability/(Asset) and Related Ratios

Last 10 Fiscal Years (which may be built prospectively)

Fiscal year ending December 31,	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total Pension Liability										
Service Cost	\$ 1,975,773,133	\$ 1,902,507,977	\$ 1,860,937,125	\$ 1,842,879,321	\$ 1,814,134,799	\$ 1,787,870,316	\$ 1,757,020,910	\$ 1,745,048,505		
Interest on the Total Pension Liability	7,552,358,592	6,846,131,206	7,194,603,494	6,604,529,732	6,363,034,249	6,349,703,745	6,089,287,273	5,680,664,977		
Benefit Changes										
Experience ⁽¹⁾	6,006,411,525	7,137,987,427	(5,980,346,708)	5,142,055,157	318,473,379	(4,488,825,613)	473,101,546	2,659,920,220		
Assumption Changes	-	-	404,242,989	-	-	1,484,977,863	-	-		
Benefit Payments	(5,939,365,686)	(5,646,263,647)	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)		
Refunds	(38,857,677)	(44,106,052)	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)		
Net Change in Total Pension Liability	9,556,319,887	10,196,256,911	(2,076,986,386)	8,339,839,123	3,433,445,998	272,497,394	3,744,760,674	5,827,662,298		
Total Pension Liability - Beginning	109,892,062,138	99,695,805,227	101,772,791,613	93,432,952,490	89,999,506,492	89,727,009,098	85,982,248,424	80,154,586,126		
Total Pension Liability - Ending (a)⁽²⁾	\$ 119,448,382,025	\$ 109,892,062,138	\$ 99,695,805,227	\$ 101,772,791,613	\$ 93,432,952,490	\$ 89,999,506,492	\$ 89,727,009,098	\$ 85,982,248,424		
Plan Fiduciary Net Position										
Employer Contributions ⁽³⁾	\$ 1,133,315,516	\$ 1,046,942,283	\$ 1,030,507,544	\$ 1,017,558,990	\$ 963,121,911	\$ 977,733,921	\$ 987,792,834	\$ 914,698,118		
Employee Contributions	1,053,242,596	987,662,027	972,950,131	965,452,633	921,863,806	937,225,184	941,903,267	871,259,789		
Pension Plan Net Investment Income	16,698,556,768	19,049,541,932	(4,049,354,577)	14,875,414,636	7,273,069,087	(673,122,812)	4,891,014,826	11,347,296,075		
Benefit Payments	(5,939,365,686)	(5,646,263,647)	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)		
Refunds	(38,857,677)	(44,106,052)	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)		
Pension Plan Administrative Expense	(33,256,008)	(34,197,722)	(31,612,198)	(26,132,873)	(20,426,189)	(22,708,614)	(24,036,951)	(22,857,502)		
Other	-	(3,901,654)	(25,448,686)	-	-	-	-	-		
Net Change in Plan Fiduciary Net Position	12,873,635,509	15,355,677,167	(7,659,381,072)	11,582,668,299	4,075,432,186	(3,642,101,238)	2,222,024,921	8,852,425,076		
Plan Fiduciary Net Position - Beginning⁽⁴⁾	112,092,758,422	96,737,081,255	104,396,462,327	92,813,794,028	88,504,670,309	92,146,771,547	89,924,746,626	81,072,321,550		
Plan Fiduciary Net Position - Ending (b)	\$ 124,966,393,931	\$ 112,092,758,422	\$ 96,737,081,255	\$ 104,396,462,327	\$ 92,580,102,495	\$ 88,504,670,309	\$ 92,146,771,547	\$ 89,924,746,626		
Net Pension Liability/(Asset) - Ending (a) - (b)	(5,518,011,906)	(2,200,696,284)	2,958,723,972	(2,623,670,714)	852,849,995	1,494,836,183	(2,419,762,449)	(3,942,498,202)		
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	104.62 %	102.00 %	97.03 %	102.58 %	99.09 %	98.34 %	102.70 %	104.59 %		
Covered-Employee Payroll⁽⁵⁾	\$ 15,359,928,023	\$ 14,832,491,878	\$ 14,301,446,269	\$ 13,943,116,649	\$ 13,706,000,000	\$ 13,530,500,000	\$ 13,219,500,000	\$ 12,884,800,000		
Net Pension Liability/(Asset) as a Percentage of Covered-Employee Payroll	(35.92)%	(14.84)%	20.69 %	(18.82)%	6.22 %	11.05 %	(18.30)%	(30.60)%		

Notes to Schedule:

- ⁽¹⁾ Starting with 2015, this item includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments. See page 23 for a full description.
- ⁽²⁾ In 2017, end of year liabilities were adjusted to reflect the Long Term Disability Insurance (LTDI) program.
- ⁽³⁾ Employer contributions shown in the above table includes Employer Required Contributions in addition to contributions paid by specific employers for unique circumstances such as Prior Service Contributions, Early Retirement Contributions, and Employer Additional Contributions.
- ⁽⁴⁾ As of calendar year 2017, the LTDI program is reported within the Wisconsin Retirement System (WRS). Accordingly, there is an adjustment to the calendar year 2017 beginning net position of \$233,691,533 to reflect LTDI assets.
- ⁽⁵⁾ Covered payroll provided by DETF.



Schedules of Required Supplementary Information

Multiyear Schedule of the Net Pension Liability/(Asset)

Last 10 Fiscal Years (which may be built prospectively)

FY Ending December 31,	Total Pension Liability	Plan Net Position	Net Pension Liability/(Asset)	Plan Net Position as a % of Total Pension Liability	Covered Payroll ⁽¹⁾	Net Pension Liability/(Asset) as a % of Covered Payroll
2011						
2012						
2013	\$ 85,982,248,424	\$ 89,924,746,626	\$ (3,942,498,202)	104.59%	\$ 12,884,800,000	(30.60)%
2014	89,727,009,098	92,146,771,547	(2,419,762,449)	102.70%	13,219,500,000	(18.30)%
2015	89,999,506,492	88,504,670,309	1,494,836,183	98.34%	13,530,500,000	11.05 %
2016	93,432,952,490	92,580,102,495	852,849,995	99.09%	13,706,000,000	6.22 %
2017	101,772,791,613	104,396,462,327	(2,623,670,714)	102.58%	13,943,116,649	(18.82)%
2018	99,695,805,227	96,737,081,255	2,958,723,972	97.03%	14,301,446,269	20.69 %
2019	109,892,062,138	112,092,758,422	(2,200,696,284)	102.00%	14,832,491,878	(14.84)%
2020	119,448,382,025	124,966,393,931	(5,518,011,906)	104.62%	15,359,928,023	(35.92)%

⁽¹⁾ Covered payroll provided by DETF.

