

Vermont State Employees' Retirement System

**Governmental Accounting Standards Board (GASB)
Statement No. 68 Accounting Valuation Report as of
June 30, 2019**





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June 21, 2019

Board of Trustees

Vermont State Employees' Retirement System

Montpelier, Vermont 05609

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statement No. 68 Accounting Valuation as of June 30, 2019, for the Vermont State Employees' Retirement System, a single-employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 68.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the State in preparing its financial reports. The financial information on which our calculations were based was provided by the Office of the State Treasurer. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

The actuarial calculations were directed under the supervision of Kathleen Riley and Matthew Strom. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate.

This valuation was prepared based on the actuarial assumptions and methods used in the June 30, 2017, actuarial valuation of the System. In our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System and are appropriate for purposes of the valuation.

We look forward to reviewing this report with you and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:



*Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary*



*Matthew A. Strom, FSA, MAAA, EA
Vice President and Actuary*

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SECTION 1

VALUATION SUMMARY

Purpose	i
Valuation Highlights	i
Important Information About Actuarial Valuations	ii

SECTION 2

GASB 68 NET PENSION LIABILITY INFORMATION

EXHIBIT 1 Membership Data.....	1
EXHIBIT 2 Net Pension Liability	2
EXHIBIT 3 Schedule of Changes in the Net Pension Liability – Last Ten Years.....	5
EXHIBIT 4 Schedule of Contributions – Last Ten Years.....	7

SECTION 3

ADDITIONAL INFORMATION FOR GASB 68

EXHIBIT A Reconciliation of Net Pension Liability	9
EXHIBIT B Deferred Outflows of Resources and Deferred Inflows of Resources	10
EXHIBIT C Pension Expense.....	12

SECTION 4

SUPPLEMENTAL INFORMATION

EXHIBIT I Actuarial Assumptions and Actuarial Cost Method.....	13
EXHIBIT II Summary of Plan Provisions	19
Appendix A Glossary	23

SECTION 1: Valuation Summary for the Vermont State Employees' Retirement System

Purpose

This report has been prepared by Segal Consulting to present certain disclosure information required by Governmental Accounting Standards Board Statement No. 68 as of June 30, 2019. This report is based on financial information as of June 30, 2018, provided by the Office of the State Treasurer and the Vermont State Employees' Retirement System Actuarial Valuation Report as of June 30, 2017, dated October 23, 2017, which reflects:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of June 30, 2017, provided by the Office of the State Treasurer;
- Economic assumptions regarding future salary increases, investment earnings, and inflation, adopted by the Board for the Actuarial Valuation Report as of June 30, 2017; and
- Demographic assumptions regarding retirement, death, withdrawal, disability, and others, adopted by the Board for the Actuarial Valuation Report as of June 30, 2017.

Valuation Highlights

The following key findings were the result of this actuarial valuation:

- GASB 68 permits a measurement date as early as the end of the fiscal year prior to the reporting date. This June 30, 2019 report uses a measurement date of June 30, 2018. The Net Pension Liability (NPL) measured as of June 30, 2018, was determined based upon the results of the actuarial valuation as of June 30, 2017, adjusted forward using standard actuarial techniques. The NPL measured as of June 30, 2017, was determined based on the results of the actuarial valuation as of June 30, 2016 (as completed by Buck Consultants), updated to reflect changes in the investment return, inflation, cost of living adjustments, and mortality assumptions.
- The NPL is equal to the difference between the Total Pension Liability (TPL) and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis. The NPL increased from \$680.3 million as of June 30, 2017, to \$767.1 million as of June 30, 2018, and the Plan's Fiduciary Net Position as a percent of the TPL decreased from 71.99% to 70.59%.
- The discount rate used to determine the TPL and NPL as of June 30, 2018, and June 30, 2017, was 7.50%.
- The annual pension expense arises from certain changes in the collective net pension liability and changes in outstanding balances of deferred outflows and deferred inflows of resources related to pensions from the end of the prior fiscal year to

SECTION 1: Valuation Summary for the Vermont State Employees' Retirement System

the end of the current fiscal year. The pension expense increased from \$100.87 million for fiscal year ending June 30, 2017 to \$117.37 million for fiscal year ending June 30, 2018.

