

Wyoming Retirement System Wyoming State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund

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 State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund

Dear Board Members:

This report provides information required by the Wyoming State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund (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 State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund 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 State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund 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.

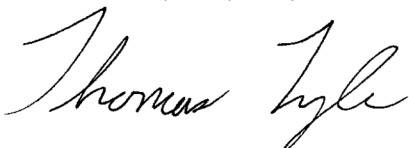
Paul T. Wood, Thomas A. Lyle, and Dana Woolfrey are members of the American Academy of Actuaries (MAAA) and are experienced in performing valuations for public retirement systems. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing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

Respectfully submitted,

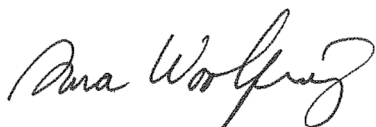
Gabriel, Roeder, Smith & Company

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	351	
- Inactive, Nonretired Members	78	
- Active Members	312	
- Total	741	
Covered Payroll	\$ 24,074,484	

Net Pension Liability

Total Pension Liability	\$ 201,538,831
Plan Fiduciary Net Position	166,211,709
Net Pension Liability	\$ 35,327,122
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	82.47 %
Net Pension Liability as a Percentage of Covered Payroll	146.74 %

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	\$ (6,433,404)
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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	\$ 2,359,906	\$ 1,093,950
Changes in assumptions	3,875,082	10,308,302
Net difference between projected and actual earnings on pension plan investments	5,881,154	15,285,017
Total	\$ 12,116,142	\$ 26,687,269

**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 slightly decrease as a percentage of payroll.
2. The unfunded liability is expected to decrease as a percentage of payroll each year in the future.
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 gradually increase 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 rolled forward to the 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 State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund. 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	\$	4,800,841
2. Interest on the Total Pension Liability		13,412,219
3. Current-Period Benefit Changes		0
4. Employee Contributions (made negative for addition here)		(3,932,180)
5. Projected Earnings on Plan Investments (made negative for addition here)		(10,656,201)
6. Pension Plan Administrative Expense		149,733
7. Other Changes in Plan Fiduciary Net Position		5,841
8. Recognition of Outflow (Inflow) of Resources due to Liabilities		(7,382,890)
9. Recognition of Outflow (Inflow) of Resources due to Assets		(2,830,767)
10. Total Pension Expense	\$	(6,433,404) *

* 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	\$	2,116,116
2. Assumption Changes (gains) or losses	\$	0
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		4.1594
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	\$	508,755
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	\$	508,755
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	\$	1,607,361
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	\$	1,607,361

B. Outflows (Inflows) of Resources due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$	(5,457,870)
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	\$	(1,091,574)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$	(4,366,296)



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	4.8205	4.8865	4.9676	4.4724	4.2551	4.1483	4.1594		Deferred Net (Inflows)/Outflows at Measurement Date
	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ -	\$ (1,821,706)	\$ 62,315	\$ (4,722,830)	\$ (2,017,522)	\$ 1,453,141	\$ 2,116,116		
2014	-	-	-	-	-	-	-	-	-
2015	-	(372,804)	-	-	-	-	-	(372,804)	(372,804)
2016	-	(372,804)	12,544	-	-	-	-	(360,260)	(360,260)
2017	-	(372,804)	12,544	(1,055,994)	-	-	-	(1,416,254)	(1,416,254)
2018	-	(372,804)	12,544	(1,055,994)	(474,142)	-	-	(1,890,396)	(1,890,396)
2019	-	(330,490)	12,544	(1,055,994)	(474,142)	350,298	-	(1,497,784)	(1,497,784)
2020	-	-	12,139	(1,055,994)	(474,142)	350,298	508,755	(658,944)	(658,944)
2021	-	-	-	(498,854)	(474,142)	350,298	508,755	(113,943)	(113,943)
2022	-	-	-	-	(120,954)	350,298	508,755	738,099	738,099
2023	-	-	-	-	-	51,949	508,755	560,704	560,704
2024	-	-	-	-	-	-	81,096	81,096	81,096
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ -	\$ (1,821,706)	\$ 62,315	\$ (4,722,830)	\$ (2,017,522)	\$ 1,453,141	\$ 2,116,116	\$ (4,930,486)	\$ 1,265,956

Assumption changes - Net (inflows)/outflows of resources

Recognition Period	4.8205	4.8865	4.9676	4.4724	4.2551	4.1483	4.1594		
	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ -	\$ 32,535,213	\$ (5,188,326)	\$ (22,946,444)	\$ 13,137,489	\$ (15,224,856)	\$ -		
2014	-	-	-	-	-	-	-	-	-
2015	-	6,658,183	-	-	-	-	-	6,658,183	6,658,183
2016	-	6,658,183	(1,044,433)	-	-	-	-	5,613,750	5,613,750
2017	-	6,658,183	(1,044,433)	(5,130,678)	-	-	-	483,072	483,072
2018	-	6,658,183	(1,044,433)	(5,130,678)	3,087,469	-	-	3,570,541	3,570,541
2019	-	5,902,481	(1,044,433)	(5,130,678)	3,087,469	(3,670,143)	-	(855,304)	(855,304)
2020	-	-	(1,010,594)	(5,130,678)	3,087,469	(3,670,143)	-	(6,723,946)	(6,723,946)
2021	-	-	-	(2,423,732)	3,087,469	(3,670,143)	-	(3,006,406)	(3,006,406)
2022	-	-	-	-	787,613	(3,670,143)	-	(2,882,530)	(2,882,530)
2023	-	-	-	-	-	(544,284)	-	(544,284)	(544,284)
2024	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ -	\$ 32,535,213	\$ (5,188,326)	\$ (22,946,444)	\$ 13,137,489	\$ (15,224,856)	\$ -	\$ 2,313,076	\$ (6,433,220)

