

Public Service Superannuation Fund

Actuarial Valuation as at March 31, 2020 for Funding Purposes

Report prepared in December 2020

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Introduction

This report presents the results of the actuarial valuation as at March 31, 2020 of the Public Service Superannuation Fund (“PSSF”). The Ministry of Finance of Bermuda retained the services of Morneau Shepell Ltd. (“Morneau Shepell”) to perform this actuarial valuation. The PSSF is sponsored by the Government of Bermuda (the “Government”). The last complete valuation was performed as at March 31, 2017.

This report was prepared for the following purposes:

- to determine the going-concern financial position of the PSSF;
- to estimate the costs of the benefits being accrued under the PSSF during the period up until the next valuation;
- to determine the adequacy of the PSSF’s contribution rates; and
- to provide the information and the actuarial opinion required by the standards of practice of the Canadian Institute of Actuaries.

In addition, we have performed a three-year projection of the funded ratio, based on assets, actuarial liabilities and normal costs projected to March 31, 2023.

The results of this valuation have been incorporated in the accounting valuation report as of March 31, 2020 that we prepared for the Accountant General’s Department.

Background

The PSSF provides contributory defined benefit pensions to Bermuda’s public service employees, and quasi-autonomous non-governmental organization (“QUANGO”) employees.

The provisions of the Public Service Superannuation Act 1981 (“PSSA”) have attempted to harmonize the different conditions and benefits previously applied to the “Special Group” members (Police and Fire Officers below the rank of Superintendent / Divisional Officer and Prison Officers below the rank of Deputy Commissioner) and other public service groups such as teachers and judges.

Terms of engagement

This report takes into account discussions with the client on the terms of engagement, as outlined in Appendix F.

Changes since last valuation

The Public Service Superannuation Act 1981 was amended in 2019 to change the compulsory retirement age from age 65 to 68. The assumptions under the PSSF were not changed at this time and as the retirement experience unfolds, it may be appropriate to modify the retirement assumptions. However, for now, we believe that it is appropriate to continue to assume that all employees will retire at age 65 for liability calculation purposes. Any change to this assumption at this time would not be expected to have a material impact on the actuarial liabilities or the normal cost.

Assumptions

The interest rate assumption has been updated to reflect market conditions as at the valuation date as outlined in Appendix A.

Subsequent Events

On March 11, 2020, the World Health Organization declared that COVID-19 was a pandemic. This public health crisis caused significant economic and social disruptions worldwide.

- The COVID-19 pandemic resulted in higher deaths for the population in general as measured by public health officials. The effect of the outbreak on the mortality incidence for the Plan is unknown at this time and no adjustments to the mortality assumption have been made in this report. The effect on the Plan if any, will be recognized in the gains or losses of future reports as the experience emerges.
- Economic conditions have also changed with a significant reduction in asset values and strained liquidity occurring in the month of March. Sustained lowered economic activity could also impact the Plan's economic assumptions. No adjustments on the Plan assets nor to any of the economic assumptions have been made or anticipated in this report.
- In response to the pandemic, the Government enacted the Public Service Superannuation Temporary Amendment Act 2020 to provide for a one-year temporary suspension of the Government's contributions to the PSSF, and an optional one year temporary suspension of a contributor's contributions. The suspension period runs from September 1, 2020 to August 31, 2021 for teachers, and from August 1, 2020 to July 31, 2021 for all other persons.

Restriction on use of this report

This report was prepared for Government of Bermuda. This report and any of its content may not be distributed, published, made available or relied upon by any other person, without the express written permission of Morneau Shepell, unless and only to the extent otherwise provided by applicable law.

Section 1 – Actuarial Opinion

This opinion is given with respect to the PSSF. We performed a valuation as at March 31, 2020, based on the PSSF provisions and data as at that date. The Government has confirmed that, between March 31, 2020 and the date of this report, no subsequent events, modifications or extraordinary changes to the membership or provisions that would materially affect the results of this actuarial valuation have occurred, except as indicated in this report.

I hereby certify that, in my opinion, as at March 31, 2020:

- The PSSF is not fully funded on the going-concern basis. The actuarial liabilities exceed the actuarial value of assets by \$1,025,908,000.
- Based on the membership data used for the valuation, and taking into account the estimated impact of the Public Service Superannuation Temporary Amendment Act 2020, we have estimated the normal cost, employee contributions and employer normal cost for each of the three year periods following the valuation date, as shown in the table below:

Table 1.1 – Projected Normal Costs

	March 31, 2023	March 31, 2022	March 31, 2021
	\$	\$	\$
Normal cost	55,206,300	34,768,700	17,788,900
Less employee contributions	34,525,500	21,744,000	11,125,000
Employer normal cost	20,680,800	13,024,700	6,663,900

In my opinion, for the purposes of this report:

- The membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation.
- The assumptions are appropriate for the purposes of the valuation.
- The methods employed in the valuation are appropriate for the purposes of the valuation.
- This report has been prepared, and my opinion given, in accordance with accepted actuarial practice in Canada.

The assumptions that form the going-concern basis used in this report were reasonable at the time this actuarial valuation report was prepared and contributions were determined.

The recommendations and opinions are given exclusively from a financial viewpoint. This valuation report does not constitute a legal opinion on the rights and duties of the Government of Bermuda, or the members over the pension fund.

Actuarial valuation results are only estimates. Actuarial valuations are performed based on assumptions and methods that are in accordance with sound actuarial principles. Emerging experience differing from these assumptions may result in gains or losses, which may affect future contribution levels. These gains or losses will be revealed in future actuarial valuations.

The next actuarial valuation will have to be performed not later than as at March 31, 2023.

The undersigned is available to provide supplementary information and explanation, as appropriate, concerning this report.

A handwritten signature in dark ink, appearing to read 'R. Kular', is positioned above the printed name.

Richard M. Kular, FSA, FCIA
Principal

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December 2020

Section 2 – Going-Concern Financial Position

Going-Concern Financial Position

The financial position of the PSSF on the going-concern basis is determined by comparing the actuarial value of the assets to the actuarial liabilities. The actuarial liabilities are based on the benefits earned up to the valuation date assuming the PSSF continues indefinitely.