Important Information About Actuarial Valuations

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by the System. The System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

SECTION 1: Valuation Summary for the Vermont State Employees' Retirement System

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Vermont State Employees' Retirement System. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Sections of this report may include actuarial results that are not rounded, but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

EXHIBIT 1

Membership Data

	June 30, 2017	June 30, 2016
Retired members and beneficiaries	6,727	6,542
Deferred members as reported by the System	742	728
Inactive members as reported by the System	1,098	1,012
Active members:		
Vested	5,367	5,285
Non-vested	<u>3,253</u>	<u>3,151</u>
Total active members	8,620	8,436
Total membership	17,187	16,718

Note: The NPL amounts measured as of June 30, 2018 and June 30, 2017 were determined based on the membership data as of June 30, 2017 and June 30, 2016, respectively.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

EXHIBIT 2

Net Pension Liability

The components of the net pension liability of the Vermont State Employees' Retirement System are as follows:

	June 30, 2018	June 30, 2017
Total pension liability	\$2,608,559,283	\$2,428,779,253
Plan fiduciary net position	1,841,500,283	1,748,442,294
System's net pension liability	767,059,000	680,336,959
Plan fiduciary net position as a percentage of the total pension liability*	70.59%	71.99%

* *These funded percentages are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.*

The net pension liability was measured as of June 30, 2018, and is determined based on the June 30, 2017 actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of June 30, 2017.

Actuarial assumptions. The total pension liability as of June 30, 2018, was determined by rolling forward the total pension liability as of June 30, 2017, to June 30, 2018. The total pension liability was calculated using the following actuarial assumptions:

Inflation	2.50%
Salary increases	Ranging from 3.50% to 7.04%
Investment rate of return	7.50%, net of pension plan investment expenses, including inflation
Cost of Living Adjustment	2.55% (2.60% for 2019) for Group A, C and D and for Group F members who retired after July 1, 2008, and 1.40% (1.30% for 2019) for all other Group F members
Mortality	
<i>Pre-retirement:</i>	Groups A/F – 101% of RP-2006 blended 30% Blue Collar Employee, 70% Healthy Employee with generational improvement Group C – RP-2006 Blue Collar Employee Table with generational improvement

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

<i>Healthy Retiree:</i>	Group D – RP-2006 Healthy Employee Table with generational improvement Groups A/F – 101% of RP-2006 blended 30% Blue Collar Annuitant, 70% Healthy Annuitant with generational improvement
	Group C – RP-2006 Blue Collar Annuitant Table with generational improvement
	Group D – RP-2006 Healthy Annuitant Table with generational improvement
<i>Disabled Retiree:</i>	RP-2006 Disabled Mortality Table with generational improvement

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2018, is summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
US Equity	18.00%	6.10%
Non-US Equity	16.00%	7.45%
Global Equity	9.00%	6.74%
Fixed Income	26.00%	2.25%
Real Estate	8.00%	5.11%
Private Markets	15.00%	7.60%
Hedge Funds	<u>8.00%</u>	3.86%
	100.00%	

Discount rate: The discount rate used to measure the total pension liability was 7.50%. In accordance with paragraph 29 of GASB 68, professional judgement was applied to determine that the System's projected fiduciary net position exceeds projected benefit payments for current active and inactive members for all years. Our analysis was based on the expectation that the employer will continue to contribute at rates set by the Board, which exceed the actuarially determined contribution rate. The actuarially determined contribution rate is comprised of an employer normal cost payment and a payment to reduce the unfunded liability to zero by June 30, 2038, in accordance with Vermont statute. 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.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

*As provided by the Vermont State Treasurer's Office

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.50%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.50%) or 1-percentage-point higher (8.50%) than the current rate:

	1% Decrease (6.50%)	Current Discount (7.50%)	1% Increase (8.50%)
Net pension liability as of June 30, 2018	\$1,068,902,959	\$767,059,000	\$521,239,330

