

Wyoming Retirement System – Public Employee Plan

GASB Statement Nos. 67 and 68 Accounting and Financial
Reporting for Pensions

For Measurement Date as of December 31, 2020





March 26, 2021

Board of Trustees
Wyoming Retirement System

Dear Board Members:

This report provides information required by the Wyoming Retirement System (WRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 and 68 for the Wyoming Retirement System ("WRS"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statement Nos. 67 and 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement Nos. 67 and 68 may produce significantly different results. This report may be provided to parties other than the Wyoming Retirement System ("WRS") only in its entirety and only with the permission of WRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by WRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by WRS.

This report complements the actuarial valuation report that was provided to WRS and should be considered in conjunction with that report. Please see the actuarial valuation report as of January 1, 2020 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions. Furthermore, this report incorporates the assumptions adopted by the Board effective August 23, 2017. For a detailed description of the experience related to these assumptions, as well as the rationale for any changes, please see our latest Wyoming Retirement System Actuarial Experience Study Report. Our experience study report was dated January 10, 2018 and it covered the five-year investigation period ending December 31, 2016.

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.


This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the Wyoming Retirement System as of the valuation date.

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.

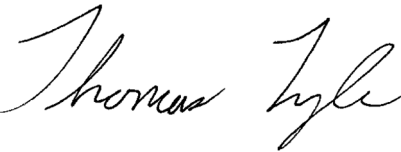
Paul T. Wood, Thomas A. Lyle, and Dana Woolfrey are members of the American Academy of Actuaries (MAAA) and are experienced in performing valuations for public retirement systems. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

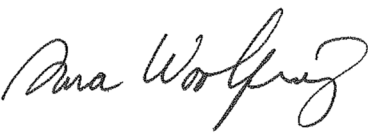
Gabriel, Roeder, Smith & Company

By 

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SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2020

	2020
Actuarial Valuation Date	January 1, 2020
Measurement Date of the Net Pension Liability	December 31, 2020
Employer's Fiscal Year Ending Date (Reporting Date)	December 31, 2020

Membership

Number of	
- Retirees and Beneficiaries	28,750
- Inactive, Nonretired Members	32,111
- Active Members	35,206
- Total	96,067
Covered Payroll	\$ 1,780,467,331

Net Pension Liability

Total Pension Liability	\$ 10,467,601,643
Plan Fiduciary Net Position	8,294,241,897
Net Pension Liability	\$ 2,173,359,746
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	79.24 %
Net Pension Liability as a Percentage of Covered Payroll	122.07 %

Development of the Single Discount Rate

Single Discount Rate	7.00 %
Long-Term Expected Rate of Investment Return	7.00 %
Long-Term Municipal Bond Rate*	2.00 %
Last year ending December 31 in the 2020 to 2119 projection period for which projected benefit payments are fully funded	2119

Total Pension Expense \$ 115,855,996

Deferred Outflows and Deferred Inflows of Resources by Source to be recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	\$ 41,300,581	\$ 18,898,401
Changes in assumptions	13,497,765	0
Net difference between projected and actual earnings on pension plan investments	303,287,998	779,774,502
Total	\$ 358,086,344	\$ 798,672,903

**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.*



Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. 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 the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state or local governments to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to 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).

Paragraph 34 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to WRS subsequent to the measurement date of December 31, 2020.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the liability and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The *statement of fiduciary net position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *statement of changes in fiduciary net position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the type of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position and the net pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- 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.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets;
- annual money-weighted rate of return.

Required Supplementary Information

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

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

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 7.00% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to decrease slightly as a percentage of payroll.
2. The unfunded liability is expected to decrease as a percentage of payroll.
3. The unfunded liability is expected to be fully amortized during the lifetimes of current members.
4. The funded status of the plan is expected to increase gradually towards a 100% funded ratio.

This funding policy results in no expected crossover date and a GASB single discount rate of 7.00%. This funding policy results in the expectation that the plan's assets will be able to fully pay for promised benefits through at least 2119. 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.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of January 1, 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 (which is published by the Federal Reserve) 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 daily 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%.

Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively, earlier application is encouraged by the GASB.



SECTION B

FINANCIAL STATEMENTS

Auditor's Note – This information is intended to assist in preparation of the financial statements of the Wyoming Retirement System. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Statement of Pension Expense under GASB Statement No. 68

Fiscal Year Ended December 31, 2020

A. Expense

1. Service Cost	\$	198,288,435
2. Interest on the Total Pension Liability		699,015,173
3. Current-Period Benefit Changes		0
4. Employee Contributions (made negative for addition here)		(165,086,190)
5. Projected Earnings on Plan Investments (made negative for addition here)		(534,940,654)
6. Pension Plan Administrative Expense		7,238,487
7. Other Changes in Plan Fiduciary Net Position		294,893
8. Recognition of Outflow (Inflow) of Resources due to Liabilities		56,144,994
9. Recognition of Outflow (Inflow) of Resources due to Assets		<u>(145,099,142)</u>
10. Total Pension Expense	\$	115,855,996 *

* In accordance with GASB 71, employers may need to illustrate contributions made after the measurement date.

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended December 31, 2020

A. Outflows (Inflows) of Resources due to Liabilities

1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	\$ 55,560,847
2. Assumption Changes (gains) or losses	\$ 0
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	3.8962
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	\$ 14,260,266
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for assumption changes	\$ 0
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	\$ 14,260,266
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	\$ 41,300,581
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for assumption changes	\$ 0
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	\$ 41,300,581

B. Outflows (Inflows) of Resources due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$ (270,952,701)
2. Recognition period for Assets {in years}	5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	\$ (54,190,540)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$ (216,762,161)

History of Deferred Outflows and Inflows of Resources by Source

Fiscal Year Ended December 31, 2020

History of Deferred Outflows and Deferred Inflows of Resources by Source

Differences between expected and actual experience - Net (inflows)/outflows of resources

Recognition Period	4.0139	3.9136	3.8583	4.1947	4.0527	3.9563	3.8962		Deferred Net (Inflows)/Outflows at Measurement Date
	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ -	\$ (66,191,620)	\$ (43,790,701)	\$ (56,701,091)	\$ (49,213,548)	\$ (7,044,256)	\$ 55,560,847		
2014	-	-	-	-	-	-	-	-	-
2015	-	(16,913,231)	-	-	-	-	-	(16,913,231)	-
2016	-	(16,913,231)	(11,349,740)	-	-	-	-	(28,262,971)	-
2017	-	(16,913,231)	(11,349,740)	(13,517,317)	-	-	-	(41,780,288)	-
2018	-	(15,451,927)	(11,349,740)	(13,517,317)	(12,143,398)	-	-	(52,462,382)	-
2019	-	-	(9,741,481)	(13,517,317)	(12,143,398)	(1,780,516)	-	(37,182,712)	-
2020	-	-	-	(13,517,317)	(12,143,398)	(1,780,516)	14,260,266	(13,180,965)	-
2021	-	-	-	(2,631,823)	(12,143,398)	(1,780,516)	14,260,266	(2,295,471)	\$ 22,402,180
2022	-	-	-	-	(639,956)	(1,702,708)	14,260,266	11,917,602	-
2023	-	-	-	-	-	-	12,780,049	12,780,049	-
2024	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ -	\$ (66,191,620)	\$ (43,790,701)	\$ (56,701,091)	\$ (49,213,548)	\$ (7,044,256)	\$ 55,560,847	\$ (167,380,369)	

Assumption changes - Net (inflows)/outflows of resources

Recognition Period	4.0139	3.9136	3.8583	4.1947	4.0527	3.9563	3.8962		
	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ -	\$ -	\$ -	\$ 290,801,601	\$ -	\$ -	\$ -		
2014	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-
2017	-	-	-	69,325,959	-	-	-	69,325,959	-
2018	-	-	-	69,325,959	-	-	-	69,325,959	-
2019	-	-	-	69,325,959	-	-	-	69,325,959	-
2020	-	-	-	69,325,959	-	-	-	69,325,959	-
2021	-	-	-	13,497,765	-	-	-	13,497,765	\$ 13,497,765
2022	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ -	\$ -	\$ -	\$ 290,801,601	\$ -	\$ -	\$ -	\$ 290,801,601	

Net Difference between projected and actual earnings on pension plan investments - Net (inflows)/outflows of resources