Table 2.1 – Going-Concern Financial Position

	March 31, 2020	March 31, 2017
	\$000	\$000
Actuarial value of assets		
Market value	559,935	574,090
Smoothing adjustment	49,809	21,623
Total	609,744	595,713
Actuarial liabilities		
Active members	831,819	719,220
Deferred vested members	59,451	52,526
Retired members and beneficiaries	744,382	672,299
Total	1,635,652	1,444,045
Actuarial surplus (unfunded liability)	(1,025,908)	(848,332)
Funding ratio	37.3%	41.3%

Reconciliation of Going-Concern Financial Position

The table below describes the change in the PSSF's going-concern financial position since the last valuation:

Table 2.2 – Reconciliation of Going-Concern Financial Position

	\$000	\$000
Actuarial surplus (unfunded liability) as at March 31, 2017		(848,332)
Expected changes in funded status		
Interest on surplus (unfunded liability)	(176,410)	
Regular contributions greater than current service cost	48,719	
Total		(127,691)
Expected surplus (unfunded liability) as at March 31, 2020		(976,023)
Actuarial gains (losses) due to the following factors		
Investment return on actuarial value of assets	(38,802)	
Salary increases	45,926	
Retirements	2,963	
Terminations	(11,008)	
Mortality	2,129	
Total		1,208
Other gains (losses)		
Changes in actuarial assumptions	(48,047)	
Data adjustments and program refinements	(3,046)	
Total		(51,093)
Actuarial surplus (unfunded liability) as at March 31, 2020		(1,025,908)

Sensitivity Analysis – Actuarial Liabilities

The table below illustrates the effect of 1% changes in the interest rate, 1% changes in salary increase rate, and one-year changes in life expectancy on the going-concern actuarial liabilities, independently. With the exception of assumption in consideration, all other assumptions and methods used for this valuation were maintained.

Table 2.3 – Sensitivity of Actuarial Liabilities

Assumption	Change	Impact on ABO	Impact on ABO
		(\$000)	(%)
Interest rate	1.0% increase	(178,108)	(10.9)
	1.0% decrease	220,588	13.5
Salary increase rate	1.0% increase	69,365	4.2
	1.0% decrease	(60,873)	(3.7)
Life expectancy	1 year increase	27,497	1.7
	1 year decrease	(26,640)	(1.6)

Section 3 – Normal Cost

Normal Cost

The table below summarizes the estimated going-concern cost of pension benefits that would have been earned in the twelve-month period following the valuation date (the normal cost) had the Government not enacted the Public Service Superannuation Temporary Amendment Act 2020.

Table 3.1 – Normal Cost (Prior to One-Year Suspension of Service and Contributions)

	As at March 31, 2020		As at March 31, 2017	
	\$000	% of payroll	\$000	% of payroll
Normal cost	51,307,100	(13.08)	46,884,300	(12.43)
Less employee contributions	32,087,000	(8.18)	31,090,400	(8.23)
Employer normal cost	19,220,100	(4.90)	15,856,100	(4.20)
Expected annual payroll	392,424,000		377,823,700	

Pursuant to the Public Service Superannuation Temporary Amendment Act 2020, Government contributions have been suspended for a one-year period and, on an optional basis, so have employee contributions. The suspension period runs from September 1, 2020 to August 31, 2021 for teachers and from August 1, 2020 to July 31, 2021 for all other persons. Assuming that no employees make contributions during the suspension period, we have estimated the normal cost earned in the twelve-month period after the valuation date (the normal cost) to be as shown in Table 3.2.

Table 3.2 – Normal Cost (With One-Year Suspension of Service and Contributions)

	As at March 31, 2020		As at March 31, 2017	
	\$000	% of payroll	\$000	% of payroll
Normal cost	17,788,900	(13.08)	46,884,300	(12.43)
Less employee contributions	11,125,000	(8.18)	31,090,400	(8.23)
Employer normal cost	6,663,900	(4.90)	15,856,100	(4.20)
Expected annual payroll	136,058,800		377,823,700	

Reconciliation of Normal Cost

The factors contributing to the change in the normal cost as a percentage of payroll are shown below:

Table 3.3 – Reconciliation of Normal Cost

	% of payroll
Normal cost as at March 31, 2017	12.43
Demographic changes	0.10
Changes in actuarial assumptions	0.55
Normal cost as at March 31, 2020	13.08

Sensitivity Analysis - Normal Cost

The table below illustrates the effect of 1% changes in the interest rate, 1% changes in salary increase rate, and one year changes in life expectancy on the normal cost, independently. All other assumptions and methods, as used in this valuation, were maintained.

Table 3.4 – Sensitivity of the Normal Cost (Prior to One-Year Suspension of Service and Contributions)

Assumption	Change	Impact on	Impact on
		Normal Cost	Normal Cost
		\$	(%)
Interest rate	1.0% increase	(7,315,800)	(14.3)
	1.0% decrease	10,845,400	21.1
Salary increase rate	1.0% increase	5,486,900	10.7
	1.0% decrease	(4,139,200)	(8.1)
Life expectancy	1 year increase	481,300	0.9
	1 year decrease	(513,400)	(1.0)

Section 4 – Three-Year Projection

Financial Position Projections

The projected financial position of the PSSF as at March 31, 2021, March 31, 2022 and March 31, 2023, using the assumptions summarized in Appendix A, and taking account of the one-year suspension of contributions, is shown below.

Table 4.1 – Projected Financial Position

	March 31, 2023	March 31, 2022	March 31, 2021
	\$000	\$000	\$000
Actuarial value of assets	544,858	547,537	571,290
Actuarial liability	1,797,475	1,720,193	1,667,894
Unfunded liability	(1,252,617)	(1,172,656)	(1,096,604)
Funded ratio	30.3%	31.8%	34.3%

Normal Cost Projections

The table below summarizes the estimated annual costs of pension benefits that are projected to be earned in the three-year period following the valuation date, using the assumptions stated in Appendix A and the March 31, 2023 contribution rates shown in Table 3.2.

Table 4.1 – Projected Normal Costs

	March 31, 2023	March 31, 2022¹	March 31, 2021¹
	\$	\$	\$
Normal cost	55,206,300	34,768,700	17,788,900
Less employee contributions	34,525,500	21,744,000	11,125,000
Employer normal cost	20,680,800	13,024,700	6,663,900

¹ Reflects one-year temporary suspension of contributions from September 1, 2020 to August 31, 2021 for teachers and from August 1, 2020 to July 31, 2020 for all other persons.