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

EXHIBIT 3

Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End June 30,									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total pension liability										
Service cost	\$49,743,850	\$42,703,770	\$47,012,283	\$41,786,352	\$39,368,808					
Interest	180,860,845	178,958,654	171,562,804	164,404,550	156,634,668					
Differences between expected and actual experience	83,265,679	19,283,274	25,051,322	3,979,303	-					
Changes of assumptions	-	42,724,968	-21,853,404	62,246,999	-					
Changes of benefit terms	-	-	-	-	-					
Benefit payments, including refunds of employee contributions	<u>-134,090,344</u>	<u>-126,479,801</u>	<u>-120,093,586</u>	<u>-111,396,184</u>	<u>-104,492,554</u>					(Historical information prior to implementation of GASB 67/68 is not required)
Net change in total pension liability	\$179,780,030	\$157,190,865	\$101,679,419	\$161,021,020	\$91,510,922					
Total pension liability - beginning	<u>2,428,779,253</u>	<u>2,271,588,388</u>	<u>2,169,908,969</u>	<u>2,008,887,949</u>	<u>1,917,377,027</u>					
Total pension liability - ending (a)	\$2,608,559,283	\$2,428,779,253	\$2,271,588,388	\$2,169,908,969	\$2,008,887,949					
Plan fiduciary net position										
Contributions - employer	\$64,564,323	\$60,280,480	\$54,347,060	\$55,881,364	\$56,482,985					
Contributions - member	40,423,239	35,966,987	34,055,217	33,296,248	31,745,692					
Net investment income	123,632,169	170,358,016	17,962,424	-8,484,694	203,721,748					
Benefit payments, including refunds of employee contributions	-134,090,344	-126,479,801	-120,093,586	-111,396,184	-104,492,554					
Administrative expenses	-1,720,253	-1,776,653	-1,468,605	-1,858,854	-1,158,183					(Historical information prior to implementation of GASB 67/68 is not required)
Other	<u>248,855</u>	<u>443,113</u>	<u>-13,597</u>	<u>177,491</u>	<u>453,853</u>					
Net change in fiduciary net position	\$93,057,989	\$138,792,142	-\$15,211,087	-\$32,384,629	\$186,753,541					
Plan fiduciary net position - beginning	<u>1,748,442,294</u>	<u>1,609,650,152</u>	<u>1,624,861,239</u>	<u>1,657,245,868</u>	<u>1,470,492,327</u>					
Plan fiduciary net position - ending (b)	\$1,841,500,283	\$1,748,442,294	\$1,609,650,152	\$1,624,861,239	\$1,657,245,868					
Net pension liability – ending: (a)-(b)	\$767,059,000	\$680,336,959	\$661,938,236	\$545,047,730	\$351,642,087					
Plan's fiduciary net position as a percentage of the total pension liability	70.59%	71.99%	70.86%	74.88%	82.50%					
Covered-employee payroll	\$504,553,289	\$471,268,111	\$462,057,022	\$437,675,917	\$416,766,302					(Historical information prior to implementation of GASB 67/68 is not required)
Net pension liability as a percentage of covered-employee payroll	152.03%	144.36%	143.26%	124.53%	84.37%					

Note: Covered-employee payroll reflects actual compensation amounts from the prior Plan year.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

Notes to Exhibit 3:

Changes in Assumptions and Methods: There have been no changes in actuarial assumptions or methods since the last measurement date.

Changes in Plan Provisions: There have been no changes in plan provisions since the last measurement date.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

EXHIBIT 4

Schedule of Contributions – Last Ten Years

	Year End June 30,									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	\$52,065,397	\$48,503,358	\$46,237,853	\$44,651,783	\$40,217,666					
Contributions in relation to the actuarially determined contribution	<u>-64,564,323</u>	<u>-60,280,480</u>	<u>-54,347,060</u>	<u>-55,881,364</u>	<u>-56,482,985</u>					
Contribution deficiency (excess)	-\$12,498,926	-\$11,777,122	-\$8,109,207	-\$11,229,581	-\$16,265,319	(Historical information prior to implementation of GASB 67/68 is not required)				
Covered-employee payroll	\$504,553,289	\$471,268,111	\$462,057,022	\$437,675,917	\$416,766,302					
Contributions as a percentage of covered-employee payroll	12.80%	12.79%	11.76%	12.77%	13.55%					

Note: Actuarially determined contributions for a given fiscal year are based on results from the June 30 actuarial valuation two years prior.

Notes to Exhibit 4:

Methods and assumptions used to establish the actuarially determined contribution for the year ending June 30, 2018:

Valuation date

Actuarially determined contribution for the year ending June 30, 2018 is based on results from the June 30, 2016 actuarial valuation, and was calculated as of June 30, with appropriate interest to the middle of the fiscal year.

Actuarial cost method

Entry Age Normal actuarial cost method

Amortization method

Amortization payments calculated to fully fund unfunded actuarial accrued liability with annual increases of 5% over a closed period.

Remaining amortization period

22 years as of July 1, 2016

The amortization of unfunded actuarial accrued liability (UAAL) within the actuarially determined contribution rate calculation is based on the level percentage of pay required to amortize the UAAL over the 30-year closed period that began July 1, 2008.