Recognition Period	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000		
	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ 180,861,863	\$ 577,381,461	\$ 35,536,046	\$ (464,917,747)	\$ 758,219,998	\$ (783,381,316)	\$ (270,952,701)		
2014	36,172,373	-	-	-	-	-	-	36,172,373	-
2015	36,172,373	115,476,292	-	-	-	-	-	151,648,665	-
2016	36,172,373	115,476,292	7,107,209	-	-	-	-	158,755,874	-
2017	36,172,373	115,476,292	7,107,209	(92,983,549)	-	-	-	65,772,325	-
2018	36,172,371	115,476,292	7,107,209	(92,983,549)	151,644,000	-	-	217,416,323	-
2019	-	115,476,293	7,107,209	(92,983,549)	151,644,000	(156,676,263)	-	24,567,690	-
2020	-	-	7,107,210	(92,983,549)	151,644,000	(156,676,263)	(54,190,540)	(145,099,142)	-
2021	-	-	-	(92,983,551)	151,644,000	(156,676,263)	(54,190,540)	(52,206,354)	\$ (476,486,504)
2022	-	-	-	-	151,643,998	(156,676,263)	(54,190,540)	(59,222,805)	-
2023	-	-	-	-	-	(156,676,264)	(54,190,540)	(210,866,804)	-
2024	-	-	-	-	-	-	(54,190,541)	(54,190,541)	-
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ 180,861,863	\$ 577,381,461	\$ 35,536,046	\$ (464,917,747)	\$ 758,219,998	\$ (783,381,316)	\$ (270,952,701)	\$ 32,747,604	

Total net differences from all sources - Net (inflows)/outflows of resources

	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ 180,861,863	\$ 511,189,841	\$ (8,254,655)	\$ (230,817,237)	\$ 709,006,450	\$ (790,425,572)	\$ (215,391,854)		
2014	36,172,373	-	-	-	-	-	-	36,172,373	-
2015	36,172,373	98,563,061	-	-	-	-	-	134,735,434	-
2016	36,172,373	98,563,061	(4,242,531)	-	-	-	-	130,492,903	-
2017	36,172,373	98,563,061	(4,242,531)	(37,174,907)	-	-	-	93,317,996	-
2018	36,172,371	100,024,365	(4,242,531)	(37,174,907)	139,500,602	-	-	234,279,900	-
2019	-	115,476,293	(2,634,272)	(37,174,907)	139,500,602	(158,456,779)	-	56,710,937	-
2020	-	-	7,107,210	(37,174,907)	139,500,602	(158,456,779)	(39,930,274)	(88,954,148)	-
2021	-	-	-	(82,117,609)	139,500,602	(158,456,779)	(39,930,274)	(141,004,060)	\$ (440,586,559)
2022	-	-	-	-	151,004,042	(158,378,971)	(39,930,274)	(47,305,203)	-
2023	-	-	-	-	-	(156,676,264)	(41,410,491)	(198,086,755)	-
2024	-	-	-	-	-	-	(54,190,541)	(54,190,541)	-
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ 180,861,863	\$ 511,189,841	\$ (8,254,655)	\$ (230,817,237)	\$ 709,006,450	\$ (790,425,572)	\$ (215,391,854)	\$ 156,168,836	



Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended December 31, 2020

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Due to Liabilities	\$ 83,586,225	\$ 27,441,231	\$ 56,144,994
2. Due to Assets	158,751,210	303,850,352	(145,099,142)
3. Total	\$ 242,337,435	\$ 331,291,583	\$ (88,954,148)

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	\$ 14,260,266	\$ 27,441,231	\$ (13,180,965)
2. Assumption Changes	69,325,959	0	69,325,959
3. Net Difference between projected and actual earnings on pension plan investments	158,751,210	303,850,352	(145,099,142)
4. Total	\$ 242,337,435	\$ 331,291,583	\$ (88,954,148)

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows of Resources
1. Differences between expected and actual experience	\$ 41,300,581	\$ 18,898,401	\$ 22,402,180
2. Assumption Changes	13,497,765	0	13,497,765
3. Net Difference between projected and actual earnings on pension plan investments	303,287,998	779,774,502	(476,486,504)
4. Total	\$ 358,086,344	\$ 798,672,903	\$ (440,586,559)

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending December 31	Net Deferred Outflows of Resources
2021	\$ (141,004,060)
2022	(47,305,203)
2023	(198,086,755)
2024	(54,190,541)
2025	0
Thereafter	0
Total	\$ (440,586,559)



Statement of Fiduciary Net Position as of December 31, 2020

	2020
Assets	
Cash and Deposits	\$ 152,895,055
Receivables	
Accounts Receivable - Sale of Investments	\$ 16,556,002
Accrued Interest and Other Dividends	15,383,522
Contributions	17,092,929
Accounts Receivable - Other	858,312,609
Total Receivables	\$ 907,345,062
Investments	
Fixed Income	\$ 1,768,248,525
Equities	4,132,727,466
Private Markets	760,153,192
Marketable Alternatives	1,504,058,608
Other	318,347,732
Total Investments	\$ 8,483,535,523
Total Assets	\$ 9,543,775,640
Liabilities	
Payables	
Accounts Payable - Purchase of Investments	\$ 1,235,784,419
Accrued Expenses	12,609,498
Accounts Payable - Other	1,139,826
Total Liabilities	\$ 1,249,533,743
Net Position Restricted for Pensions	\$ 8,294,241,897

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

	2020
Additions	
Contributions	
Employer	\$ 163,847,654
Employee	161,723,547
Other Employer Contributions	2,137,171
Other Employee Contributions	3,362,643
Total Contributions	\$ 331,071,015
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 749,003,371
Interest and Dividends	104,545,712
Less Investment Expense	(47,655,728)
Net Investment Income	\$ 805,893,355
Other	\$ 0
Total Additions	\$ 1,136,964,370
 Deductions	
Benefit Payments, including Refunds of Employee Contributions	\$ 625,747,935
Pension Plan Administrative Expense	7,238,487
Other	294,893
Total Deductions	\$ 633,281,315
Net Increase in Net Position	\$ 503,683,055
 Net Position Restricted for Pensions	
Beginning of Year	\$ 7,790,558,842
End of Year	\$ 8,294,241,897

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note – This information is intended to assist in preparation of the financial statements of the Wyoming Retirement System. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Schedule of Changes in Net Pension Liability and Related Ratios

Current Reporting Period

Fiscal Year Ended December 31, 2020

A. Total pension liability	
1. Service cost	\$ 198,288,435
2. Interest on the total pension liability	699,015,173
3. Changes of benefit terms	0
4. Difference between expected and actual experience of the total pension liability	55,560,847
5. Changes of assumptions	0
6. Benefit payments, including refunds of employee contributions	(625,747,935)
7. Net change in total pension liability	327,116,520
8. Total pension liability – beginning	10,140,485,123
9. Total pension liability – ending	\$ 10,467,601,643
B. Plan fiduciary net position	
1. Contributions – employer	\$ 165,984,825
2. Contributions – employee	165,086,190
3. Net investment income	805,893,355
4. Benefit payments, including refunds of employee contributions	(625,747,935)
5. Pension plan administrative expense	(7,238,487)
6. Other	(294,893)
7. Net change in plan fiduciary net position	503,683,055
8. Plan fiduciary net position – beginning	7,790,558,842
9. Plan fiduciary net position – ending	\$ 8,294,241,897
C. Net pension liability	\$ 2,173,359,746
D. Plan fiduciary net position as a percentage of the total pension liability	79.24 %
E. Covered-employee payroll	\$ 1,780,467,331
F. Net pension liability as a percentage of covered-employee payroll	122.07 %



Schedules of Required Supplementary Information

Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Last 10 Fiscal Years (which may be built prospectively)