Multiyear Schedule of Contributions

Last 10 Fiscal Years (which may be built prospectively)

FY Ending December 31,	Actuarially Determined Contribution ^{(1),(2)}	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll ⁽³⁾	Actual Contribution as a % of Covered Payroll
2011					
2012					
2013	\$ 905,148,514	\$ 905,148,514	-	\$ 12,884,800,000	7.02%
2014	977,068,988	977,068,988	-	13,219,500,000	7.39%
2015	967,730,052	967,730,052	-	13,530,500,000	7.15%
2016	954,159,009	954,159,009	-	13,706,000,000	6.96%
2017	1,014,870,679	1,014,870,679	-	13,943,116,649	7.28%
2018	1,028,390,526	1,028,390,526	-	14,301,446,269	7.19%
2019	1,044,964,610	1,044,964,610	-	14,832,491,878	7.05%
2020	1,131,486,002	1,131,486,002	-	15,359,928,023	7.37%

⁽¹⁾ Since it is the actuary's understanding that the System's practice is to require employers to contribute the percent-of-payroll employer contribution rate shown in the actuarial valuation report, the Actuarially Determined Contributions shown in the Schedule of Contributions are the actual contributions made by the participating employers in the fiscal year.

⁽²⁾ Starting with 2016, Actuarially Determined Contributions includes Employer Required Contributions, paid by each employer based on a percentage of payroll. This amount excludes contributions paid by specific employers for unique circumstances such as Prior Service Contributions, Early Retirement Contributions, and Employer Additional Contributions.

⁽³⁾ Covered payroll provided by DETF.

Notes to Schedule of Contributions

Valuation Date: December 31, 2018

Methods and Assumptions used to Determine Actuarial Contribution on prior page:

Actuarial Cost Method	Frozen Entry Age
Amortization Method	Level Percentage of Payroll - Closed Amortization Period
Amortization Period	30-Year closed from date of participation in WRS
Asset Valuation Method	5-Year smoothed value
Inflation	2.0% to 2.5% -- approximate; No explicit price inflation assumption is used in this valuation.
Salary Increases	3.1% to 8.6% including inflation
Net Investment Rate of Return	5.40%
Weighted based on assumed rate for:	
Retired participants	5.00%
Active participants	
Post-retirement participants	5.00%
Pre-retirement participants	7.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2018 valuation pursuant to an experience study of the period 2015 - 2017.
Mortality	Wisconsin 2018 Mortality Table adjusted for future mortality improvements using the MP-2018 fully generational improvement scale (multiplied by 60%).

Other Information:

Notes The actuarially determined contribution for calendar 2020 was determined from the December 31, 2018 actuarial valuation.

Multiyear Schedule of Investment Returns

Last 10 Fiscal Years (which may be built prospectively)

<u>FY Ending December 31,</u>	<u>Core Annual Return¹</u>	<u>Variable Annual Return¹</u>
2011	1.25 %	(3.02)%
2012	13.40 %	16.94 %
2013	13.18 %	28.78 %
2014	5.44 %	7.24 %
2015	(0.63)%	(1.11)%
2016	8.29 %	10.49 %
2017	15.85 %	23.27 %
2018	(3.56)%	(7.61)%
2019	19.49 %	28.80 %
2020	15.06 %	17.05 %

¹ Annual money-weighted rate of return, net of investment expenses.

The money weighted rate of return expresses investment performance net of pension plan investment expense, adjusted for the changing amounts actually invested.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The long-term expected rate of return is reviewed every three years in conjunction with the WRS experience study. For each major asset class that is included in the pension plan's target asset allocation as of December 31, 2020, these best estimates of geometric real rates of return were provided by DETF and are summarized in the following tables:

Core Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
Equities	51.00%	4.70%
Fixed Income	25.00%	0.80%
Inflation Sens. Assets	16.00%	-0.40%
Real Estate	8.00%	3.10%
Private Equity/Debt	11.00%	7.60%
Multi-asset	4.00%	3.30%
Cash	-15.00%	0.90%
Total	100.00%	

Variable Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
Domestic Equity	70.00%	4.10%
International Equity	30.00%	4.90%
Fixed Income	N/A	N/A
Inflation Sens. Assets	N/A	N/A
Real Estate	N/A	N/A
Private Equity/Debt	N/A	N/A
Multi-asset	N/A	N/A
Cash	N/A	N/A
Total	100.00%	

Single Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00% and a long-term bond rate of 2.00%. Because of the unique structure of WRS, the 7.00% expected rate of return implies that a dividend of approximately 1.9% will always be paid. For purposes of the single discount rate, it was assumed that the dividend would always be paid. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments (including expected dividends) of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability/(asset) to changes in the single discount rate, the following presents the plan's net pension liability/(asset), calculated using a single discount rate of 7.00%, as well as what the plan's net pension liability/(asset) would be if it were calculated using a single discount rate that is 100 basis points lower or 100 basis points higher:

Sensitivity of Net Pension Liability/(Asset) to the Single Discount Rate Assumption

Discount Rate	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Ultimate Dividend Rate	6.00%	7.00%	8.00%
	1.90%	1.90%	1.90%
Total Pension Liability	\$ 131,822,096,544	\$ 119,448,382,025	\$ 110,366,442,730
Plan Fiduciary Net Position	124,966,393,931	124,966,393,931	124,966,393,931
Net Pension Liability/(Asset)	\$ 6,855,702,613	\$ (5,518,011,906)	\$ (14,599,951,201)

This schedule is presented because it is required by GASB standards. Users of this report should not conclude that the authors view the upper end of the range as reasonable.

For the WRS, the determination of liabilities also depends on the assumed dividend which is linked to the interest rate used in the liability calculation. Therefore, we have also shown an alternative set of Sensitivity Analysis which varies the assumed dividend in conjunction with the change in the discount rate. For the liabilities shown below, the assumed dividend was 1.00% for the 6.0% discount rate, 1.90% for the 7.0% discount rate, and 2.90% for the 8.0% discount rate.

Sensitivity of Net Pension Liability/(Asset) to the Single Discount Rate Assumption

	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Discount Rate	6.00%	7.00%	8.00%
Ultimate Dividend Rate	1.00%	1.90%	2.90%
Total Pension Liability	\$ 124,383,140,512	\$ 119,448,382,025	\$ 115,785,343,996
Plan Fiduciary Net Position	124,966,393,931	124,966,393,931	124,966,393,931
Net Pension Liability/(Asset)	\$ (583,253,419)	\$ (5,518,011,906)	\$ (9,181,049,935)

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	222,723
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	169,166
Active Plan Members	<u>258,338</u>
Total Plan Members	650,227

SECTION E

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Bond Buyer Index) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 2.00%; and the resulting single discount rate is 7.00%.