SECTION 2: Net Pension Liability Information for the Vermont State Employees' Retirement System

Notes to Exhibit 4 (continued):

Asset valuation method

The amount of the assets for valuation purposes equals the preliminary asset value plus 20% of the difference between market and preliminary asset values. The preliminary asset value is equal to the previous year's asset value (for valuation purposes) adjusted for contributions less benefit payments and expenses plus expected investment income. If necessary, a further adjustment is made to ensure that the valuation assets are within 20% of the market value.

Actuarial assumptions:

Investment rate of return

7.95%, net of pension plan investment expenses

Inflation rate

3.00% to 3.25%

Projected salary increases

3.50% to 7.04%

Mortality

Pre-retirement:

Groups A/D/F – RP-2000 Custom Table

Group C – RP-2000 Table for Employees using Scale BB to 2026

Healthy Retiree:

Groups A/F – RP-2000 Mortality Tables for Employees and Healthy Annuitants projected with Scale BB to 2026 with a 30% Blue collar adjustment

Group D – RP-2000 Tables for Employees and Healthy Annuitants projected with Scale BB to 2026

Group C – RP-2000 Tables for Employees and Healthy Annuitants projected with Scale BB to 2026 with a Blue collar adjustment.

Disabled Retiree:

RP-2000 Combined Mortality Tables for Employees and Healthy Annuitants with a five-year set-forward

Other assumptions:

Same as those used in the June 30, 2016 actuarial funding valuation

SECTION 3: Additional Information for GASB 68 for the Vermont State Employees' Retirement System

Changes in the net pension liability from the beginning of the year to the end of the year arise from the net difference between changes in the total pension liability and plan fiduciary net position that occurred during the year. Changes in net pension liability will be recognized immediately as pension expense, or reported as deferred outflows of resources related to pensions or deferred inflows of resources related to pensions, depending on the nature of the change.

Differences between actual and expected investment-related experience are recognized over a closed five-year period. Differences between actual and expected non-investment-related experience and changes of assumptions are recognized over the average of the expected remaining service lives of all members who are provided with pensions through the pension plan (active employees and inactive employees). The amounts below that are not included in pension expense for the current year are included in deferred outflows of resources or deferred inflows of resources related to pensions.

EXHIBIT A

Reconciliation of Net Pension Liability

	Increase/(Decrease) For Fiscal Year Ending June 30, 2018		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) – (b)
Balances at beginning of year	\$2,428,779,253	\$1,748,442,294	\$680,336,959
Changes for the year			
Service cost	49,743,850		49,743,850
Interest	180,860,845		180,860,845
Differences between expected and actual experience	83,265,679		83,265,679
Contributions – employer		64,564,323	-64,564,323
Contributions – member		40,423,239	-40,423,239
Net investment income		123,632,169	-123,632,169
Benefit payments, including refunds of employee contributions	-134,090,344	-134,090,344	0
Administrative expense		-1,720,253	1,720,253
Other		248,855	-248,855
Changes of assumptions	0		0
Change of benefit terms	0		0
Net changes	<u>\$179,780,030</u>	<u>\$93,057,989</u>	<u>\$86,722,041</u>
Balances at end of year	<u>\$2,608,559,283</u>	<u>\$1,841,500,283</u>	<u>\$767,059,000</u>

SECTION 3: Additional Information for GASB 68 for the Vermont State Employees' Retirement System

As shown in Exhibit A, during the plan year that ended June 30, 2018, the change in net pension liability due to differences between expected and actual demographic experience is an increase of \$83,265,679. The average expected remaining service lives of all members is 6 years, determined as of July 1, 2017 (the beginning of the measurement period ending June 30, 2018). Therefore, of the \$83,265,679 demographic loss, \$13,877,613 is recognized in pension expense in the current year and \$69,388,066 is reflected as a deferred outflow of resources related to pensions. There was no change in net pension liability due to assumption changes or changes in plan provisions.

Based on the assumed investment return of 7.50%, the expected net investment income for the year was \$129,986,640. As shown in Exhibit A, the actual net investment income for the year was \$123,632,169. The difference between actual and expected investment experience is an increase in net pension liability of \$6,354,471, which is recognized over a 5-year period. Of this amount, \$1,270,894 is reflected in the current year and \$5,083,577 is reflected as a deferred outflow of resources related to pensions.