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	\$ 3,410,288	\$ 10,785,198	\$ 682,472	\$ (8,825,212)	\$ 14,702,888	\$ (15,256,127)	\$ (5,457,870)		
2014	682,058	-	-	-	-	-	-	682,058	682,058
2015	682,058	2,157,040	-	-	-	-	-	2,839,098	2,839,098
2016	682,058	2,157,040	136,494	-	-	-	-	2,975,592	2,975,592
2017	682,058	2,157,040	136,494	(1,765,042)	-	-	-	1,210,550	1,210,550
2018	682,056	2,157,040	136,494	(1,765,042)	2,940,578	-	-	4,151,126	4,151,126
2019	-	2,157,038	136,494	(1,765,042)	2,940,578	(3,051,225)	-	417,843	417,843
2020	-	-	136,496	(1,765,042)	2,940,578	(3,051,225)	(1,091,574)	(2,830,767)	(2,830,767)
2021	-	-	-	(1,765,044)	2,940,578	(3,051,225)	(1,091,574)	(2,967,265)	(2,967,265)
2022	-	-	-	-	2,940,576	(3,051,225)	(1,091,574)	(1,202,223)	(1,202,223)
2023	-	-	-	-	-	(3,051,227)	(1,091,574)	(4,142,801)	(4,142,801)
2024	-	-	-	-	-	-	(1,091,574)	(1,091,574)	(1,091,574)
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ 3,410,288	\$ 10,785,198	\$ 682,472	\$ (8,825,212)	\$ 14,702,888	\$ (15,256,127)	\$ (5,457,870)	\$ 41,637	\$ (9,403,863)

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

	2014	2015	2016	2017	2018	2019	2020	Total	
Total	\$ 3,410,288	\$ 41,498,705	\$ (4,443,539)	\$ (36,494,486)	\$ 25,822,855	\$ (29,027,842)	\$ (3,341,754)		
2014	682,058	-	-	-	-	-	-	682,058	682,058
2015	682,058	8,442,419	-	-	-	-	-	9,124,477	9,124,477
2016	682,058	8,442,419	(895,395)	-	-	-	-	8,229,082	8,229,082
2017	682,058	8,442,419	(895,395)	(7,951,714)	-	-	-	277,368	277,368
2018	682,056	8,442,419	(895,395)	(7,951,714)	5,553,905	-	-	5,831,271	5,831,271
2019	-	7,729,029	(895,395)	(7,951,714)	5,553,905	(6,371,070)	-	(1,935,245)	(1,935,245)
2020	-	-	(861,959)	(7,951,714)	5,553,905	(6,371,070)	(582,819)	(10,213,657)	(10,213,657)
2021	-	-	-	(4,687,630)	5,553,905	(6,371,070)	(582,819)	(6,087,614)	(6,087,614)
2022	-	-	-	-	3,607,235	(6,371,070)	(582,819)	(3,346,654)	(3,346,654)
2023	-	-	-	-	-	(3,543,562)	(582,819)	(4,126,381)	(4,126,381)
2024	-	-	-	-	-	-	(1,010,478)	(1,010,478)	(1,010,478)
2025	-	-	-	-	-	-	-	-	-
Thereafter	-	-	-	-	-	-	-	-	-
	\$ 3,410,288	\$ 41,498,705	\$ (4,443,539)	\$ (36,494,486)	\$ 25,822,855	\$ (29,027,842)	\$ (3,341,754)	\$ (2,575,773)	\$ (14,571,127)



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	\$ 3,958,661	\$ 11,341,551	\$ (7,382,890)
2. Due to Assets	3,077,074	5,907,841	(2,830,767)
3. Total	\$ 7,035,735	\$ 17,249,392	\$ (10,213,657)

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	\$ 871,192	\$ 1,530,136	\$ (658,944)
2. Assumption Changes	3,087,469	9,811,415	(6,723,946)
3. Net Difference between projected and actual earnings on pension plan investments	3,077,074	5,907,841	(2,830,767)
4. Total	\$ 7,035,735	\$ 17,249,392	\$ (10,213,657)

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	\$ 2,359,906	\$ 1,093,950	\$ 1,265,956
2. Assumption Changes	3,875,082	10,308,302	(6,433,220)
3. Net Difference between projected and actual earnings on pension plan investments	5,881,154	15,285,017	(9,403,863)
4. Total	\$ 12,116,142	\$ 26,687,269	\$ (14,571,127)

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	\$ (6,087,614)
2022	(3,346,654)
2023	(4,126,381)
2024	(1,010,478)
2025	0
Thereafter	0
Total	\$ (14,571,127)



Statement of Fiduciary Net Position as of December 31, 2020

	2020
Assets	
Cash and Deposits	\$ 3,943,460
Receivables	
Accounts Receivable - Sale of Investments	\$ 330,704
Accrued Interest and Other Dividends	310,054
Contributions	7
Accounts Receivable - Other	17,138,819
Total Receivables	\$ 17,779,584
Investments	
Fixed Income	\$ 35,320,498
Equities	82,550,610
Private Markets	15,183,946
Marketable Alternatives	30,043,345
Other	6,354,052
Total Investments	\$ 169,452,451
Total Assets	\$ 191,175,495
Liabilities	
Payables	
Accounts Payable - Purchase of Investments	\$ 24,684,608
Accrued Expenses	262,963
Accounts Payable - Other	16,215
Total Liabilities	\$ 24,963,786
Net Position Restricted for Pensions	\$ 166,211,709



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

	2020
Additions	
Contributions	
Employer	\$ 3,631,486
Employee	3,547,451
Other Employer Contributions	33,510
Other Employee Contributions	384,729
Total Contributions	\$ 7,597,176
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 14,965,729
Interest and Dividends	2,096,679
Less Investment Expense	(948,337)
Net Investment Income	\$ 16,114,071
Other	\$ 0
Total Additions	\$ 23,711,247
 Deductions	
Benefit Payments, including Refunds of Employee Contributions	\$ 11,638,230
Pension Plan Administrative Expense	149,733
Other	5,841
Total Deductions	\$ 11,793,804
Net Increase in Net Position	\$ 11,917,443
 Net Position Restricted for Pensions	
Beginning of Year	\$ 154,294,266
End of Year	\$ 166,211,709



SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note – This information is intended to assist in preparation of the financial statements of the Wyoming State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund. 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	\$ 4,800,841
2. Interest on the total pension liability	13,412,219
3. Changes of benefit terms	0
4. Difference between expected and actual experience of the total pension liability	2,116,116
5. Changes of assumptions	0
6. Benefit payments, including refunds of employee contributions	(11,638,230)
7. Net change in total pension liability	8,690,946
8. Total pension liability – beginning	192,847,885
9. Total pension liability – ending	\$ 201,538,831
B. Plan fiduciary net position	
1. Contributions – employer	\$ 3,664,996
2. Contributions – employee	3,932,180
3. Net investment income	16,114,071
4. Benefit payments	(11,270,238)
5. Refunds	(367,992)
6. Pension plan administrative expense	(149,733)
7. Other	(5,841)
8. Net change in plan fiduciary net position	11,917,443
9. Plan fiduciary net position – beginning	154,294,266
10. Plan fiduciary net position – ending	\$ 166,211,709
C. Net pension liability	\$ 35,327,122
D. Plan fiduciary net position as a percentage of the total pension liability	82.47 %
E. Covered-employee payroll	\$ 24,074,484
F. Net pension liability as a percentage of covered-employee payroll	146.74 %