The tables in this section provide background for the development of the single discount rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities). The contribution rate for the first year was developed from the 2019 actuarial valuations (14.20%). Expected contribution rates gradually decrease as the unrecognized asset gains from the Market Recognition Account are phased-in over the next 5 years. The expected contribution rate then remains level for 20 years and is assumed to migrate to the ultimate contribution rate of 13.24% once the Experience Amortization Reserve (EAR) component is paid down.

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

The WRS funding policy as it affects the closed group cannot be modelled with 100% accuracy. In reality, assets that appear to be left over after all benefit obligations are satisfied would be assigned to the funding benefits of people who enter the plan after the measurement date.

Single Discount Rate Development

Projection of Contributions Ending December 31, 2120

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 15,065,614,071				
1	15,013,557,739	\$ 1,010,532,544	\$ 1,121,392,655	\$ -	\$ 2,131,925,199
2	14,520,021,946	942,901,185	1,046,341,822	-	1,989,243,007
3	14,083,336,292	861,808,948	956,353,389	-	1,818,162,337
4	13,665,330,152	808,015,706	896,658,779	-	1,704,674,485
5	13,255,367,250	729,087,472	809,071,752	-	1,538,159,224
6	12,852,197,645	683,998,776	759,036,616	-	1,443,035,392
7	12,455,970,325	662,911,409	735,635,868	-	1,398,547,277
8	12,065,027,498	642,105,285	712,547,216	-	1,354,652,501
9	11,676,713,241	621,439,055	689,613,804	-	1,311,052,859
10	11,289,254,698	600,818,366	666,730,930	-	1,267,549,296
11	10,899,855,423	580,094,391	643,733,438	-	1,223,827,829
12	10,503,172,793	558,982,793	620,305,799	-	1,179,288,592
13	10,098,441,718	537,442,853	596,402,829	-	1,133,845,682
14	9,686,609,992	515,525,014	572,080,501	-	1,087,605,515
15	9,265,137,004	493,094,064	547,188,771	-	1,040,282,835
16	8,834,678,413	470,184,896	521,766,362	-	991,951,258
17	8,396,349,835	446,856,885	495,879,159	-	942,736,044
18	7,950,757,075	423,142,271	469,562,943	-	892,705,214
19	7,499,634,589	399,133,364	442,920,146	-	842,053,510
20	7,045,042,128	374,939,782	416,072,417	-	791,012,199
21	6,587,630,815	350,596,181	389,058,209	-	739,654,390
22	6,125,622,095	326,007,904	361,772,484	-	687,780,388
23	5,656,559,239	301,044,203	334,070,149	-	635,114,352
24	5,180,113,689	275,687,592	305,931,800	-	581,619,392
25	4,700,103,295	250,141,259	277,582,916	-	527,724,175
26	4,221,027,182	264,901,536	293,962,463	-	558,863,999
27	3,746,547,004	235,124,298	260,918,525	-	496,042,823
28	3,281,144,208	205,916,736	228,506,757	-	434,423,493
29	2,829,000,450	177,541,279	197,018,381	-	374,559,660
30	2,396,649,297	150,407,958	166,908,409	-	317,316,367
31	1,996,299,919	125,282,992	139,027,117	-	264,310,109
32	1,635,869,215	102,663,226	113,925,858	-	216,589,084
33	1,318,297,763	82,733,204	91,809,420	-	174,542,624
34	1,046,345,490	65,666,132	72,870,011	-	138,536,143
35	819,958,564	51,458,632	57,103,882	-	108,562,514
36	635,644,999	39,891,555	44,267,843	-	84,159,398
37	487,333,534	30,583,883	33,939,077	-	64,522,960
38	369,277,456	23,174,967	25,717,368	-	48,892,335
39	276,448,860	17,349,267	19,252,562	-	36,601,829
40	204,481,298	12,832,756	14,240,568	-	27,073,324
41	149,744,123	9,397,582	10,428,540	-	19,826,122
42	108,557,419	6,812,803	7,560,199	-	14,373,002
43	77,869,365	4,886,894	5,423,010	-	10,309,904
44	55,675,365	3,494,052	3,877,366	-	7,371,418
45	39,669,154	2,489,541	2,762,655	-	5,252,196
46	28,036,239	1,759,487	1,952,511	-	3,711,998
47	19,645,111	1,232,880	1,368,133	-	2,601,013
48	13,450,200	844,102	936,704	-	1,780,806
49	8,880,290	557,306	618,444	-	1,175,750
50	5,569,332	349,518	387,862	-	737,380



Single Discount Rate Development

Projection of Contributions Ending December 31, 2120

(Concluded)

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
51	\$ 3,225,767	\$ 202,442	\$ 224,650	\$ -	\$ 427,092
52	1,641,658	103,027	114,329	-	217,356
53	747,501	46,911	52,058	-	98,969
54	345,874	21,706	24,088	-	45,794
55	159,351	10,000	11,098	-	21,098
56	58,656	3,681	4,085	-	7,766
57	13,596	853	947	-	1,800
58	867	55	60	-	115
59	271	17	19	-	36
60	-	-	-	-	-
61	-	-	-	-	-
62	-	-	-	-	-
63	-	-	-	-	-
64	-	-	-	-	-
65	-	-	-	-	-
66	-	-	-	-	-
67	-	-	-	-	-
68	-	-	-	-	-
69	-	-	-	-	-
70	-	-	-	-	-
71	-	-	-	-	-
72	-	-	-	-	-
73	-	-	-	-	-
74	-	-	-	-	-
75	-	-	-	-	-
76	-	-	-	-	-
77	-	-	-	-	-
78	-	-	-	-	-
79	-	-	-	-	-
80	-	-	-	-	-
81	-	-	-	-	-
82	-	-	-	-	-
83	-	-	-	-	-
84	-	-	-	-	-
85	-	-	-	-	-
86	-	-	-	-	-
87	-	-	-	-	-
88	-	-	-	-	-
89	-	-	-	-	-
90	-	-	-	-	-
91	-	-	-	-	-
92	-	-	-	-	-
93	-	-	-	-	-
94	-	-	-	-	-
95	-	-	-	-	-
96	-	-	-	-	-
97	-	-	-	-	-
98	-	-	-	-	-
99	-	-	-	-	-
100	-	-	-	-	-