Fiscal year ending December 31,	2020	2019	2018	2017	2016	2015	2014
Total pension liability							
Service cost	\$ 198,288,435	\$ 194,455,298	\$ 195,575,014	\$ 201,824,345	\$ 219,893,113	\$ 217,488,957	\$ 213,059,299
Interest on the total pension liability	699,015,173	676,902,286	658,459,157	641,429,003	664,368,366	638,943,600	614,848,444
Changes of benefit terms	0	0	0	0	0	0	0
Difference between expected and actual experience	55,560,847	(7,044,256)	(49,213,548)	(56,701,091)	(43,790,701)	(66,191,620)	0
Changes of assumptions	0	0	0	290,801,601	0	0	0
Benefit payments, including refunds of employee contributions	(625,747,935)	(600,487,685)	(566,027,667)	(535,492,257)	(501,610,080)	(469,954,814)	(436,096,614)
Net change in total pension liability	327,116,520	263,825,643	238,792,956	541,861,601	338,860,698	320,286,123	391,811,130
Total pension liability - beginning	10,140,485,123	9,876,659,480	9,637,866,524	9,096,004,923	8,757,144,225	8,436,858,102	8,045,046,972
Total pension liability - ending (a)	\$ 10,467,601,643	\$ 10,140,485,123	\$ 9,876,659,480	\$ 9,637,866,524	\$ 9,096,004,923	\$ 8,757,144,225	\$ 8,436,858,102
Plan fiduciary net position							
Employer contributions	\$ 165,984,825	\$ 157,385,096	\$ 147,632,510	\$ 148,746,669	\$ 151,488,715	\$ 144,622,373	\$ 127,929,930
Employee contributions	165,086,190	157,610,787	151,130,515	149,752,251	152,422,538	153,529,134	137,144,565
Pension plan net investment income	805,893,355	1,251,518,669	(252,571,153)	923,878,089	454,712,993	(67,155,642)	318,184,952
Benefit payments, including refunds of employee contributions	(625,747,935)	(600,487,685)	(566,027,667)	(535,492,257)	(501,610,080)	(469,954,814)	(436,096,614)
Pension plan administrative expense	(7,238,487)	(6,527,091)	(7,033,951)	(6,551,109)	(5,993,529)	(5,097,818)	(5,182,863)
Other	(294,893)	(309,531)	(287,669)	(312,336)	(312,336)	(312,704)	5,539,339
Net change in plan fiduciary net position	503,683,055	959,190,245	(527,157,415)	680,021,307	250,708,301	(244,369,471)	147,519,309
Plan fiduciary net position - beginning	7,790,558,842	6,831,368,597	7,358,526,012	6,678,504,705	6,427,796,404	6,672,165,875	6,524,646,566
Plan fiduciary net position - ending (b)	\$ 8,294,241,897	\$ 7,790,558,842	\$ 6,831,368,597	\$ 7,358,526,012	\$ 6,678,504,705	\$ 6,427,796,404	\$ 6,672,165,875
Net pension liability - ending (a) - (b)	\$ 2,173,359,746	\$ 2,349,926,281	\$ 3,045,290,883	\$ 2,279,340,512	\$ 2,417,500,218	\$ 2,329,347,821	\$ 1,764,692,227
Plan fiduciary net position as a percentage							
of total pension liability	79.24 %	76.83 %	69.17 %	76.35 %	73.42 %	73.40 %	79.08 %
Covered-employee payroll	\$ 1,780,467,331	\$ 1,738,212,750	\$ 1,741,354,609	\$ 1,776,377,586	\$ 1,782,905,215	\$ 1,744,073,882	\$ 1,709,412,443
Projected valuation payroll	\$ 1,824,979,015	\$ 1,781,668,069	\$ 1,784,888,475	\$ 1,820,787,026	\$ 1,858,678,687	\$ 1,818,197,022	\$ 1,782,062,471
Net pension liability as a percentage of covered-employee payroll	122.07 %	135.19 %	174.88 %	128.31 %	135.59 %	133.56 %	103.23 %

Notes to Schedule:

For 2020, 2019, 2018, 2017, 2016, and 2015, "Other" changes to Plan Fiduciary Net Position includes other funding sources and depreciation expenses.

For 2014, "Other" changes also may include member redeposits and member service purchase contributions.



Schedules of Required Supplementary Information

Schedule of Net Pension Liability Multiyear

Last 10 Fiscal Years (which may be built prospectively)

FY Ending December 31,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll*	Net Pension Liability as a % of Covered Payroll
2014	\$ 8,436,858,102	\$ 6,672,165,875	\$ 1,764,692,227	79.08 %	\$ 1,709,412,443	103.23 %
2015	8,757,144,225	6,427,796,404	2,329,347,821	73.40 %	1,744,073,882	133.56 %
2016	9,096,004,923	6,678,504,705	2,417,500,218	73.42 %	1,782,905,215	135.59 %
2017	9,637,866,524	7,358,526,012	2,279,340,512	76.35 %	1,776,377,586	128.31 %
2018	9,876,659,480	6,831,368,597	3,045,290,883	69.17 %	1,741,354,609	174.88 %
2019	10,140,485,123	7,790,558,842	2,349,926,281	76.83 %	1,738,212,750	135.19 %
2020	10,467,601,643	8,294,241,897	2,173,359,746	79.24 %	1,780,467,331	122.07 %

* Covered payroll is the amount in force as of the valuation date and likely differs from the actual payroll paid during the year.



Schedule of Contributions Multiyear Last 10 Fiscal Years

FY Ending December 31,	Actuarially Determined Contribution	Actual Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Actual Contribution as a % of Covered Payroll
2014	\$ 183,086,430	\$ 129,627,747	\$ 53,458,683	\$ 1,709,412,443	7.58 %
2015	168,411,742	144,622,373	23,789,369	1,744,073,882	8.29 %
2016	174,211,753	151,488,715	22,723,038	1,782,905,215	8.50 %
2017	167,125,230	148,746,669	18,378,561	1,776,377,586	8.37 %
2018	191,677,662	147,632,510	44,045,152	1,741,354,609	8.48 %
2019	207,518,684	157,385,096	50,133,588	1,738,212,750	9.05 %
2020	219,815,919	165,984,825	53,831,094	1,780,467,331	9.32 %

* Includes other funding sources but excludes member redeposits and member service purchase contributions.

** Covered payroll is the amount in force as of the valuation date and likely differs from the actual payroll paid during the year.



Notes to Schedule of Contributions

Valuation Date: January 1, 2020
Notes Actuarially determined contribution rates are calculated as of July 1 each year for implementation the following fiscal year.

Methods and Assumptions Used to Determine Contribution Rates:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	27 years
Asset Valuation Method	5-Year smoothed market
Inflation	2.25%
Salary Increases	2.5% to 6.5% including inflation
Payroll Growth Rate	2.50%
Cost-of-Living Increase	0.00%
Investment Rate of Return	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 2012 - 2016.
Post-Retirement Mortality	RP-2014 Healthy Annuitant Mortality Table, fully generational, projected with Scale MP-2017 Males: No set back with a multiplier of 100% Females: No set back with a multiplier of 88%
Pre-Retirement Mortality	RP-2014 Employee Mortality Table, fully generational, projected with Scale MP-2017 Males: No set back with a multiplier of 100% Females: No set back with a multiplier of 100%

Other Information:

Notes There were no benefit changes during the year.

The employer is contributing at the rate of 8.87% of salary plus, effective March 5, 2015, an additional 1.0% for park rangers. Employees are contributing at the rate of 8.75% of salary. Per Enrolled Act No. 65, both employee and employer contributions rates will increase 0.25% per year for the next two years starting July 1, 2020 to an ultimate employer contribution rate of 9.37% and an ultimate employee contribution rate of 9.25%.

The roll-forward methodology employed for purposes of the GASB disclosures is based on generally accepted actuarial methods.



Schedule of Investment Returns Multiyear Last 10 Fiscal Years

<u>FY Ending December 31,</u>	<u>Annual Return¹</u>
2014	4.70 %
2015	(0.26)%
2016	7.60 %
2017	14.20 %
2018	(3.52)%
2019	18.72 %
2020	11.03 %

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

SECTION D

NOTES TO FINANCIAL STATEMENTS

Auditor's Note – This information is intended to assist in preparation of the financial statements of the Wyoming Retirement System. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

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%. 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 statutory contribution rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments 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.

Sensitivity of Results

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 7.00%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

1% Decrease	Current Single Discount Rate Assumption	1% Increase
6.00%	7.00%	8.00%
\$ 3,405,407,303	\$ 2,173,359,746	\$ 1,145,205,248

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	28,750
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	32,111
Active Plan Members	<u>35,206</u>
Total Plan Members	96,067

SECTION E

SUMMARY OF BENEFITS

Summary of Benefits

Covered Members	Any full-time or regular part-time employee of an employer as defined under W.S. 9-3-402(a)(vii)
Tier	Members who join the State of Wyoming Retirement System by August 31, 2012 are in Tier 1, while members who join on or after September 1, 2012 are in Tier 2.
Final Average Salary	For Tier 1 member: employee's average annual salary for the highest paid three continuous years of service. For Tier 2 member: employee's average annual salary for the highest paid five continuous years of service.
Service Retirement	
Eligibility	Tier 1 members may retire upon normal retirement on the date he/she attains age 60 with four or more years of service while Tier 2 members may retire upon normal retirement on the date he/she attains age 65 with four or more years of service. All employees may also retire upon normal retirement on the date that the sum of the member's age and service is at least 85. Tier 1 members are eligible for a reduced benefit at age 50 with four or more years of service and Tier 2 members are eligible for a reduced benefit at age 55 with four or more years of service. All members are eligible for a reduced benefit at any age with 25 or more years of service.
Monthly Benefit	For Tier 1 member: 2.125% of employee's Final Average Salary for each year of credited service for the first 15 years of service credit plus 2.25% of Final Average Salary for any years of service credit exceeding 15 years. For Tier 2 member: 2.000% of employee's Final (5-year) Average Salary for each year of credited service. This amount is reduced by 5.00% per year that the employee is under age 60 for Tier 1 and under age 65 for Tier 2. However, members retiring with a combined age and service of at least 85 receive an unreduced benefit. Employees hired prior to July 1, 1981 may be entitled to benefits earned under a different formula.
Vesting	Any employee who has left employment with four or more years of service, and who has not withdrawn accumulated contributions, is eligible to receive the above benefit or can elect to receive a lump-sum refund of employee contributions with interest. An employee who terminates with less than four years of service is only eligible for the lump-sum benefit.

Disability Benefit

Eligibility	Ten or more years of service.
Benefit	Service retirement benefit earned as of the date of disability, payable immediately.
Park Rangers	Effective March 5, 2015, for eligible peace officers as defined under W.S. 6-1-104(a)(vi)(P) whose disability is duty-related, the member shall be eligible immediately for a benefit of 62.5% of the member's final salary.