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	\$ 4,800,841	\$ 4,614,951	\$ 5,078,748	\$ 4,764,423	\$ 7,631,559	\$ 7,511,738	\$ 5,276,236
Interest on the total pension liability	13,412,219	12,833,018	12,084,646	12,129,167	12,213,078	11,513,094	11,490,234
Changes of benefit terms	0	0	0	0	0	0	0
Difference between expected and actual experience	2,116,116	1,453,141	(2,017,522)	(4,722,830)	62,315	(1,821,706)	0
Changes of assumptions	0	(15,224,856)	13,137,489	(22,946,444)	(5,188,326)	32,535,213	0
Benefit payments, including refunds of employee contributions	(11,638,230)	(11,132,637)	(10,612,051)	(10,304,469)	(9,719,868)	(9,046,994)	(8,732,855)
Net change in total pension liability	8,690,946	(7,456,383)	17,671,310	(21,080,153)	4,998,758	40,691,345	8,033,615
Total pension liability - beginning	192,847,885	200,304,268	182,632,958	203,713,111	198,714,353	158,023,008	149,989,393
Total pension liability - ending (a)	\$ 201,538,831	\$ 192,847,885	\$ 200,304,268	\$ 182,632,958	\$ 203,713,111	\$ 198,714,353	\$ 158,023,008
Plan fiduciary net position							
Employer contributions	\$ 3,664,996	\$ 3,639,164	\$ 3,529,976	\$ 3,552,582	\$ 3,574,065	\$ 3,355,688	\$ 3,006,277
Employee contributions	3,932,180	4,196,524	3,796,060	3,485,756	3,678,081	3,524,286	3,150,559
Pension plan net investment income	16,114,071	24,466,565	(4,908,329)	17,623,232	8,622,074	(1,199,475)	5,900,708
Benefit payments	(11,270,238)	(10,843,842)	(10,260,821)	(9,795,108)	(9,396,540)	(8,926,088)	(8,364,762)
Refunds	(367,992)	(288,795)	(351,230)	(509,361)	(323,328)	(120,906)	(368,093)
Pension plan administrative expense	(149,733)	(138,770)	(139,377)	(128,991)	(114,832)	(95,918)	(96,479)
Other	(5,841)	(6,039)	(5,536)	(5,897)	(5,897)	(5,850)	229,589
Net change in plan fiduciary net position	11,917,443	21,024,807	(8,339,257)	14,222,213	6,033,623	(3,468,263)	3,457,799
Plan fiduciary net position - beginning	154,294,266	133,269,459	141,608,716	127,386,503	121,352,880	124,821,143	121,363,344
Plan fiduciary net position - ending (b)	\$ 166,211,709	\$ 154,294,266	\$ 133,269,459	\$ 141,608,716	\$ 127,386,503	\$ 121,352,880	\$ 124,821,143
Net pension liability - ending (a) - (b)	\$ 35,327,122	\$ 38,553,619	\$ 67,034,809	\$ 41,024,242	\$ 76,326,608	\$ 77,361,473	\$ 33,201,865
Plan fiduciary net position as a percentage of total pension liability	82.47 %	80.01 %	66.53 %	77.54 %	62.53 %	61.07 %	78.99 %
Covered-employee payroll	\$ 24,074,484	\$ 23,118,850	\$ 23,063,176	\$ 23,641,495	\$ 23,636,482	\$ 22,196,930	\$ 21,817,686
Projected valuation payroll	\$ 24,676,346	\$ 23,696,821	\$ 23,639,756	\$ 24,646,258	\$ 24,641,033	\$ 23,140,300	\$ 22,744,938
Net pension liability as a percentage of covered-employee payroll	146.74 %	166.76 %	290.66 %	173.53 %	322.92 %	348.52 %	152.18 %

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	\$ 158,023,008	\$ 124,821,143	\$ 33,201,865	78.99 %	\$ 21,817,686	152.18 %
2015	198,714,353	121,352,880	77,361,473	61.07 %	22,196,930	348.52 %
2016	203,713,111	127,386,503	76,326,608	62.53 %	23,636,482	322.92 %
2017	182,632,958	141,608,716	41,024,242	77.54 %	23,641,495	173.53 %
2018	200,304,268	133,269,459	67,034,809	66.53 %	23,063,176	290.66 %
2019	192,847,885	154,294,266	38,553,619	80.01 %	23,118,850	166.76 %
2020	201,538,831	166,211,709	35,327,122	82.47 %	24,074,484	146.74 %

* 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	\$ 4,037,681	\$ 3,077,515	\$ 960,166	\$ 21,817,686	14.11 %
2015	3,784,380	3,355,688	428,692	22,196,930	15.12 %
2016	4,097,473	3,574,065	523,408	23,636,482	15.12 %
2017	4,041,445	3,552,582	488,863	23,641,495	15.03 %
2018	3,607,303	3,529,976	77,327	23,063,176	15.31 %
2019	3,997,559	3,639,164	358,395	23,118,850	15.74 %
2020	4,345,242	3,664,996	680,246	24,074,484	15.22 %

* 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	2.50% to 8.50% 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 14.88% of salary.
Employees are contributing at the rate of 14.56% of salary.
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 State Highway Patrol, Game & Fish Warden and Criminal Investigator Retirement Fund. 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 an expected rate of return on pension plan investments of 7.00% and a municipal bond rate of 2.00%. 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 required contribution rate. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments through the year 2119. 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%
\$ 60,488,520	\$ 35,327,122	\$ 14,585,354



Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	351
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	78
Active Plan Members	<u>312</u>
Total Plan Members	741



SECTION E

SUMMARY OF BENEFITS

Summary of Benefits

Covered Members

Any person who is employed by the Wyoming state highway patrol division as a sworn law enforcement officer;

Any person who is commissioned as a full time law enforcement officer of the Wyoming state game and fish department;

Any criminal investigator as defined under W.S. 9-3-602(a)(iv);

Any person designated and appointed as capitol police under W.S. 9-1-612 and qualified pursuant to W.S. 9-1-701 through 9-1-707.