Single Discount Rate Development

Projection of Plan Fiduciary Net Position Ending December 31, 2120

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
1	\$ 124,966,393,931	\$ 2,131,925,199	\$ 6,485,579,483	\$ 8,597,846,850	\$ 129,210,586,497
2	129,210,586,497	1,989,243,007	6,869,342,431	8,876,826,383	133,207,313,456
3	133,207,313,456	1,818,162,337	7,181,602,101	9,139,966,474	136,983,840,167
4	136,983,840,167	1,704,674,485	7,603,221,509	9,385,911,350	140,471,204,493
5	140,471,204,493	1,538,159,224	7,937,880,447	9,612,782,430	143,684,265,700
6	143,684,265,700	1,443,035,392	8,198,375,294	9,825,460,571	146,754,386,369
7	146,754,386,369	1,398,547,277	8,455,619,485	10,029,987,000	149,727,301,161
8	149,727,301,161	1,354,652,501	8,722,072,885	10,227,412,562	152,587,293,339
9	152,587,293,339	1,311,052,859	8,987,855,084	10,416,966,791	155,327,457,904
10	155,327,457,904	1,267,549,296	9,252,200,149	10,598,185,841	157,940,992,892
11	157,940,992,892	1,223,827,829	9,519,836,587	10,770,420,074	160,415,404,208
12	160,415,404,208	1,179,288,592	9,786,854,189	10,932,908,805	162,740,747,416
13	162,740,747,416	1,133,845,682	10,044,926,444	11,085,239,467	164,914,906,121
14	164,914,906,121	1,087,605,515	10,293,466,077	11,227,287,780	166,936,333,338
15	166,936,333,338	1,040,282,835	10,532,073,058	11,358,949,405	168,803,492,520
16	168,803,492,520	991,951,258	10,769,895,623	11,479,804,544	170,505,352,698
17	170,505,352,698	942,736,044	10,998,071,857	11,589,390,259	172,039,407,144
18	172,039,407,144	892,705,214	11,210,462,266	11,687,744,669	173,409,394,761
19	173,409,394,761	842,053,510	11,412,846,067	11,774,937,345	174,613,539,549
20	174,613,539,549	791,012,199	11,605,033,830	11,850,858,444	175,650,376,362
21	175,650,376,362	739,654,390	11,784,313,638	11,915,501,232	176,521,218,347
22	176,521,218,347	687,780,388	11,955,612,710	11,968,781,222	177,222,167,247
23	177,222,167,247	635,114,352	12,118,706,733	12,010,423,764	177,748,998,629
24	177,748,998,629	581,619,392	12,274,172,899	12,040,112,017	178,096,557,140
25	178,096,557,140	527,724,175	12,423,881,263	12,057,435,512	178,257,835,563
26	178,257,835,563	558,863,999	12,565,908,797	12,064,909,572	178,315,700,338
27	178,315,700,338	496,042,823	12,698,447,933	12,062,238,141	178,175,533,368
28	178,175,533,368	434,423,493	12,816,993,645	12,046,227,326	177,839,190,543
29	177,839,190,543	374,559,660	12,921,189,217	12,017,038,365	177,309,599,351
30	177,309,599,351	317,316,367	13,012,104,744	11,974,869,127	176,589,680,100
31	176,589,680,100	264,310,109	13,079,859,964	11,920,319,613	175,694,449,858
32	175,694,449,858	216,589,084	13,119,513,246	11,854,647,117	174,646,172,813
33	174,646,172,813	174,542,624	13,128,668,123	11,779,505,986	173,471,553,300
34	173,471,553,300	138,536,143	13,101,555,187	11,696,976,611	172,205,510,867
35	172,205,510,867	108,562,514	13,038,006,394	11,609,508,896	170,885,575,883
36	170,885,575,883	84,159,398	12,938,339,863	11,519,703,114	169,551,098,532
37	169,551,098,532	64,522,960	12,803,771,207	11,430,244,292	168,242,094,578
38	168,242,094,578	48,892,335	12,637,706,985	11,343,790,141	166,997,070,069
39	166,997,070,069	36,601,829	12,442,147,701	11,262,944,346	165,854,468,542
40	165,854,468,542	27,073,324	12,217,389,416	11,190,367,874	164,854,520,324
41	164,854,520,324	19,826,122	11,963,375,250	11,128,862,267	164,039,833,464
42	164,039,833,464	14,373,002	11,680,764,073	11,081,370,654	163,454,813,046
43	163,454,813,046	10,309,904	11,368,632,050	11,051,019,273	163,147,510,173
44	163,147,510,173	7,371,418	11,029,344,046	11,041,081,201	163,166,618,746
45	163,166,618,746	5,252,196	10,670,970,028	11,054,676,831	163,555,577,745
46	163,555,577,745	3,711,998	10,298,395,601	11,094,670,523	164,355,564,665
47	164,355,564,665	2,601,013	9,913,246,562	11,163,883,606	165,608,802,722
48	165,608,802,722	1,780,806	9,517,481,752	11,265,199,541	167,358,301,317
49	167,358,301,317	1,175,750	9,112,852,486	11,401,566,125	169,648,190,706
50	169,648,190,706	737,380	8,700,705,913	11,576,024,456	172,524,246,629



Single Discount Rate Development

Projection of Plan Fiduciary Net Position Ending December 31, 2120 (Concluded)