Adequacy of Current Contribution Rates

The funded ratio of the PSSF at March 31, 2020 is 37.3% based on the Actuarial Value of Assets at that date. The financial position is projected to decline in each of the three fiscal years following the valuation date, as shown in Table 4.1, where we see increasing deficit amounts and decreasing funded ratios. The 37.3% funded ratio is projected to drop to 30.3% as at March 31, 2023, if the invested assets earn the assumed 6.25% rate of return per annum.

The following explains the reasons for the projected declines:

1. As in prior years, the projected total employer and employee contributions exceed the normal cost of benefits earned each year. Based on Table 4.1, the estimated excess is \$4.5 million, \$8.7 million and \$13.8 million in the three years following the valuation date.
2. The \$1.03 billion PSSF deficit might be expected to grow at 6.25% per annum, to \$1.23 billion in three years time, however, after taking the excess contributions in point 1 into account, the projected deficit would be slightly lower, at \$1.20 billion.
3. However, in Table 4.1 we are projecting that the deficit will grow to \$1.25 billion in three years' time.
4. The reason for this is the impact of the five-year asset smoothing that is used to develop the Actuarial Value of Assets. Table B.5 in Appendix B illustrates that the smoothed rates of return on projected actuarial asset values are less than 6.25% per annum in each of the three years following the valuation date. So, while the projected liabilities are assumed to grow at 6.25% per year, the growth in the smoothed asset values in these years is not projected to be enough to keep up with the growth in the liabilities, leading to this higher increase in the PSSF deficit and the decreasing funded ratios noted.

Appendix A – Going-Concern Actuarial Basis

Asset Valuation Method

A smoothed market value of assets has again been used for the valuation. The “Actuarial Value of Assets” is a five-year averaging of the investment gain or loss experienced each year, relative to the 6.5% investment return that had been assumed to be earned in each year prior to the valuation date, to eliminate short-term fluctuations. The following table shows how these gains and losses are gradually recognized for purposes of this smoothing method:

Table A.1

Year gain or loss occurred	Percent recognized in Actuarial Value of Assets
Five years prior to valuation	100%
Four years prior to valuation	80%
Three years prior to valuation	60%
Two years prior to valuation	40%
One year prior to valuation	20%

Actuarial Cost Method

The actuarial liabilities and the normal cost on the going-concern basis were calculated using the projected accrued benefit (or projected unit credit) actuarial cost method. The actuarial liabilities are equal to the actuarial present value of benefits earned by members for services prior to the valuation date, taking into account the assumptions as indicated hereafter. The normal cost is equal to the actuarial present value of benefits expected to be earned by members in the year following the valuation date. The employer normal cost is the excess of the normal cost over employees’ required contributions.

The ratio of the normal cost to the covered payroll for the period will tend to be stable over time if the demographic characteristics of the active members are similar from one valuation to the next. All other things being equal, an increase in the average age of the active members will result in an increase in this ratio.

For valuation purposes, member ages were rounded to the nearest birthday. However, to determine eligibility for benefits, ages of the active members were rounded up to the next integer age.

Assumptions

With the exception of the investment return (interest rate) assumption, we have employed the same assumptions in performing the March 31, 2020 valuation as were used in the prior valuation. The investment return assumed was reduced from 6.5% per annum to 6.25% per annum, and the derivation of the new rate is shown later in this Appendix.

Actuarial Assumptions

The main actuarial assumptions used in the going-concern valuation are summarized in the following table. All rates and percentages are annualized unless otherwise noted.

Table A.1 – Going-Concern Actuarial Assumptions

	March 31, 2020			
Economic Assumptions				
Investment return (interest rate)	6.25% per annum (previously 6.50% per annum)			
Inflation rate	3.00% per annum			
Interest credited on employee contributions	4.00% per annum			
Salary increase rates	Age band	% per annum		
	20-25	6.00		
	25-30	6.00		
	30-35	5.10		
	35-40	4.40		
	40-45	4.15		
	45-50	4.10		
	50-55	3.90		
	55-60	3.65		
60-65	3.45			
Demographic Assumptions				
Mortality (post-retirement only)	2014 CPM Public Sector Mortality Table projected generationally by CPM Improvement Scale B No occupational mortality has been assumed			
Retirement Age – active members with 8 years of service	Age	Special Groups(%)	Pre-82 Non- Special Groups (%)	Post-82 Non- Special Groups (%)
	50-54	2.5	0.0	0.0
	55	100.0	10.0	1.0
	56-59		2.5	1.0
	60-61		18.5	8.0
	62-64		12.5	8.0
65		100.0	100.0	
Retirement age – active members age 65 or older	Assumed to retire immediately, even with less than 8 years of service			
Retirement age – deferred vested members	Age 60			

	March 31, 2020		
Termination rates	Duration	Special Groups (%)	Non-Special Groups (%)
	0	5.0	13.0
	1	5.0	10.0
	2	4.5	9.0
	3	4.0	8.0
	4	4.0	7.0
	5	4.0	6.0
	6	4.0	6.0
	7	4.0	8.5
8+	1.4	1.4	
Temporary suspension of accruals – 2020/2021	100% of employees are assumed to not contribute to the PSSF during their applicable one-year suspension period		
Disability	None assumed		
Marital status	63% of male active, deferred vested members and retirees are assumed to have a wife; 50% of female active, deferred vested members and retirees are assumed to have a husband; widowed spouses are assumed not to remarry		
Spousal age difference	Women are assumed to be three years younger than men		
Dependent children	Active and deferred vested members are assumed to have no dependent children upon their death. Existing dependent children of former retirees will remain dependent until age 21		
Form of pension and pension commutation at retirement	Active and deferred members will be provided with the following pension forms: <ul style="list-style-type: none"> • Married members: Joint and 60% survivor • Single members: Single life, 5 year guarantee • 25% of pension is commuted using the 11.5 factor 		
Other Assumptions			
Expenses	None; the assumed investment return is net of all expenses		
Hardship withdrawals	Hardship withdrawal balances owing are included in assets as a receivable. Consequently, no adjustments were required to be made to the PSSF's liabilities.		

