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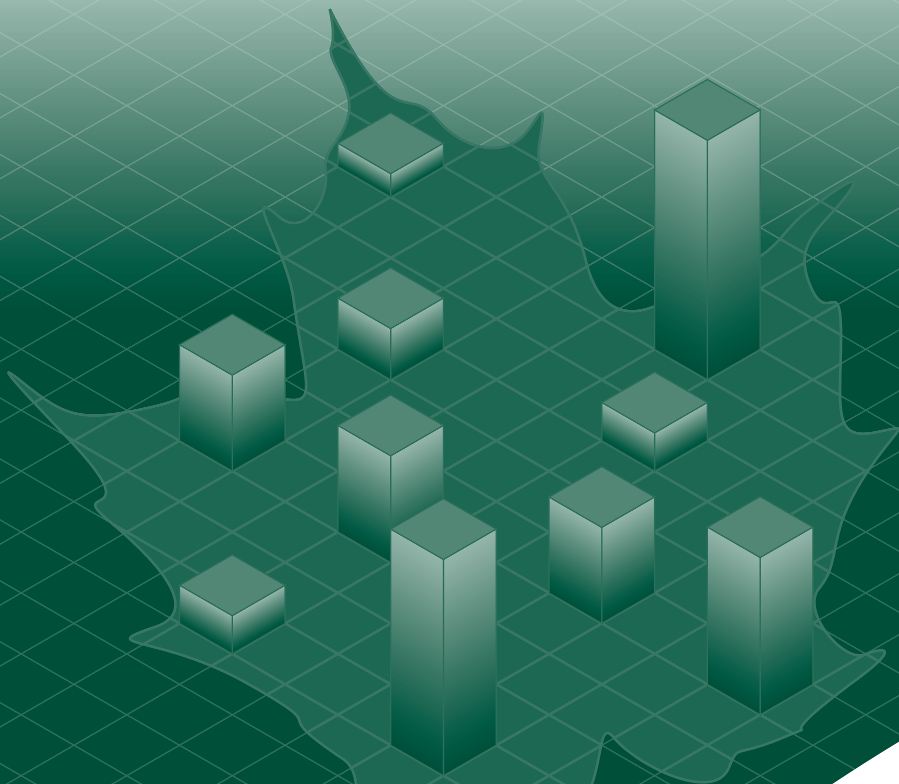

ACTUARIAL REPORT

on the Pension Plans for the

CANADIAN FORCES

Regular Force and Reserve Force as at 31 March 2016

Canada

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21 September 2017

The Honourable Scott Brison, P.C., M.P.
President of Treasury Board
Ottawa, Canada
K1A 0R5

Dear Minister:

Pursuant to section 6 of the *Public Pensions Reporting Act*, I am pleased to submit the report on the actuarial review as at 31 March 2016 of the Canadian Forces Pension Plans. This is the first report that shows the combined results of both the Regular Force Pension Plan and the Reserve Force Pension Plan. The Regular Force Pension Plan is established by Parts I, III and IV of the *Canadian Forces Superannuation Act*, includes the Canadian Forces-related benefits provided under the *Special Retirement Arrangements Act*, and is subject to the *Pension Benefits Division Act*. The Reserve Force Pension Plan is established by Part I.1 of the *Canadian Forces Superannuation Act* and subject to the *Pension Benefits Division Act.*

Yours sincerely,

Jean-Claude Ménard

Jean-Claude Ménard, F.S.A., F.C.I.A.
Chief Actuary

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I. Executive Summary

This actuarial report on the pension plans for the Canadian Forces – Regular Force Pension Plan (Regular Force Plan) and the Reserve Force Pension Plan (Reserve Force Plan) was made pursuant to the *Public Pensions Reporting Act* (PPRA).

This actuarial valuation is as at 31 March 2016 and is in respect of the pension benefits and contributions defined by Parts I, III and IV of the *Canadian Forces Superannuation Act* (CFSA), the *Special Retirement Arrangements Act* (SRAA), which covers the Retirement Compensation Arrangements (RCA), and the *Pension Benefits Division Act* (PBDA) for members of the Regular Force Plan. This valuation is also in respect of the pension benefits and contributions defined by Part I.1 of the CFSA and the PBDA for members of the Reserve Force Plan.

The previous actuarial reports for the Regular Force Plan and the Reserve Force Plan were made as at 31 March 2013 and as at 31 March 2015 respectively. However, this report will reconcile the results to the previous 31 March 2013 Reserve Force Plan actuarial report for consistency between the Regular and Reserve Force Plans. The date of the next periodic review is scheduled to occur no later than 31 March 2019.

A. Purpose of the Report

The purposes of this actuarial valuation are to determine the state of the Regular Force Plan composed of the Canadian Forces Superannuation Account (Superannuation Account), the Canadian Forces Pension Fund (CFPF) and the Retirement Compensation Arrangements (RCA) Account, to determine the state of the Reserve Force Plan composed of the Reserve Force Pension Fund (RFPF) as well as to assist the President of the Treasury Board in making informed decisions regarding the financing of the government's pension benefit obligation.

B. Valuation Basis

Contribution rates for Regular Force members for calendar years 2016 and 2017 (as approved by the Treasury Board) and for calendar year 2018 and beyond (estimated) have been updated since the last valuation and are assumed to be equal to the contribution rates of Group 1 contributors under the pension plan for the Public Service of Canada (PS pension plan).

Contribution rates for Reserve Force members are set by regulation. There have been no other changes to the plan provisions of either report since the previous valuation. This report is based on pension benefit provisions enacted by legislation, summarized in Appendices 1 and 2.

For the Regular Force Plan, the financial data on which this valuation is based are composed of CFPF tangible assets that the government has earmarked for the payment of benefits for service since 1 April 2000; the Superannuation Account established to track the government's pension benefit obligations for service prior to 1 April 2000; and the RCA Account for benefits in excess of those that can be provided under the *Income Tax Act* limits for registered pension plans. For the Reserve Force Plan, the financial data on which this valuation is based are composed of RFPF tangible assets that the government has earmarked for the payment of benefits for Reserve Force service.

These pension assets and accounts balances are summarized in Appendix 3. The membership data provided by the Department of National Defence (DND) and the Department of Public Services and Procurement Canada (PSPC) are summarized in Appendix 4.

The valuation was prepared using accepted actuarial practices, methods and assumptions, which are summarized in Appendices 5 to 8.

All actuarial assumptions used in this report are best-estimate assumptions. They are, individually and in aggregate, reasonable for the purposes of the valuation at the date of this report.

Actuarial assumptions used in the previous report were revised based on economic trends and demographic experience. A complete description of the assumptions is given in Appendices 6 and 7. Table 1 represents a summary of the ultimate economic assumptions used in this report and a comparison with those used in the previous report.

Table 1 Ultimate Best-Estimate Economic Assumptions

	31 March 2016	31 March 2013
Assumed level of inflation	2.00%	2.00%
Real increase in pensionable earnings	0.80%	1.00%
Real rate of return on the Pension Fund	4.00%	4.10%
Real rate of return on the Superannuation Account	2.70%	2.80%
Real rate of return on the RCA Account	2.70%	1.40%

C. Main Findings

The proposed amounts to be credited to (or debited from) the Superannuation Account, the CFPF, the RFPF and the RCA Account are shown on calendar year basis in this section, beginning with calendar year 2018, which is the first calendar year that follows the expected tabling of this report. Valuation results on a plan year[1] basis are shown in Section II.

1) Superannuation Account (Service prior to 1 April 2000)

As at 31 March 2016, the recorded balance of the Superannuation Account is $45,718 million and the actuarial liability for service prior to 1 April 2000[2] is $47,385 million. The resulting shortfall is $1,667 million.

In accordance with the CFSA, the actuarial shortfall could be amortized over a maximum period of 15 years beginning on 31 March 2018. If the shortfall is amortized over the maximum period, 15 equal annual credits of $148 million could be made to the Superannuation Account. The time, manner and amount of such credits are to be determined by the President of the Treasury Board.

1 Any reference to a given *plan year* in this report refers to the 12-month period ending 31 March of the given year.
2 The actuarial liability for service prior to 1 April 2000 refers to the actuarial liability for service accrued prior to that date except for service elections since 1 April 2000 that are deemed to be service accrued since that date.

2) Canadian Forces Pension Fund (Service since 1 April 2000)

a) Current Service Cost[1]

The estimated total current service cost, borne jointly by the contributors of the Regular Force Plan and the government, is $1,288.7 million for calendar year 2018. The estimated member contributions are $524.3 million and the estimated government contributions are $764.4 million for calendar year 2018. Administrative expenses are estimated at $17.6 million (included in the total current service cost) for calendar year 2018.

The following table also shows the projected current service cost expressed as a percentage of the expected pensionable payroll[2] and in millions of dollars for the three calendar years following the expected laying of this report. The ratio of government current service cost to the members current service cost is also shown. Projected current service costs shown in this table are based on the member contribution rates shown in Section II.C.2).

Table 2 Canadian Forces Pension Fund Current Service Cost on a Calendar Year Basis

	Current Service Cost ($ millions)			Current Service Cost (% of pensionable payroll)			
Calendar Year	Contributors	Government	Total	Contributors	Government	Total	Ratio of Government to Contributors Current Service Cost
2018	524.3	764.4	1,288.7	10.37	15.12	25.49	1.46
2019	530.5	769.0	1,299.5	10.29	14.92	25.21	1.45
2020	539.2	776.1	1,315.3	10.24	14.73	24.97	1.44

b) Financial position and amortization of actuarial surplus (deficit)

As at 31 March 2016, the actuarial value of the assets in respect of the CFPF is $22,478 million and the actuarial liability is $24,048 million, resulting in an actuarial deficit of $1,570 million.

In accordance with the CFSA, actuarial deficits could be amortized over a period of up to 15 years. If the actuarial deficit of $1,570 million is amortized over the maximum period, 15 equal annual payments of $145 million could be made to the CFPF beginning on 31 March 2018, considering the special payment of $170 million determined by the President of the Treasury Board that was made on 31 March 2017. The final time, manner and amount of any special payments are to be determined by the President of the Treasury Board.

3) Reserve Force Pension Fund

a) Current Service Cost

The estimated total current service cost, borne jointly by the contributors of the reserve force and the government, is $53.3 million for calendar year 2018. The estimated member contributions are $16.9 million and the estimated government contributions are $36.4 million for calendar year 2018. Administrative expenses

1 Also called normal cost.
2 Pensionable payroll means the aggregate of pensionable earnings of all contributors with less than 35 years of service.

are estimated at $5.7 million (included in the total current service cost) for calendar year 2018.

Table 3 shows the projected current service cost expressed as a percentage of the expected pensionable payroll[1] and in millions of dollars for the three calendar years following the expected laying of this report. The ratio of government current service cost to the members current service cost is also shown. Projected current service costs shown in this table are based on the member contribution rates shown in Section II.C.2).

Table 3 Reserve Force Pension Fund Current Service Cost on a Calendar Year Basis

Calendar Year	Current Service Cost ($ millions)			Current Service Cost (% of pensionable payroll)			Government to Contributors Ratio
	Contributors	Government	Total	Contributors	Government	Total	
2018	16.9	36.4	53.3	5.20	11.22	16.42	2.16
2019	18.0	38.3	56.3	5.20	11.10	16.30	2.14
2020	19.0	40.6	59.6	5.20	11.09	16.29	2.13

b) Financial position and amortization of actuarial surplus (deficit)

As at 31 March 2016, the actuarial value of the assets in respect of the RFPF is $513 million and the actuarial liability is $566 million, resulting in an actuarial deficit of $53 million.

In accordance with section 87 of the *Reserve Force Pension Plan Regulations*, the actuarial deficit is amortized with equal annual instalments over a period of 15 years. To amortize the actuarial deficit of $53 million, 15 equal annual special payments of $5.3 million are required to be made to the RFPF beginning on 31 March 2018, considering the special payment of $4.2 million determined by the President of Treasury Board that was made on 31 March 2017, on the basis of the 31 March 2015 actuarial report on the Reserve Force Plan.

4) RCA Account

As at 31 March 2016, the balance of the RCA Account is $774 million and the actuarial liability is $441 million, resulting in an excess of $333 million.

The estimated RCA total current service cost, borne jointly by the contributors of the regular force and the government, is $21.5 million for calendar year 2018 and is estimated to be $22.5 million and $23.5 million, respectively, for the following two calendar years.

Table 4 shows the projected current service cost expressed as a percentage of the expected pensionable payroll and the ratio of government current service cost to contributor current service cost for the three calendar years following the expected tabling of this report.

[1] Pensionable payroll is defined in Note 1 of Appendix 1-D.