Pre-retirement Death Benefit

Eligibility	No age or service requirements.
Benefit	A lump sum equal to two times the employee contributions with interest. If the employee is vested, the beneficiary can elect, in lieu of this lump sum, to receive a monthly annuity equal to the actuarial equivalent of the retirement benefit that would be due the employee.
Park Rangers	Effective March 5, 2015, for eligible peace officers as defined under W.S. 6-1-104(a)(vi)(P) whose death is duty-related, the member shall be eligible immediately for a benefit of 62.5% of member's final actual salary, payable to the surviving spouse plus 6% of the member's final actual salary for each unmarried child under age 18. Payment shall not exceed the member's final actual salary.

Contributions

Employee	9.00% of salary
Employer	9.12% of salary plus an additional 1.00% for park rangers.
	Per Enrolled Act No. 65, both employee and employer contribution rates will increase 0.25% on July 1, 2021.
Interest	3.00% annually (0.00% for non-vested members).

Cost-of-Living Improvements W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change.



Optional Forms of Payment

All options include the choice to elect a reduced benefit with a self-funded annual COLA of 1%, 2%, or 3% per year. COLAs commence on the July 1st following the two-year anniversary of retirement.

- | | |
|-----------|---|
| Option 1 | Monthly benefit for life with a lump-sum death benefit equal to the excess (if any) of the employee contributions with interest over the total benefits received. |
| Option 2 | Monthly benefit for life. Upon death, 100% of the benefit continues to be paid to the beneficiary. |
| Option 2P | Monthly benefit for life. Upon death, 100% of the benefit continues to be paid to the beneficiary. Benefit reverts to Option 1 amount but without the cash refund feature upon beneficiary death. |
| Option 3 | Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary. |
| Option 3P | Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary. Benefit reverts to Option 1 amount but without the cash refund feature upon beneficiary death. |
| Option 4a | Monthly benefit for life with a guarantee of 120 monthly payments |
| Option 4b | Monthly benefit for life with a guarantee of 240 monthly payments |
| Option 5 | The largest possible monthly benefit payable for life with no lump-sum death benefit. |

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Summary of Actuarial Assumptions and Methods

The following methods and assumptions were used in preparing the January 1, 2020 actuarial valuation report.

1. Valuation Date

The valuation date for any given year is January 1st, the first day of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

2. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal (EAN) actuarial cost method, amortized as a level percentage of payroll. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) the rate that will amortize the unfunded actuarial accrued liability (UAAL).

- a. The valuation is prepared on the projected benefit basis, under which the present value, at the investment return rate assumed to be earned in the future (currently 7.00%), of each participant's expected benefit payable at retirement or death is determined, based on his/her age, service, sex and compensation. The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his/her terminating with a service, disability, or survivor's benefit. Future salary increases are also anticipated. The present value of the expected benefits payable for the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Fund on account of the present group of participants and beneficiaries.
- b. The employer contributions required to support the benefits of the Fund are determined using a level funding approach, and consist of a normal cost contribution and a unfunded accrued liability contribution.
- c. The normal cost contribution is determined using the "entry age normal" actuarial cost method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his/her behalf based on the benefits provisions applicable for the individual member.
- d. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability. Amortization bases are established each year and amortized based on the Board's policy. The Board's policy consists of amortizing the unfunded liability as of January 1, 2018, over a closed 30 year period with each subsequent amortization base created as a result of year to year experience changes over individual 20 year closed periods. The current year amortization base is determined by taking the current unfunded liability less the outstanding amounts of prior year bases..



3. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income, with interest, dividends, and other income recognized immediately. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses. An adjustment is made if the actuarial value is not within 20% of the Market Value. For any year following a year in which the 20% of market value adjustment was applied, the actuarial value is determined as if the adjustment was not applied in the previous year.

4. Economic Assumptions

a. Investment return

7.00% per year, compounded annually, composed of an assumed 2.25% inflation rate and a 4.75% net real rate of return. This rate represents the assumed return, net of investment expenses.

b. Salary increase rate

Service	Rate	Service	Rate
1	6.50%	14	3.50%
2	6.50%	15	3.25%
3	6.50%	16	3.25%
4	6.00%	17	3.25%
5	5.25%	18	3.25%
6	4.75%	19	3.00%
7	4.25%	20	3.00%
8	4.00%	21	2.75%
9	4.00%	22	2.75%
10	4.00%	23	2.75%
11	3.75%	24	2.75%
12	3.50%	25	2.50%
13	3.50%	25+	2.50%

c. Payroll growth rate

In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 2.50% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

d. Cost-of-Living adjustment

No cost-of-living adjustment is assumed since the policy for providing the benefit requires Board approval to make the recommendation to the Joint Appropriations Committee and the funded level of the plan shows a cost-of-living requirement would not be permitted.

5. Demographic Assumptions

a. Mortality

Healthy Pre-Retirement Mortality:

RP-2014 Employee Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Healthy Post-Retirement Mortality:

RP-2014 Healthy Annuitant Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 88%

Disabled Mortality

RP-2014 Disabled Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Age	Pre-Retirement		Post-Retirement		Disabled	
	Projected to 2020 using Scale MP-2017					
	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.04%	0.01%	0.04%	0.02%
25	0.05%	0.02%	0.06%	0.03%	0.20%	0.09%
30	0.05%	0.02%	0.09%	0.06%	0.50%	0.24%
35	0.06%	0.03%	0.13%	0.10%	0.92%	0.45%
40	0.07%	0.04%	0.19%	0.14%	1.32%	0.68%
45	0.09%	0.06%	0.27%	0.18%	1.63%	0.90%
50	0.16%	0.11%	0.38%	0.23%	1.90%	1.14%
55	0.27%	0.17%	0.55%	0.32%	2.24%	1.44%
60	0.47%	0.25%	0.78%	0.47%	2.65%	1.73%
65	0.83%	0.36%	1.10%	0.70%	3.17%	2.05%
70	1.34%	0.60%	1.62%	1.07%	3.91%	2.67%
75			2.54%	1.74%	5.14%	3.87%
80			4.23%	2.93%	7.24%	5.83%
85			7.37%	5.14%	10.78%	8.73%
90			13.01%	9.14%	16.56%	12.86%
95			20.87%	15.23%	23.60%	18.94%
100			30.32%	23.24%	31.55%	27.12%

b. Disability and Withdrawal

Age	Disability		Withdrawal		Withdrawal		
	Male	Female	Ultimate		Service	First five years	
			Male	Female		Male	Female
20	0.01%	0.01%	11.00%	10.00%	1	22%	25%
25	0.01%	0.01%	11.00%	10.00%	2	18%	21%
30	0.01%	0.01%	6.00%	6.00%	3	14%	15%
35	0.01%	0.01%	5.00%	5.00%	4	13%	15%
40	0.01%	0.01%	4.00%	5.00%	5	13%	14%
45	0.02%	0.02%	4.00%	5.00%			
50	0.12%	0.05%	3.00%	4.00%			
55	0.24%	0.12%	3.00%	4.00%			
60	0.24%	0.24%	3.00%	4.00%			

c. Retirement Rates

Age	Retirement	
	Unreduced	Reduced
<50	15.0%	1.0%
50	15.0%	0.5%
51	15.0%	0.5%
52	15.0%	0.5%
53	15.0%	0.5%
54	15.0%	0.5%
55	17.0%	1.0%
56	17.0%	1.0%
57	15.0%	1.0%
58	15.0%	1.0%
59	15.0%	2.5%
60	13.0%	2.5%
61	13.0%	2.5%
62	18.0%	2.5%
63	15.0%	2.5%
64	15.0%	2.5%
65	25.0%	
66	30.0%	
67	28.0%	
68	25.0%	
69	25.0%	
70	15.0%	
71	15.0%	
72	15.0%	
73	15.0%	
74	15.0%	
75	15.0%	
76	15.0%	
77	15.0%	
78	15.0%	
79	15.0%	
80+	100.0%	

6. Other Assumptions

- a. Percent married: 85.00% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)
- b. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
- c. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.
- d. Percent electing deferred termination benefit: Vested terminating members are assumed to elect a refund or a deferred benefit. It is assumed that 25% of active members who terminate with a deferred vested benefit will elect to have their contributions refunded.
- e. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available, which for this plan is age 60 (65 for Tier 2).
- f. No benefit amount data is available for members entitled to deferred benefits. The benefit is estimated using the final average compensation and service provided by WRS.
- g. There will be no recoveries once disabled. We assume all members are totally disabled.
- h. No surviving spouse will remarry.
- i. Administrative expenses: Assumed to be the average of the prior two years, with each year projected at 2.50% to the valuation date.
- j. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pay represents amount paid to members during the year ended on the valuation date.
- k. Decrement timing: Decrements of all types are assumed to occur mid-year.
- l. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
- m. Decrement relativity: Decrement rates are converted to probabilities in order to account for multiple decrements.
- n. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in the report, and the actual payroll payable at the time contributions are made.
- o. Benefit Service: All members are assumed to accrue one year of service each year. Exact fractional service is used to determine the amount of benefit payable.