Choice of Assumptions

The going-concern actuarial assumptions were selected by the Government with the guidance of Morneau Shepell Ltd. Since the benefits under the PSSF are backed by the Government of Bermuda, long-term benefit security is not necessarily a primary concern and therefore, not an objective for funding of the PSSF. As a result, it is appropriate to use best-estimate assumptions and it is not necessary to include provisions for adverse deviations in determining the actuarial liabilities and costs of the PSSF in the valuations.

The following summarizes the rationale for selection of the going-concern actuarial assumptions:

Interest rate

The elements considered in the development of the discount rate assumption for going-concern purposes are summarized in the table below:

Table A.2 – Interest Rate

	%
Expected inflation ¹	2.25
Expected real return	3.91
Value added for rebalancing and diversification effect	0.50
Expected investment management expenses ²	(0.07)
Expected administration expenses	(0.25)
Interest rate	6.34
Interest rate (rounded) ³	6.25

1 US inflation expectation

2 Assuming passive investment management strategy

3 Interest rate rounded to the nearest 25 basis points

The following table shows the target asset mix in accordance with the Plan's statement of Investment Policies and Procedures.

Table A.3 – Total Asset Mix

Asset classes	Target asset mix
	%
Global equity	22.5
US equity	9.5
International equity	6.0
Fixed income	30.5
Alternative Investments	31.5
Total	100.0

Portfolio rebalancing will affect the portfolio's expected long-term return. In other words, realigning portfolio's weightings to the target determined in the investment policy from time to time will have an impact on the long-term return. The impact of portfolio rebalancing depends on its frequency, the weightings between asset classes, the level of diversification in the portfolio and the investment horizon. The expected return is also influenced by the level of diversification of the portfolio (this is independent of rebalancing). The expected impact of rebalancing and diversification on the portfolio's return (weighted average of returns of asset classes) was estimated on the basis of a log-normal distribution.

Salary Increase Rates

The salary increase assumption is comprised of a base rate of 3.00% for inflation on island plus an age-related margin, producing the salary increase rates by age band outlined in Table A.1.

Mortality Rates

The 2014 PSSF Pensioner Mortality Study showed that the mortality of public sector employees in Bermuda has kept in pace with mortality improvements of similar employee groups in Canada and elsewhere. We have therefore maintained the same mortality assumption used in the prior valuation (i.e., CPM 2014 Public Sector Mortality Table projected with two-dimensional CPM Improvement Scale B).

Termination Rates

The termination assumption used is based on the 2017 Termination Study. The termination rates are noted in Table A.1.

Retirement Age

We have maintained the retirement assumption used in the last valuation which is based on the 2017 Retirement Study. This retirement assumptions makes recognition of differing patterns of retirement for members of the Special Groups and Non-Special Groups, with a further refinement for Pre and Post-82 Non-Special Group members.

Marital Status at Retirement

The 2017 Marital Status at Retirement Study results were maintained as to the number of members who are expected to be married when they retire. 63% of male members and 50% of female members are now assumed to be married at retirement.

Administration expenses

Plan administration expenses have been running at 0.25% of invested assets, or less, in 2017 to 2020, and are therefore supportive of the 6.25% interest rate assumption.

Appendix B – Assets

Description of Plan Assets and Market Value of Assets

We have relied upon the unaudited financial statements provide to us by the Accountant General’s Department, following tests of reasonableness with respect to contributions, benefit payments and investment income. The following table shows the assets as at March 31, 2020 on a market value basis, and for comparison, those at March 31, 2017:

Table B.1 – Market Value of Assets (“MVA”)

	March 31, 2020	March 31, 2017
	\$000	\$000
Invested Assets		
Mutual funds/short term investments	5,349	10,601
Bonds	82,710	79,293
Investment equities	283,817	207,848
Private equities	96,587	126,385
Other alternative investments	90,931	147,074
Total invested assets	559,394	571,201
Other assets		
Cash and deposits	316	1,316
Contributions receivable	700	308
Due from Consolidated Fund	(3,856)	3,284
Due to Contributory Pension Fund	(1,076)	(1,076)
Investment sales receivable	3,384	2,324
Accrued interest and dividends	556	697
Accounts payable and accrued expenses	(427)	(584)
Pension benefits payable	—	(119)
Investment purchases payable & accounts payable	(5,926)	(7,669)
Net Forex receivable / (payable)	—	(11)
Due from financial hardship withdrawal	6,885	4,493
Foreign taxes payable	(15)	(23)
Derivatives and forwards	—	(51)
Total	541	2,889
Net assets per financial statements	559,935	574,090

Changes to PSSF Assets – Market Value Basis

The following table shows changes affecting the MVA during the inter-valuation period. The reconciliation is based on the preliminary financial statements provided to us by the Accountant General's Department.

Table B.2 – Reconciliation

	2020	2019	2018
	\$000	\$000	\$000
MVA – beginning of period	606,375	613,667	574,090
Increase in assets			
Contributions			
– Employee Contributions	30,934	30,554	29,998
– Employer Contributions	30,934	30,554	29,998
– Total	61,868	61,108	59,996
Investment income	(16,846)	16,667	61,965
Total	45,022	77,775	121,961
Decrease in assets			
Benefits paid			
– Pensions in payment	80,374	76,099	73,301
– Transfer and refunds	5,819	5,380	6,788
– Total	86,193	81,479	80,089
Expenses	5,269	3,588	2,295
Total	91,462	85,067	82,384
MVA – end of period	559,935	606,375	613,667

Derivation of Actuarial Value of Assets (“AVA”)

The following table illustrates the derivation of the AVA as at March 31, 2020, based on the five-year smoothing method described in Appendix A, and subject to the 15% corridor which was established a number of years ago:

Table B.3 – Actuarial Value of Assets

	2020	2019	2018	2017
	\$000	\$000	\$000	\$000
MVA – Beginning of Period	606,375	613,667	574,090	535,689
PLUS				
Employee Contributions	30,934	30,554	29,998	29,935
Government Contributions	30,934	30,554	29,998	29,935
LESS				
Benefit Payments	80,374	76,098	73,301	72,455
Refunds	5,819	5,380	6,788	9,453
Investment Return at 6.5% Assumed Rate	38,624	39,226	36,662	34,104
Expected Value of Assets – End of Period	620,674	632,523	590,659	547,755
MVA – End of Period	559,935	606,375	613,667	574,090
Investment Gain/(Loss) Relative to 6.5% Rate	(60,739)	(26,148)	23,008	26,335
MVA at March 31, 2020	559,935			
Adjustment for F2017 (20%)	(5,267)			
Adjustment for F2018 (40%)	(9,204)			
Adjustment for F2019 (60%)	15,689			
Adjustment for F2020 (80%)	48,591			
Adjustment for 15% Corridor	—			
AVA at March 31, 2020	609,744			

Projected Actuarial Value of Assets

In the following table we project the MVA for the three-year period following the March 31, 2020 valuation date based on the assumed 6.25% per annum valuation interest rate (prior to March 31, 2020 assumed rate was 6.50% per annum) and then derive the AVA at the end of each year using the five-year smoothing method.