Table 4 RCA Current Service Cost on a Calendar Year Basis

	Current Service Cost ($ millions)			Current Service Cost (% of pensionable payroll)			
Calendar Year	Contributors	Government	Total	Contributors	Government	Total	Ratio of Government to Contributors Current Service Cost
2018	3.47	18.04	21.51	0.07	0.36	0.43	5.20
2019	3.64	18.84	22.48	0.07	0.37	0.44	5.18
2020	3.86	19.66	23.52	0.07	0.38	0.45	5.09

II. Valuation Results

This report is based on pension benefit provisions enacted by legislation, summarized in Appendices 1 and 2, and the financial and membership data summarized in Appendices 3 and 4. The valuation was prepared using accepted actuarial practices, methods and assumptions summarized in Appendices 5 to 8. Emerging experience that differs from the corresponding assumptions will result in gains or losses to be revealed in subsequent reports.

Projections of the financial positions of the Superannuation Account, CFPF and the RFPF are shown in Appendices 9, 10 and 11, respectively.

A. Financial Position

1) Canadian Forces Superannuation Account

Prior to 1 April 2000, contributions by members of the regular force and the government to the Regular Force Plan were credited to the Superannuation Account. The valuation results of this section show the financial position of the Superannuation Account as at 31 March 2016. The results of the previous valuation are also shown for comparison purposes.

Table 5 State of the Canadian Forces Superannuation Account
($ millions)

	31 March 2016	31 March 2013
Recorded Account balance	45,695	46,357
Present value of prior service contributions	23	33
Total	**45,718**	**46,390**
Actuarial Liability		
Active contributors	6,045	7,534
Retirement pensioners	37,804	34,362
Disability pensioners	154	197
Surviving dependents	3,138	2,917
Administrative expenses	232	149
Pension Modernization cost	12	74
Total Actuarial Liability	**47,385**	**45,233**
Actuarial Excess/(Shortfall)	**(1,667)**	**1,157**

In accordance with the CFSA, the actuarial shortfall of $1,667 million could be amortized over a maximum period of 15 years beginning on 31 March 2018. If the shortfall is amortized over the maximum period, 15 equal annual credits of $148 million could be made to the Superannuation Account. The time, manner and amount of such credits are to be determined by the President of the Treasury Board. It is expected that the government will amortize the actuarial shortfall through a one-time special credit to the Superannuation Account of $1,813 million as at 31 March 2018 to take into account the interest on the shortfall accumulated from 31 March 2016 to 31 March 2018.

2) Canadian Forces Pension Fund

Beginning on 1 April 2000, contributions by the government and members of the regular force are no longer credited to the Superannuation Account. Rather, they are credited to the CFPF, and the total amount of contributions net of benefits paid and administrative expenses is transferred to the Public Sector Pension Investment Board (PSPIB) and invested in the financial markets. The valuation results of this section show the financial position of the CFPF as at 31 March 2016. The results of the previous valuation are also shown for comparison purposes.

Table 6 Balance Sheet - Canadian Forces Pension Fund
($ millions)

	31 March 2016	31 March 2013
Assets		
Market value of assets	23,168	15,148
Actuarial smoothing adjustment	(1,078)	(721)
Present value of prior service contributions	267	198
Amount receivable from Part I.1 - Rollover members	57	105
Remaining contributions for pre-2007 Reserve Force service	64	184
Total Assets	**22,478**	**14,914**
Actuarial Liability		
Active contributors	15,239	11,782
Contributors' pre-2007 Reserve Force service	56	237
Retirement pensioners	8,601	5,229
Disability pensioners	8	6
Surviving dependents	84	51
Outstanding payments	51	-
Pension Modernization cost	9	45
Total Actuarial Liability	**24,048**	**17,350**
Actuarial Surplus/(Deficit)	**(1,570)**	**(2,436)**

In accordance with the CFSA, actuarial deficits could be amortized over a period of up to 15 years. If the actuarial deficit of $1,570 million is amortized over the maximum period, 15 equal annual payments of $145 million could be made to the CFPF beginning on 31 March 2018, considering the special payment of $170 million determined by the President of the Treasury Board that was made on 31 March 2017. The final time, manner and amount of any special payments are to be determined by the President of the Treasury Board.

3) Reserve Force Pension Fund

Contributions made by the government and members of the Reserve Force Plan are credited to the RFPF, and the total amount of contributions net of benefits paid and administrative expenses is transferred to the PSPIB and invested in the financial markets. The valuation results of this section show the financial position of the RFPF as at 31 March 2016. The results of the previous valuation are also shown for comparison purposes.

Table 7 Balance Sheet - Reserve Force Pension Fund
($ millions)

	31 March 2016	31 March 2013
Actuarial Value of Assets		
Market value of assets	505	415
Actuarial smoothing adjustment	(30)	(18)
Present value of prior service contributions	25	17
Remaining contributions for processed prior service	42	0
Remaining contributions for unprocessed prior service	28	47
Amount payable to Regular Force pension plan	(57)	(105)
Total assets	**513**	**356**
Actuarial Liability		
Active contributors	370	242
Contributors' unprocessed prior service	30	39
Retirement pensioners	156	77
Disability pensioners	3	0
Surviving dependents	2	1
Outstanding payments	1	7
Pension modernization cost	4	26
Total actuarial liability	**566**	**392**
Actuarial Surplus/(Deficit)	**(53)**	**(36)**

In accordance with section 87 of the *Reserve Force Pension Plan Regulations*, the actuarial deficit is amortized with equal annual instalments over a period of 15 years. Taking into account the special payment of $4.2 million that was made on 31 March 2017, the actuarial deficit of $53 million could be amortized in 15 equal annual payments of $5.3 million beginning on 31 March 2018.

B. CFSA - Reconciliation of the Changes in Financial Position

Table 8 shows the reconciliation of the changes in financial position of the Superannuation Account, CFPF and the RFPF. Explanations of the elements that have larger impact on the changes in the financial position of the different accounts are provided below.

Table 8 Reconciliation of CFSA Financial Position
($ millions)

	Superannuation Account Actuarial Excess/ (Shortfall)	CFPF Actuarial Surplus/ (Deficit)	RFPF Actuarial Surplus/ (Deficit)
As at 31 March 2013	**1,157**	**(2,436)**	**(36)**
Recognized investment gains as at 31 March 2013	-	721	18
Retroactive changes to the population data	104	(245)	(104)
Methodology changes	3	49	19
Expected interest on revised initial financial position	203	(289)	(16)
Special credits/payments	-	624	4
Net experience gains and losses	95	2,849	32
Revision of actuarial assumptions	(3,120)	(1,794)	(37)
Valuation methodology change - Reservists under Part I	4	38	-
Change in the present value of prior service contributions	1	86	5
Change in the present value of administrative expenses	(108)	-	-
Recognition of remaining contributions for processed prior service	-	-	42
Recognition of unprocessed prior service	-	8	(2)
Change in the amount transferred between Plans - Rollover members		(48)	48
Change in outstanding payments	-	(51)	6
Change in capitalized value of pension modernization cost	(6)	(4)	(2)
Unrecognized investment gains as at 31 March 2016	-	(1,078)	(30)
As at 31 March 2016	**(1,667)**	**(1,570)**	**(53)**

1) Recognized Investment Gains as at 31 March 2013

An actuarial asset valuation method that minimizes the impact of short-term fluctuations in the market value of assets was used in the previous valuation report (see Appendix 6). This caused the actuarial value of the CFPF assets to be $721 million less than their market value. The same actuarial asset valuation method is used for RFPF and this caused the actuarial value of the RFPF assets to be $18 million less than their market value.

2) Retroactive Changes to the Population Data

The net impact of the retroactive changes to the population data received from both DND and PSPC has resulted in a decrease of $104 million in the Superannuation Account actuarial liabilities, an increase of $245 million in the CFPF actuarial liabilities, and an increase of $104 million in the RFPF actuarial liabilities.

The increase in the RFPF actuarial liabilities is unusually large in relative terms. This is due to population data changes associated with the processing of a large number of past earnings elections during the intervaluation period.

3) Change in Methodology

The net impact of methodology changes was a decrease of $3 million in the Superannuation Account actuarial liabilities, a decrease of $49 million in the CFPF actuarial liabilities, and a decrease of $19 million in the RFPF actuarial liabilities.

The change in the RFPF actuarial liabilities due to methodology is unusually large in relative terms. This is due to a variety of improvements which were made to the process that compiles the valuation population files from the raw data extracts received from DND and PSPC.

4) Expected Interest on Initial Financial Position

After factoring in the change in methodology and the retroactive changes to the population data, the expected interest to 31 March 2016 on the Superannuation Account actuarial excess of $1,264 million as at 31 March 2013 amounted to $203 million. For the CFPF, the expected interest rate on the revised deficit position of $1,911 million amounted to $289 million. For the RFPF, the expected interest rate on the revised deficit position of $103 million amounted to $16 million.

These amounts of interest were based on the Superannuation Account yields, the CFPF returns and the RFPF returns projected in the previous report for the three-year intervaluation period.

5) Special Payments Made in the Intervaluation Period

A deficit of $2,436 million was reported in the CFPF as at 31 March 2013, and the government took the position to amortize this deficit over the 13 years expected average remaining service lifetime of participating members of the regular force starting on 31 March 2015. A total of $589 million of special payment was made to the CFPF during the intervaluation period that resulted in an increase of $624 million in asset after factoring the expected interest.

A deficit of $36 million was reported in the RFPF as at 31 March 2013 which was to be amortized over a period of 15 years in accordance with the *Reserve Force Pension Plan Regulations*. A total of $3.8 million of special payment was made to the RFPF during the intervaluation period that resulted in an increase of $4 million in asset after factoring the expected interest.

6) Experience Gains and Losses

Since the previous valuation, experience gains and losses have increased the Superannuation Account actuarial excess by $95 million. The CFPF actuarial deficit has decreased by $2,849 million due to the experience gains and losses over the three-year intervaluation period. The RFPF actuarial deficit has decreased by $32 million due to the experience gains and losses. The main experience gain and loss items are described in Table 9.

Table 9 Experience Gains and Losses
($ millions)

	Superannuation Account	Canadian Forces Pension Fund	Reserve Force Pension Fund
Demographic experience (i)			
Terminations with a deferred annuity	(3)	(250)	9
Transfer Values	3	23	(129)[1]
Disabilities 3B with an annuity[2]	(22)	(159)	
Disability Retirements	-	-	1
Rollover from Part I.1	-	(4)	-
Rehired pensioner members	17	(2)	-
Retirements	137	37	2
Disabilities 3A with an annuity[2]	-	-	-
Return of contributions	6	12	-
Non-disabled pensioner deaths	(68)	(6)	(1)
Contributor deaths with survivors	(3)	(1)	-
Widow(er) deaths	(8)	-	-
Disabled pensioner deaths	1	-	-
Total	**60**	**(350)**	**(118)**
Investment earnings (ii)	(14)	2,843	73
Economic salary increases (iii)	86	218	6
Cost/contributions difference (iv)	9	144	68
Change in service or earnings accrual (v)	-	(54)	10
Pension benefit division payments (vi)	(27)	(40)	-
Promotional and seniority increases (vii)	2	31	-
Pension indexation (viii)	62	16	-
Administrative expenses	20	16	(8)
Expected/actual disbursements (ix)	(54)	(13)	1
YMPE increases	1	1	-
Miscellaneous	(50)	37	-
Net experience gains (losses)	**95**	**2,849**	**32**

(i) The demographic assumptions having a large impact are as follows:

- The actual number of members opting for a deferred annuity was greater than expected which resulted in an increase of $3 million in the actuarial liability of the Superannuation Account and an increase of $250 million in the CFPF. Under the RFPF, the previous valuation assumed there would be a lump sum payment made based on the commuted value of the accrued pension deferred to age 60 in respect of all vested members who ceased to participate to the

1 Include members exiting the Reserve Force plan due to a rollover. A rollover results in the same transfer of assets from the RFPF as if the member had elected to receive a Transfer Value.

2 Any condition rendering a member of the Regular Force mentally or physically unfit to perform his or her duties. A member is discharged under Q. R. & O. 15.01 Article 3B when he or she is unable to perform the duties of his or her own occupation. A member is discharged under Q.R. & O. 15.01 Article 3A when he or she is unable to perform the duties of any occupation.

Reserve Force Plan before the age of 50. However, during the valuation period, it was observed that there were 2,858 such terminations which were not rollover terminations and for which the member has not opted to receive a transfer value. Such members are recognized in this valuation as deferred annuitants. As at 31 March 2016, the actuarial liability held for these members as deferred annuitants is less than the corresponding actuarial liability held for these members as contributors. This resulted in a decrease of $9 million in the RFPF actuarial liability.