Experience Analysis

An experience study was conducted on behalf of all WRS' plans covering the five year period ending December 31, 2016. That study provided a detailed analysis concerning the development of the long term inflation rate, real rate of return and discount rate. The study also analyzed each major actuarial assumption (e.g. mortality, salary increases, retirement, termination and disability) and proposed assumptions consistent with the findings. For further information on the experience study and related assumption recommendation, the reader is directed to request the December 31, 2016 Wyoming Retirement System Experience Study.

SECTION G

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 Federal Reserve) 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 **Projection of Plan 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 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.

Single Discount Rate Development

Projection of Contributions

Ending December 31 for 2020 to 2069

Year	Projected Payroll for Current Employees	Payroll for Future Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Employer Contributions Related to Payroll of Future Employees	Total Contributions
	(a)	(b)=max(0,(c)-(a))	(c)	(d)	(e)=(a)*ER%	(f) = (b)*netER%	(g)=(d)+(e)+(f)
2020	\$ 1,780,467,331	\$ 44,511,683	\$ 1,824,979,015	\$ 165,086,190	\$ 163,453,468	\$ 3,756,829	\$ 332,296,487
2021	1,765,126,998	105,476,492	1,870,603,490	161,067,839	163,185,991	9,429,699	333,683,529
2022	1,664,223,627	253,144,950	1,917,368,577	153,940,686	155,937,754	22,649,359	332,527,799
2023	1,582,395,091	382,507,700	1,965,302,791	146,408,546	148,307,900	34,244,636	328,961,082
2024	1,511,978,985	502,456,376	2,014,435,361	139,858,056	141,672,431	44,965,892	326,496,379
2025	1,448,839,131	615,957,114	2,064,796,245	134,017,620	135,756,227	55,056,140	324,829,987
2026	1,391,146,186	725,269,965	2,116,416,151	128,681,022	130,350,398	64,748,550	323,779,970
2027	1,335,087,384	834,239,171	2,169,326,555	123,495,583	125,097,688	74,407,345	323,000,616
2028	1,279,260,698	944,299,021	2,223,559,719	118,331,615	119,866,727	84,174,174	322,372,516
2029	1,223,940,576	1,055,208,136	2,279,148,712	113,214,503	114,683,232	94,039,135	321,936,870
2030	1,168,350,260	1,167,777,170	2,336,127,430	108,072,399	109,474,419	104,083,970	321,630,788
2031	1,112,396,233	1,282,134,383	2,394,530,616	102,896,652	104,231,527	114,329,232	321,457,411
2032	1,056,505,733	1,397,888,148	2,454,393,881	97,726,780	98,994,587	124,747,668	321,469,035
2033	1,000,938,594	1,514,815,134	2,515,753,728	92,586,820	93,787,946	135,324,748	321,699,514
2034	945,431,957	1,633,215,614	2,578,647,571	87,452,456	88,586,974	146,090,402	322,129,832
2035	890,064,565	1,753,049,195	2,643,113,760	82,330,972	83,399,050	157,043,549	322,773,571
2036	834,526,756	1,874,664,848	2,709,191,604	77,193,725	78,195,157	168,214,774	323,603,656
2037	778,507,306	1,998,414,088	2,776,921,394	72,011,926	72,946,135	179,633,377	324,591,438
2038	722,504,487	2,123,839,942	2,846,344,429	66,831,665	67,698,670	191,256,599	325,786,934
2039	667,158,175	2,250,344,865	2,917,503,040	61,712,131	62,512,721	203,030,117	327,254,969
2040	612,720,993	2,377,719,623	2,990,440,616	56,676,692	57,411,957	214,933,270	329,021,919
2041	559,354,845	2,505,846,786	3,065,201,631	51,740,323	52,411,549	226,955,490	331,107,362
2042	507,500,356	2,634,331,316	3,141,831,672	46,943,783	47,552,783	239,060,794	333,557,360
2043	457,116,785	2,763,260,679	3,220,377,464	42,283,303	42,831,843	251,254,694	336,369,840
2044	408,443,538	2,892,443,363	3,300,886,901	37,781,027	38,271,160	263,515,377	339,567,564
2045	362,215,199	3,021,193,875	3,383,409,074	33,504,906	33,939,564	275,781,486	343,225,956
2046	318,680,503	3,149,313,798	3,467,994,301	29,477,947	29,860,363	288,033,993	347,372,303
2047	277,958,010	3,276,736,149	3,554,694,159	25,711,116	26,044,666	300,254,110	352,009,892
2048	240,292,070	3,403,269,443	3,643,561,513	22,227,016	22,515,367	312,410,468	357,152,851
2049	205,751,018	3,528,899,533	3,734,650,551	19,031,969	19,278,870	324,486,294	362,797,133
2050	174,410,845	3,653,605,970	3,828,016,815	16,133,003	16,342,296	336,463,018	368,938,317
2051	146,343,021	3,777,374,214	3,923,717,235	13,536,729	13,712,341	348,321,541	375,570,611
2052	121,745,895	3,900,064,271	4,021,810,166	11,261,495	11,407,590	360,038,658	382,707,743
2053	100,724,669	4,021,630,751	4,122,355,420	9,317,032	9,437,902	371,610,507	390,365,441
2054	82,976,106	4,142,438,200	4,225,414,306	7,675,290	7,774,861	383,075,290	398,525,441
2055	68,076,415	4,262,973,249	4,331,049,664	6,297,068	6,378,760	394,482,930	407,158,758
2056	55,568,275	4,383,757,631	4,439,325,906	5,140,065	5,206,747	405,886,079	416,232,891
2057	45,133,025	4,505,176,029	4,550,309,054	4,174,805	4,228,964	417,324,121	425,727,890
2058	36,436,089	4,627,630,691	4,664,066,780	3,370,338	3,414,061	428,837,016	435,621,415
2059	29,231,904	4,751,436,546	4,780,668,450	2,703,951	2,739,029	440,456,625	445,899,605
2060	23,344,769	4,876,840,392	4,900,185,161	2,159,391	2,187,405	452,207,934	456,554,730
2061	18,525,779	5,004,164,011	5,022,689,790	1,713,635	1,735,866	464,122,428	467,571,929
2062	14,634,990	5,133,622,045	5,148,257,035	1,353,737	1,371,299	476,221,709	478,946,745
2063	11,503,881	5,265,459,580	5,276,963,461	1,064,109	1,077,914	488,530,119	490,672,142
2064	8,984,731	5,399,902,817	5,408,887,548	831,088	841,869	501,070,818	502,743,775
2065	6,972,978	5,537,136,759	5,544,109,737	645,000	653,368	513,862,708	515,161,076
2066	5,380,971	5,677,331,509	5,682,712,480	497,740	504,197	526,922,786	527,924,723
2067	4,146,138	5,820,634,154	5,824,780,292	383,518	388,493	540,265,666	541,037,677
2068	3,181,267	5,967,218,532	5,970,399,799	294,267	298,085	553,908,208	554,500,560
2069	2,420,273	6,117,239,521	6,119,659,794	223,875	226,780	567,865,091	568,315,746



Single Discount Rate Development Projection of Contributions Ending December 31 for 2070 to 2119 (concluded)