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
51	\$ 172,524,246,629	\$ 427,092	\$ 8,281,967,177	\$ 11,791,745,674	\$ 176,034,452,218
52	176,034,452,218	217,356	7,857,612,848	12,052,054,051	180,229,110,777
53	180,229,110,777	98,969	7,428,603,281	12,360,437,457	185,161,043,921
54	185,161,043,921	45,794	6,996,359,818	12,720,543,599	190,885,273,496
55	190,885,273,496	21,098	6,562,708,153	13,136,159,924	197,458,746,365
56	197,458,746,365	7,766	6,129,494,099	13,611,208,615	204,940,468,647
57	204,940,468,647	1,800	5,698,601,659	14,149,755,135	213,391,623,922
58	213,391,623,922	115	5,272,028,548	14,756,013,492	222,875,608,981
59	222,875,608,981	36	4,851,871,937	15,434,349,210	233,458,086,290
60	233,458,086,290	-	4,440,271,400	16,189,284,990	245,207,099,880
61	245,207,099,880	-	4,039,323,218	17,025,511,784	258,193,288,446
62	258,193,288,446	-	3,651,104,973	17,947,902,813	272,490,086,286
63	272,490,086,286	-	3,277,668,836	18,961,527,869	288,173,945,319
64	288,173,945,319	-	2,920,978,222	20,071,671,027	305,324,638,124
65	305,324,638,124	-	2,582,851,182	21,283,853,813	324,025,640,756
66	324,025,640,756	-	2,264,892,744	22,603,864,325	344,364,612,337
67	344,364,612,337	-	1,968,415,813	24,037,793,527	366,433,990,051
68	366,433,990,051	-	1,694,439,412	25,592,076,959	390,331,627,598
69	390,331,627,598	-	1,443,719,181	27,273,538,380	416,161,446,797
70	416,161,446,797	-	1,216,730,438	29,089,435,962	444,034,152,321
71	444,034,152,321	-	1,013,651,989	31,047,512,881	474,068,013,214
72	474,068,013,214	-	834,361,016	33,156,052,195	506,389,704,392
73	506,389,704,392	-	678,380,865	35,423,937,549	541,135,261,076
74	541,135,261,076	-	544,821,908	37,860,722,020	578,451,161,188
75	578,451,161,188	-	432,348,960	40,476,705,001	618,495,517,230
76	618,495,517,230	-	339,176,773	43,283,015,797	661,439,356,254
77	661,439,356,254	-	263,165,323	46,291,699,934	707,467,890,864
78	707,467,890,864	-	202,014,061	49,515,801,452	756,781,678,255
79	756,781,678,255	-	153,445,465	52,969,437,720	809,597,670,510
80	809,597,670,510	-	115,327,568	56,667,868,740	866,150,211,682
81	866,150,211,682	-	85,749,154	60,627,564,357	926,692,026,885
82	926,692,026,885	-	63,051,888	64,866,272,390	991,495,247,387
83	991,495,247,387	-	45,829,303	69,403,090,420	1,060,852,508,505
84	1,060,852,508,505	-	32,907,023	74,258,543,329	1,135,078,144,811
85	1,135,078,144,811	-	23,321,249	79,454,667,698	1,214,509,491,261
86	1,214,509,491,261	-	16,296,723	85,015,103,650	1,299,508,298,187
87	1,299,508,298,187	-	11,215,532	90,965,194,969	1,390,462,277,624
88	1,390,462,277,624	-	7,592,565	97,332,098,188	1,487,786,783,248
89	1,487,786,783,248	-	5,052,011	104,144,900,998	1,591,926,632,234
90	1,591,926,632,234	-	3,300,869	111,434,750,680	1,703,358,082,045
91	1,703,358,082,045	-	2,114,901	119,234,992,974	1,822,590,960,117
92	1,822,590,960,117	-	1,326,678	127,581,321,560	1,950,170,954,999
93	1,950,170,954,999	-	811,836	136,511,938,916	2,086,682,082,080
94	2,086,682,082,080	-	481,157	146,067,729,190	2,232,749,330,113
95	2,232,749,330,113	-	272,811	156,292,443,721	2,389,041,501,023
96	2,389,041,501,023	-	145,089	167,232,900,079	2,556,274,256,013
97	2,556,274,256,013	-	70,364	178,939,195,500	2,735,213,381,149
98	2,735,213,381,149	-	30,967	191,464,935,615	2,926,678,285,796
99	2,926,678,285,796	-	13,279	204,867,479,549	3,131,545,752,067
100	3,131,545,752,067	-	7,798	219,208,202,376	3,350,753,946,645

The Plan Fiduciary Net Position is projected to grow throughout the projection period due to the surplus as of the measurement date combined with the funding policy. Please note this is a theoretical closed group projection which does not take into account the projected payout of future new entrants into the System.



Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2120

Year	Projected Benefit			Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
	Projected Beginning Plan Net Position	Payments Including Dividends	Funded Portion of Benefit Payments				
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ⁿ ((a)-.5)	(g)=(e)*vf ⁿ ((a)-.5)	(h)=(c)/(1+sdr) ⁿ (a-.5)
1	\$ 124,966,393,931	\$ 6,485,579,483	\$ 6,485,579,483	\$ -	\$ 6,269,846,339	\$ -	\$ 6,269,846,339
2	129,210,586,497	6,869,342,431	6,869,342,431	-	6,206,396,247	-	6,206,396,247
3	133,207,313,456	7,181,602,101	7,181,602,101	-	6,064,037,733	-	6,064,037,733
4	136,983,840,167	7,603,221,509	7,603,221,509	-	6,000,043,809	-	6,000,043,809
5	140,471,204,493	7,937,880,447	7,937,880,447	-	5,854,334,782	-	5,854,334,782
6	143,684,265,700	8,198,375,294	8,198,375,294	-	5,650,892,138	-	5,650,892,138
7	146,754,386,369	8,455,619,485	8,455,619,485	-	5,446,918,485	-	5,446,918,485
8	149,727,301,161	8,722,072,885	8,722,072,885	-	5,250,992,268	-	5,250,992,268
9	152,587,293,339	8,987,855,084	8,987,855,084	-	5,057,011,615	-	5,057,011,615
10	155,327,457,904	9,252,200,149	9,252,200,149	-	4,865,182,446	-	4,865,182,446
11	157,940,992,892	9,519,836,587	9,519,836,587	-	4,678,426,683	-	4,678,426,683
12	160,415,404,208	9,786,854,189	9,786,854,189	-	4,494,999,778	-	4,494,999,778
13	162,740,747,416	10,044,926,444	10,044,926,444	-	4,311,709,968	-	4,311,709,968
14	164,914,906,121	10,293,466,077	10,293,466,077	-	4,129,339,960	-	4,129,339,960
15	166,936,333,338	10,532,073,058	10,532,073,058	-	3,948,654,056	-	3,948,654,056
16	168,803,492,520	10,769,895,623	10,769,895,623	-	3,773,661,493	-	3,773,661,493
17	170,505,352,698	10,998,071,857	10,998,071,857	-	3,601,506,650	-	3,601,506,650
18	172,039,407,144	11,210,462,266	11,210,462,266	-	3,430,894,879	-	3,430,894,879
19	173,409,394,761	11,412,846,067	11,412,846,067	-	3,264,330,122	-	3,264,330,122
20	174,613,539,549	11,605,033,830	11,605,033,830	-	3,102,149,659	-	3,102,149,659
21	175,650,376,362	11,784,313,638	11,784,313,638	-	2,943,993,523	-	2,943,993,523
22	176,521,218,347	11,955,612,710	11,955,612,710	-	2,791,390,640	-	2,791,390,640
23	177,222,167,247	12,118,706,733	12,118,706,733	-	2,644,364,255	-	2,644,364,255
24	177,748,998,629	12,274,172,899	12,274,172,899	-	2,503,072,685	-	2,503,072,685
25	178,096,557,140	12,423,881,263	12,423,881,263	-	2,367,853,009	-	2,367,853,009
26	178,257,835,563	12,565,908,797	12,565,908,797	-	2,238,244,739	-	2,238,244,739
27	178,315,700,338	12,698,447,933	12,698,447,933	-	2,113,880,994	-	2,113,880,994
28	178,175,533,368	12,816,993,645	12,816,993,645	-	1,994,032,730	-	1,994,032,730
29	177,839,190,543	12,921,189,217	12,921,189,217	-	1,878,731,955	-	1,878,731,955
30	177,309,599,351	13,012,104,744	13,012,104,744	-	1,768,178,514	-	1,768,178,514
31	176,589,680,100	13,079,859,964	13,079,859,964	-	1,661,108,020	-	1,661,108,020
32	175,694,449,858	13,119,513,246	13,119,513,246	-	1,557,143,816	-	1,557,143,816
33	174,646,172,813	13,128,668,123	13,128,668,123	-	1,456,290,094	-	1,456,290,094
34	173,471,553,300	13,101,555,187	13,101,555,187	-	1,358,208,043	-	1,358,208,043
35	172,205,510,867	13,038,006,394	13,038,006,394	-	1,263,196,343	-	1,263,196,343
36	170,885,575,883	12,938,339,863	12,938,339,863	-	1,171,532,786	-	1,171,532,786
37	169,551,098,532	12,803,771,207	12,803,771,207	-	1,083,502,754	-	1,083,502,754
38	168,242,094,578	12,637,706,985	12,637,706,985	-	999,485,777	-	999,485,777
39	166,997,070,069	12,442,147,701	12,442,147,701	-	919,644,360	-	919,644,360
40	165,854,468,542	12,217,389,416	12,217,389,416	-	843,954,821	-	843,954,821
41	164,854,520,324	11,963,375,250	11,963,375,250	-	772,343,915	-	772,343,915
42	164,039,833,464	11,680,764,073	11,680,764,073	-	704,765,244	-	704,765,244
43	163,454,813,046	11,368,632,050	11,368,632,050	-	641,058,494	-	641,058,494
44	163,147,510,173	11,029,344,046	11,029,344,046	-	581,239,814	-	581,239,814
45	163,166,618,746	10,670,970,028	10,670,970,028	-	525,564,222	-	525,564,222
46	163,555,577,745	10,298,395,601	10,298,395,601	-	474,032,028	-	474,032,028
47	164,355,564,665	9,913,246,562	9,913,246,562	-	426,452,089	-	426,452,089
48	165,608,802,722	9,517,481,752	9,517,481,752	-	382,641,978	-	382,641,978
49	167,358,301,317	9,112,852,486	9,112,852,486	-	342,405,808	-	342,405,808
50	169,648,190,706	8,700,705,913	8,700,705,913	-	305,532,557	-	305,532,557



Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2120(Concluded)

Year	Projected Beginning Plan Net Position	Projected Benefit		Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
		Payments Including Dividends	Funded Portion of Benefit Payments				
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^{-(a)-5}	(g)=(e)*vf ^{-(a)-5}	(h)=(c)/(1+sdr) ^{-(a)-5}
51	\$ 172,524,246,629	\$ 8,281,967,177	\$ 8,281,967,177	\$ -	\$ 271,802,052	\$ -	\$ 271,802,052
52	176,034,452,218	7,857,612,848	7,857,612,848	-	241,005,013	-	241,005,013
53	180,229,110,777	7,428,603,281	7,428,603,281	-	212,940,778	-	212,940,778
54	185,161,043,921	6,996,359,818	6,996,359,818	-	187,430,399	-	187,430,399
55	190,885,273,496	6,562,708,153	6,562,708,153	-	164,311,215	-	164,311,215
56	197,458,746,365	6,129,494,099	6,129,494,099	-	143,425,037	-	143,425,037
57	204,940,468,647	5,698,601,659	5,698,601,659	-	124,619,172	-	124,619,172
58	213,391,623,922	5,272,028,548	5,272,028,548	-	107,748,327	-	107,748,327
59	222,875,608,981	4,851,871,937	4,851,871,937	-	92,674,091	-	92,674,091
60	233,458,086,290	4,440,271,400	4,440,271,400	-	79,263,773	-	79,263,773
61	245,207,099,880	4,039,323,218	4,039,323,218	-	67,389,162	-	67,389,162
62	258,193,288,446	3,651,104,973	3,651,104,973	-	56,927,484	-	56,927,484
63	272,490,086,286	3,277,668,836	3,277,668,836	-	47,761,611	-	47,761,611
64	288,173,945,319	2,920,978,222	2,920,978,222	-	39,779,419	-	39,779,419
65	305,324,638,124	2,582,851,182	2,582,851,182	-	32,873,483	-	32,873,483
66	324,025,640,756	2,264,892,744	2,264,892,744	-	26,940,782	-	26,940,782
67	344,364,612,337	1,968,415,813	1,968,415,813	-	21,882,434	-	21,882,434
68	366,433,990,051	1,694,439,412	1,694,439,412	-	17,604,393	-	17,604,393
69	390,331,627,598	1,443,719,181	1,443,719,181	-	14,018,255	-	14,018,255
70	416,161,446,797	1,216,730,438	1,216,730,438	-	11,041,341	-	11,041,341
71	444,034,152,321	1,013,651,989	1,013,651,989	-	8,596,715	-	8,596,715
72	474,068,013,214	834,361,016	834,361,016	-	6,613,234	-	6,613,234
73	506,389,704,392	678,380,865	678,380,865	-	5,025,158	-	5,025,158
74	541,135,261,076	544,821,908	544,821,908	-	3,771,785	-	3,771,785
75	578,451,161,188	432,348,960	432,348,960	-	2,797,325	-	2,797,325
76	618,495,517,230	339,176,773	339,176,773	-	2,050,930	-	2,050,930
77	661,439,356,254	263,165,323	263,165,323	-	1,487,201	-	1,487,201
78	707,467,890,864	202,014,061	202,014,061	-	1,066,937	-	1,066,937
79	756,781,678,255	153,445,465	153,445,465	-	757,404	-	757,404
80	809,597,670,510	115,327,568	115,327,568	-	532,014	-	532,014
81	866,150,211,682	85,749,154	85,749,154	-	369,688	-	369,688
82	926,692,026,885	63,051,888	63,051,888	-	254,051	-	254,051
83	991,495,247,387	45,829,303	45,829,303	-	172,576	-	172,576
84	1,060,852,508,505	32,907,023	32,907,023	-	115,809	-	115,809
85	1,135,078,144,811	23,321,249	23,321,249	-	76,705	-	76,705
86	1,214,509,491,261	16,296,723	16,296,723	-	50,094	-	50,094
87	1,299,508,298,187	11,215,532	11,215,532	-	32,220	-	32,220
88	1,390,462,277,624	7,592,565	7,592,565	-	20,385	-	20,385
89	1,487,786,783,248	5,052,011	5,052,011	-	12,677	-	12,677
90	1,591,926,632,234	3,300,869	3,300,869	-	7,741	-	7,741
91	1,703,358,082,045	2,114,901	2,114,901	-	4,635	-	4,635
92	1,822,590,960,117	1,326,678	1,326,678	-	2,717	-	2,717
93	1,950,170,954,999	811,836	811,836	-	1,554	-	1,554
94	2,086,682,082,080	481,157	481,157	-	861	-	861
95	2,232,749,330,113	272,811	272,811	-	456	-	456
96	2,389,041,501,023	145,089	145,089	-	227	-	227
97	2,556,274,256,013	70,364	70,364	-	103	-	103
98	2,735,213,381,149	30,967	30,967	-	42	-	42
99	2,926,678,285,796	13,279	13,279	-	17	-	17
100	3,131,545,752,067	7,798	7,798	-	9	-	9
Totals					\$ 138,110,434,604	\$ -	\$ 138,110,434,604