Table B.4 – Projected AVA for the Next Three Years

	2023	2022	2021	2020	2019	2018
	\$000	\$000	\$000	\$000	\$000	\$000
MVA- Beginning of Period	518,011	528,989	559,935	606,375	613,667	574,090
PLUS						
Employee Contributions	34,526	21,744	11,125	30,934	30,554	29,998
Government Contributions	34,526	21,744	11,125	30,934	30,554	29,998
LESS						
Benefit Payments	80,374	80,374	80,374	80,377	76,098	73,301
Refunds	5,819	5,819	5,819	5,819	5,380	6,788
Investment Return at Expected Assumed Rate ¹	31,840	31,727	32,998	38,624	39,226	36,662
Expected Value of Assets	532,710	518,011	528,989	620,674	632,523	590,659
MVA – End of Period ²	532,710	518,011	528,989	559,935	606,375	613,667
Investment Gain/(Loss) Relative to Expected Rate ¹	—	—	—	(60,739)	(26,148)	23,008
<u>Smoothing adjustments:</u>						
20% adjustment	12,148	5,230	(4,602)			
40% adjustment	—	24,296	10,459			
60% adjustment	—	—	36,444			
80% adjustment	—	—	—			
AVA – End of Period	544,858	547,537	571,290			

¹ Expected assumed rate of return is equal to 6.50% per annum prior to March 31, 2020 and 6.25% per annum thereafter

² 2021 to 2023 projected MVA

Asset Returns

The annual rates of return achieved on assets, after investment management fees and other fees charged to the fund, are as follows:

Table B.5 – Net Rate of Return on Assets

Year	Market Value Basis	Actuarial Value of Assets Basis
	%	%
2014	7.28	11.13
2015	4.41	7.16
2016	(4.75)	3.80
2017	11.52	4.71
2018	10.58	5.48
2019	2.17	4.78
2020	(3.72)	3.01
2021	6.25	4.41
2022	6.25	3.45
2023 (see discussion below)	6.25	2.68

Please note that the numbers above the double line in the table are returns based on actual MVA's and the smoothed AVA values constructed based on the MVA's reported up to the March 31, 2020 valuation date. In Table B.4, we have projected the actual March 31, 2020 MVA of \$559,935 forward at the 6.25% rate, as noted in Table B.5 above, producing an expected MVA in 2023 of \$532,710.

One of the impacts of using a smoothed actuarial value of assets for the valuation is that investment losses that are not realized immediately will simply be recognized later, if fund rates of return do not exceed the assumed 6.25% investment return assumption on the MVA in the years following the valuation date. This is why the AVA rates of return in Table B.5 after 2020 can be seen to trend lower from the 6.25% assumed rate, due to the deferred recognition of the 2020 investment loss of \$60,739. We should point out that March 31, 2020 asset values were quite depressed, due to the shock of the pandemic, and have recovered quite a bit since then. This suggests that future MVA's and AVA's should be higher than those projected in this report that are based on the March 31, 2020 asset values.

Appendix C – Membership Data

Description of Membership Data

Our valuation is based on data provided to us by the Accountant General's Department and compiled as at March 31, 2020. We have taken the following steps to review the data to ensure sufficiency and reliability:

- the records of each member were reconciled with the data of the previous valuation, and the results of this reconciliation were reviewed with the Accountant General's Department;
- the contributions and pensions paid since the last valuation shown in the financial statements were compared with the equivalent values drawn from the data;
- basic data checks were performed to ensure that age, salary and service data were reasonable for the purposes of the valuation.

Summary of Membership Data

The following tables were prepared using data provided by the Accountant General's Department regarding PSSF active members, retirees and former members.

These tables show the following:

- C.1 Summary of Membership Data
- C.2 Changes in PSSF Membership
- C.3 Age/Service Distribution of All Active members
- C.4 Age/Service Distribution of Active Special Group members
- C.5 Age/Service Distribution of Active Pre-1982 Non-Special Group members
- C.6 Age/Service Distribution of Active Post-1982 Non-Special Group members

Table C.1 – Summary of Membership Data

		March 31, 2020	March 31, 2017
Active members:	Number	629	643
Special Groups	Average age	43.0	42.6
	Average credited service	14.6	14.4
	Annual salary	\$ 55,852,500	\$ 56,147,700
	Average salary	\$ 88,796	\$ 87,321
Active members:	Number	80	116
Non-Special Groups Pre-1982	Average age	62.2	59.9
	Average credited service	40.5	37.6
	Annual salary	\$ 6,709,800	\$ 9,240,400
	Average salary	\$ 83,872	\$ 79,659
Active members:	Number	3,767	3,669
Non-Special Groups Post-1982	Average age	48.0	47.3
	Average credited service	13.3	12.8
	Annual salary	\$ 311,937,000	\$ 288,800,600
	Average salary	\$ 82,808	\$ 78,714
Deferred vested members	Number	471	463
	Average age	51.1	51.3
	Average annual pension	\$ 14,696	\$ 14,119
Retirees & beneficiaries	Number	3,188	2,946
	Average age	71.3	70.5
	Average annual pension	\$ 22,090	\$ 21,872