Year	Projected Payroll for Current Employees (a)	Payroll for Future Employees (b)=max(0,(c)-(a))	Total Employee Payroll (c)	Contributions from Current Employees (d)	Employer Contributions for Current Employees (e)=(a)*ER%	Employer Contributions Related to Payroll of Future Employees (f) = (b)*netER%	Total Contributions (g)=(d)+(e)+(f)
2070	\$ 1,820,715	\$ 6,270,830,574	\$ 6,272,651,289	\$ 168,416	\$ 170,601	\$ 582,148,945	\$ 582,487,962
2071	1,338,412	6,428,129,159	6,429,467,571	123,803	125,409	596,772,547	\$ 597,021,759
2072	958,883	6,589,245,377	6,590,204,260	88,697	89,847	611,746,377	611,924,921
2073	674,272	6,754,285,095	6,754,959,367	62,370	63,179	627,080,455	627,206,004
2074	455,160	6,923,378,191	6,923,833,351	42,102	42,648	642,787,165	642,871,915
2075	295,014	7,096,634,171	7,096,929,185	27,289	27,643	658,877,108	658,932,040
2076	181,982	7,274,170,433	7,274,352,415	16,833	17,052	675,361,529	675,395,414
2077	105,291	7,456,105,934	7,456,211,225	9,739	9,866	692,251,876	692,271,481
2078	57,086	7,642,559,420	7,642,616,506	5,280	5,349	709,559,833	709,570,462
2079	28,259	7,833,653,660	7,833,681,919	2,614	2,648	727,297,368	727,302,630
2080	12,183	8,029,511,784	8,029,523,967	1,127	1,142	745,476,375	745,478,644
2081	4,107	8,230,257,959	8,230,262,066	380	385	764,108,631	764,109,396
2082	903	8,436,017,715	8,436,018,618	84	85	783,206,033	783,206,202
2083	79	8,646,919,004	8,646,919,083	7	7	802,780,681	802,780,695
2084	38	8,863,092,022	8,863,092,060	3	4	822,844,849	822,844,856
2085	0	9,084,669,362	9,084,669,362	0	0	843,411,011	843,411,011
2086	0	9,311,786,096	9,311,786,096	0	0	864,491,840	864,491,840
2087	0	9,544,580,748	9,544,580,748	0	0	886,100,300	886,100,300
2088	0	9,783,195,267	9,783,195,267	0	0	908,249,644	908,249,644
2089	0	10,027,775,149	10,027,775,149	0	0	930,953,423	930,953,423
2090	0	10,278,469,528	10,278,469,528	0	0	954,225,499	954,225,499
2091	0	10,535,431,266	10,535,431,266	0	0	978,080,046	978,080,046
2092	0	10,798,817,048	10,798,817,048	0	0	1,002,531,578	1,002,531,578
2093	0	11,068,787,474	11,068,787,474	0	0	1,027,594,955	1,027,594,955
2094	0	11,345,507,161	11,345,507,161	0	0	1,053,285,406	1,053,285,406
2095	0	11,629,144,840	11,629,144,840	0	0	1,079,618,536	1,079,618,536
2096	0	11,919,873,461	11,919,873,461	0	0	1,106,610,337	1,106,610,337
2097	0	12,217,870,298	12,217,870,298	0	0	1,134,277,199	1,134,277,199
2098	0	12,523,317,055	12,523,317,055	0	0	1,162,635,919	1,162,635,919
2099	0	12,836,399,981	12,836,399,981	0	0	1,191,703,714	1,191,703,714
2100	0	13,157,309,981	13,157,309,981	0	0	1,221,498,234	1,221,498,234
2101	0	13,486,242,731	13,486,242,731	0	0	1,252,037,576	1,252,037,576
2102	0	13,823,398,799	13,823,398,799	0	0	1,283,340,301	1,283,340,301
2103	0	14,168,983,769	14,168,983,769	0	0	1,315,425,442	1,315,425,442
2104	0	14,523,208,363	14,523,208,363	0	0	1,348,312,519	1,348,312,519
2105	0	14,886,288,572	14,886,288,572	0	0	1,382,021,552	1,382,021,552
2106	0	15,258,445,786	15,258,445,786	0	0	1,416,573,072	1,416,573,072
2107	0	15,639,906,931	15,639,906,931	0	0	1,451,988,136	1,451,988,136
2108	0	16,030,904,604	16,030,904,604	0	0	1,488,288,335	1,488,288,335
2109	0	16,431,677,219	16,431,677,219	0	0	1,525,495,811	1,525,495,811
2110	0	16,842,469,149	16,842,469,149	0	0	1,563,633,265	1,563,633,265
2111	0	17,263,530,878	17,263,530,878	0	0	1,602,723,971	1,602,723,971
2112	0	17,695,119,150	17,695,119,150	0	0	1,642,791,785	1,642,791,785
2113	0	18,137,497,129	18,137,497,129	0	0	1,683,861,164	1,683,861,164
2114	0	18,590,934,557	18,590,934,557	0	0	1,725,957,177	1,725,957,177
2115	0	19,055,707,921	19,055,707,921	0	0	1,769,105,518	1,769,105,518
2116	0	19,532,100,619	19,532,100,619	0	0	1,813,332,523	1,813,332,523
2117	0	20,020,403,134	20,020,403,134	0	0	1,858,665,187	1,858,665,187
2118	0	20,520,913,212	20,520,913,212	0	0	1,905,131,173	1,905,131,173
2119	0	21,033,936,042	21,033,936,042	0	0	1,952,758,837	1,952,758,837



Single Discount Rate Development

Projection of Plan Net Position

Ending December 31 for 2020 to 2069

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.000%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2020	\$ 7,790,558,842	\$ 331,071,015	\$ 625,747,935	\$ 7,533,380	\$ 805,893,355	\$ 8,294,241,897
2021	8,294,241,897	333,683,529	657,004,475	7,295,354	569,221,073	8,532,846,670
2022	8,532,846,670	332,527,799	676,664,154	7,477,737	585,200,914	8,766,433,492
2023	8,766,433,492	328,961,082	695,969,433	7,664,681	600,758,579	8,992,519,039
2024	8,992,519,039	326,496,379	718,044,397	7,856,298	615,733,612	9,208,848,334
2025	9,208,848,334	324,829,987	739,479,575	8,052,705	630,075,025	9,416,221,066
2026	9,416,221,066	323,779,970	761,197,280	8,254,023	643,800,796	9,614,350,529
2027	9,614,350,529	323,000,616	782,544,112	8,460,374	656,901,440	9,803,248,099
2028	9,803,248,099	322,372,516	802,928,206	8,671,883	669,394,003	9,983,414,529
2029	9,983,414,529	321,936,870	823,160,137	8,888,680	681,287,063	10,154,589,645
2030	10,154,589,645	321,630,788	842,870,805	9,110,897	692,572,938	10,316,811,669
2031	10,316,811,669	321,457,411	862,093,884	9,338,669	703,253,248	10,470,089,775
2032	10,470,089,775	321,469,035	880,557,324	9,572,136	713,339,792	10,614,769,142
2033	10,614,769,142	321,699,514	898,187,426	9,811,440	722,860,426	10,751,330,216
2034	10,751,330,216	322,129,832	915,479,789	10,056,726	731,831,072	10,879,754,605
2035	10,879,754,605	322,773,571	932,470,913	10,308,144	740,249,647	10,999,998,766
2036	10,999,998,766	323,603,656	948,763,575	10,565,847	748,125,834	11,112,398,833
2037	11,112,398,833	324,591,438	964,238,887	10,829,993	755,486,262	11,217,407,654
2038	11,217,407,654	325,786,934	978,239,862	11,100,743	762,386,952	11,316,240,935
2039	11,316,240,935	327,254,969	990,916,618	11,378,262	768,910,063	11,410,111,087
2040	11,410,111,087	329,021,919	1,002,514,951	11,662,718	775,132,907	11,500,088,244
2041	11,500,088,244	331,107,362	1,012,222,454	11,954,286	781,159,016	11,588,177,882
2042	11,588,177,882	333,557,360	1,020,159,116	12,253,144	787,126,222	11,676,449,204
2043	11,676,449,204	336,369,840	1,025,917,681	12,559,472	793,193,305	11,767,535,196
2044	11,767,535,196	339,567,564	1,029,149,834	12,873,459	799,557,337	11,864,636,803
2045	11,864,636,803	343,225,956	1,030,288,297	13,195,295	806,430,081	11,970,809,248
2046	11,970,809,248	347,372,303	1,028,219,360	13,525,178	814,064,657	12,090,501,671
2047	12,090,501,671	352,009,892	1,023,243,899	13,863,307	822,762,259	12,228,166,615
2048	12,228,166,615	357,152,851	1,015,241,995	14,209,890	832,839,169	12,388,706,749
2049	12,388,706,749	362,797,133	1,004,157,220	14,565,137	844,640,369	12,577,421,895
2050	12,577,421,895	368,938,317	990,128,689	14,929,266	858,531,901	12,799,834,157
2051	12,799,834,157	375,570,611	973,158,062	15,302,497	874,900,047	13,061,844,257
2052	13,061,844,257	382,707,743	953,373,671	15,685,060	894,153,908	13,369,647,177
2053	13,369,647,177	390,365,441	931,309,581	16,077,186	916,709,288	13,729,335,139
2054	13,729,335,139	398,525,441	907,382,650	16,479,116	942,977,665	14,146,976,479
2055	14,146,976,479	407,158,758	882,027,205	16,891,094	973,367,870	14,628,584,808
2056	14,628,584,808	416,232,891	855,269,793	17,313,371	1,008,298,817	15,180,533,351
2057	15,180,533,351	425,727,890	827,221,331	17,746,205	1,048,212,119	15,809,505,824
2058	15,809,505,824	435,621,415	798,182,990	18,189,860	1,093,564,496	16,522,318,885
2059	16,522,318,885	445,899,605	768,234,333	18,644,607	1,144,829,890	17,326,169,440
2060	17,326,169,440	456,554,730	737,601,502	19,110,722	1,202,504,029	18,228,515,975
2061	18,228,515,975	467,571,929	706,463,446	19,588,490	1,267,102,327	19,237,138,296
2062	19,237,138,296	478,946,745	674,999,538	20,078,202	1,339,163,036	20,360,170,337
2063	20,360,170,337	490,672,142	643,404,807	20,580,157	1,419,248,569	21,606,106,084
2064	21,606,106,084	502,743,775	611,820,903	21,094,661	1,507,948,469	22,983,882,764
2065	22,983,882,764	515,161,076	580,364,628	21,622,028	1,605,884,295	24,502,941,479
2066	24,502,941,479	527,924,723	549,131,544	22,162,579	1,713,713,647	26,173,285,727
2067	26,173,285,727	541,037,677	518,242,945	22,716,643	1,832,132,688	28,005,496,504
2068	28,005,496,504	554,500,560	487,815,764	23,284,559	1,961,878,072	30,010,774,813
2069	30,010,774,813	568,315,746	457,933,253	23,866,673	2,103,731,077	32,201,021,710