EXHIBIT B

Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

	Year Established	Original Balance	Original Amortization Period	Amortization Amount During 2018	Outstanding Balance at June 30, 2018
Outflows					
Demographics	2015	\$3,979,303	6 years	\$663,218	\$1,326,431
Assumptions	2015	62,246,999	6 years	10,374,500	20,748,999
Investments	2015	139,303,693	5 years	27,860,739	27,860,737
Demographics	2016	25,051,322	6 years	4,175,220	12,525,662
Investments	2016	109,920,576	5 years	21,984,115	43,968,231
Demographics	2017	19,283,274	6 years	3,213,879	12,855,516
Assumptions	2017	42,724,968	6 years	7,120,828	28,483,312
Demographics	2018	83,265,679	6 years	13,877,613	69,388,066
Investments	2018	6,354,471	5 years	1,270,894	5,083,577
Total outflows				\$90,541,006	\$222,240,531
Inflows					
Investments	2014	\$112,337,748	5 years	\$22,467,548	\$0
Assumptions	2016	21,853,404	6 years	3,642,234	10,926,702
Investments	2017	43,645,572	5 years	8,729,114	26,187,344
Total inflows				\$34,838,896	\$37,114,046

SECTION 3: Additional Information for GASB 68 for the Vermont State Employees' Retirement System

EXHIBIT B (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

	June 30, 2018	June 30, 2017
Deferred Outflows of Resources		
Difference between expected and actual experience in the Total Pension Liability	\$96,095,675	\$34,759,926
Changes of assumptions	49,232,311	66,727,639
Net difference between projected and actual earnings on pension plan investments	<u>50,725,201</u>	<u>64,289,816</u>
Total Deferred Outflows of Resources	\$196,053,187	\$165,777,381
Deferred Inflows of Resources		
Difference between expected and actual experience in the Total Pension Liability	\$0	\$0
Changes of assumptions	10,926,702	14,568,936
Net difference between projected and actual earnings on pension plan investments	<u>0</u>	<u>0</u>
Total Deferred Inflows of Resources	\$10,926,702	\$14,568,936
Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:		
Year Ended June 30:		
2018	N/A	\$40,553,603
2019	\$78,169,656	63,021,149
2020	50,308,914	35,160,407
2021	17,287,086	2,138,579
2022	25,483,215	10,334,707
2023	13,877,614	0
Thereafter	0	0

SECTION 3: Additional Information for GASB 68 for the Vermont State Employees' Retirement System

Exhibit C below shows the individual components of pension expense, which totaled \$117,368,324 for the fiscal year that ended June 30, 2018.

Annual pension expense for the year can also be viewed as the change in net pension liability, plus employer contributions for the year, less the change in outstanding balances of deferred outflows and deferred inflows of resources from the end of the prior fiscal year to end of the current fiscal year. From Exhibit A, the change in net pension liability during the year was \$86,722,041 and employer contributions were \$64,564,323. The net value of deferred outflows and deferred inflows of resources as of the end of the current fiscal year is \$185,126,485 compared to the net value as of the end of the prior fiscal year of \$151,208,445 for a change of \$33,918,040. Therefore, the pension expense for the fiscal year that ended June 30, 2018, is \$86,722,041 + \$64,564,323 – \$33,918,040, or \$117,368,324.

EXHIBIT C

Pension Expense

	Fiscal Year Ending June 30, 2018	Fiscal Year Ending June 30, 2017
Components of pension expense		
Service cost	\$49,743,850	\$42,703,770
Interest on the total pension liability	180,860,845	178,958,654
Projected earnings on plan investments	-129,986,640	-126,712,444
Contributions – member	-40,423,239	-35,966,987
Administrative expense	1,720,253	1,776,653
Other	-248,855	-443,113
Current year recognition of:		
Changes of assumptions	0	7,120,828
Difference between expected and actual experience	13,877,613	3,213,879
Difference between projected and actual earnings on pension plan investments	1,270,894	-8,729,114
Change of benefit terms	0	0
Recognition of prior year's deferred outflows of resources	75,392,499	65,057,792
Recognition of prior year's deferred inflows of resources	<u>-34,838,896</u>	<u>-26,109,784</u>
Total pension expense	<u>\$117,368,324</u>	<u>\$100,870,134</u>

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

EXHIBIT I

Actuarial Assumptions and Actuarial Cost Method*

Rationale for Assumptions:

The information and analysis used in selecting each assumption (except for economic assumptions and mortality tables) that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated October 29, 2015 (as prepared by Buck Consultants). Economic assumptions, including inflation, investment return, and assumed cost-of-living adjustment increases were studied and adopted by the Board on July 13, 2017. Mortality table assumptions were studied and adopted by the Board on September 25, 2017. The next Actuarial Experience study will be performed in 2020 for the July 1, 2021 valuation.