Table C.2 – Changes in PSSF Membership

	Special Groups Active Members	Non- Special Groups Pre-82 Actives	Non- Special Groups Post-82 Actives	Deferred Vested Members	Retirees & Beneficiaries	Total
Members at March 31, 2017	643	116	3,669	463	2,946	7,837
New members	83	—	681	—	—	764
Terminations						
— Deferred pensions	(8)	(1)	(102)	111	—	—
— Paid out	(19)	(1)	(259)	(6)	—	(285)
Deaths						
— With no survivors/dependents	—	—	—	—	(193)	(193)
— With survivors/dependents	(1)	(1)	(10)	(1)	(75)	(88)
Retirements	(71)	(33)	(210)	(94)	408	—
Survivor pension	—	—	—	—	95 ¹	95
Data adjustments	2	—	(2)	(2)	7	(5)
Members at March 31, 2020	629	80	3,767	471	3,188	8,135

1 Multiple beneficiaries in pay following death of certain plan member or retiree

Table C.3 – Age/Service distribution for all active members as at March 31, 2020

Service		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40+	Total
Age											
<25	Number	48	1								49
	Avg. Service	1.6	5.0								1.7
	Avg. Earnings	60,400	*								60,301
25-30	Number	168	30	1							199
	Avg. Service	1.7	6.9	10.9							2.5
	Avg. Earnings	69,953	70,041	*							70,068
30-35	Number	193	118	65	5						381
	Avg. Service	2.0	7.3	11.9	15.5						5.5
	Avg. Earnings	78,023	83,436	74,877	91,912						79,345
35-40	Number	160	119	168	42						489
	Avg. Service	2.3	7.6	12.2	16.6						8.2
	Avg. Earnings	79,457	87,066	80,445	81,960						81,863
40-45	Number	135	89	174	99	30	5				532
	Avg. Service	2.3	7.7	12.5	17.2	21.6	25.7				10.6
	Avg. Earnings	84,649	88,017	85,811	83,491	83,506					85,581
45-50	Number	124	100	186	195	93	26	6			730
	Avg. Service	2.1	7.7	12.6	17.4	22.3	28.0	30.8			13.4
	Avg. Earnings	77,456	87,704	84,878	86,314	91,758	85,410	98,163			85,393
50-55	Number	83	84	133	143	123	62	76	7		711
	Avg. Service	2.2	7.5	12.7	17.4	22.3	27.4	32.0	35.9		17.0
	Avg. Earnings	85,866	85,275	85,524	88,522	90,467	95,114	91,219	79,311		88,377
55-60	Number	93	80	113	117	89	71	129	44	2	738
	Avg. Service	2.2	7.4	12.5	17.5	22.4	27.4	32.3	37.2	40.5	19.1
	Avg. Earnings	86,889	86,890	82,804	81,858	83,417	98,174	91,224	86,067	*	86,832
60-65	Number	18	61	122	105	74	60	90	73	34	637
	Avg. Service	1.9	7.9	12.2	17.4	22.5	27.5	32.0	37.6	42.6	22.3
	Avg. Earnings	75,017	91,618	77,216	78,008	71,719	82,818	80,819	92,638	78,805	80,914
65+	Number	1	1	3	2	1		1	1		10
	Avg. Service	2.8	7.9	11.5	16.3	23.0		31.6	35.6		16.8
	Avg. Earnings	*	*	59,362	*	*		*	*		101,396
Total	Number	1,023	683	965	708	410	224	302	125	36	4,476
	Avg. Service	2.1	7.5	12.4	17.3	22.3	27.5	32.1	37.3	42.5	14.0
	Avg. Earnings	78,311	85,978	82,405	84,315	85,574	92,067	88,265	89,905	79,057	83,668

* omitted to maintain confidentiality

Table C.4 – Age/Service distribution for active Special Group members as at March 31, 2020

Service		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35+	Total
Age										
<25	Number	19								19
	Avg. Service	2.6								2.6
	Avg. Earnings	65,650								65,650
25-30	Number	34	13	1						48
	Avg. Service	1.9	6.9	10.9						3.4
	Avg. Earnings	73,115	84,056	*						76,435
30-35	Number	14	27	20	5					66
	Avg. Service	2.6	7.1	12.0	15.5					8.3
	Avg. Earnings	73,964	86,409	89,261	91,912					85,050
35-40	Number	19	13	30	16					78
	Avg. Service	2.4	8.5	12.2	16.3					10.0
	Avg. Earnings	77,840	84,664	86,046	95,396					85,735
40-45	Number	9	18	28	25	11	4			95
	Avg. Service	2.9	7.4	12.4	17.0	21.5	25.8			13.4
	Avg. Earnings	82,722	84,619	88,024	89,084	92,717	118,267			88,972
45-50	Number	6	13	32	38	22	14	4		129
	Avg. Service	2.9	7.8	11.8	17.5	22.2	28.3	30.7		16.8
	Avg. Earnings	81,929	87,011	87,367	90,535	96,071	100,121	106,837		91,484
50-55	Number	3	8	21	39	33	15	33	3	155
	Avg. Service	3.4	7.5	12.8	17.2	22.3	27.2	32.3	35.7	21.5
	Avg. Earnings	86,892	85,096	88,494	91,428	94,155	103,575	101,848	92,326	94,608
55+	Number		3	8	5	3	10	8	2	39
	Avg. Service		8.1	12.5	18.4	22.8	27.3	32.6	35.6	22.8
	Avg. Earnings		88,331	82,892	88,317	104,003	100,558	105,716	92,326	95,325
Total	Number	104	95	140	128	69	43	45	5	629
	Avg. Service	2.4	7.5	12.2	17.1	22.2	27.4	32.2	35.7	14.6
	Avg. Earnings	74,466	85,541	87,420	91,099	94,965	103,115	102,979	92,326	88,796

* omitted to maintain confidentiality

Table C.5 – Age/Service distribution for active pre-1982 Non-Special Group members as at March 31, 2020

Service		30-35	35-40	40+	Total
Age					
55-60	Number		10	2	12
	Avg. Service		39.2	40.5	39.4
	Avg. Earnings		78,398	*	79,222
60-65	Number	1	28	27	56
	Avg. Service	34.67	39.15	42.41	40.64
	Avg. Earnings	*	87,733	78,831	83,723
65+	Number		5	7	12
	Avg. Service		38.1	43.3	41.2
	Avg. Earnings		103,933	78,707	89,218
Total	Number	1	43	36	80
	Avg. Service	34.7	39.0	42.5	40.5
	Avg. Earnings	*	87,446	79,057	83,872