- The number of withdrawals with a transfer value was less than expected while the number of disability 3B terminations with a transfer value was higher than expected. The net impact of all terminations with a transfer value resulted in an increase of $3 million in the initial Superannuation Account excess and a decrease of $23 million in the initial CFPF deficit.
- Under the RFPF, withdrawals with a transfer value and rollovers resulted in an increase of $129 million in the actuarial deficit. The majority of the increase in the actuarial deficit is attributable to payments made from the RFPF to the CFPF during the intervaluation period in respect of rollovers which occurred prior to 31 March 2013.
- The significant increase in the actual number of Disability 3B retirements above the projected number resulted in an increase in the actuarial liability of $22 million in the Superannuation Account and of $159 million in the CFPF.
- A total of 680 pensioners were rehired to the Regular Force Plan during the intervaluation period. The net impact of releasing the pensioner liability and setting up the contributor liability for each such member resulted in a decrease of $17 million in the actuarial liability of the Superannuation Account and an increase of $2 million in the actuarial liability of the CFPF. The increase in liability on the CFPF is due to 35 pensioners of the Reserve Force Plan moving to a contributor status under the Regular Force Plan.
- In light of the significant increase in the number of Disability 3B retirements, the number of retirements has decreased over the intervaluation period which resulted in a decrease of $137 million in the actuarial liability of the Superannuation Account and a decrease of $37 million in the actuarial liability of the CFPF. The impact on the actuarial liability of the RFPF is minimal with a reduction of $2 million.
- Mortality under the Canadian Forces pension plans improved over the intervaluation which resulted in an increase in the actuarial liabilities. The impact is an additional $68, $6 and $1 million in actuarial liability of the Superannuation Account, the CFPF and the RFPF respectively.

(ii) The rates of interest credited to the Superannuation Account were marginally less than the corresponding projected Superannuation Account yields in the previous valuation. Consequently, the experience loss was $14 million. The investment return on both Pension Funds exceeded expectations in plan years 2014 and 2015, but was less than expected in plan year 2016. This resulted in an investment gain of $2,843 million for the CFPF and an investment gain of $73 for the RFPF over the three-year intervaluation period.

(iii) Economic salary increases during the intervaluation period were smaller than expected. This resulted in a decrease in the actuarial liability of $86 million in the Superannuation Account, of $218 million in the CFPF and of $6 million in the RFPF.

(iv) Higher than expected member and government contributions during the intervaluation period resulted in a gain of $9 million with respect to the Superannuation Account, a gain of $144 million with respect to the CFPF and a gain of $68 million with respect to the RFPF. The main reason for the disproportionately large gain on the RFPF is the large number of past earnings elections which DND processed in the intervaluation period.

(v) Service accruals higher than expected increased the CFPF actuarial liability by $54 million. Earnings accruals lower than expected decreased the RFPF actuarial liability by $10 million.

(vi) The net impact of the divisions of pension due to marriage breakdown (amount paid out to the former spouse versus the actuarial liability released) accounted for a loss of $27 million in the Superannuation Account and an increase of $40 million in the CFPF actuarial deficit. The Reserve Force Plan is not impacted by pension divisions since no direction is provided under the *Pension Benefits Division Regulations* regarding the division of pension upon the marriage breakdown of member of the Reserve Force Plan.

(vii) Promotional and seniority salary increases were lower than expected at many ages resulting in a decrease in the actuarial liability of $2 million in the Superannuation Account and of $31 million in the CFPF.

(viii) Pension indexation was as expected at 1 January 2014, more than expected at 1 January 2015 and less than expected at 1 January 2016 which resulted in a decrease in the actuarial liability of $62 million in the Superannuation Account, of $16 in the CFPF and no impact in the RFPF.

(ix) Under the Superannuation Account, $54 million more than expected was paid in lump sum and annuity payments as well as $13 million more from the CFPF and $1 million less from the RFPF.

7) Revision of Actuarial Assumptions

Actuarial assumptions were revised based on economic trends and demographic experience as described in Appendix 7. This revision has increased the Superannuation Account actuarial liabilities by $3,120 million, increased the CFPF actuarial liabilities by $1,794 million and increased the RFPF actuarial liability by $37 million. The impacts of these revisions are described in the following table.

Table 10 Revision of Actuarial Assumptions
($ millions)

	Superannuation Account	Canadian Forces Pension Fund	Reserve Force Pension Fund
Economic assumptions			
Pension Indexation	277	58	1
Increase in pensionable earnings	60	330	11
Rates of return / Yield on Account	(3,333)	(1,721)	(59)
Total	**(2,996)**	**(1,333)**	**(47)**
Age difference between spouses	191	31	1
Survivor mortality rates	52	4	-
Longevity improvement factors	(291)	(86)	(2)
Pensioner mortality rates	(57)	(34)	(1)
Disabled retirements 3B rates	(52)	(315)	-
Proportion married at death	5	3	-
Pensionable retirement rates	22	(9)	-
Annuity reduction factors	9	3	-
Seniority and promotional salary increases	(2)	12	-
Proportion electing a deferred annuity	-	(1)	2
Assumptions related to children and students	-	-	-
Withdrawals rates	-	(66)	8
Contributor mortality rates	(1)	(3)	-
Net impact of revision	**(3,120)**	**(1,794)**	**(37)**

The net impact of the revision of the assumptions on the Superannuation Account is largely attributable to the change in economic assumptions and the new longevity improvement factors. With respect to the CFPF, the net impact of the revision is largely attributable to the change in economic assumptions and the new disabled retirement 3B assumptions. With respect to the RFPF, the net impact of the revisions is largely attributable to the change in economic assumptions and the new withdrawal rate assumptions.

The following revisions were made to the economic assumptions used in the previous report:

– ultimate real increase in average earnings decreased from 1.00% to 0.80%; and
– ultimate real rate of return on both Pension Funds decreased from 4.10% to 4.00%; and
– ultimate real rate of return on the Superannuation Account decreased from 2.80% to 2.70%.

Details of the changes in economic assumptions, including the assumed yield on the Superannuation Account, are described in Appendix 6.

8) Valuation methodology change - Reserve Force members under Part I

In the previous valuation, Reserve Force members participating to the Regular Force Plan were valued similarly as Regular Force members, that is, the “service in the forces” was used for purpose of benefit threshold and benefit accrual. In this valuation, Reserve Force members have been segregated and are valued using the "pensionable service" for benefit threshold and their benefit accrual is based on the expected accrual ratio (qualifying service/pensionable service). This effectively treats these Reserve Force members as part time members under the Regular Force Plan.

While the previous valuation overestimated the accrued liability for these Reserve Force members, the current valuation would underestimate the liability for Reserve Force members that are currently working full time. Of a total of 1,582 Reserve Force members at the valuation date, 1,152 Reserve Force members have an accrual ratio less than one which indicates that the underestimation would be less in absolute term compared to the previous report overestimation.

This valuation methodology change resulted in a decrease of $4 million in the Superannuation Account actuarial liability and a decrease of $38 million in the CFPF actuarial liability.

9) Change in the Present Value of Prior Service Contributions

The expected total government cost is shown in Table 22 on page 32. The government is expected to make additional contributions in excess of the current service cost for members' prior service elections. The change in the present value of prior service contributions correspond to members' elections since the last report where the members opted to pay for these elections by instalments. Members' prior service elections paid through instalments has the effect of increasing the Superannuation Account and the CFPF assets by $1 and $86 million respectively as well as increasing the RFPF assets by $5 million.

10) Change in the Present Value of Administrative Expenses

The previous report annual administrative expense assumption of 0.5% of total pensionable payroll is increased to 0.75% in this report. This increase is based on the projection of administrative expenses provided by DND, which covers the next three years.

For plan year 2017, 58.1% of total administrative expenses are being charged to the Superannuation Account; it is assumed that the proportion charged to the Superannuation Account will reduce at the rate of 2.5% per year as compare to 3.0% per year in the previous report. The additional 0.25% of annual administrative expenses resulted in a decrease of $108 million of the Superannuation Account initial actuarial excess.

11) Recognition of Remaining Contributions for Processed Prior Service

According to section 17 of the *Reserve Force Pension Plan Regulations*, past earnings elections with a cost to the member of more than $500 are to be paid by way of monthly installments. Section 21 of the *Reserve Force Pension Plan Regulations* give members, at any time, the option to pre-pay any amount that remains unpaid in respect of a past earnings election. Many members have exercised this pre-payment option.

In normal circumstances the time elapsed between the processing of a past earnings election and the creation of a monthly installment schedule is minimal. If a member has a processed election but there is no installment schedule in effect, it would normally be assumed that the election was fully paid.

However, many Reserve Force members have been identified who have a processed past earnings election but who have neither an installment schedule nor any record of having made a lump sum payment. Discussions with DND have confirmed that there are many Reserve Force installment schedules which are considered incomplete in their system. It was therefore decided to estimate and recognize the expected future contributions for all Reserve Force members having a processed past earnings election but no installment schedule in effect as of the valuation date.

Given the unknown reliability of the installment schedule which are incomplete and the tendency of members to make lump sum payments, the expected future contributions are valued as if members will make an immediate lump sum payment for the estimated unpaid amount of their past earnings election. Unpaid amounts were estimated by estimating the cost to the member of the past earnings election and deducting from that cost the sum of all contributions received up to the valuation date. Unpaid amounts are subject to interest from the date the member is notified of the finalized cost of their past earnings election.

As of the valuation date the total unpaid amount was estimated to be $21 million. When these amounts are paid they will be matched by the government. Therefore the total remaining contributions for processed past earnings elections not on an installment schedule is $42 million and the recognition of this amount reduces the RFPF deficit by the same amount.

12) Recognition of Unprocessed Prior Service

For the current valuation, DND has provided a list of the remaining members with pre-2007 Reserve Force service elections that have not yet been processed. As at 31 March 2016 there were a total of 368 Regular Force members and 530 Reserve Force members with such elections. These elections are recognized in both the actuarial assets and the actuarial liabilities of the CFPF and the RFPF. The gain of $8 million in the CFPF and loss of $2 million in the RFPF represent the difference between the recognized future contributions and the recognized liability for these unprocessed elections.

13) Amount receivable from Reserve Force Plan - Rollover Members

Rollovers are described in Appendix 1D.23. In normal circumstances, the time elapsed between the rollover date and the date of the transfer of assets between the plans is minimal. However, given the delays in the processing of past earnings elections and other challenges associated with the newness of the Reserve Force Plan, a significant backlog of outstanding asset transfers had accumulated by 31 March 2013. DND processed a large number of these outstanding asset transfers during the valuation period. However, the impact of the large number of processed payments was offset by the large number of rollovers which occurred during the valuation period.

In this report a total of 930 members have been identified as members who have rolled over to the Regular Force Plan by the valuation date but assets had not been transferred by the valuation date. From information provided by DND and PSPC in April 2017 we know that 341 of the 930 outstanding asset transfers were processed by 13 April 2017 and that the actual amount transferred in respect of these 341 rollovers was $25.1 million. The outstanding asset transfers in respect of the remaining 589 rollovers were estimated at $31.9 million for a total amount payable of $57 million as of the valuation date.

The amount payable to Regular Force Plan decreased by $48 million from $105.4 million as at 31 March 2013 to $57 million as at 31 March 2016.

14) Change in outstanding payments

For members terminating with a return of contributions or a transfer value payment before 31 March 2016 where the actual payments will occur after that date, a revision of the estimate of such payments resulted in an increase of $51 million in the CFPF liability and a decrease of $6 million in the RFPF liability.

15) Pension Modernization Cost

The PSPC Pension Modernization Project is almost completed as the target date for completion is by the end of plan year 2017. The cost associated with this project is debited directly from the Superannuation Account, CFPF and the RFPF. The net impact of the project remaining cost is a reduction of $6 million to the Superannuation Account initial excess, an increase of $4 million to the CFPF deficit, and an increase of $2 million to the RFPF deficit.

16) Unrecognized Investment Gains

The actuarial asset valuation method used in this valuation is the same as that described in the 2013 valuation report. For this valuation, the method resulted in an actuarial value of CFPF assets and the RFPF assets that is $1,078 and $30 million less than their respective market value, due to unrecognized investment gains.

C. CFSA - Cost Certificate

1) Current Service Cost

The details of the current service cost for plan year 2017 and reconciliation with the 2014 current service cost are shown below.