SECTION F

SUMMARY OF ASSUMPTIONS

Summary of Assumptions Used to Develop Total Pension Liability Assumptions Adopted by ETF Board After Consulting with Actuary

The actuarial assumptions were developed based on an Experience Study covering January 1, 2015 through December 31, 2017. While sample rates are illustrated in this section, please refer to the Wisconsin Experience Study report dated November 19, 2018 which supplies a full listing of actuarial assumptions at every age and a rationale for the selection of assumptions. Please note that minor technical adjustments were made to the mortality rates subsequent to publication of the 2015-2017 Experience Study. Please refer to page 25 for the most current mortality assumptions.

Economic Assumptions

In determining plan liabilities for accounting purposes, a discount rate of 7.0% is used for both actives and retirees. However, a long term assumed dividend of 1.9% is also assumed. For retirees, this produces the same result as assuming a 5% discount rate. Dividends are not guaranteed, and this valuation develops dividends that reflect known entries (phased-in gains and losses) in the Market Recognition Account (MRA), based on the 7.0% return assumption. The dividend rates used in developing the Total Pension Liability for accounting purposes are as follows:

2021: 5.1% Core, 13.0% Variable
2022: 4.8% Core, 1.9% Variable
2023: 3.4% Core, 1.9% Variable
2024: 5.0% Core, 1.9% Variable
2025: 3.2% Core, 1.9% Variable
2026 and later: 1.9% Core, 1.9% Variable

The **Wage Inflation Rate** assumed in this valuation was 3.0% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes rated 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%.

The assumed **Real Rate of Return** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 7.0% pre-retirement investment return rate translates to an assumed real rate of return over wage inflation of 4.0%. The assumed real rate of return over price inflation would be 4.5% considering an inflation assumption of 2.5%.

Merit and Longevity pay increase assumptions for individual active members are shown for sample services below. An additional 3.0% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.

% Merit and Longevity Increase Next Year						
Service	Gen.	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 the period 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 Retirement Values
Wisconsin 2018 Mortality Table with 5% Interest**

Sample Attained Ages in 2020	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$213.04	\$217.69	45.4	48.3	0.000999	0.000619
45	204.74	210.36	40.3	43.2	0.001243	0.000922
50	194.30	201.24	35.3	38.2	0.001610	0.001335
55	181.69	190.09	30.4	33.2	0.003746	0.002407
60	167.45	176.84	25.8	28.4	0.005427	0.003517
65	150.47	160.89	21.4	23.7	0.008322	0.005262
70	131.26	141.93	17.1	19.2	0.013474	0.008704
75	109.81	120.31	13.2	15.0	0.022566	0.015725
80	87.08	96.94	9.7	11.1	0.041382	0.029617
85	65.62	73.71	6.8	7.9	0.077414	0.059609

* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.

The values shown above are for non-disabled participants in 2020. For disabled participants, the following table was used:

Sample Attained Ages in 2020	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$199.65	\$207.91	37.8	41.8	0.001441	0.001027
45	188.03	198.23	32.8	36.8	0.002357	0.001537
50	174.63	186.48	28.1	31.9	0.004644	0.002699
55	158.90	172.41	23.5	27.1	0.006263	0.003971
60	140.43	155.56	19.1	22.4	0.010932	0.006136
65	120.05	135.91	15.0	18.0	0.017777	0.010514
70	98.05	113.95	11.4	13.9	0.030629	0.018928
75	75.91	90.50	8.2	10.2	0.057905	0.035682
80	56.28	67.87	5.7	7.1	0.106542	0.073019
85	40.23	49.64	3.9	4.9	0.171981	0.126179

* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.

Active Participant Mortality Rates

Sample Attained Ages in 2020	Mortality Rates*	
	Males	Females
20	0.000135	0.000081
25	0.000165	0.000091
30	0.000214	0.000124
35	0.000380	0.000224
40	0.000500	0.000310
45	0.000621	0.000462
50	0.000805	0.000668
55	0.001873	0.001205
60	0.002713	0.001760
65	0.004161	0.002634
70	0.006737	0.004356
75	0.011283	0.007870
80	0.020691	0.014823

* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.

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

Rates of Retirement for Those Eligible to Retire

Normal Retirement

Age	General		Exec. & Elected	University		Public School		Protective*	
	Male	Female		Male	Female	Male	Female	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 for protective with 20+ years of service.

Reduced Retirement

Age	% Retiring Next Year						
	General		Exec. & Elected	University		Public School	
	Male	Female		Male	Female	Male	Female
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%	2.0%	7.4%	12.0%	21.0%	23.0%
63	18.0%	18.0%	2.0%	7.4%	12.0%	21.0%	23.0%
64	17.0%	18.0%	2.0%	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 five 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%

SECTION G

PLAN PROVISIONS

Summary of Benefit Provisions

Normal Retirement Eligibility

The age a participant becomes eligible for an unreduced age and service annuity is:

General, Public School, and University		Protective		Executive & Elected [#]	
Age	Service	Age	Service	Age	Service
65	Any*	54	Any*	62	Any*
57	30	53	25	57	30

* Participants first employed after 1989 and terminated before April 24, 1998 must have creditable service in 5 calendar years.