Final Average Salary

Employee's average annual salary for the highest paid three continuous years of service.

Service Retirement

Eligibility

Age 50 with six or more years of service.

Monthly Benefit

2.50% of employee's highest three-year average salary for each year of credited service, not to exceed 75.0% of final average salary.

Vesting

Any employee who has left employment with six 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 contributions with interest. An employee who terminates with less than six years of service is only eligible for the lump-sum benefit.

Duty Disability Retirement

Eligibility

No age or service eligibility requirements. Partial or total disability resulting from an individual and specific act, the type of which would normally occur only while employed as an employee, or as otherwise defined under W.S. 9-3-611(a).

Monthly Benefit

62.5% of Final Average Salary.

Non-duty Disability Retirement

Eligibility

10 years of credited service. Partial or total disability, but not eligible for duty disability.

Monthly Benefit

50.0% of Final Average Salary.



Pre-retirement Duty Death Benefit

Eligibility	No age or service requirements.
Monthly Benefit	50% of member's final actual salary, payable to the surviving spouse plus 5% of the member's final actual salary for each unmarried child under 18. Payment shall not exceed the member's final actual salary.

Pre-retirement Non-duty Death Benefit

Eligibility	No age or service requirements.
Monthly Benefit	2% for each year of credited service, not to exceed 50%, of the member's final actual salary payable to the surviving spouse plus 5% of the member's final actual salary for each unmarried child under 18. Payment shall not exceed 60% of the member's final actual salary.

Post-retirement Death Benefit

Monthly Benefit	50% of the benefit payable prior to the member's death plus 5% of the member's final actual salary for each unmarried child under 18. Payment shall not exceed 60% of the member's final actual salary.
-----------------	---

Contributions

Employee	14.56% of salary. The Employer may subsidize all except 1.62% of the employee contributions, which shall be paid through salary reductions.
Employer	14.88% of salary.
Interest	3.00% annually effective January 1, 2016.

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

Option 1	Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary.
Option 2	Monthly benefit for life. Upon death, 100% of the benefit continues to be paid to the beneficiary.
Option 3	Not available under this plan.
Option 4	Monthly benefit for life with a guarantee of 120 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

Age	Rate
20	8.50%
25	8.00%
30	5.75%
35	4.00%
40	3.00%
45	3.00%
50	3.00%
55	2.50%
60	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. Rates Before Retirement

Healthy Pre-Retirement Mortality:

RP-2014 Mortality Table for Healthy Employees, 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 Mortality Table for Healthy Annuitants, 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%

100% of active deaths are assumed to be duty-related



b. Disability and Withdrawal

Age	Disability		Withdrawal	
	Male	Female	Ultimate	
			Male	Female
20	0.10%	0.10%	18.00%	18.00%
25	0.10%	0.10%	6.00%	6.00%
30	0.23%	0.23%	6.00%	6.00%
35	0.39%	0.39%	6.00%	6.00%
40	0.57%	0.57%	5.00%	5.00%
45	0.73%	0.73%	5.00%	5.00%
50	0.75%	0.75%	2.50%	2.50%
55	0.75%	0.75%	1.00%	1.00%
60	0.75%	0.75%	1.00%	1.00%

100% of active disabilities are assumed to be duty-related

c. Retirement Rates

Age	Rate	Age	Rate
50	15%	56	10%
51	5%	57	15%
52	5%	58	15%
53	5%	59	15%
54	10%	60	35%
55	10%	61	40%
		62	100%

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, whichever is more valuable at the time of termination.
- 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 50.
- f. No benefit 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.
- h. No surviving spouse will remarry.
- i. Administrative expenses: Average of actual expenses for 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.

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	Payroll for Current Employees		Payroll for Future Employees		Total Employee Payroll		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	\$ 23,887,561	\$ 788,785	\$ 24,676,346	\$ 3,932,180	\$ 3,583,492	\$ 81,504	\$ 7,597,176				
2021	22,678,342	2,614,912	25,293,254	3,301,967	3,401,751	273,334	6,977,052				
2022	21,731,643	4,193,942	25,925,585	3,164,127	3,257,573	438,303	6,860,003				
2023	20,727,279	5,846,446	26,573,725	3,017,892	3,102,874	610,645	6,731,411				
2024	19,603,656	7,634,412	27,238,068	2,854,292	2,932,707	797,733	6,584,732				
2025	18,487,860	9,431,160	27,919,020	2,691,832	2,763,935	985,787	6,441,554				
2026	17,471,772	11,145,224	28,616,996	2,543,890	2,610,283	1,165,656	6,319,829				
2027	16,495,317	12,837,104	29,332,421	2,401,718	2,462,751	1,344,012	6,208,481				
2028	15,509,869	14,555,863	30,065,732	2,258,237	2,314,073	1,525,879	6,098,189				
2029	14,512,242	16,305,133	30,817,375	2,112,982	2,163,775	1,711,707	5,988,464				
2030	13,553,616	18,034,193	31,587,809	1,973,406	2,020,844	1,898,020	5,892,270				
2031	12,590,469	19,787,035	32,377,504	1,833,172	1,875,980	2,086,105	5,795,257				
2032	11,648,310	21,538,632	33,186,942	1,695,994	1,735,598	2,276,742	5,708,334				
2033	10,758,324	23,258,292	34,016,616	1,566,412	1,601,914	2,462,800	5,631,126				
2034	9,894,299	24,972,732	34,867,031	1,440,610	1,473,261	2,651,177	5,565,048				
2035	9,065,521	26,673,186	35,738,707	1,319,940	1,349,856	2,839,021	5,508,817				
2036	8,260,419	28,371,756	36,632,175	1,202,717	1,229,976	3,027,281	5,459,974				
2037	7,534,210	30,013,769	37,547,979	1,096,981	1,121,844	3,210,198	5,429,023				
2038	6,860,340	31,626,338	38,486,678	998,866	1,020,819	3,387,456	5,407,141				
2039	6,190,863	33,257,982	39,448,845	901,390	921,200	3,570,242	5,392,832				
2040	5,559,642	34,875,424	40,435,066	809,484	827,275	3,751,922	5,388,681				
2041	4,994,007	36,451,936	41,445,943	727,127	743,108	3,929,906	5,400,141				
2042	4,461,104	38,020,988	42,482,092	649,537	663,812	4,107,561	5,420,910				
2043	3,944,352	39,599,792	43,544,144	574,298	586,920	4,286,710	5,447,928				
2044	3,439,563	41,193,185	44,632,748	500,800	511,807	4,467,569	5,480,176				
2045	2,961,375	42,787,192	45,748,567	431,176	440,653	4,648,774	5,520,603				
2046	2,508,169	44,384,112	46,892,281	365,189	373,216	4,830,428	5,568,833				
2047	2,088,104	45,976,484	48,064,588	304,028	310,710	5,011,575	5,626,313				
2048	1,721,679	47,544,524	49,266,203	250,676	256,186	5,190,071	5,696,933				
2049	1,402,235	49,095,623	50,497,858	204,165	208,653	5,366,713	5,779,531				
2050	1,115,783	50,644,521	51,760,304	162,458	166,029	5,542,753	5,871,240				
2051	855,344	52,198,968	53,054,312	124,538	127,275	5,718,956	5,970,769				
2052	628,258	53,752,412	54,380,670	91,474	93,485	5,894,312	6,079,271				
2053	454,738	55,285,449	55,740,187	66,210	67,665	6,066,847	6,200,722				
2054	304,527	56,829,165	57,133,692	44,339	45,314	6,239,798	6,329,451				
2055	185,568	58,376,466	58,562,034	27,019	27,613	6,412,174	6,466,806				
2056	101,148	59,924,937	60,026,085	14,727	15,051	6,584,050	6,613,828				
2057	42,528	61,484,209	61,526,737	6,192	6,328	6,756,249	6,768,769				
2058	17,281	63,047,624	63,064,905	2,516	2,571	6,928,406	6,933,493				
2059	3,845	64,637,683	64,641,528	560	572	7,102,982	7,104,114				
2060	0	66,257,566	66,257,566	0	0	7,280,681	7,280,681				
2061	0	67,914,005	67,914,005	0	0	7,462,405	7,462,405				
2062	0	69,611,855	69,611,855	0	0	7,648,695	7,648,695				
2063	0	71,352,151	71,352,151	0	0	7,839,683	7,839,683				
2064	0	73,135,955	73,135,955	0	0	8,035,501	8,035,501				
2065	0	74,964,354	74,964,354	0	0	8,236,259	8,236,259				
2066	0	76,838,463	76,838,463	0	0	8,442,071	8,442,071				
2067	0	78,759,425	78,759,425	0	0	8,653,058	8,653,058				
2068	0	80,728,411	80,728,411	0	0	8,869,362	8,869,362				
2069	0	82,746,621	82,746,621	0	0	9,091,121	9,091,121				