* omitted to maintain confidentiality

Table C.6 – Age/Service distribution for active post-1982 Non-Special Group members as at March 31, 2020

Service		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35+	Total
Age										
<25	Number	29	1							30
	Avg. Service	1.0	5.0							1.1
	Avg. Earnings	56,960	*							56,913
25-30	Number	134	17							151
	Avg. Service	1.7	6.9							2.2
	Avg. Earnings	69,150	59,325							68,044
30-35	Number	179	91	45						315
	Avg. Service	2.0	7.4	11.8						5.0
	Avg. Earnings	78,340	82,555	68,484						78,150
35-40	Number	141	106	138	26					411
	Avg. Service	2.3	7.5	12.2	16.7					7.9
	Avg. Earnings	79,675	87,360	79,227	73,691					81,128
40-45	Number	126	71	146	74	19	1			437
	Avg. Service	2.3	7.8	12.5	17.2	21.7	25.6			10.0
	Avg. Earnings	84,786	88,878	85,387	81,601	78,174	*			84,843
45-50	Number	118	87	154	157	71	12	2		601
	Avg. Service	2.0	7.7	12.8	17.4	22.4	27.6	31.1		12.6
	Avg. Earnings	77,229	87,808	84,361	85,292	90,422	68,248	*		84,085
50-55	Number	80	76	112	104	90	47	43	4	556
	Avg. Service	2.1	7.5	12.6	17.5	22.2	27.4	31.7	36.1	15.8
	Avg. Earnings	85,828	85,294	84,967	87,432	89,115	92,414	83,063	69,550	86,639
55-60	Number	93	77	105	112	86	61	121	32	687
	Avg. Service	2.2	7.3	12.5	17.5	22.4	27.4	32.3	36.6	18.5
	Avg. Earnings	86,889	86,834	82,797	81,570	82,699	97,783	90,266	88,072	86,483
60-65	Number	18	61	122	105	74	60	89	40	569
	Avg. Service	1.9	7.9	12.2	17.4	22.5	27.5	32.0	36.5	20.1
	Avg. Earnings	75,017	91,618	77,216	78,008	71,719	82,818	80,564	94,660	80,462
65+	Number	1	1	3	2	1		1	1	10
	Avg. Service	2.8	7.9	11.5	16.3	23.0		31.6	35.6	16.8
	Avg. Earnings	*	*	59,362	*	*		*	*	101,396
Total	Number	919	588	825	580	341	181	256	77	3,767
	Avg. Service	2.0	7.5	12.4	17.4	22.3	27.5	32.1	36.5	13.3
	Avg. Earnings	78,747	86,048	81,554	82,817	83,674	89,442	85,619	91,121	82,808

* omitted to maintain confidentiality

Appendix D – Summary of PSSA Provisions

Our valuation was based on the terms of the PSSA in effect on March 31, 2020. The following is a summary of the main provisions in effect on March 31, 2020. It is not intended as a complete description of the PSSA. For details, reference should be made to the PSSA.

In 2019, the Government enacted the Public Service Superannuation Amendment Act 2019. This amendment increased the age of compulsory retirement for certain public officers from age 65 to age 68. In response to the pandemic, the Government enacted the Public Service Superannuation Temporary Amendment Act 2020 to provide for a one-year temporary suspension of the Government's contributions to the PSSF, and an optional one year temporary suspension of a contributor's contributions. The suspension period runs from September 1, 2020 to August 31, 2021 for teachers, and from August 1, 2020 to July 31, 2021 for all other persons.

Background

The Public Service Superannuation Fund ("PSSF") was established by the Public Treasury (Administration and Payments) Act, 1969. The provisions are embodied in the Public Service Superannuation Act, 1981 (as amended).

Eligibility

The PSSF provides retirement and death benefits for individuals who contribute to the Fund. Public officers, teachers, police, firemen, judges, prison officers and other government employees contribute to the Fund, provided certain eligibility requirements are satisfied. The 2007 Amendment Act allows part-time and casual employees to be eligible to join the PSSF. It also allows employees who are hired after attaining age 57 to join.

Contributions

Since April 1, 1978, members have been required to contribute to the PSSF with contributions ranging from 1% to 4% of salary. Effective October 1, 1981 (September 1, 1981 with respect to teachers), members have been contributing 5% of salary with equal matching contributions made by the Government. Effective April 1, 2006, the PSSF was amended to increase both the Government and the Employee contribution rates to 6%, with further increases of 1% per year up to 8% for each party as at April 1, 2008. The Government contribution rate and the Employee contribution rate were increased to 6.5% effective April 1, 2006 for Special Group members, with further increases of 1.5% per year up to 9.5% as at April 1, 2008.

The Public Service Superannuation Temporary Amendment Act 2020 provides for a one year temporary suspension of the Government's contributions to the PSSF, and an optional one year temporary suspension of a contributor's contributions. The suspension period runs from September 1, 2020 to August 31, 2021 for teachers, and from August 1, 2020 to July 31, 2021 for all other persons.

Effective April 1, 2012, a one year suspension period was introduced during which Government contributions to the PSSF were not required to be made at the same time as member contributions. It was understood that no Government contributions were required to be made to the PSSF during the suspension period.

Contributions are credited with interest at the rate of 4% per annum. Contributions no longer cease at age 65 after the 2007 Amendment Act.

Prior to April 1, 1978, the PSSF was non-contributory.

Pension

The PSSF provides a pension equal to one eight-hundredth of final salary for each completed month of Contributory service, which is equivalent to 1.5% of final salary of each year of contributory service.

The benefit rate for judges is one six-hundredth of final salary for each completed month of contributory service, which is equivalent to 2.0% of final salary of each year of contributory service.

Members must be 18 years or older and have completed 8 years or more of service to qualify for a pension. In addition, the maximum pension payable to any member is 60% of the member's highest salary for service in Bermuda.

Suspension of COLA Increases

Pensions in payment have been subject to bi-annual Cost of Living Adjustments ("COLA"). On June 27, 2014, the Minister of Finance announced that COLA increases would be suspended for pensioners until such time as the sustainability of PSSF has improved.

Retirement Date

The normal retirement date under the PSSF varies from age 50 to 68 depending on the member's occupation. After the passing of the 2007 Amendment Act, if a member continues to work after reaching the normal retirement age, benefits continue to accrue.