Table 11 Current Service Cost for Plan Year 2017
($ millions)

	Canadian Forces Pension Fund	Reserve Force Pension Fund
Members required contributions	480.4	15.0
Government current service cost	806.8	35.5
Total current service cost	**1,287.2**	**50.5**
Expected pensionable payroll	4,977.1	288.9
Total current service cost as % of expected pensionable payroll	**25.86%**	**17.48%**

Table 12 Reconciliation of CFSA Current Service Cost
(Percentage of pensionable payroll)

	Canadian Forces Pension Fund	Reserve Force Pension Fund
For plan year 2014	**24.06**	**15.06**
Use correct seniority and promotional salary scale	-	(0.27)
Valuation methodology change	(0.12)	-
Retroactive changes to the population data	0.15	0.18
Expected current service cost change	(0.28)	0.46
Valuation methodology change - Reservists under Part I	(0.05)	-
Experience (gains)losses	(0.04)	0.15
Changes in assumptions		
Pension Indexation	-	-
Increase in pensionable earnings	(0.75)	(0.53)
Rates of return	2.30	2.50
Recognition of Pensionable Allowance	(0.13)	-
Withdrawals	0.09	(0.58)
Pensionable retirements	0.03	-
Proportion electing a deferred annuity	0.01	(0.15)
Disabled retirements 3B	0.44	-
Contributors mortality rates	0.01	-
Pensioners mortality rates	0.03	0.02
Longevity improvement factors	0.09	0.08
Seniority and promotional salary increases	(0.03)	0.21
Proportion married at death	-	(0.01)
Age difference between spouses	(0.03)	(0.02)
Administrative expenses	0.09	0.50
Unexplained Changes	-	(0.01)
For plan year 2017	**25.86**	**17.48**

2) Projection of Current Service Costs

The current service cost is borne jointly by the plan members and the government. The Regular Force member contribution rates have been changed since the last valuation. Contribution rates are set equal to the contribution rates of Group 1 contributors under the pension plan for the PS pension plan.

Member Contribution Rates[1]

Calendar Year	Regular Force Member		Reserve Force Member
	Below YMPE	Above YMPE	
2016	9.05%	11.04%	5.20%
2017	9.47%	11.68%	5.20%
2018	9.83%	12.13%	5.20%
2019	9.76%	12.08%	5.20%
2020	9.71%	12.04%	5.20%

Current service costs on a plan year basis, expressed in percentage of the projected pensionable payroll as well as in dollar amount are shown in Table 13 for Regular Force members and Table 14 for Reserve Force members. Member contributions and the government current service costs are also shown on a calendar year basis in the Executive Summary.

Table 13 Projection of Current Service Cost on a Plan Year Basis - CFPF

Plan Year	$ Millions			% of Pensionable Payroll			Split
	Members	Government	Total	Members	Government	Total	Members : Government
2017	480.4	806.8	1287.2	9.65	16.21	25.86	37% : 63%
2018	504.3	780.8	1285.1	10.10	15.64	25.74	39% : 61%
2019	526.2	763.8	1290.0	10.36	15.04	25.40	41% : 59%
2020	533.0	769.7	1302.7	10.29	14.86	25.15	41% : 59%
2021	542.1	777.4	1319.5	10.23	14.68	24.91	41% : 59%
2026	609.0	853.9	1462.9	10.08	14.13	24.21	42% : 58%
2031	701.0	1002.2	1703.2	10.04	14.36	24.40	41% : 59%

Table 14 Projection of Current Service Cost on a Plan Year Basis- RFPF

Plan Year	$ Millions			% of Pensionable Payroll			Split
	Members	Government	Total	Members	Government	Total	Members : Government
2017	15.0	35.5	50.5	5.20	12.28	17.48	30% : 70%
2018	16.1	35.1	51.2	5.20	11.36	16.56	31% : 69%
2019	17.2	36.8	54.0	5.20	11.17	16.37	32% : 68%
2020	18.2	38.9	57.1	5.20	11.10	16.30	32% : 68%
2021	19.3	41.1	60.4	5.20	11.08	16.28	32% : 68%
2026	24.8	54.9	79.7	5.20	11.50	16.70	31% : 69%
2031	31.1	75.2	106.3	5.20	12.54	17.74	29% : 71%

3) Administrative Expenses (Pension Modernization Cost Included)

Based upon the assumptions described in Appendix 7 B. 3, the CFPF and the RFPF administrative expenses are included in the total current service costs. As for the previous report, the expected administration expenses exclude the PSPIB operating expenses, as these are recognized implicitly through a decrease in the real rate of

[1] The Regular Force member contribution rates shown after calendar year 2017 are estimates and subject to change. There are no scheduled changes to the Reserve Force member contribution rate currently set by the *Reserve Force Pension Plan Regulations* at 5.2% of pensionable earnings.

return. The total administrative expenses for the Regular Force Plan and the Reserve Force Plan are estimated to be as follows:

Table 15 Administrative Expenses
$ Millions

	Ongoing			Pension Modernization		
Plan Year	SA[1]	CFPF	RFPF	SA	CFPF	RFPF
2017	21.7	15.6	5.1	12.4	9.0	4.1
2018	20.8	16.6	5.4	-	-	-
2019	20.2	17.9	5.8	-	-	-
2020	19.7	19.2	6.1	-	-	-

The Superannuation Account administrative expenses have been capitalized and are shown as a liability in the balance sheet.

4) Contributions for Prior Service Elections

Based on the valuation data and the assumptions described in sections B and C of Appendix 6 and recent statistical information provided by the DND, member and government contributions for prior service elections were estimated as follows:

Table 16 Estimated Contributions for Prior Service [2]
($ millions)

Plan Year	Superannuation Account		Canadian Forces Pension Fund		Reserve Force Pension Fund	
	Members	Government	Members	Government	Members	Government
2017	1.0	1.0	11.6	19.1	5.0	5.0
2018	1.0	1.0	11.9	18.0	13.2	13.2
2019	0.9	0.9	12.3	17.4	13.1	13.1
2020	0.9	0.9	12.7	17.9	9.3	9.3
2021	0.9	0.9	13.1	18.3	1.3	1.3

D. Sensitivity of Valuation Results to Variations in Longevity Improvement Factors

This valuation assumes that the current mortality rates applicable to members of the Canadian Forces will improve over time. This assumption is based on the longevity improvement assumption[3] contained in the 27th Canada Pension Plan (CPP) actuarial report.

Table 17 measures the effect on the plan year 2017 current service cost and the liabilities for service prior to 1 April 2000 and for service since that date, under various longevity improvement assumptions. The current longevity improvement assumption is described in Table 55 of Appendix 7.

1 Canadian Forces Superannuation Account.
2 There is no contribution for prior service to the RCA.
3 In this report 'longevity improvement assumption' is equivalent to the 'mortality improvement assumption' discussed in the 27th Actuarial Report on the Canada Pension Plan

Table 17 Sensitivity of Results to Variation in Longevity Improvement Factors

	Current Service Cost as a % of pensionable payroll				Actuarial Liability ($ millions)					
					Regular Force Plan					
	Regular Force Plan		Reserve Force Plan		Service prior to 1 April 2000		Service since April 2000		Reserve Force Plan	
Longevity improvement factors	2017	Effect	2017	Effect	2017	Effect	2017	Effect	2017	Effect
Current basis	25.86	None	17.48	None	47,385	None	24,048	None	566	None
- if 0%	24.95	(0.90)	16.63	(0.85)	45,431	(1,954)	23,317	(731)	542	(24)
- if ultimate 50% higher	26.17	0.31	17.78	0.30	47,900	515	24,285	237	574	8
- if ultimate 50% lower	25.65	(0.21)	17.26	(0.22)	47,165	(220)	23,907	(141)	561	(5)
- if kept at 2017 level	26.64	0.79	18.22	0.74	48,588	1,203	24,638	590	585	19

The sensitivity of the life expectancy at age 65 to the variation in longevity improvement factors is shown in Table 57 on page 85.

E. Sensitivity to Variations in Key Economic Assumptions

The information required by statute, which is presented in the main report, has been derived using best-estimate assumptions regarding future demographic and economic trends. The key best-estimate assumptions, i.e. those for which changes within a reasonable range have the most significant impact on the long-term financial results, are described in Appendices 6 and 7. Both the length of the projection period and the number of assumptions required ensure that actual future experience will almost certainly not develop precisely in accordance with the best-estimate assumptions. Individual sensitivity tests have been performed, projecting the pension plan’s financial status using alternative assumptions.

Table 18 measure the effect on the plan year 2017 current service cost, the liabilities for Regular Force service prior to 1 April 2000, and the liabilities for Regular Force service since that date when key economic assumptions are varied by one percentage point per annum from plan year 2017 onward. Similarly, Table 19 measures the effect on the plan year 2017 current service cost and the liabilities for Reserve Force service when key economic assumptions are varied by one percentage point per annum from plan year 2017 onward.

Table 18 Sensitivity of Results to Variations in Key Economic Assumptions- Regular Force

	Current Service Cost (% of pensionable payroll)		Actuarial Liability ($ millions) Service prior to April 2000		Actuarial Liability ($ millions) Service since April 2000	
Assumption(s) Varied	2017	Effect	2017	Effect	2017	Effect
None (i.e. current basis)	25.86	None	47,385	None	24,048	None
Investment yield						
- if 1% higher	20.34	(5.53)	41,691	(5,694)	20,023	(4,025)
- if 1% lower	33.67	7.80	54,513	7,128	29,429	5,381
Inflation						
- if 1% higher	30.26	4.40	54,034	6,649	27,764	3,716
- if 1% lower	22.48	(3.39)	41,958	(5,427)	21,114	(2,934)
Salary, YMPE and MPE						
- if 1% higher	28.15	2.29	47,564	179	25,157	1,109
- if 1% lower	23.89	(1.97)	47,215	(170)	23,067	(981)
All economic assumptions						
- if 1% higher	25.46	(0.41)	47,239	(146)	23,846	(202)
- if 1% lower	26.43	0.57	47,571	186	24,349	301

Table 19 Sensitivity of Results to Variations in Key Economic Assumptions - Reserve Force

	Current Service Cost (% of Pensionable Payroll)		Actuarial Liability ($ millions)	
Assumption(s) Varied	2017	Effect	2017	Effect
None (i.e. current basis)	17.48	None	566.0	None
Investment yield				
- if 1% higher	13.10	(4.38)	450.0	(116.0)
- if 1% lower	24.11	6.63	730.0	164.0
Inflation				
- if 1% higher	21.41	3.93	675.0	109.0
- if 1% lower	14.67	(2.81)	483.0	(83.0)
Salary, YMPE and MPE				
- if 1% higher	19.52	2.04	605.0	39.0
- if 1% lower	15.81	(1.67)	533.0	(33.0)
All economic assumptions				
- if 1% higher	17.29	(0.19)	560.0	(6.0)
- if 1% lower	17.68	0.20	572.0	6.0

The differences between the results above and those shown in the valuation can also serve as a basis for approximating the effect of other numerical variations in a key assumption to the extent that such effects are linear.

F. RCA - Financial Position

This section shows the financial position of the RCA Account as at 31 March 2016. The results of the previous valuation are also shown for comparison.

Table 20 State of the RCA Account
($ millions)

	31 March 2016	31 March 2013
Recorded Account balance	392	330
Tax Credit (CRA Refundable tax)	382	319
Total Assets	**774**	**649**
Actuarial Liability		
Pensionable excess earnings		
• Active contributors	238	361
• Pensioners	163	159
Survivor Allowance		
• Active contributors	5	6
• Pensioners	35	35
Total Actuarial Liability	**441**	**561**
Actuarial Excess/(Shortfall)	**333**	**88**

The sum of the recorded balance of the RCA Account and the tax credit (CRA refundable tax) is $774 million; it exceeds the actuarial liability of $441 million by 76% as at 31 March 2016 (16% as at 31 March 2013).

The large increase in the actuarial excess is mainly the result of discounting the actuarial liabilities at the full yield instead of half of the yield as done in the previous report. There is no authority to treat excess in the RCA Account.

G. RCA - Current Service Cost

The projected current service cost, borne jointly by the members and the government, of 0.83% for plan year 2017 calculated in the previous valuation has decreased to 0.40% of pensionable payroll in this valuation. The RCA current service cost for plan year 2017 is estimated to marginally increase over the next three years to reach 0.44% of pensionable payroll in plan year 2020 as shown in Table 21.

Table 21 RCA - Current Service Cost
($ millions)

	Plan Year			
Total current service cost	2017	2018	2019	2020
Pensionable excess earnings	19.1	20.0	20.9	21.8
Survivor Allowance	0.8	0.8	0.9	0.9
Total	**19.9**	**20.8**	**21.8**	**22.7**
Member contributions	3.0	3.3	3.5	3.7
Government current service cost	16.9	17.5	18.3	19.0
Current service cost as % of total pensionable payroll	**0.40%**	**0.42%**	**0.43%**	**0.44%**

H. Summary of Estimated Government Cost

The following table summarizes the estimated total government cost on a plan year basis.