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

Year	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)
2070	0	91,336,788	91,336,788	0	0	10,035,517	10,035,517
2071	0	93,620,208	93,620,208	0	0	10,286,651	10,286,651
2072	0	95,960,713	95,960,713	0	0	10,544,076	10,544,076
2073	0	98,359,731	98,359,731	0	0	10,807,936	10,807,936
2074	0	100,818,724	100,818,724	0	0	11,078,372	11,078,372
2075	0	103,339,192	103,339,192	0	0	11,355,536	11,355,536
2076	0	105,922,672	105,922,672	0	0	11,639,597	11,639,597
2077	0	108,570,739	108,570,739	0	0	11,930,715	11,930,715
2078	0	111,285,007	111,285,007	0	0	12,229,066	12,229,066
2079	0	114,067,132	114,067,132	0	0	12,534,830	12,534,830
2080	0	116,918,810	116,918,810	0	0	12,848,200	12,848,200
2081	0	119,841,780	119,841,780	0	0	13,169,375	13,169,375
2082	0	122,837,825	122,837,825	0	0	13,498,555	13,498,555
2083	0	125,908,771	125,908,771	0	0	13,835,947	13,835,947
2084	0	129,056,490	129,056,490	0	0	14,181,760	14,181,760
2085	0	132,282,902	132,282,902	0	0	14,536,206	14,536,206
2086	0	135,589,975	135,589,975	0	0	14,899,508	14,899,508
2087	0	138,979,724	138,979,724	0	0	15,271,891	15,271,891
2088	0	142,454,217	142,454,217	0	0	15,653,591	15,653,591
2089	0	146,015,572	146,015,572	0	0	16,044,844	16,044,844
2090	0	149,665,961	149,665,961	0	0	16,445,890	16,445,890
2091	0	153,407,610	153,407,610	0	0	16,856,977	16,856,977
2092	0	157,242,800	157,242,800	0	0	17,278,357	17,278,357
2093	0	161,173,870	161,173,870	0	0	17,710,287	17,710,287
2094	0	165,203,217	165,203,217	0	0	18,153,027	18,153,027
2095	0	169,333,297	169,333,297	0	0	18,606,848	18,606,848
2096	0	173,566,629	173,566,629	0	0	19,072,023	19,072,023
2097	0	177,905,795	177,905,795	0	0	19,548,835	19,548,835
2098	0	182,353,440	182,353,440	0	0	20,037,574	20,037,574
2099	0	186,912,276	186,912,276	0	0	20,538,537	20,538,537
2100	0	191,585,083	191,585,083	0	0	21,052,027	21,052,027
2101	0	196,374,710	196,374,710	0	0	21,578,358	21,578,358
2102	0	201,284,078	201,284,078	0	0	22,117,849	22,117,849
2103	0	206,316,180	206,316,180	0	0	22,670,828	22,670,828
2104	0	211,474,085	211,474,085	0	0	23,237,630	23,237,630
2105	0	216,760,937	216,760,937	0	0	23,818,602	23,818,602
2106	0	222,179,960	222,179,960	0	0	24,414,094	24,414,094
2107	0	227,734,459	227,734,459	0	0	25,024,471	25,024,471
2108	0	233,427,820	233,427,820	0	0	25,650,103	25,650,103
2109	0	239,263,516	239,263,516	0	0	26,291,371	26,291,371
2110	0	245,245,104	245,245,104	0	0	26,948,665	26,948,665
2111	0	251,376,232	251,376,232	0	0	27,622,386	27,622,386
2112	0	257,660,638	257,660,638	0	0	28,312,946	28,312,946
2113	0	264,102,154	264,102,154	0	0	29,020,766	29,020,766
2114	0	270,704,708	270,704,708	0	0	29,746,277	29,746,277
2115	0	277,472,326	277,472,326	0	0	30,489,924	30,489,924
2116	0	284,409,134	284,409,134	0	0	31,252,159	31,252,159
2117	0	291,519,362	291,519,362	0	0	85,823,300	85,823,300
2118	0	298,807,346	298,807,346	0	0	87,968,883	87,968,883
2119	0	306,277,530	306,277,530	0	0	90,168,105	90,168,105