Single Discount Rate Development

Projection of Plan Net Position

Ending December 31 for 2070 to 2119 (concluded)

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.000%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2070	\$ 32,201,021,710	\$ 582,487,962	\$ 428,664,890	\$ 24,463,340	\$ 2,258,522,535	\$ 34,588,903,978
2071	34,588,903,978	597,021,759	400,058,477	25,074,924	2,427,137,620	37,187,929,956
2072	37,187,929,956	611,924,921	372,161,047	25,701,797	2,610,520,554	40,012,512,587
2073	40,012,512,587	627,206,004	345,044,072	26,344,342	2,809,678,064	43,078,008,241
2074	43,078,008,241	642,871,915	318,758,289	27,002,950	3,025,683,574	46,400,802,491
2075	46,400,802,491	658,932,040	293,362,862	27,678,024	3,259,682,348	49,998,375,993
2076	49,998,375,993	675,395,414	268,915,800	28,369,974	3,512,896,332	53,889,381,966
2077	53,889,381,966	692,271,481	245,470,762	29,079,224	3,786,629,717	58,093,733,178
2078	58,093,733,178	709,570,462	223,080,043	29,806,204	4,082,274,933	62,632,692,325
2079	62,632,692,325	727,302,630	201,789,258	30,551,359	4,401,319,137	67,528,973,475
2080	67,528,973,475	745,478,644	181,636,552	31,315,143	4,745,351,354	72,806,851,778
2081	72,806,851,778	764,109,396	162,652,099	32,098,022	5,116,070,163	78,492,281,215
2082	78,492,281,215	783,206,202	144,859,114	32,900,473	5,515,291,918	84,613,019,749
2083	84,613,019,749	802,780,695	128,273,077	33,722,984	5,944,959,528	91,198,763,910
2084	91,198,763,910	822,844,856	112,900,687	34,566,059	6,407,151,913	98,281,293,933
2085	98,281,293,933	843,411,011	98,739,096	35,430,211	6,904,094,195	105,894,629,831
2086	105,894,629,831	864,491,840	85,775,876	36,315,966	7,438,168,619	114,075,198,448
2087	114,075,198,448	886,100,300	73,989,101	37,223,865	8,011,926,248	122,862,012,031
2088	122,862,012,031	908,249,644	63,348,055	38,154,462	8,628,099,432	132,296,858,590
2089	132,296,858,590	930,953,423	53,812,998	39,108,323	9,289,615,146	142,424,505,838
2090	142,424,505,838	954,225,499	45,335,793	40,086,031	9,999,609,243	153,292,918,756
2091	153,292,918,756	978,080,046	37,861,132	41,088,182	10,761,441,642	164,953,491,131
2092	164,953,491,131	1,002,531,578	31,327,561	42,115,386	11,578,712,501	177,461,292,262
2093	177,461,292,262	1,027,594,955	25,668,788	43,168,271	12,455,279,442	190,875,329,600
2094	190,875,329,600	1,053,285,406	20,814,979	44,247,478	13,395,275,890	205,258,828,440
2095	205,258,828,440	1,079,618,536	16,694,127	45,353,665	14,403,130,609	220,679,529,793
2096	220,679,529,793	1,106,610,337	13,233,500	46,487,506	15,483,588,499	237,210,007,623
2097	237,210,007,623	1,134,277,199	10,360,902	47,649,694	16,641,732,761	254,928,006,988
2098	254,928,006,988	1,162,635,919	8,005,830	48,840,937	17,883,008,530	273,916,804,669
2099	273,916,804,669	1,191,703,714	6,100,390	50,061,960	19,213,248,083	294,265,594,117
2100	294,265,594,117	1,221,498,234	4,580,163	51,313,509	20,638,697,760	316,069,896,439
2101	316,069,896,439	1,252,037,576	3,385,375	52,596,347	22,166,046,692	339,431,998,986
2102	339,431,998,986	1,283,340,301	2,461,126	53,911,255	23,802,457,494	364,461,424,400
2103	364,461,424,400	1,315,425,442	1,758,074	55,259,037	25,555,599,076	391,275,431,807
2104	391,275,431,807	1,348,312,519	1,232,811	56,640,513	27,433,681,714	419,999,552,716
2105	419,999,552,716	1,382,021,552	847,803	58,056,525	29,445,494,565	450,768,164,505
2106	450,768,164,505	1,416,573,072	571,283	59,507,939	31,600,445,814	483,725,104,169
2107	483,725,104,169	1,451,988,136	376,842	60,995,637	33,908,605,656	519,024,325,482
2108	519,024,325,482	1,488,288,335	243,140	62,520,528	36,380,752,298	556,830,602,447
2109	556,830,602,447	1,525,495,811	153,295	64,083,541	39,028,421,233	597,320,282,656
2110	597,320,282,656	1,563,633,265	94,311	65,685,630	41,863,957,988	640,682,093,967
2111	640,682,093,967	1,602,723,971	56,575	67,327,770	44,900,574,610	687,118,008,203
2112	687,118,008,203	1,642,791,785	33,071	69,010,965	48,152,410,155	736,844,166,107
2113	736,844,166,107	1,683,861,164	18,782	70,736,239	51,634,595,453	790,091,867,703
2114	790,091,867,703	1,725,957,177	10,351	72,504,645	55,363,322,449	847,108,632,334
2115	847,108,632,334	1,769,105,518	5,519	74,317,261	59,355,918,421	908,159,333,493
2116	908,159,333,493	1,813,332,523	2,824	76,175,192	63,630,925,432	973,527,413,431
2117	973,527,413,431	1,858,665,187	1,376	78,079,572	68,208,185,360	1,043,516,183,030
2118	1,043,516,183,030	1,905,131,173	628	80,031,562	73,108,930,897	1,118,450,212,909
2119	1,118,450,212,909	1,952,758,837	361	82,032,351	78,355,882,929	1,198,676,821,963