Table 22 Summary of Estimated Government Cost
($ millions)

Plan Year	Current Service Cost			Total Prior Service Contributions			Special Payments		Total Government Cost
	CFPF	RCA	RFPF	SA	CFPF	RFPF	CFPF	RFPF	
2017	806.9	16.9	35.5	1.0	19.1	5.0	170.0	4.2	1,058.6
2018	780.7	17.5	35.1	1.0	18.0	13.2	145.2	5.3	1,016.0
2019	763.8	18.3	36.8	0.9	17.4	13.1	145.2	5.3	1,000.8

III. Actuarial Opinion

In our opinion, considering that this report was prepared pursuant to the *Public Pensions Reporting Act*,

- the valuation input data on which the valuation is based are sufficient and reliable for the purposes of the valuation;
- the assumptions that have been used are, individually and in aggregate, appropriate for the purposes of the valuation;
- the methodology employed is appropriate for the purposes of the valuation; and
- this report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada.

In particular, this report was prepared in accordance with the Standards of Practice (General Standards and Practice – Practice-Specific Standards for Pension Plans) published by the Canadian Institute of Actuaries.

To the best of our knowledge, after discussion with the Department of National Defence, there were no events between the valuation date and the date of this report that would have a material impact on the results of this valuation.

The payment of accrued pension benefits being the responsibility of the government, the likelihood of the plan being wound-up and its obligation not being fulfilled is practically nonexistent. Further, the legislation does not define the benefits payable upon wind-up. Therefore, a solvency valuation has not been performed.

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Ottawa, Canada
21 September 2017

Appendix 1 - Summary of Pension Benefit Provisions

Pensions for members of the regular force were first provided under the Militia Pension Act of 1901, when in 1950 it became the *Defence Services Pension Act* until the *Defence Services Pension Continuation Act* and the *Canadian Forces Superannuation Act* (CFSA) were enacted in 1959. Benefits are also provided to members of the regular force under the *Special Retirement Arrangements Act*.

The enactment of Bill C-78 on 21 September 1999 gave authority to create a pension plan for the members of the reserve force. The Reserve Force Plan was established on 1 March 2007 and provides pension benefits to part-time members of the reserve force who meet the threshold requirements for becoming plan members. The benefit eligibility rules under this plan are the same as the rules that apply to Regular Force members starting on 1 March 2007.

Benefits under both the Regular Force Plan and the Reserve Force Plan may be reduced in accordance with the *Pension Benefits Division Act* if there is a breakdown of a spousal union.

Changes since the last valuation

This is the first report that shows the combined results of both Regular Force Plan and Reserve Force Plan.

The previous actuarial reports for the Regular Force Plan and the Reserve Force Plan were made as at 31 March 2013 and as at 31 March 2015 respectively. However, this report will reconcile the results to the previous 31 March 2013 Reserve Force Plan actuarial report for consistency between the Regular and Reserve Force Plans.

Since then, all changes made to the CFSA are considered cosmetic and have no financial impact on the funding of either pension plan.

Methodology changes

In the previous valuation, Reserve Force members participating in the Regular Force Plan were valued as Regular Force members, that is, the “service in the forces” (qualifying service) was used for purpose of benefit threshold and benefit accrual. In this valuation, Reserve Force members have been segregated and are valued using the “pensionable service” for benefit threshold and their benefit accrual is based on their expected accrual ratio (qualifying service/pensionable service). This effectively treats these Reserve Force members as part time members under the Regular Force Plan.

Pensionable service years credited to each member of the reserve force as at 31 March 2016 was used to estimate future benefit entitlements. In contrast to the previous valuation, this valuation no longer recognizes that certain Reserve Force members will be entitled to an immediate annuity after the completion of a total of 25 years of qualifying service. The impact of this change in valuation methodology was measured and found to be immaterial to the valuation results. This change in valuation methodology has allowed us to significantly reduce the complexity of our valuation data processing.

Summary of Pension Benefit Provisions

Summarized in this appendix are the pension benefits, for both the Regular Force members and the Reserve Force members, provided under the CFSA registered provisions, which are in compliance with the *Income Tax Act*. For the Regular Force Plan, the portion of the benefits in excess of the *Income Tax Act* limits for the registered is provided under the RCA described in Appendix 2.

The legislation shall prevail if there is a discrepancy between it and this summary.

A. Membership

Regular Force membership in the Regular Force Plan is compulsory for all full-time members of the Canadian Forces.

As of 1 March 2007, a member of the reserve force is considered to be a member of the regular force and will become a member of the Regular Force Plan,

- on 1 March 2007 if, on that date,
  - the member's total number of days of paid Canadian Forces service during any period of 60 months beginning on or after 1 April 1999 was no less than 1,674,
  - the member already was or became a member of the Canadian Forces during the first month of the period and remained a member of the Canadian Forces throughout the period without any interruption of more than 60 days,
  - the member is not a person required to contribute to the Public Service Pension Fund or the Royal Canadian Mounted Police Pension Fund, and
  - the member does not have any pensionable service to their credit under Part I of the CFSA;
- in any other case, on the first day of the month following a period of 60 months ending after 1 March 2007 if
  - the member's total number of days of paid Canadian Forces service during the period was no less than 1,674,
  - the member already was or became a member of the Canadian Forces during the first month of the period and remained a member of the Canadian Forces throughout the period without any interruption of more than 60 days, and
  - the member does not have any pensionable service to their credit under Part I of the CFSA.

The general rule is that, once a Reserve Force member is deemed a Regular Force member for the purposes of Part I of the CFSA and does not fail to receive pensionable earnings in any 12 consecutive months, the member remains a contributor under Part I of the CFSA as long as they remain a member of the Reserve Force. There are exceptions to the general rule previously described but for the purpose of this report, these were considered immaterial.

A member of the reserve force is deemed to become a participant in the Reserve Force Plan, defined under Part I.1 of the CFSA, if,

a) during each of any two consecutive periods of 12 months beginning on or after

1 April 1999 and ending no later than 1 March 2007, the earnings that the member was entitled to receive were at least 10 per cent of the Annual Earnings Threshold[1], provided that the member already was or became a member of the Canadian Forces during the first month of the first period and remained a member of the Canadian Forces, without any interruption of more than 60 days, until 1 March 2007; or

b) in any other case, on the first day of the month following two consecutive periods of 12 months, the second of which ending after 1 March 2007 and during each of which the earnings that they were entitled to receive were at least 10 per cent of the Annual Earnings Threshold, provided that the member already was or became a member of the Canadian Forces during the first month of the first period and remained a member of the Canadian Forces, without any interruption of more than 60 days, throughout those two periods.

B. Contributions

1. Members

For Regular Force members, during the first 35 years of pensionable service, members contribute according to the rates shown in the following table. The contribution rates shown after calendar year 2017 are not final and are subject to change. After 35 years of pensionable service, members contribute only 1% of pensionable earnings.

Calendar Year	2016(1)	2017(1)	2018(2)	2019(2)	2020(2)
Contribution rates on earnings **up to** the maximum covered by the CPP/QPP	9.05%	9.47%	9.83%	9.76%	9.71%
Contribution rates on any earnings **over** the maximum covered by the CPP/QPP	11.04%	11.68%	12.13%	12.08%	12.04%

(1) Approved by Treasury Board
(2) Estimated

For Reserve Force members, during the first 35 years of pensionable service, members contribute 5.2% on all earnings up to 66 2/3 times the defined benefit limit as determined under the Income Tax Regulations. After 35 years of pensionable service, members contribute only 1% of pensionable earnings.

2. Government

a) Current Service

The government determines its normal monthly contribution as that amount which, when combined with the required member contributions in respect of current service and expected interest earnings, is sufficient to cover the cost, as estimated by the President of the Treasury Board, of all future payable benefits that have accrued in respect of pensionable service during that month and the administrative expenses incurred during that month.

1 Annual Earnings Threshold is equal to the sum of 1/12 of the Year's Maximum Pensionable Earnings over any 12 month period.

b) Elected Prior Service

The government matches Regular Force member contributions credited under the Superannuation Account for prior service elections; however, no contributions are credited if the member is paying the double rate.

Government credits to the Canadian Forces Pension Fund in respect of elected prior service are as described for current service; however, if the member is paying the double rate the government contribution rate is generally adjusted so that total member and government contributions match the current service cost.

For Reserve Force members, this valuation assumes that the government will match member contributions for prior service elections.

c) Actuarial Excess and Surplus

In accordance with the CFSA, the government has the authority to:

- debit the excess of accounts available for benefits over the actuarial liability from the Superannuation Account subject to limitations, and
- deal with any actuarial surplus, subject to limitations, in the Canadian Forces Pension Fund as it occurs, either by reducing members and/or employer contributions or by making withdrawals.

The regulations under Part I.1 of the CFSA give the government the authority to deal with any actuarial surplus, subject to limitations, in the RFPF as it occurs by reducing employer contributions.

d) Actuarial Shortfall and Deficit

In accordance with the CFSA, if an actuarial shortfall under the Superannuation Account is identified through a statutory actuarial report, the actuarial shortfall can be amortized over a period of up to 15 years, such that the amount that in the opinion of the President of the Treasury Board will, at the end of the fifteenth fiscal year following the tabling of that report or at the end of the shorter period that the President of the Treasury Board may determine, together with the amount that the President of the Treasury Board estimates will be to the credit of the Superannuation Account at that time, meet the cost of the benefits payable in respect of pensionable service prior to 1 April 2000.

If an actuarial deficit under the CFPF is identified through a statutory actuarial report, the actuarial deficit can be amortized over a period of up to 15 years, such that the amount that in the opinion of the President of the Treasury Board will, at the end of the fifteenth fiscal year following the tabling of that report or at the end of the shorter period that the President of the Treasury Board may determine, together with the amount that the President of the Treasury Board estimates will be to the credit of the Canadian Forces Pension Fund at that time, meet the cost of the benefits payable in respect of pensionable service since 1 April 2000.

Similarly, if an actuarial deficit under the RFPF is identified through a statutory actuarial report, the RFPF is to be credited with such annual amounts that will fully amortize the actuarial deficit over a period of 15 years.

C. Summary Description of Benefits under the Regular Force Plan and the Reserve Force Plan

The objective of the Regular Force Plan and the Reserve Force Plan is to provide an employment earnings–related lifetime retirement pension to eligible members. Benefits to members in case of disability and to the spouse and children in case of death are also provided.

Regular Force member's pension benefits are coordinated with the pensions paid by the CPP. The initial rate of a Regular Force member's retirement pension is equal to 2% of the highest average of annual pensionable earnings over any period of five consecutive[1] years, multiplied by the number of years of pensionable service not exceeding 35. The pension is indexed annually with the Consumer Price Index (CPI) and the accumulated indexation may be payable at age 55 at the earliest as defined in Note 6 of section D below. Entitlement to benefits depends on either the qualifying service in the Canadian Forces or the pensionable service, as defined below in Notes 7 and 8 of section D below.

Reserve Force member's pension benefits are equal to 1.5% of the greater of the Reserve Force member's total pensionable earnings and total updated pensionable earnings over the most recent 35 years of pensionable service (i.e. Updated Career Average Plan). The Reserve Force Plan also provides a bridge benefit equal to 0.5% of the greater of the pensioner's total bridge benefit earnings and total updated bridge benefit earnings over the most recent 35 years of pensionable service. Reserve Force pension and bridge benefits are indexed annually with the Consumer Price Index and the accumulated indexation may be payable at age 55 at the earliest, as defined in Note 6 of section D below.

Entitlement to benefits depends on either the qualifying service in the Canadian Forces or the pensionable service, as defined below in Notes 7 and 8 of section D below.

[1] Any five-year period of pensionable service selected by or on behalf of the contributor, or during any period so selected consisting of consecutive periods of pensionable service totalling five years.

Detailed notes on the following overview are provided in the following section.

1. Regular Force Member Benefit Entitlement on the Basis of Qualifying Service

a) Active Regular Force Members

Type of Termination	Qualifying Service in the Canadian Forces *(Note 7)*	Benefit
Retirement on completion of short engagement (an officer other than a subordinate officer who has not reached retirement age and is not serving on an intermediate engagement or for an indefinite period of service) *(Note 9)*	Less than 2 years	Return of contributions *(Note 11)*
	At least 2 but less than 25 years (less than 20 years – old terms of service)	At option of member (1) deferred annuity *(Note 13)*; or (2) transfer value if under age 50 *(Note 14)*
	25 years or more (20 years or more – old terms of service)	See "Retirement for reasons other than those previously mentioned"
Retirement during an indefinite period of service after having completed an intermediate engagement and prior to reaching retirement age, for reasons other than disability or, to promote economy or efficiency	Any length	Immediate annuity to which member was entitled upon completion of intermediate engagement increased to such extent as prescribed by regulation[1] *(Note 15)*
Retirement on completion of intermediate engagement (a member who has not reached retirement age and is not serving for an indefinite period of service) *(Note 10)*	25 years or more (20 years or more – old terms of service)	Immediate annuity *(Note 12)*
Compulsory retirement because of disability[2]	Less than 2 years	Return of contributions *(Note 11)*
	At least 2 but less than 10 years	At option of member (1) deferred annuity *(Note 13)*; or (2) transfer value if under age 50 *(Note 14)*
	10 years or more	Immediate annuity

1 The CFSA limits the annuity to the immediate annuity to which the active member would be entitled if retiring because of age or disability, and the formula in the CFS Regulations (Appendix 1D.16 always produces less than the maximum.