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	\$ 154,294,266	\$ 7,597,176	\$ 11,638,230	\$ 155,574	\$ 16,114,071	\$ 166,211,709
2021	166,211,709	6,977,052	12,092,632	154,289	11,453,494	172,395,334
2022	172,395,334	6,860,003	12,475,129	158,146	11,869,026	178,491,088
2023	178,491,088	6,731,411	12,900,416	162,100	12,276,535	184,436,518
2024	184,436,518	6,584,732	13,421,573	166,152	12,669,597	190,103,122
2025	190,103,122	6,441,554	13,900,482	170,306	13,044,712	195,518,599
2026	195,518,599	6,319,829	14,367,858	174,564	13,403,379	200,699,385
2027	200,699,385	6,208,481	14,816,593	178,928	13,746,612	205,658,957
2028	205,658,957	6,098,189	15,360,740	183,401	14,071,110	210,284,115
2029	210,284,115	5,988,464	15,927,410	187,986	14,371,440	214,528,623
2030	214,528,623	5,892,270	16,395,942	192,686	14,648,963	218,481,228
2031	218,481,228	5,795,257	16,877,413	197,503	14,905,575	222,107,144
2032	222,107,144	5,708,334	17,362,643	202,440	15,139,533	225,389,928
2033	225,389,928	5,631,126	17,792,502	207,501	15,351,706	228,372,757
2034	228,372,757	5,565,048	18,244,994	212,689	15,542,483	231,022,604
2035	231,022,604	5,508,817	18,723,784	218,006	15,709,380	233,299,011
2036	233,299,011	5,459,974	19,182,399	223,456	15,851,080	235,204,210
2037	235,204,210	5,429,023	19,539,508	229,043	15,970,900	236,835,581
2038	236,835,581	5,407,141	19,823,592	234,769	16,074,371	238,258,732
2039	238,258,732	5,392,832	20,140,689	240,638	16,162,386	239,432,623
2040	239,432,623	5,388,681	20,447,356	246,654	16,233,657	240,360,952
2041	240,360,952	5,400,141	20,629,306	252,820	16,292,562	241,171,529
2042	241,171,529	5,420,910	20,793,473	259,141	16,344,151	241,883,976
2043	241,883,976	5,447,928	20,910,894	265,619	16,390,688	242,546,080
2044	242,546,080	5,480,176	21,004,605	272,260	16,434,692	243,184,083
2045	243,184,083	5,520,603	21,054,536	279,066	16,478,791	243,849,876
2046	243,849,876	5,568,833	20,997,878	286,043	16,528,766	244,663,555
2047	244,663,555	5,626,313	20,890,134	293,194	16,591,162	245,697,702
2048	245,697,702	5,696,933	20,699,593	300,524	16,672,287	247,066,805
2049	247,066,805	5,779,531	20,444,885	308,037	16,779,471	248,872,885
2050	248,872,885	5,871,240	20,152,127	315,738	16,918,861	251,195,121
2051	251,195,121	5,970,769	19,828,635	323,631	17,095,701	254,109,325
2052	254,109,325	6,079,271	19,470,726	331,722	17,315,465	257,701,614
2053	257,701,614	6,200,722	19,066,413	340,015	17,584,730	262,080,639
2054	262,080,639	6,329,451	18,639,742	348,516	17,910,080	267,331,911
2055	267,331,911	6,466,806	18,185,232	357,228	18,297,734	273,553,992
2056	273,553,992	6,613,828	17,703,111	366,159	18,754,620	280,853,170
2057	280,853,170	6,768,769	17,199,823	375,313	19,287,896	289,334,699
2058	289,334,699	6,933,493	16,671,638	384,696	19,905,122	299,116,980
2059	299,116,980	7,104,114	16,134,376	394,313	20,613,907	310,306,312
2060	310,306,312	7,280,681	15,590,024	404,171	21,421,627	323,014,425
2061	323,014,425	7,462,405	15,043,003	414,275	22,335,922	337,355,475
2062	337,355,475	7,648,695	14,496,204	424,632	23,364,663	353,447,996
2063	353,447,996	7,839,683	13,949,776	435,248	24,516,147	371,418,803
2064	371,418,803	8,035,501	13,403,877	446,129	25,799,250	391,403,549
2065	391,403,549	8,236,259	12,858,797	457,283	27,223,462	413,547,189
2066	413,547,189	8,442,071	12,314,955	468,715	28,798,917	438,004,507
2067	438,004,507	8,653,058	11,772,841	480,432	30,536,439	464,940,731
2068	464,940,731	8,869,362	11,233,021	492,443	32,447,578	494,532,208
2069	494,532,208	9,091,121	10,696,166	504,754	34,544,660	526,967,069