Roll-forward Techniques:

The results as of June 30, 2018, are based on the results of the Vermont State Employees' Retirement System Actuarial Valuation Report as of June 30, 2017 adjusted forward, using standard actuarial techniques.

Inflation:

2.50%.

Investment Return:

7.50%.

The investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.

** Same assumptions used in the June 30, 2018, Actuarial Valuation and Review.*

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Salary Increases:

Age	Annual Rate of Salary Increase %
20	7.04%
25	6.21%
30	5.66%
35	5.26%
40	4.92%
45	4.36%
50	3.70%
55	3.50%
60	3.50%

Cost-of-Living Adjustments:

Assumed to occur at the rate of 2.55% per annum for Groups A, C and D members and 1.40% per annum for Group F members (beginning at age 62 for deferred retirements). For Group F members retiring after July 1, 2008, cost-of-living adjustments are assumed to occur at the rate of 2.55% per annum effective January 1, 2014. The January 1, 2019 COLA is assumed to be 1.30% for those in group E and F who retired before June 30, 2018, and 2.60% for all other groups.

Mortality Rates:

Death in Active Service:

Groups A/F: 101% of RP-2006 blended 30% Blue Collar Employee, 70% Healthy Employee with generational projection using Scale SSA-2017.
 Group C: RP-2006 Blue Collar Employee with generational projection using Scale SSA-2017.
 Group D*: RP-2006 Healthy Employee with generational projection using Scale SSA-2017.

Healthy Post-retirement:

Groups A/F: 101% of RP-2006 blended 30% Blue Collar Annuitant, 70% Healthy Annuitant with generational projection using Scale SSA-2017.
 Group C: RP-2006 Blue Collar Annuitant with generational projection using Scale SSA-2017.
 Group D: RP-2006 Healthy Annuitant with generational projection using Scale SSA-2017.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Disabled Post-retirement:

All Groups – RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017.

The tables with the generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date. The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the various industries and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual amount of deaths by benefit amount and the projected amount based on the prior assumption over the five-year period ending June 30, 2016. The mortality tables were then adjusted to future years using a generational projection with Scale SSA-2017 to reflect future mortality improvement.

* 30% of deaths assume to be accidental.

Please note, the description of the mortality table has been changed to be consistent with revised nomenclature related to unprojected rates of mortality used in the RP-2014 series of mortality tables.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Separation from Service before Retirement (Due to Withdrawal and Disability):

Representative values of the assumed annual rates of withdrawal and disability are as follows:

Age	Rate (%)				
	Withdrawal ¹			Disability	
	Groups A/D/F Male/Female	Group C		Groups A/D/F	Group C
25	4.91%	4.32%	8.64%	0.02%	0.08%
30	3.93	4.32	8.64	0.02	0.10
35	3.28	4.32	8.64	0.03	0.13
40	3.04	4.32	8.64	0.04	0.20
45	2.69	4.32	8.64	0.06	0.32
50	2.25	4.32	8.64	0.10	0.55
55	1.83	4.32	8.64	0.18	0.91
60	3.90	4.32	8.64	0.28	1.46

¹ Withdrawal rates are increased during the first 10 years of service for Groups C and F. For Group C, no withdrawal is assumed after a member has attained 20 years of service, For Group D, no withdrawal is assumed after a member has reached age 55.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Retirement Rates:

Age	Retirement Group F ²		Age	Retirement Group F ²	
	Male	Female		Male	Female
50	16.0%	6.0%	60	5.6%	5.6%
51	16.0	8.0	61	11.2	11.2
52	8.0	9.0	62	22.4	22.4
53	8.0	9.0	63	17.5	14.0
54	8.0	10.0	64	17.5	14.0
55	4.0	5.0	65	25.0	20.0
56	3.4	4.2	66	15.0	15.0
57	4.5	5.6	67	17.5	17.5
58	5.0	6.3	68	17.5	17.5
59	5.6	5.6	69	20.0	20.0
			70	100.0	100.0

² All Group A, C, and D members are assumed to retire when first eligible.

The retirement rates were based on historical and current demographic data, adjusted to reflect conditions of the various industries, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior assumption over the four-year period ending June 30, 2014.

Inactive Members as Reported by the System:

Valuation liability equals 250% of accumulated contributions.

Deferred Members as Reported by the System:

Assumed to retire at their Normal Retirement Age with deferred vested benefit.

Future Administrative Expenses:

No provisions made; expenses of the System are paid by the State.