2 Any condition rendering a member of the Regular Force mentally or physically unfit to perform his or her duties. A member is discharged under Q. R. & O. 15.01 Article 3B when he or she is unable to perform the duties of his or her own occupation. A member is discharged under Q.R. & O. 15.01 Article 3A when he or she is unable to perform the duties of any occupation.

Type of Termination	Qualifying Service in the Canadian Forces *(Note 7)*	Benefit
Compulsory retirement to promote economy or efficiency	Less than 2 years	Return of contributions
	More than 2 but less than 10 years	At option of member (1) deferred annuity *(Note 13)*; or (2) transfer value if under age 50 *(Note 14)*
	At least 10 but less than 25 years (less than 20 years – old terms of service)	At option of member (1) return of contributions; or (2) deferred annuity; or (3) transfer value if under age 50 *(Note 14)* (4) with consent of the Minister of National Defence, an immediate reduced annuity *(Note 16)*
	25 years or more (20 years or more – old terms of service)	Immediate annuity *(Note 12)*
Retirement for reasons other than those previously mentioned	Less than 2 years	Return of contributions *(Note 11)*
	At least 2 but less than 25 years (less than 20 years – old terms of service)	At option of member (1) deferred annuity *(Note 13)*; or (2) transfer value if under age 50 *(Note 14)*
	(At least 20 but less than 25 years – old terms of service)	Immediate reduced annuity
	25 years or more	Officer: - immediate reduced annuity *(Note 16)*; Other than officer: - immediate annuity *(Note 12)*

b) Benefits in Case of Death of an Active Regular Force Member

Status at Death	Qualifying Service in the Canadian Forces *(Note 7)*	Benefit
Leaving no eligible spouse or children under 25 *(Notes 18 and 19)*	Less than 2 years	Return of contributions
	2 years or more	Five times the annual amount of retirement pension to which the member would have been entitled at the date of death
Leaving eligible spouse and/or children under 25	Less than 2 years	Return of contributions or an amount equal to one month's earnings of the deceased member for each year of credited pensionable service, whichever is the greater
	2 years or more	Annual allowance *(Note 20)*

c) Benefits in Case of Death of a Regular Force Pensioner

Status at Death	Benefit
Leaving no eligible spouse or children under 25	Minimum death benefit (*Note 21*)
Leaving eligible spouse and/or children under 25	Annual allowance (*Note 20*)

2. Regular Force Member Benefit Entitlement on the Basis of Pensionable Service

Member's Type of Termination	**Benefit**
With two or more years of pensionable service; and	
▪ Involuntary termination due to a work force reduction program and	
– With 20 years of service or more – Age 50 or over and service 10 years of service or more	Immediate annuity (*Note 12*)
▪ Leaving prior to age 50, except for death or disability	Deferred annuity (*Note 13*) or Transfer Value (*Note 14*)
▪ Leaving at age 50 or over, except for death or disability, and	
– Age 60 or over, or age 55 or over and service 30 years or more	Immediate annuity (*Note 12*)
– Otherwise	Deferred annuity or annual allowance (*Note 20*)

3. Reserve Force Member Benefit Entitlement on the basis of "Pensionable" Service

Member's Type of Termination	**Benefit**
With less than two years of pensionable service	Return of contributions (*Note11 14*)
With two or more years of pensionable service; and	
▪ Involuntary termination due to a work force reduction program and	
– With 20 years of service or more – Age 50 or over and 10 years of service or more	Immediate annuity (*Note 12*)
▪ Leaving prior to age 50, except for death, and	
- Because of disability	Immediate annuity (*Note 12*)
- Otherwise	Deferred annuity (*Note 13*) or Transfer Value (*Note 14*)
▪ Leaving at age 50 or over, except for death or disability, and	
– Age 60 or over, or age 55 or over and service 30 years or more	Immediate annuity (*Note 12*)
– Otherwise	Deferred annuity (*Note 13*) or annual allowance (*Note 20*)

4. Reserve Force Member Benefit Entitlement on the basis of "Qualifying" Service

Member's Type of Termination	**Benefit**
Retirement on completion of 25 years or more of Canadian Forces service (*Note 7*)	Immediate annuity (*Note 12*)

D. Explanatory Notes

1. Pensionable Earnings

For the Regular Force Plan, pensionable earnings means the salary at the annual rate prescribed by the regulations made pursuant to the *National Defence Act* together with the allowances for medical and dental care costs. Pensionable payroll means the aggregate pensionable earnings of all members with less than 35 years of pensionable service.

For the Reserve Force Plan, earnings means pay earned by a member of the Canadian Forces at the rates prescribed by the regulations made pursuant to the *National Defence Act* together with premiums in lieu of leave. Pensionable earnings means the earnings of a member with less than 35 years of pensionable service, who has completed the required two-year waiting period. Pensionable payroll means the aggregate pensionable earnings of all members.

2. Wage measure for Reserve Force Plan

Wage measure is

(a) for a calendar year prior to 2018 , the corresponding rate of pay shown in Table 60 of this report; and

(b) for a calendar year after 2017 , the greater of

  a. the standard basic rate of pay for a period of duty or training of six hours or more, before any retroactive adjustment, that was prescribed or established under the *National Defence Act,* to be paid on October 1 of the preceding year to a member at the rank of Corporal (class A), and

  b. the wage measure of the previous year.

3. Updated Pensionable Earnings for Reserve Force Plan

The updated pensionable earnings for a calendar year are the Reserve Force member's pensionable earnings for that year, subject to the *Income Tax Act* limits, times A/B, rounded to the nearest fourth decimal place, where

A = the average of the wage measures for five years consisting of the year the member most recently ceased to be a member and the most recent years during which the member was a member and, if necessary, the years preceding all of those years, and

B = the wage measure for that calendar year.

4. Bridge Benefit Earnings for Reserve Force Plan

Bridge benefit earnings for a calendar year are the lesser of

(a) the member's pensionable earnings for that year, and

(b) the Year's Maximum Pensionable Earnings (YMPE) for that year.

5. Updated Bridge Benefit Earnings for Reserve Force Plan

Updated bridge benefit earnings for a calendar year are the lesser of

(a) the member’s updated pensionable earnings for that year, and

(b) the average of the YMPE for five years consisting of the year the member most recently ceased to be a member and the preceding four years.

6. Indexation for Regular Force Plan and Reserve Force Plan

a) Level of Indexation Adjustments

All immediate and deferred annuities (pensions and allowances) are adjusted every January to the extent warranted by the increase, as at 30 September of the previous year, in the 12-month average Consumer Price Index. If the indicated adjustment is negative, annuities are not decreased for that year; however, the next following adjustment is diminished accordingly.

b) First Indexation Adjustment

Indexation adjustments accrue from the end of the month in which employment or participation in the plan terminates. The first annual adjustment following termination of employment is prorated accordingly.

c) Commencement of Indexation Payments

Payment of the indexation portion of a retirement, disability or survivor pension normally commences when the pension is put into pay. However, regarding a retirement pension, the pensioner must be at least 55 years old and the sum of age and pensionable service at least 85; or the retirement pensioner must be at least 60 years old.

7. Qualifying Service in the Canadian Forces (Regular Force Plan and Reserve Force Plan)

Qualifying service in the Canadian Forces means service for which a Regular or Reserve Force member is paid, and includes:

- days of service in the Regular Force for which pay was authorized and periods of authorized leave of absence;
  - excluding any service for which a member was paid a return of contributions or lump sum payment under the CFSA that he or she did not elect to repay on subsequent enrolment;
- days of service in the Reserve Force for which pay was authorized and authorized absences for maternity and parental purposes:
  - days of training or duty of less than 6 hours = half-day
  - days of Class “A” service = 1.4 days
  - periods before 1 April 1999 (when duration of period is verifiable but not the number of days) = quarter time
  - during maternity and parental leaves, days of Canadian Forces service are based on service in previous 12 months

8. **Pensionable Service**

Pensionable service includes any period of service in the Regular Force or Reserve Force in respect of which an active member either (1) made contributions that remain in the Superannuation Account, CFPF or the RFPF, or (2) elected to contribute. It also includes any period of prior service for which an active member was paid a return of contributions or lump sum payment under the CFSA that he or she did elect to repay on subsequent enrolment. It also includes prior service in the Public Service of Canada, the Royal Canadian Mounted Police and the militaries of the Commonwealth of Nations that the member elected to count as pensionable service.

9. **Short Engagement for Regular Force Plan**

Short engagement means a continuous period of service as a commissioned officer in the regular force for a period not exceeding nine years.

10. **Intermediate Engagement for Regular Force Plan**

Intermediate engagement means, under the old terms of service, 20 years of continuous service as a member of the regular force. Under the new terms of service, an intermediate engagement is 25 years of continuous service as a member of the regular force.

11. **Return of Contributions**

Return of contributions means the payment of an amount equal to the accumulated current and prior service contributions paid or transferred by the member into the Superannuation Account, the CFPF or the RFPF together with interest. Interest is calculated at the quarterly Pension Fund rate each quarter on the accumulated contributions with interest as at the end of the previous quarter.

12. **Immediate Annuity**

For Regular Force Plan, immediate annuity means an unreduced pension that becomes payable immediately upon a pensionable retirement or a pensionable disability. The annual amount is equal to 2% of the highest average annual pensionable earnings (Note 1) of the active member over any period of five[1] consecutive[2] years, multiplied by the number of years of pensionable service not exceeding 35. However, if such highest five-year earnings average exceeds the yearly maximum prescribed for the calendar year in which service is terminated, then the annual amount is reduced by 2% of such excess, multiplied by the number of years of pensionable service after April 1995.

When a regular force pensioner attains age 65 or becomes entitled to a disability pension from the CPP, the annual amount of pension is reduced by a percentage of the indexed

[1] If the number of years of pensionable service is less than five, then the average is over the entire period of pensionable service.

[2] Any five-year period of pensionable service selected by or on behalf of the contributor, or during any period so selected consisting of consecutive periods of pensionable service totalling five years.

CPP annual pensionable earnings[1] (or, if lesser, the indexed five-year pensionable earnings average on which the immediate annuity is based), multiplied by the years of CPP pensionable service[2]. The applicable percentage is 0.625%.

For Reserve Force Plan, immediate annuity means an unreduced pension that becomes payable immediately upon a pensionable retirement or a pensionable disability. The annual amount is equal to 1.5% of the greater of the member's total pensionable earnings and total updated pensionable earnings over the most recent 35 years of pensionable service, plus an additional bridge benefit equal to 0.5% of the greater of the member's total bridge benefit earnings and total updated bridge benefit earnings.

For both plans, annuities are payable in equal monthly instalments in arrears until the end of the month in which the pensioner dies or when the disability pensioner recovers from disability. Upon the death of the pensioner, either a survivor allowance (Note 20) or a minimum death benefit (Note 21) may be payable.

13. Deferred Annuity

Deferred annuity means an annuity that becomes payable to a retirement pensioner when he or she reaches age 60. The annual payment is determined as for an immediate annuity (see Note 12 above) but is adjusted to reflect the indexation (see Note 6) from the date of termination to the commencement of annuity payments.

The deferred annuity becomes an immediate annuity during any period of disability beginning before age 60. If the disability ceases before age 60, the immediate annuity reverts to the original deferred annuity.

14. Transfer Value

Active members who, at their date of termination of pensionable service, are under age 50 and who are eligible for a deferred annuity may elect to transfer the commuted value of their benefits, determined in accordance with the regulations, to

- a locked-in Registered Retirement Savings Plan of the prescribed kind; or
- another pension plan registered under the *Income Tax Act*; or
- a financial institution for the purchase of a locked-in immediate or deferred annuity of the prescribed kind.

15. Annuity Payable upon Retirement During an Indefinite Period of Service for Regular Force Plan

For a regular force active member who has not reached retirement age and who, while on an indefinite period of service after completing an intermediate engagement, ceases to be a member of the regular force for any reason other than disability, or to promote economy or efficiency, the Canadian Forces Superannuation Regulations (CFSR) prescribe an annuity that is equal to the greater of

1 Indexed CPP annual pensionable earnings means the average of the YMPE, as defined in the CPP, over the last five years of pensionable service, increased by indexation proportionate to that accrued in respect of the immediate annuity.