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	\$ 526,967,069	\$ 9,318,472	\$ 10,162,983	\$ 517,373	\$ 36,840,835	\$ 562,446,021
2071	562,446,021	9,551,565	9,634,190	530,308	39,350,132	601,183,220
2072	601,183,220	9,790,534	9,110,552	543,565	42,087,519	643,407,156
2073	643,407,156	10,035,517	8,592,865	557,154	45,068,969	689,361,623
2074	689,361,623	10,286,651	8,081,985	571,083	48,311,522	739,306,728
2075	739,306,728	10,544,076	7,578,797	585,360	51,833,359	793,520,007
2076	793,520,007	10,807,936	7,084,260	599,994	55,653,880	852,297,569
2077	852,297,569	11,078,372	6,599,454	614,994	59,793,780	915,955,273
2078	915,955,273	11,355,536	6,125,468	630,369	64,275,136	984,830,108
2079	984,830,108	11,639,597	5,663,401	646,128	69,121,505	1,059,281,681
2080	1,059,281,681	11,930,715	5,214,342	662,282	74,358,027	1,139,693,799
2081	1,139,693,799	12,229,066	4,779,377	678,839	80,011,538	1,226,476,187
2082	1,226,476,187	12,534,830	4,359,618	695,810	86,110,685	1,320,066,273
2083	1,320,066,273	12,848,200	3,956,157	713,205	92,686,057	1,420,931,169
2084	1,420,931,169	13,169,375	3,570,099	731,035	99,770,321	1,529,569,730
2085	1,529,569,730	13,498,555	3,202,512	749,311	107,398,366	1,646,514,828
2086	1,646,514,828	13,835,947	2,854,398	768,044	115,607,465	1,772,335,798
2087	1,772,335,798	14,181,760	2,526,695	787,245	124,437,446	1,907,641,064
2088	1,907,641,064	14,536,206	2,220,206	806,926	133,930,879	2,053,081,017
2089	2,053,081,017	14,899,508	1,935,589	827,099	144,133,275	2,209,351,112
2090	2,209,351,112	15,271,891	1,673,292	847,776	155,093,309	2,377,195,244
2091	2,377,195,244	15,653,591	1,433,486	868,971	166,863,053	2,557,409,431
2092	2,557,409,431	16,044,844	1,216,160	890,695	179,498,239	2,750,845,659
2093	2,750,845,659	16,445,890	1,021,101	912,962	193,058,520	2,958,416,006
2094	2,958,416,006	16,856,977	847,839	935,786	207,607,765	3,181,097,122
2095	3,181,097,122	17,278,357	695,675	959,181	223,214,373	3,419,934,996
2096	3,419,934,996	17,710,287	563,660	983,161	239,951,603	3,676,050,065
2097	3,676,050,065	18,153,027	450,619	1,007,740	257,897,935	3,950,642,669
2098	3,950,642,669	18,606,848	355,180	1,032,933	277,137,450	4,244,998,854
2099	4,244,998,854	19,072,023	275,793	1,058,756	297,760,232	4,560,496,559
2100	4,560,496,559	19,548,835	210,791	1,085,225	319,862,803	4,898,612,181
2101	4,898,612,181	20,037,574	158,450	1,112,356	343,548,580	5,260,927,529
2102	5,260,927,529	20,538,537	117,040	1,140,165	368,928,360	5,649,137,221
2103	5,649,137,221	21,052,027	84,880	1,168,669	396,120,832	6,065,056,531
2104	6,065,056,531	21,578,358	60,380	1,197,886	425,253,132	6,510,629,755
2105	6,510,629,755	22,117,849	42,089	1,227,833	456,461,419	6,987,939,101
2106	6,987,939,101	22,670,828	28,720	1,258,529	489,891,504	7,499,214,184
2107	7,499,214,184	23,237,630	19,163	1,289,992	525,699,509	8,046,842,167
2108	8,046,842,167	23,818,602	12,487	1,322,242	564,052,578	8,633,378,618
2109	8,633,378,618	24,414,094	7,940	1,355,298	605,129,638	9,261,559,112
2110	9,261,559,112	25,024,471	4,921	1,389,180	649,122,213	9,934,311,694
2111	9,934,311,694	25,650,103	2,973	1,423,910	696,235,292	10,654,770,206
2112	10,654,770,206	26,291,371	1,745	1,459,507	746,688,270	11,426,288,595
2113	11,426,288,595	26,948,665	995	1,495,995	800,715,944	12,252,456,214
2114	12,252,456,214	27,622,386	551	1,533,395	858,569,587	13,137,114,241
2115	13,137,114,241	28,312,946	291	1,571,730	920,518,100	14,084,373,266
2116	14,084,373,266	29,020,766	149	1,611,023	986,849,239	15,098,632,099
2117	15,098,632,099	29,746,277	72	1,651,299	1,057,870,938	16,184,597,943
2118	16,184,597,943	30,489,924	30	1,692,581	1,133,912,715	17,347,307,971
2119	17,347,307,971	31,252,159	14	1,734,896	1,215,327,189	18,592,152,409



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-.5)	(g)=(e)*vf^(a-.5)	(h)=((c)/(1+SDR)^(a-.5))
2020	\$ 154,294,266	\$ 11,638,230	\$ 11,638,230	\$ 0	\$ 11,251,102	\$ 0	\$ 11,251,102
2021	166,211,709	12,092,632	12,092,632	0	10,925,596	0	10,925,596
2022	172,395,334	12,475,129	12,475,129	0	10,533,813	0	10,533,813
2023	178,491,088	12,900,416	12,900,416	0	10,180,298	0	10,180,298
2024	184,436,518	13,421,573	13,421,573	0	9,898,661	0	9,898,661
2025	190,103,122	13,900,482	13,900,482	0	9,581,182	0	9,581,182
2026	195,518,599	14,367,858	14,367,858	0	9,255,449	0	9,255,449
2027	200,699,385	14,816,593	14,816,593	0	8,920,106	0	8,920,106
2028	205,658,957	15,360,740	15,360,740	0	8,642,712	0	8,642,712
2029	210,284,115	15,927,410	15,927,410	0	8,375,279	0	8,375,279
2030	214,528,623	16,395,942	16,395,942	0	8,057,619	0	8,057,619
2031	218,481,228	16,877,413	16,877,413	0	7,751,619	0	7,751,619
2032	222,107,144	17,362,643	17,362,643	0	7,452,785	0	7,452,785
2033	225,389,928	17,792,502	17,792,502	0	7,137,663	0	7,137,663
2034	228,372,757	18,244,994	18,244,994	0	6,840,360	0	6,840,360
2035	231,022,604	18,723,784	18,723,784	0	6,560,623	0	6,560,623
2036	233,299,011	19,182,399	19,182,399	0	6,281,605	0	6,281,605
2037	235,204,210	19,539,508	19,539,508	0	5,979,950	0	5,979,950
2038	236,835,581	19,823,592	19,823,592	0	5,669,992	0	5,669,992
2039	238,258,732	20,140,689	20,140,689	0	5,383,822	0	5,383,822
2040	239,432,623	20,447,356	20,447,356	0	5,108,221	0	5,108,221
2041	240,360,952	20,629,306	20,629,306	0	4,816,520	0	4,816,520
2042	241,171,529	20,793,473	20,793,473	0	4,537,243	0	4,537,243
2043	241,883,976	20,910,894	20,910,894	0	4,264,360	0	4,264,360
2044	242,546,080	21,004,605	21,004,605	0	4,003,243	0	4,003,243
2045	243,184,083	21,054,536	21,054,536	0	3,750,242	0	3,750,242
2046	243,849,876	20,997,878	20,997,878	0	3,495,468	0	3,495,468
2047	244,663,555	20,890,134	20,890,134	0	3,250,030	0	3,250,030
2048	245,697,702	20,699,593	20,699,593	0	3,009,706	0	3,009,706
2049	247,066,805	20,444,885	20,444,885	0	2,778,198	0	2,778,198
2050	248,872,885	20,152,127	20,152,127	0	2,559,267	0	2,559,267
2051	251,195,121	19,828,635	19,828,635	0	2,353,444	0	2,353,444
2052	254,109,325	19,470,726	19,470,726	0	2,159,779	0	2,159,779
2053	257,701,614	19,066,413	19,066,413	0	1,976,571	0	1,976,571
2054	262,080,639	18,639,742	18,639,742	0	1,805,924	0	1,805,924
2055	267,331,911	18,185,232	18,185,232	0	1,646,625	0	1,646,625
2056	273,553,992	17,703,111	17,703,111	0	1,498,103	0	1,498,103
2057	280,853,170	17,199,823	17,199,823	0	1,360,293	0	1,360,293
2058	289,334,699	16,671,638	16,671,638	0	1,232,261	0	1,232,261
2059	299,116,980	16,134,376	16,134,376	0	1,114,533	0	1,114,533
2060	310,306,312	15,590,024	15,590,024	0	1,006,477	0	1,006,477
2061	323,014,425	15,043,003	15,043,003	0	907,628	0	907,628
2062	337,355,475	14,496,204	14,496,204	0	817,417	0	817,417
2063	353,447,996	13,949,776	13,949,776	0	735,145	0	735,145
2064	371,418,803	13,403,877	13,403,877	0	660,165	0	660,165
2065	391,403,549	12,858,797	12,858,797	0	591,887	0	591,887
2066	413,547,189	12,314,955	12,314,955	0	529,770	0	529,770
2067	438,004,507	11,772,841	11,772,841	0	473,317	0	473,317
2068	464,940,731	11,233,021	11,233,021	0	422,069	0	422,069
2069	494,532,208	10,696,166	10,696,166	0	375,605	0	375,605