Unknown Data for Participants:

Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Percent Married:	Groups A/D: 75.4% of male members and 64.0% of female members are assumed to be married. Group C: 73.3% of male members and 61.0% of female members are assumed to be married. Group F: 71.4% of male members and 63.1% of female members are assumed to be married.
Age of Spouse:	Females three years younger than males.
Benefit Elections:	Non-Group C: All members are assumed to elect the single life annuity option Group C: Single members are assumed to elect single life annuity. Married members are assumed to elect 70% joint & survivor option
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each member.
Changes Actuarial Assumptions:	There have been no changes in actuarial assumptions since the last valuation.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

EXHIBIT II

Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Effective Date:	July 1, 1972 (for consolidated system).
Creditable Service:	Service as a member plus purchased service.
Average Final Compensation (AFC):	Groups A/F: Average annual compensation during highest 3 consecutive years. Group C: Average annual compensation during highest 2 consecutive years. Group D: Annual compensation at retirement.
Normal Retirement – Eligibility:	Group A: Earlier of age 65 with 5 years of service for members hired after July 1, 2004, and age 62 with 20 years of service. Group C: Age 55. Group D: Age 62 with 5 years of service. Group F: Age 62 or 30 years of service. For members hired after June 30, 2008, age 65 or a sum of age plus service greater than or equal to 87.
Normal Retirement – Amount:	Group A: 1.67% of AFC times service. Group C: 2.50% of AFC times service up to 20 years. Group D: 3.33% of AFC times service up to 30 years. Group F: 1.25% of AFC times service prior to January 1, 1991, plus 1.67% of AFC times service after 1990, up to a maximum benefit of 50% of AFC. For members hired on or after July 1, 2008, the maximum benefit is 60% of AFC.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Early Retirement – Eligibility: Groups A/D: Age 55 with 5 years of service or 30 years of service.
 Group C: Age 50 with 20 years of service.
 Group F: Age 55 with 5 years of service.

Early Retirement – Amount: Group A: Actuarial equivalent of normal retirement allowance. For members with 30 years of service, there is no reduction.
 Group C: Same as normal retirement allowance.
 Group D: Normal allowance reduced by 3% for each year commencement precedes age 62.
 Group F: For members hired prior to July 1, 2008, no reduction if 30 years of service; otherwise normal allowance reduced by 6% for each year commencement precedes age 62. For members hired on or after July 1, 2008, no reduction if combination of years and service equal 87; other reduced from age 65 based on the following table:

Years of Service	Reduction in Benefit
35	One-eighth of 1% per year
30	One-fourth of 1% per year
25	One-third of 1% per year
20	Five-twelfths of 1% per year
Less than 20	Five-ninths of 1% per year

Vesting: All groups – 5 years of creditable service. Allowance beginning at normal retirement age based on AFC and service at termination.

Ordinary Disability – Eligibility: All groups – 5 years of service and incapacitated, not work related, for performance of duty.

Ordinary Disability – Amount: All groups – Immediate allowance based on service to date of disability. Benefit is the greatest of 25% of AFC and unreduced accrued benefit as of date of disability.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Accidental Disability – Eligibility:	All groups – Incapacitated because of work related accident.
Accidental Disability – Amount:	Groups A/D/F: Immediate allowance based on service projected to normal retirement. Benefit is the greater of 25% of AFC and unreduced accrued benefit as of date of disability. Group C: Immediate allowance equal to 50% of AFC with additional 10% of AFC for each dependent child (up to 30%).
Ordinary Death – Eligibility:	Groups A/F: Death after eligibility for early retirement or 10 years of service. Groups C/D: Death after normal retirement age or 10 years of service.
Ordinary Death – Amount:	Groups A/D/F: Maximum of reduced allowance under 100% survivor option and disability allowance under 100% disability survivor option, commencing immediately. Group C: 70% of the allowance that would have been payable to the member plus additional allowance equal to 10% of AFC for each dependent child (up to 30%).
Accidental Death – Eligibility:	All groups – Death because of work related accident.
Accidental Death – Amount:	Groups A/D/F: Allowance equal to 25% of AFC payable to spouse. Group C: Allowance equal to 35% of AFC payable to spouse plus 10% for each dependent child (up to 30%).
Post-Retirement Adjustments:	Groups A/C/D: Allowances in payment for at least one year increased on each January 1 by the percentage increase in Consumer Price Index, but not more than 5%. Group F: Same, but increase is based on half of the Consumer Price Index increase. Increase is based on the full Consumer Price Index increase starting in 2014 for employees retiring after July 1, 2008.
Optional Benefit and Death after Retirement:	Lifetime allowance or actuarially equivalent allowance with survivor benefit as elected by member upon retirement. Upon death of a Group C member, an allowance equal to 70% of the member's allowance is continue to the surviving spouse.
Refund of Contributions:	Upon termination, if the member so elects, or if no other benefit is payable, the member's accumulated contributions with interest are refunded.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Member Contribution Rates: Groups A/D/F: 6.65%.
Group C: 8.53%.