2 Years of CPP pensionable service, means the number of years of pensionable service after 1965 or after attaining age 18, whichever is later, but not exceeding 35.

(a) an immediate annuity based on the pensionable service to the date of completion of the intermediate engagement only and the highest consecutive five-year earnings average at date of retirement, and

(b) an immediate annuity based upon the total pensionable service to the date of retirement and the highest consecutive five-year employment earnings average at that date reduced by 5% for each full year by which

- in the case of an officer, the age at the date of retirement is less than the retirement age applicable to the member's rank; or
- in the case of a member other than an officer, the age at the date of retirement is less than the retirement age applicable to the member's rank or the period of service in the Regular Force is less than 25 years, whichever is the lesser.

16. Reduced Immediate Annuity for Regular Force Members

Reduced immediate annuity means an immediate annuity for which the annual amount of the annuity as determined in Note 12 is reduced as stated below.

With the consent of the Minister of National Defence, a regular force active member who is required to terminate to promote economy or efficiency and has between 10 and 20 years of service in the regular force may choose an immediate annuity reduced, until attainment of age 65 but not thereafter, by 5% for each full year not exceeding six by which

(a) the period of service in the regular force is less than 20 years; or

(b) the age of the active member at the time of retirement is less than the retirement age applicable to the member's rank,

whichever is the lesser.

A regular force active member who, not having reached retirement age, ceases to be a member of the regular force for any reason other than disability, or to promote economy or efficiency, or while on an indefinite period of service is entitled

(a) as an officer having served in the regular force for 20 years or more, to an immediate annuity reduced by 5% for each full year by which his or her age at the time of retirement is less than the retirement age applicable to his or her rank, or

(b) as other than an officer having served in the regular force for 20 years or more but less than 25 years, to an immediate annuity reduced by 5% for each full year by which

- the period of service in the regular force is less than 25 years, or
- the age at the time of retirement is less than the retirement age applicable to the member's rank,

whichever is the lesser.

When a Regular Force Plan pensioner in receipt of an immediate reduced annuity becomes disabled before reaching age 60, the pensioner ceases to be entitled to that immediate reduced annuity and becomes entitled to an immediate annuity adjusted in accordance with regulations to take into account the amount of any immediate reduced annuity which the pensioner may have received prior to becoming disabled.

17. Annual Allowance for Regular Force and Reserve Force Plan Members

Annual allowance for members means an annuity payable immediately on retirement or upon attaining age 50, if later. The amount of the allowance is equal to the amount of the deferred annuity to which the member would otherwise be entitled, reduced by 5% multiplied by the difference between 60 and the age when the allowance becomes payable.

However, if the member is at least 50 years old at termination, and has at least 25 years of pensionable service, then the difference is reduced (subject to the above as a maximum) to the greater of

- 55 minus the age, and
- 30 minus the number of years of pensionable service.

When a member in receipt of an annual allowance becomes disabled before reaching age 60, the annual allowance becomes an immediate annuity adjusted in accordance with regulations to take into account the amount of any annual allowance received prior to becoming disabled.

18. Eligible Surviving Spouse or Common-Law Partner

Eligible surviving spouse means the surviving spouse or common-law partner of an active member or pensioner except where

(a) the active member or pensioner died within one year of marriage, unless the Minister of National Defence is satisfied that the member's health at the time of the marriage justified an expectation of surviving for at least one year; or

(b) the pensioner married or began a common-law relationship at age 60 or over, unless after such marriage or partnership the pensioner either

- became a plan contributor again, or
- made an optional survivor benefit election within 12 months following the marriage to accept a reduced pension so that the new spouse would be eligible for a survivor pension. This reduction is reversed if and when the new spouse predeceases the pensioner or the spousal union is terminated for reason other than death; or

(c) the pensioner is a female who retired before 20 December 1975 and did not make an optional survivor benefit election within the one-year period ending 6 May 1995.

19. Eligible Surviving Children

Eligible surviving children are all surviving children of an active member or pensioner who are either under age 18, or age 18 or over but under 25 and in full-time attendance at a school or university.

20. Annual Allowance for Eligible Survivors

For Regular Force Plan, annual allowance means, for the eligible surviving spouse or common-law partner and children of an active member or pensioner, an annuity that becomes payable immediately upon the death of that individual. The amount of the allowance, called a “basic allowance”, is equal to 1% of the highest average of annual pensionable earnings of the active member over five consecutive years, multiplied by the number of years of pensionable service not exceeding 35.

The annual allowance for a spouse or a common-law partner is equal to the basic allowance except in the case where the spouse became eligible to a survivor pension as a result of an optional survivor benefit election, in which case it is equal to the percentage of the basic allowance specified by the pensioner making the election.

The annual allowance for an eligible surviving child is equal to 20% of the basic allowance, subject to a reduction if there are more than four eligible surviving children in the same family. The annuity otherwise payable to an eligible surviving child is doubled if the child is an orphan.

Annual allowances are not coordinated with the CPP and are payable in equal monthly instalments in arrears until the end of the month in which the survivor dies or otherwise loses eligibility. If applicable, a residual benefit (Note 21) is payable to the estate upon the death of the last survivor.

For Reserve Force Plan, annual allowance means, for the eligible surviving spouse or common-law partner and children of a member or pensioner, an annuity that becomes payable immediately upon the death of that individual. The amount of the annual allowance, called a basic allowance, is equal to

(a) 1% of the greater of the pensioner’s total pensionable earnings and total updated pensionable earnings; or,

(b) if the member was in receipt of an annual allowance at the time of death, an amount equal to A × B / C where:

- A = the amount calculated under paragraph (a),
- B = the amount of the annual allowance, and
- C = the amount of the deferred annuity to which the pensioner was entitled.

(c) Each eligible surviving child of a member is entitled to receive,

- if the member died leaving an eligible surviving spouse, an allowance equal to 1/4 of the basic allowance or, if there are more than two children, to an annual allowance equal to 1/2 of the basic allowance divided by the number of children; or
- if the member died without leaving an eligible surviving spouse, and
  - there are fewer than four children, an annual allowance equal to 1/2 of the basic allowance, or
  - there are more than three children, an annual allowance equal to 1.5 times the basic allowance divided by the number of children.
- The proportion of the basic allowance that constitutes the annual allowance shall be revised when the number of children who are entitled changes

21. Minimum Death Benefit

If upon the death of an active member there is no person to whom an allowance provided under the terms of the CFSA may be paid, or if the persons to whom such allowances may be paid die or cease to be entitled thereto and no other amount may be paid to them, then it is paid to the estate of the active member or to the named beneficiary under CFSA Part II, if any exists

(a) for an active member who was not a member of the Regular Force or the Reserve Force on or after 20 December 1975, any amount by which the amount of return of contributions exceeds the aggregate of all amounts paid to those persons and to the active member ;

(b) for an active member who was a member of the Regular Force or the Reserve Force on or after 20 December 1975, an amount equal to the greater of a return of contributions and an amount equal to five times the basic annuity in (including the bridge benefit for the Reserve Force member) to which the active member was or would have been entitled at the time of his or her death exceed the aggregate of all amounts paid to those persons and to the contributor.

22. Division of Pension in Case of Spousal Union Breakdown

In accordance with the *Pension Benefits Division Act* (PBDA), upon the breakdown of a spousal union (including common-law partnership), a lump sum can be transferred upon application supported by a court order or by mutual consent agreement, from the amounts in the Superannuation Account, the CFPF and the RFPF to the credit of an active member or pensioner. As at the transfer date, the maximum transferable amount is half the value of the retirement pension accrued by the active or former member during the period of cohabitation. If the member's benefits are not vested, the maximum transferable amount corresponds to half the member's contributions made during the period subject to division, accumulated with interest at the rate applicable on a refund of contributions. The benefits of the active member or pensioner are then reduced accordingly. As of 31 March 2016, the *Pension Benefits Division Regulations* does not provide the necessary directions to account for the different benefit provisions under the Reserve Force Plan. Hence, the pension accrued for a member of the Reserve Force Plan cannot be divided upon a breakdown of a spousal union at this time.

23. Rollovers

Certain members who cease to participate in the Reserve Force Plan subsequently become participants in the Regular Force Plan. As described in section 10.2 of CFSR, any period of pensionable service which is to a member's credit under the Reserve Force Plan on the day before the day on which that member becomes a contributor to the Regular Force Plan is rolled over to the Regular Force Plan. Whenever a rollover occurs, the actuarial liability associated with the member under the Reserve Force Plan is immediately extinguished and a new actuarial liability is immediately established under the Regular Force Plan.

There are two main scenarios in which a rollover of service from the Reserve Force Plan to the Regular Force Plan would arise. In the first scenario a member of Reserve Force makes a successful application to join the Regular Force. The member's transfer from the Reserve Force to the Regular Force triggers the rollover of service. In the second scenario the member begins to contribute to the Regular Force Plan by virtue of meeting the criteria described in section 8.1(1) (d) of the CFSR. This occurs upon the completion of a minimum of 55 months of Canadian Forces service within a period of 60 consecutive months. The member remains in the Reserve Force but is considered to be a member of the Regular Force for the purposes of Part I of the CFSA and the CFSR.

Following a rollover the actuarial liability is removed from Reserve Force Plan and created under the Regular Force Plan and assets are transferred from the RFPF to the CFPF. For members who are not vested when the rollover occurs, DND calculates the amount to transfer between the pension funds in the same manner as a return of contributions. For members who are vested when the rollover occurs, DND calculates the amount to transfer between the pension plans as the commuted value of the accrued pension at age 60.

Appendix 2 - RCA Benefit Provisions under the Regular Force Plan

This appendix describes the Canadian Forces pension benefits financed through RCA rather than through the CFSA registered provisions using the Superannuation Account and the CFPF. As described below, RCAs are pension plans not subject to the benefit limitations that apply to registered pension plans because they are taxed on a current rather than on a deferred basis.

Effective 1 May 1995, RCA was established pursuant to the SRAA to provide for all pension benefits in excess of those that may be paid under the CFSA but are limited to be in accordance with the *Income Tax Act* restrictions on registered pension plans.

The following benefits are currently provided under a RCA to the extent that they are in excess of the *Income Tax Act* limits.

Benefit	CFSA **Registered Provisions limit**
Survivor allowance for service from 1 January 1992 onward (see Appendix 1D.20)	<u>Pre-retirement death</u> • Maximum spouse allowance is two-thirds of the greater of A and B; and • Maximum aggregate dependants' allowance is the greater of A and B, where A is the amount of member annuity earned to date of death, and B is the hypothetical amount of member annuity earned to age 65 where the average annual salary is limited to 1.5 times the average YMPE <u>Post-retirement death</u> The amount of spouse allowance is limited in any year to a maximum of two-thirds the retirement benefit that would have been payable to the member in that year.
Minimum lump sum death benefit (see Appendix 1D.21)	<u>Pre-retirement death</u> The amount of pre-retirement death benefit where the member has no eligible dependants is limited to the greater of the member contributions with interest and the present value of the member's accrued benefits on the day prior to death. <u>Post-retirement death</u> If the member has no eligible dependants at retirement, then the minimum death benefit is limited to the member contributions with interest.
Excess pensionable earnings (provided since 1 May 1995 for service since then)	The highest consecutive average pensionable earnings is subject to a prescribed yearly maximum that varies by calendar year and the registered plan's benefit formula. The calendar year 2017 Maximum Pensionable Earnings was $163,100 for the Regular Force Plan.

Appendix 3 - Assets, Accounts and Rates of Return

A. Assets and Accounts Available for Benefits

The government has a statutory obligation to fulfill the pension promise enacted by legislation to members of the Canadian Forces. Since 1 April 2000, the government has earmarked invested assets to meet the cost of pension benefits under the CFPF. For the RFPF, the government has earmarked invested assets since its inception on 1 March 2007.

With respect to the unfunded portion of the Regular Force Plan, accounts available for benefits were established to track the government's pension benefit obligations such as the Superannuation Account, for service prior to 1 April 2000, and the RCA Account for benefits in excess of those that can be provided under the Income Tax Act limits for registered pension plans.

1. Canadian Forces Superannuation Account

Regular Force Plan member contributions, government costs and benefits earned up to 31 March 2000 are tracked entirely through the CFSA Superannuation Account, which forms part of the Accounts of Canada.

The Superannuation Account was credited with all Regular Force member contributions and government costs prior to 1 April 2000, as well as with prior service contributions and costs for elections made prior to 1 April 2000 for periods before 1 April 2000 but credited after that date. It is charged with both the benefit payments made in respect of service earned under the Superannuation Account and the allocated portion of the plan administrative expenses.