Single Discount Rate Development

Present Values of Projected Benefits

Ending December 31 for 2070 to 2119 (concluded)

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)-5}	(g)=(e)*vf ^{(a)-5}	(h)=((c)/(1+SDR) ^{(a)-5})
2070	\$ 526,967,069	\$ 10,162,983	\$ 10,162,983	\$ 0	\$ 333,534	\$ 0	\$ 333,534
2071	562,446,021	9,634,190	9,634,190	0	295,495	0	295,495
2072	601,183,220	9,110,552	9,110,552	0	261,154	0	261,154
2073	643,407,156	8,592,865	8,592,865	0	230,200	0	230,200
2074	689,361,623	8,081,985	8,081,985	0	202,350	0	202,350
2075	739,306,728	7,578,797	7,578,797	0	177,338	0	177,338
2076	793,520,007	7,084,260	7,084,260	0	154,921	0	154,921
2077	852,297,569	6,599,454	6,599,454	0	134,878	0	134,878
2078	915,955,273	6,125,468	6,125,468	0	117,001	0	117,001
2079	984,830,108	5,663,401	5,663,401	0	101,098	0	101,098
2080	1,059,281,681	5,214,342	5,214,342	0	86,992	0	86,992
2081	1,139,693,799	4,779,377	4,779,377	0	74,519	0	74,519
2082	1,226,476,187	4,359,618	4,359,618	0	63,528	0	63,528
2083	1,320,066,273	3,956,157	3,956,157	0	53,877	0	53,877
2084	1,420,931,169	3,570,099	3,570,099	0	45,439	0	45,439
2085	1,529,569,730	3,202,512	3,202,512	0	38,094	0	38,094
2086	1,646,514,828	2,854,398	2,854,398	0	31,732	0	31,732
2087	1,772,335,798	2,526,695	2,526,695	0	26,251	0	26,251
2088	1,907,641,064	2,220,206	2,220,206	0	21,558	0	21,558
2089	2,053,081,017	1,935,589	1,935,589	0	17,565	0	17,565
2090	2,209,351,112	1,673,292	1,673,292	0	14,191	0	14,191
2091	2,377,195,244	1,433,486	1,433,486	0	11,362	0	11,362
2092	2,557,409,431	1,216,160	1,216,160	0	9,009	0	9,009
2093	2,750,845,659	1,021,101	1,021,101	0	7,069	0	7,069
2094	2,958,416,006	847,839	847,839	0	5,486	0	5,486
2095	3,181,097,122	695,675	695,675	0	4,207	0	4,207
2096	3,419,934,996	563,660	563,660	0	3,185	0	3,185
2097	3,676,050,065	450,619	450,619	0	2,380	0	2,380
2098	3,950,642,669	355,180	355,180	0	1,753	0	1,753
2099	4,244,998,854	275,793	275,793	0	1,272	0	1,272
2100	4,560,496,559	210,791	210,791	0	909	0	909
2101	4,898,612,181	158,450	158,450	0	638	0	638
2102	5,260,927,529	117,040	117,040	0	441	0	441
2103	5,649,137,221	84,880	84,880	0	299	0	299
2104	6,065,056,531	60,380	60,380	0	199	0	199
2105	6,510,629,755	42,089	42,089	0	129	0	129
2106	6,987,939,101	28,720	28,720	0	83	0	83
2107	7,499,214,184	19,163	19,163	0	51	0	51
2108	8,046,842,167	12,487	12,487	0	31	0	31
2109	8,633,378,618	7,940	7,940	0	19	0	19
2110	9,261,559,112	4,921	4,921	0	11	0	11
2111	9,934,311,694	2,973	2,973	0	6	0	6
2112	10,654,770,206	1,745	1,745	0	3	0	3
2113	11,426,288,595	995	995	0	2	0	2
2114	12,252,456,214	551	551	0	1	0	1
2115	13,137,114,241	291	291	0	0	0	0
2116	14,084,373,266	149	149	0	0	0	0
2117	15,098,632,099	72	72	0	0	0	0
2118	16,184,597,943	30	30	0	0	0	0
2119	17,347,307,971	14	14	0	0	0	0
Totals	\$ 230,450,004	\$ 230,450,004	\$ 230,450,004	\$ 0	\$ 230,450,004	\$ 0	\$ 230,450,004



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	<p>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:</p> <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; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method (EAN)	<p>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.</p>
Fiduciary Net Position	<p>The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.</p>
GASB	<p>The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.</p>
Money-Weighted Rate of Return	<p>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.</p>
Multiple-Employer Defined Benefit Pension Plan	<p>A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.</p>
Municipal Bond Rate	<p>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.</p>
Net Pension Liability (NPL)	<p>The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.</p>



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.