Changes in Plan Provisions There have been no changes in plan provisions since the last valuation.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Appendix A

Glossary

Definitions of certain terms *as they are used in Statement 68*; the terms may have different meanings in other contexts.

Active employees:	Individuals employed at the end of the reporting or measurement period, as applicable.
Actual contributions:	Cash contributions recognized as additions to a pension plan's fiduciary net position.
Actuarial present value of projected benefit payments:	Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial valuation:	The determination, as of a point in time (the actuarial valuation date), of the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial valuation date:	The date as of which an actuarial valuation is performed.
Actuarially determined contribution:	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
Ad hoc cost-of-living adjustments (ad hoc COLAs):	Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.
Ad hoc postemployment benefit changes:	Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions.
Agent employer:	An employer whose employees are provided with pensions through an agent multiple-employer defined benefit pension plan.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Agent multiple-employer defined benefit pension plan (agent pension plan):

A multiple-employer defined benefit pension plan in which pension plan assets are pooled for investment purposes but separate accounts are maintained for each individual employer so that each employer's share of the pooled assets is legally available to pay the benefits of only its employees.

Allocated insurance contract:

A contract with an insurance company under which related payments to the insurance company are currently used to purchase immediate or deferred annuities for individual employees. Also may be referred to as an annuity contract.

Automatic cost-of-living adjustments (automatic COLAs):

Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Automatic postemployment benefit changes:

Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Closed period:

A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.

Collective deferred outflows of resources and deferred inflows of resources related to pensions:

Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective net pension liability.

Collective net pension liability:

The net pension liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Collective pension expense:	Pension expense arising from certain changes in the collective net pension liability.
Contributions:	Additions to a pension plan's fiduciary net position for amounts from employers, nonemployer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.
Cost-of-living adjustments:	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-sharing employer:	An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.
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 retirement option program (DROP):	A program that permits an employee to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The employee continues to provide service to the employer and is paid for that service by the employer after the DROP entry date; however, the pensions that would have been paid to the employee (if the employee had retired and not entered the DROP) are credited to an individual employee account within the defined benefit pension plan until the end of the DROP period.
Defined benefit pension plans:	Pension plans that are used to provide defined benefit pensions.

- Defined benefit pensions:** Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 68.)
- Defined contribution pension plans:** Pension plans that are used to provide defined contribution pensions.
- Defined contribution pensions:** Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.
- Discount rate:** The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:
1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of Statement 68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.
 2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Entry age actuarial cost method:	A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the <i>normal cost</i> . The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the <i>actuarial accrued liability</i> .
Inactive employees:	Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
Measurement period:	The period between the prior and the current measurement dates.
Multiple-employer defined benefit pension plan:	A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Net pension liability:	The liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan.
Nonemployer contributing entities:	Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 68, employees are not considered nonemployer contributing entities.
Other postemployment benefits:	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 postemployment benefits do not include termination benefits.
Pension plans:	Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed, and benefits are paid as they come due.
Pensions:	Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

Plan members:	Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).
Postemployment:	The period after employment.
Postemployment benefit changes:	Adjustments to the pension of an inactive employee.
Postemployment healthcare benefits:	Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment.
Projected benefit payments:	All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.
Public employee retirement system:	A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.
Real rate of return:	The rate of return on an investment after adjustment to eliminate inflation.
Service costs:	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
Single employer:	An employer whose employees are provided with pensions through a single-employer defined benefit pension plan.
Single-employer defined benefit pension plan (single-employer pension plan):	A defined benefit pension plan that is used to provide pensions to employees of only one employer.
Special funding situations:	<p>Circumstances in which a nonemployer entity is legally responsible for making contributions directly to a pension plan that is used to provide pensions to the employees of another entity or entities and either of the following conditions exists:</p> <p>The amount of contributions for which the nonemployer entity legally is responsible is <i>not</i> dependent upon one or more events or circumstances unrelated to the pensions.</p>

SECTION 4: Supplemental Information for the Vermont State Employees' Retirement System

The nonemployer entity is the only entity with a legal obligation to make contributions directly to a pension plan.

Termination benefits:

Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.

Total pension liability:

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement.

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