Single Discount Rate Development

Present Values of Projected Benefits

Ending December 31 for 2020 to 2069

Year	Projected Beginning Plan Net Position	Projected Benefit Payments	Funded Portion of Projected Benefit Payments	Unfunded Portion of Projected 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 All Benefit Payments using Single Discount Rate (SDR)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^a ((a)-.5)	(g)=(e)*vf ^a ((a)-.5)	(h)=((c)/(1+SDR))^((a)-.5)
2020	\$ 7,790,558,842	\$ 625,747,935	\$ 625,747,935	\$ 0	\$ 604,933,362	\$ 0	\$ 604,933,362
2021	8,294,241,897	657,004,475	657,004,475	0	593,598,317	0	593,598,317
2022	8,532,846,670	676,664,154	676,664,154	0	571,365,122	0	571,365,122
2023	8,766,433,492	695,969,433	695,969,433	0	549,220,759	0	549,220,759
2024	8,992,519,039	718,044,397	718,044,397	0	529,571,127	0	529,571,127
2025	9,208,848,334	739,479,575	739,479,575	0	509,700,906	0	509,700,906
2026	9,416,221,066	761,197,280	761,197,280	0	490,346,040	0	490,346,040
2027	9,614,350,529	782,544,112	782,544,112	0	471,118,865	0	471,118,865
2028	9,803,248,099	802,928,206	802,928,206	0	451,767,104	0	451,767,104
2029	9,983,414,529	823,160,137	823,160,137	0	432,851,018	0	432,851,018
2030	10,154,589,645	842,870,805	842,870,805	0	414,220,268	0	414,220,268
2031	10,316,811,669	862,093,884	862,093,884	0	395,950,705	0	395,950,705
2032	10,470,089,775	880,557,324	880,557,324	0	377,972,682	0	377,972,682
2033	10,614,769,142	898,187,426	898,187,426	0	360,318,012	0	360,318,012
2034	10,751,330,216	915,479,789	915,479,789	0	343,229,007	0	343,229,007
2035	10,879,754,605	932,470,913	932,470,913	0	326,728,290	0	326,728,290
2036	10,999,998,766	948,763,575	948,763,575	0	310,688,852	0	310,688,852
2037	11,112,398,833	964,238,887	964,238,887	0	295,099,540	0	295,099,540
2038	11,217,407,654	978,239,862	978,239,862	0	279,798,556	0	279,798,556
2039	11,316,240,935	990,916,618	990,916,618	0	264,882,610	0	264,882,610
2040	11,410,111,087	1,002,514,951	1,002,514,951	0	250,451,372	0	250,451,372
2041	11,500,088,244	1,012,222,454	1,012,222,454	0	236,333,206	0	236,333,206
2042	11,588,177,882	1,020,159,116	1,020,159,116	0	222,603,976	0	222,603,976
2043	11,676,449,204	1,025,917,681	1,025,917,681	0	209,215,443	0	209,215,443
2044	11,767,535,196	1,029,149,834	1,029,149,834	0	196,144,464	0	196,144,464
2045	11,864,636,803	1,030,288,297	1,030,288,297	0	183,515,367	0	183,515,367
2046	11,970,809,248	1,028,219,360	1,028,219,360	0	171,165,277	0	171,165,277
2047	12,090,501,671	1,023,243,899	1,023,243,899	0	159,193,480	0	159,193,480
2048	12,228,166,615	1,015,241,995	1,015,241,995	0	147,615,482	0	147,615,482
2049	12,388,706,749	1,004,157,220	1,004,157,220	0	136,452,116	0	136,452,116
2050	12,577,421,895	990,128,689	990,128,689	0	125,743,755	0	125,743,755
2051	12,799,834,157	973,158,062	973,158,062	0	115,503,299	0	115,503,299
2052	13,061,844,257	953,373,671	953,373,671	0	105,752,436	0	105,752,436
2053	13,369,647,177	931,309,581	931,309,581	0	96,546,719	0	96,546,719
2054	13,729,335,139	907,382,650	907,382,650	0	87,912,401	0	87,912,401
2055	14,146,976,479	882,027,205	882,027,205	0	79,865,253	0	79,865,253
2056	14,628,584,808	855,269,793	855,269,793	0	72,376,112	0	72,376,112
2057	15,180,533,351	827,221,331	827,221,331	0	65,422,941	0	65,422,941
2058	15,809,505,824	798,182,990	798,182,990	0	58,996,606	0	58,996,606
2059	16,522,318,885	768,234,333	768,234,333	0	53,068,217	0	53,068,217
2060	17,326,169,440	737,601,502	737,601,502	0	47,618,838	0	47,618,838
2061	18,228,515,975	706,463,446	706,463,446	0	42,624,856	0	42,624,856
2062	19,237,138,296	674,999,538	674,999,538	0	38,062,116	0	38,062,116
2063	20,360,170,337	643,404,807	643,404,807	0	33,907,047	0	33,907,047
2064	21,606,106,084	611,820,903	611,820,903	0	30,133,266	0	30,133,266
2065	22,983,882,764	580,364,628	580,364,628	0	26,714,008	0	26,714,008
2066	24,502,941,479	549,131,544	549,131,544	0	23,622,765	0	23,622,765
2067	26,173,285,727	518,242,945	518,242,945	0	20,835,502	0	20,835,502
2068	28,005,496,504	487,815,764	487,815,764	0	18,329,162	0	18,329,162
2069	30,010,774,813	457,933,253	457,933,253	0	16,080,709	0	16,080,709



Single Discount Rate Development

Present Values of Projected Benefits

Ending December 31 for 2070 to 2119 (concluded)

Year	Projected Plan Net Position	Projected Benefit Payments	Funded Portion of Projected Benefit Payments	Unfunded Portion of Projected 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 All Benefit Payments using Single Discount Rate (SDR)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ⁿ ((a)-.5)	(g)=(e)*vf ⁿ ((a)-.5)	(h)=((c)/(1+SDR))^((a)-.5)
2070	\$ 32,201,021,710	\$ 428,664,890	\$ 428,664,890	\$ 0	\$ 14,068,155	\$ 0	\$ 14,068,155
2071	34,588,903,978	400,058,477	400,058,477	0	12,270,406	0	12,270,406
2072	37,187,929,956	372,161,047	372,161,047	0	10,667,990	0	10,667,990
2073	40,012,512,587	345,044,072	345,044,072	0	9,243,628	0	9,243,628
2074	43,078,008,241	318,758,289	318,758,289	0	7,980,785	0	7,980,785
2075	46,400,802,491	293,362,862	293,362,862	0	6,864,446	0	6,864,446
2076	49,998,375,993	268,915,800	268,915,800	0	5,880,752	0	5,880,752
2077	53,889,381,966	245,470,762	245,470,762	0	5,016,867	0	5,016,867
2078	58,093,733,178	223,080,043	223,080,043	0	4,260,982	0	4,260,982
2079	62,632,692,325	201,789,258	201,789,258	0	3,602,162	0	3,602,162
2080	67,528,973,475	181,636,552	181,636,552	0	3,030,294	0	3,030,294
2081	72,806,851,778	162,652,099	162,652,099	0	2,536,047	0	2,536,047
2082	78,492,281,215	144,859,114	144,859,114	0	2,110,861	0	2,110,861
2083	84,613,019,749	128,273,077	128,273,077	0	1,746,890	0	1,746,890
2084	91,198,763,910	112,900,687	112,900,687	0	1,436,954	0	1,436,954
2085	98,281,293,933	98,739,096	98,739,096	0	1,174,496	0	1,174,496
2086	105,894,629,831	85,775,876	85,775,876	0	953,551	0	953,551
2087	114,075,198,448	73,989,101	73,989,101	0	768,710	0	768,710
2088	122,862,012,031	63,348,055	63,348,055	0	615,098	0	615,098
2089	132,296,858,590	53,812,998	53,812,998	0	488,331	0	488,331
2090	142,424,505,838	45,335,793	45,335,793	0	384,490	0	384,490
2091	153,292,918,756	37,861,132	37,861,132	0	300,091	0	300,091
2092	164,953,491,131	31,327,561	31,327,561	0	232,061	0	232,061
2093	177,461,292,262	25,668,788	25,668,788	0	177,704	0	177,704
2094	190,875,329,600	20,814,979	20,814,979	0	134,674	0	134,674
2095	205,258,828,440	16,694,127	16,694,127	0	100,946	0	100,946
2096	220,679,529,793	13,233,500	13,233,500	0	74,785	0	74,785
2097	237,210,007,623	10,360,902	10,360,902	0	54,721	0	54,721
2098	254,928,006,988	8,005,830	8,005,830	0	39,517	0	39,517
2099	273,916,804,669	6,100,390	6,100,390	0	28,142	0	28,142
2100	294,265,594,117	4,580,163	4,580,163	0	19,746	0	19,746
2101	316,069,896,439	3,385,375	3,385,375	0	13,640	0	13,640
2102	339,431,998,986	2,461,126	2,461,126	0	9,268	0	9,268
2103	364,461,424,400	1,758,074	1,758,074	0	6,187	0	6,187
2104	391,275,431,807	1,232,811	1,232,811	0	4,055	0	4,055
2105	419,999,552,716	847,803	847,803	0	2,606	0	2,606
2106	450,768,164,505	571,283	571,283	0	1,641	0	1,641
2107	483,725,104,169	376,842	376,842	0	1,012	0	1,012
2108	519,024,325,482	243,140	243,140	0	610	0	610
2109	556,830,602,447	153,295	153,295	0	359	0	359
2110	597,320,282,656	94,311	94,311	0	207	0	207
2111	640,682,093,967	56,575	56,575	0	116	0	116
2112	687,118,008,203	33,071	33,071	0	63	0	63
2113	736,844,166,107	18,782	18,782	0	34	0	34
2114	790,091,867,703	10,351	10,351	0	17	0	17
2115	847,108,632,334	5,519	5,519	0	9	0	9
2116	908,159,333,493	2,824	2,824	0	4	0	4
2117	973,527,413,431	1,376	1,376	0	2	0	2
2118	1,043,516,183,030	628	628	0	1	0	1
2119	1,118,450,212,909	361	361	0	0	0	0
Totals	\$ 11,741,471,448	\$ 11,741,471,448	\$ 11,741,471,448	\$ 0	\$ 11,741,471,448	\$ 0	\$ 11,741,471,448



SECTION H

GLOSSARY OF TERMS

Glossary of Terms

Accrued Service	Service credited under the system that was rendered before the date of the actuarial valuation.
Actuarial Accrued Liability (AAL)	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."
Actuarial Assumptions	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.
Actuarial Cost Method	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.
Actuarial Equivalent	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.
Actuarial Gain (Loss)	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.
Actuarial Present Value (APV)	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.
Actuarial Valuation	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.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)	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

Amortization Method	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).
Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	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.
Covered-Employee Payroll	The payroll of employees that are provided with pensions through the pension plan.
Deferred Inflows and Outflows	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.
Deferred Retirement Option Program (DROP)	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.

Glossary of Terms

Discount Rate

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:

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.

Entry Age Actuarial Cost Method (EAN)

The EAN is a cost 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 ages(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.

Fiduciary Net Position

The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.

GASB

The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Money-Weighted Rate of Return

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.

Multiple-Employer Defined Benefit Pension Plan

A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.

Municipal Bond Rate

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.

Net Pension Liability (NPL)

The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.



Glossary of Terms

Other Postemployment Benefits (OPEB)	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.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
Total Pension Expense	<p>The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:</p> <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
Total Pension Liability (TPL)	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
Unfunded Actuarial Accrued Liability (UAAL)	The UAAL is the difference between actuarial accrued liability and valuation assets.
Valuation Assets	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.