These conditions apply to those people hired on or before December 31, 2016. For others, the General eligibility conditions apply.

Normal Retirement Annuity

The age and service annuity payable at Normal Retirement Age is based on Final Average Earnings (FAE) and Creditable Service (CS) as follows:

Multiplier for Service Rendered			Group
Before 2000	Between 2000 and 2011	After 2011	
2.165%	2.0%	1.6%	Executive group and elected officials
2.165%	2.0%	2.0%	Protective occupation participants covered by Social Security
2.665%	2.5%	2.5%	Protective occupation participants not covered by Social Security
1.765%	1.6%	1.6%	All other participants

FAE is generally the average of the 3 highest years of earnings (July 1 - June 30 for teachers, educational support staff, and judges; calendar year for others) preceding retirement. These years do not have to be consecutive. For legislators and state constitutional officers who are ineligible to receive pay increases during their term, FAE is the statutory rate of earnings at termination.

Maximum formula annuity is 85% of FAE for protective occupation participants not covered by Social Security, 65% of FAE for protectives covered by Social Security, and 70% for all other participants. If greater than the formula amount, an annuity equal to the actuarial equivalent of two times the required accumulated contributions is paid in lieu of the formula amount (i.e., the Money Purchase Minimum).



Reduced Retirement. Any participant who has attained age 55 and any Protective occupation participant who has attained age 50 may apply for a reduced retirement annuity. The benefit is reduced 0.4% for each month that the annuity effective date precedes the Normal Retirement Age. For Non-Protective participants terminating after 6/30/90, the 0.4% is reduced for months after the attainment of age 57 and before the annuity effective date by .001111% for each month of creditable service.

Voluntary Termination Before Immediate Benefit Eligibility. Participant may either (i) receive a refund of accumulated contributions, or (ii) leave contributions on deposit and apply for a retirement annuity on or after the minimum retirement age based upon age and accrued service at time of termination.

Post-Retirement Adjustments. Annuities are increased annually if the investment income credited to retired life funds is in excess of the assumed benefit rate (presently 5%), other plan experiences are within projected ranges, and the resulting adjustment would be at least 0.5% (2.0% for the variable fund).

Disability Benefits. Generally, disability means the inability to engage in any substantial gainful activity by reason of a medically determinable physical or mental impairment which can be expected to result in death or to be of long-continued and indefinite duration. Disability applicants must be participating employees who are under normal retirement age, have not already taken a WRS benefit and who meet a service requirement.

For this purpose **normal retirement age** is:

- 65 for general employees and executives and elected officials hired after December 31, 2016
- 62 for executives and elected officials hired on or before December 31, 2016
- 53 for protective occupation employees with 25 or more years of creditable service
- 54 for other protective occupation employees

The **service requirement** is that during the seven years preceding application the individual must have earned:

- At least 6 months of service credit in five of those years or
- A total of five years of service credit.

Disability Amount: The disability benefit is the WRS formula benefit based upon service projected to normal retirement age as described above, without regard to the reduced retirement reduction.

Death-in-Service

- (a) Prior to age 50 for Protective participants, age 55 for others, the benefit is the equivalent of twice the accumulated employee contributions required and all additional contributions and employer amounts contributed prior to 1974 for teachers, or 1966 for others.
- (b) After age 50 for Protective participants, age 55 for others, the benefit is the amount that would have been paid if participant had retired and elected 100% survivor option. Benefit is payable to any natural living person. If there is no eligible beneficiary, a refund of contributions is paid to the estate.

Interest Credits. For years after 1999, and for people with some active service after 1999, participant core accounts (including the variable at core accounts) are credited with interest at the full (core) effective rate. For others, accounts are credited with interest as follows:

Date of Participation	Rate Credited For Purpose of	
	Money Purchase Minimum	Refunds
Prior to 1982	Actual	Actual
January 1, 1982 & Later	5%	3%

Participant variable accounts are credited with interest based on the earnings in the variable portfolio.

Contribution Rates. The financial objective of WRS is to establish and receive contributions that will remain level from year to year and decade to decade.

Statutory required participant contributions prior to July 1, 2011 were as follows:

General, Public School, and University	5.0%
Executives & Elected Officials	5.5
Protectives	
- With Social Security	6.0
- Without Social Security	8.0

Statutory required participant contributions after July 1, 2011 are set equal to one-half of the actuarially determined rate for General participants and Executive and Elected Officials. Participant contributions for Protective participants are set equal to the participant contribution for General members.

Normal Form of Benefit. The normal form of benefit is a straight life annuity with no death benefits. Optional forms of benefit which are actuarially reduced are listed below:

- A life annuity with 60 or 180 monthly payments guaranteed.
- A joint survivorship annuity with 75% continued to beneficiary.
- A joint survivorship annuity with 100% continued to beneficiary.
- A joint survivorship annuity reduced 25% upon either your death or your beneficiary's death.
- A joint survivorship annuity with 100% continued to beneficiary combined with 180 monthly payments guaranteed.

For formula benefit calculations, optional forms are calculated at the lower of the current age or age 62 (Normal Retirement Age for Protective occupations). If a retiree (and beneficiary if in receipt of a joint survivorship annuity) dies prior to receiving benefits which, in total, are at least equal to the members contributions, a "residual refund" for the difference is paid.

Vesting. Participants hired prior to July 1, 2011 vest immediately. After July 1, 2011, participants vest after 5 years of service.

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

<i>Actuarial Accrued Liability (AAL)</i>	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Equivalent</i>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value (APV)</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Glossary of Terms

<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<i>Deferred Retirement Option Program (DROP)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Discount Rate</i>	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period and;2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

<i>Entry Age Actuarial Cost Method (EAN)</i>	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit age(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<i>Fiduciary Net Position</i>	The fiduciary net position is the value of the assets of the trust.
<i>Long-Term Expected Rate of Return</i>	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
<i>Money-Weighted Rate of Return</i>	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
<i>Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<i>Municipal Bond Rate</i>	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
<i>Net Pension Liability (NPL)</i>	The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.
<i>Non-Employer Contribution Entities</i>	Non-employer contribution entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting statement plan members are not considered non-employer contribution entities.
<i>Normal Cost</i>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

Glossary of Terms

<i>Other Postemployment Benefits (OPEB)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (TPL)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (UAAL)</i>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.