Special Group members and regiment members may be forced to retire at age 55, or even earlier if special conditions are met. A member may be permitted to continue in public service until a later age (60 for an officer or 70 for others).

For greater clarity, pensions are not reduced for members who retire prior to normal retirement date.

Form of Pension

At retirement, members can elect to receive 75%, 80%, 85%, 90% or 95% of their pension and a lump sum amount. The lump sum is equal to 11.5 times the remaining portion of the pension.

On the death of a pensioner, benefits are payable as summarized below under "Death Benefit".

Hardship Withdrawals

The PSSA was amended to allow members to elect to receive a partial refund of contributions from the PSSF on or after April 1, 2012. Withdrawals are limited to 25% of the member's contributions with interest. Any such withdrawals that are not repaid will serve to reduce a member's ultimate pension benefits from the PSSF.

Termination of Employment

Members who terminate employment after 8 years of service are entitled to receive a deferred pension as early as 55 to 60, depending on the member's occupation.

If a member is not entitled to a deferred pension, the member is entitled to a refund of their contributions, with interest.

Members who terminate employment may transfer their contributions with interest to another pension plan, or a retirement product prescribed by the Pension Commission under the National Pension Scheme (Occupational Pensions) Act 1998.

Disability

If a member becomes permanently injured due to:

- The actual discharge of his duty;
- Without his own default; and
- By some injury attributable to the nature of his duty;

The member is entitled to a disability pension in addition to his retirement pension earned to date. The amount of the disability pension is determined on the member's capacity to contribute to his own support as follows:

Degree of Disability	Annual Amount Payable
Slightly impaired	5/60 of salary at date of injury
Impaired	10/60 of salary at date of injury
Moderately impaired	15/60 of salary at date of injury
Totally destroyed	20/60 of salary at date of injury

Death Benefit

If the member has less than 8 years of service, the beneficiary will receive the contributions with interest.

If the member has more than 8 years of service:

- If the member has a spouse but no children, the spouse will receive 60% of the pension earned to date.
- If the member has a spouse and children at the date of death, the spouse will receive 50% of the pension earned to date and other 50% of the pension will be split evenly between the children until they attain age 18, or age 25 if a dependent or a full-time student (maximum 40% per child).
- If the member has children but no spouse, 60% of the pension will be split evenly between the children until they attain age 18, or age 25 if a dependent or a full-time student (maximum 40% per child).
- If the member does not have a spouse or children and has commenced his pension for less than five years, the designated beneficiary (the estate, if no designated beneficiary) shall receive the remainder of the five years.
- If the member does not have a spouse or children and has not commenced his pension, the designated beneficiary (the estate, if no designated beneficiary) shall receive the greater of the member's contributions with interest, or the commuted value of the pension.

Capital Sum Payable on Death

In addition to the death benefit, the member is entitled to a lump sum payment equal to one year of basic salary, offset by any payments from the Workman's Compensation Act, Defence Act or Government Employees Act. This sum is payable provided the member dies due to:

- The actual discharge of his duty;
- Without his own default;
- By some injury attributable to the nature of his duty; and
- Has been in the service of the Government for a continuous period of not less than one year.

Special Groups - Additional Benefits

Additional benefits are awarded to Special Group members if they retire on or after age 55. Specifically, such members are entitled to additional service, equal to the difference between their retirement date and age 60, in the computation of their pension benefit. For greater clarity, regiment members are not entitled to this additional service benefit.

Insufficient PSSF Assets

If the assets in the PSSF are insufficient to meet the payments chargeable against it, the deficiency shall be made up out of the Consolidated Fund.

Repealed Acts

There are three Repealed Acts: The School Teachers' Superannuation Act 1934, The Hospital Nurses Superannuation Act 1948, and The Pensions Act 1970. Members of the PSSF who were members of one of the Repealed Acts prior to joining the PSSF are entitled to the benefits under the Repealed Acts for past and future service.

Under all Repealed Acts, the age at which a member is entitled to a retirement pension is age 55, instead of age 60 under the PSSF. This has been taken into account in the valuation of liabilities for Non-Special Group members who had a date of membership prior to April 1, 1982.

Appendix E – Employer Certification

With respect to the actuarial valuations for funding and accounting purposes of the PSSF as of March 31, 2020, I hereby certify that, to the best of my knowledge and belief:

- The Summary of PSSA Provisions presented in Appendix D of this report is a complete and accurate representation of the provisions applicable to the PSSF, as they are interpreted to determine member benefit entitlements under the PSSF;
- The assumptions used and summarized in Appendix A of this report are determined by the Ministry of Finance and are adopted as its best estimate assumptions (without any provisions for adverse deviations);
- The asset information supplied and presented in Appendix B of this report is a complete and accurate representation of the net assets available for benefits provided under the terms of the PSSF;
- The membership data supplied to the actuary and summarized in Appendix C of this report is a complete and accurate description of all individuals known to be entitled to benefits under the PSSF as at March 31, 2020;
- All events subsequent to March 31, 2020 that may have an impact on the results of the valuation have been communicated to the actuary.

Anthony Manders
Financial Secretary
Ministry of Finance, Bermuda

Date

Appendix F – Terms of Engagement

Direction from the Ministry of Finance

For the purposes of preparing the actuarial valuations for funding and accounting purposes of the PSSF as of March 31, 2020, the Financial Secretary has provided us with the following direction:

Determination of Adequacy of the Fund

As required under Section 8A(2) of the Public Service Superannuation Act 1981, the actuary is instructed to make a report on the adequacy of the Fund.

Objectives of funding

The Government's objectives in establishing the assumptions, cost method and asset valuation method are to:

- Reflect the timing of benefits being earned;
- Comply with applicable pension legislation; and
- Promote stable contributions with an orderly and rational allocation among time periods.

Intergenerational equity

The valuation assumptions and methods should not unduly favour inactive members over current and future generations of active members and vice versa.

Security of benefits and provisions for adverse deviations

No margins for adverse deviations should be reflected in the going-concern discount rate.

Hypothetical Wind up Valuation

Since the PSSF does not define the benefits that would be payable if it were to be wound up, the actuary is not to perform a hypothetical wind up valuation.

Anthony Manders
Financial Secretary
Ministry of Finance, Bermuda

Date



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