The Superannuation Account is credited with interest as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity. No formal debt instrument is issued to the Superannuation Account by the government in recognition of the amounts therein. Interest is credited every three months on the basis of the average yield for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces and RCMP pension plans.

Table 23 Reconciliation of Balances in Superannuation Account
($ millions)

Plan Year	2014	2015	2016	2014-2016
Public Accounts opening balance	**46,357**	**46,297**	**46,119**	**46,357**
INCOME				
Net Interest earnings	2,427	2,308	2,140	6,875
Employer contributions	3	3	3	9
Member contributions	3	3	3	9
Transfers received	1	-	-	1
Actuarial liability adjustments	-	-	-	-
Subtotal	**2,434**	**2,314**	**2,146**	**6,894**
EXPENDITURES				
Annuities	2,418	2,425	2,505	7,348
Pension divisions	41	33	23	97
Return of contributions	-	-	-	-
Pension transfer value payments	2	2	2	6
Transfers to other pension plans	1	-	-	1
Minimum benefits	-	1	-	1
Administrative expenses	*32*	*31*	*38*	*101*
Subtotal	**2,494**	**2,492**	**2,568**	**7,554**
Public Accounts closing balance	**46,297**	**46,119**	**45,697**	**45,697**

Since the last valuation, the Superannuation Account balance has decreased by $660 million (a 1.4% decrease) to reach $45,697 million as at 31 March 2016.

2. Canadian Forces Pension Fund (CFPF)

Since 1 April 2000, Regular Force contributions (except for prior service elections made prior to 1 April 2000) have been credited to the CFPF. The CFPF is invested in the financial markets with a view to achieving maximum rates of return without undue risk.

The CFPF has been credited with all Regular Force contributions since 1 April 2000, as well as with prior service contributions in respect of elections made since that date. The Pension Fund is also credited with the net investment returns generated by the capital assets managed by the Public Sector Pension Investment Board (PSPIB). It is debited with both the benefit payments made in respect of service earned and prior service elections made since 1 April 2000 and the allocated portion of the plan administrative expenses.

Table 24 Reconciliation of Balances in Canadian Forces Pension Fund
($ millions)

Plan Year	2014	2015	2016	2014-2016
Opening balance	**15,148**	**18,615**	**22,174**	**15,148**
INCOME				
Net Investment Earnings	2,470	2,699	159	5,328
Employer contributions	840	796	757	2,393
Member contributions	397	424	450	1,271
Transfers received	23	48	84	155
Actuarial liability adjustments	249	170	170	589
Subtotal	**3,979**	**4,137**	**1,620**	**9,736**
EXPENDITURES				
Annuities	318	376	442	1,136
Pension divisions	33	29	24	86
Return of contributions	1	1	1	3
Pension transfer value payments	141	152	133	426
Transfers to other pension plans	1	1	1	3
Minimum benefits	1	1	1	3
Administrative expenses	17	18	24	59
Subtotal	**512**	**578**	**626**	**1,716**
Closing balance	**18,615**	**22,174**	**23,168**	**23,168**

Since the last valuation, the CFPF balance has increased by 8,020 million (a 52.9% increase) to reach 23,168 million as at 31 March 2016.

3. Canadian Forces RCA Account

The amount in the RCA account available for benefits is composed of the recorded balance in the RCA Account, which forms part of the Public Accounts of Canada, and a tax credit (CRA refundable tax). Each calendar year, a debit is made from the RCA Account such that in total roughly half of the recorded balances in the Account are held as a tax credit (CRA refundable tax).

No formal debt instrument is issued to the RCA Account by the government in recognition of the amounts therein. Interest is credited every three months on the basis of the average yield for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces and RCMP pension plans.

Table 25 Reconciliation of Balances in RCA Account
($ millions)

Plan Year	2014	2015	2016	2014-2016
Public Accounts opening balance	**330.0**	**351.2**	**373.5**	**330.0**
INCOME				
Net Interest earnings	18.1	18.3	18.0	54.4
Employer contributions	28.5	28.8	26.5	83.8
Member contributions	2.4	2.5	2.4	7.3
Subtotal	**49.0**	**49.6**	**46.9**	**145.5**
EXPENDITURES				
Annuities	4.7	5.3	6.2	16.2
Pension divisions	0.2	0.0	0.2	0.4
Pension transfer value payments	0.9	1.5	1.3	3.7
Minimum benefits	0.0	0.1	0.0	0.1
Amount transfer to CRA	22.0	20.4	20.7	63.1
Subtotal	**27.8**	**27.3**	**28.4**	**83.5**
Public Accounts closing balance	**351.2**	**373.5**	**392.0**	**392.0**
Refundable tax	341.1	361.5	382.2	382.2

Since the last valuation, the RCA Account balance has grown by $62.0 million (a 18.8% increase) to reach 392.0 million as at 31 March 2016, and the refundable tax, totalling 319.1 $ million as at 31 March 2013, has increased by $63.1 million (a 19.8% increase) to reach 382.2 $ million as at 31 March 2016.

4. Reserve Force Pension Fund (RFPF)

Since 1 March 2007, Reserve Force member contributions (for current and prior service) have been credited to the RFPF. The Fund is invested in the financial markets with a view to achieving maximum rates of return without undue risk.

The RFPF has been credited with all contributions as well as with the net investment returns generated by the capital assets managed by the PSPIB. It is debited with benefit payments and plan administrative expenses.

Table 26 Reconciliation of Balances in Reserve Force Pension Fund
($ millions)

Plan Year	2014	2015	2016	2014-2016
Opening Balance	**414.9**	**466.9**	**549.8**	**414.9**
INCOME				
Net Investment Earnings	63.7	67.9	3.8	135.5
Employer contributions	12.9	65.2	41.7	119.8
Member contributions	27.3	28.3	27.8	83.3
Actuarial liability adjustments	-	1.9	1.9	3.8
Subtotal	**103.9**	**163.3**	**75.2**	**342.4**
EXPENDITURES				
Annuities	4.5	5.2	6.1	15.8
Return of contributions	0.1	0.1	-	0.2
Pension transfer value payments	11.8	12.9	13.5	38.2
Transfers to other pension plans	22.5	48.4	83.9	154.8
Minimum benefits	-	0.1	0.1	0.2
Administrative expenses	13.0	13.7	16.5	43.2
Subtotal	**51.9**	**80.4**	**120.1**	**252.4**
Closing Balance	**466.9**	**549.8**	**504.9**	**504.9**

Since the last valuation, the Fund balance has increased by $90 million (a 21.7% increase) to reach $505 million as at 31 March 2016.

B. Interest Earnings/ Rates of Return

The interest earnings in respect of the Superannuation Account were calculated using the entries in Table 23 which are based on book values since the notional bonds are deemed to be held to maturity. The interest earnings were computed using the dollar-weighted approach and assume that cash flows occur in the middle of the plan year (except for actuarial liability adjustments, which occur on 31 March). The CFPF and the RFPF rates of return are those from the PSPIB 2017 Annual Report.

Plan Year	Superannuation Account	Canadian Forces Pension Fund	Reserve Force Pension Fund
2014	5.4%	15.9%	15.9%
2015	5.1%	14.2%	14.2%
2016	4.8%	0.7%	0.7%

C. Sources of Asset and Accounts Available for Benefits Data

The Superannuation Account, the RCA Account, the CFPF and the RFPF entries shown in Section A above were taken from the Public Accounts of Canada and the financial statements of the Public Sector Pension Investment Board.

Appendix 4 - Membership Data

A. Sources of Membership Data

The valuation input data required in respect of members, former members (pensioners) and survivors is provided by the Department of National Defence (DND). An additional set of valuation data on Regular Force and Reserve Force pensioners is extracted from master computer files maintained by Public Services and Procurement Canada (PSPC) which provides OSFI with the ability to verify the information provided by DND.

The main valuation data file supplied by DND contains the historical status information on all members up to 31 March 2016. The valuation data file on pensioners provided by PSPC covers the period of 1 April 2013 to 31 March 2016.

B. Validation of Membership Data

1. Status-Related Tests

The following status tests were performed on the main valuation data file:

- a consistency check that a status could be established for each record of a member. The status of a member may change over time but at a given point in time it can be only one of the following: contributor, outstanding termination, pensioner, deceased leaving an eligible survivor;
- a consistency check of the changes in status of a member during the intervaluation period; e.g.
  - if a contributor record indicated that the member retired, then a pensioner record should exist; and
  - if a contributor or pensioner record indicated that the member died leaving an eligible survivor, then a corresponding survivor record should exist;
- a reconciliation between the status of members as at 31 March 2016 from the current valuation data and the status of the members as at 31 March 2013 from the previous valuation data.

2. Benefit-Related Tests

Consistency tests were performed to ensure that all information required to value the member benefits based on individual statuses as at 31 March 2016 was included, by verifying that

a) For Regular Force Active Members

- the pensionable and qualifying service was reasonable in relation to the attained age;
- the salary was included and, if not, a salary was calculated by updating a salary rate from a previous year with an average earnings increase or, failing that, the average salary rate for that rank, sex, age and service was used.

b) For Reserve force Active Members

- the pensionable and qualifying service was reasonable in relation to the attained age;

- the earnings were included and, if not, imputing earnings by updating earnings from a previous year with an average earnings increase or failing that, using the average earnings for that sex.

c) For Pensioners and Survivors in Receipt of an Annuity

- the amount of the annuity, including indexation, was included; and
- the benefits were indexed up to 1 January 2016.

d) For Adjustments to Status and Benefit Data

- appropriate adjustments were made to the basic data, after consulting with the data providers, based on the omissions and discrepancies identified by the tests described herein and other additional tests.

C. Membership Data

The following tables show the detailed reconciliation of membership data since the last valuation. Detailed membership data are shown in Appendix 13.

Table 27 Reconciliation of Regular Force Contributors

	Male			Female			
	Officer	Other Rank	Total	Officer	Other Rank	Total	Total
As at 31 March 2013	**14,245**	**46,905**	**61,150**	**3,014**	**7,783**	**10,797**	**71,947**
Data corrections	53	(15)	38	12	(14)	(2)	36
New Contributors							
New entrants	1,651	7,525	9,176	337	1,248	1,585	10,761
Rehired /cash-out	92	800	892	20	111	131	1,023
Rehired/pensioners Part I	203	556	759	44	95	139	898
Rehired/pensioners Part I.1	4	38	42	1	5	6	48
Subtotal	1,950	8,919	10,869	402	1,459	1,861	12,730
Changes of							
Activity Status	35	78	113	10	15	25	138
Officers/Other Ranks	287	(287)	-	84	(84)	-	-
Service Type	187	1,502	1,689	73	336	409	2,098
Subtotal	509	1,293	1,802	167	267	434	2,236
Lump sum terminations							
Return of contribution	(254)	(1,230)	(1,484)	(50)	(199)	(249)	(1,733)
Transfer value	(384)	(3,186)	(3,570)	(91)	(405)	(496)	(4,066)
Subtotal	(638)	(4,416)	(5,054)	(141)	(604)	(745)	(5,799)
Pensionable terminations							
Disability (3A)	-	(5)	(5)	-	(2)	(2)	(7)
Disability (3B)	(463)	(3,017)	(3,480)	(120)	(727)	(847)	(4,327)
Death	(21)	(93)	(114)	(3)	(13)	(16)	(130)
Retirement							
Deferred	(325)	(1,550)	(1,875)	(115)	(326)	(441)	(2,316)
Immediate	(1,290)	(2,037)	(3,327)	(135)	(141)	(276)	(3,603)
Subtotal	(2,099)	(6,702)	(8,801)	(373)	(1,209)	(1,582)	(10,383)
As at 31 March 2016	**14,020**	**45,984**	**60,004**	**3,081**	**7,682**	**10,763**	**70,767**

Table 28 Reconciliation of Reserve Force Contributors

	Male			Female			
	Officer	Other Rank	Total	Officer	Other Rank	Total	Total
As at 31 March 2013	**4,620**	**11,732**	**16,352**	**2,201**	**2,274**	**4,475**	**20,827**
Data corrections	28	(629)	(601)	(36)	(124)	(160)	(761)
New Participants	952	3,793	4,745	541	659	1,200	5,945
Rehired/pensioners Part I.1	183	289	472	117	53	170	642
Lumpsum terminations							
Return of contribution	(123)	(572)	(695)	(43)	(102)	(145)	(840)
Transfer value	(138)	(619)	(757)	(82)	(132)	(214)	(971)
Transfer to Res. Part I	(104)	(332)	(436)	(58)	(160)	(218)	(654)
Transfer to Reg. Force	(177)	(1,076)	(1,253)	(49)	(142)	(191)	(1,444)
Subtotal	(542)	(2,599)	(3,141)	(232)	(536)	(768)	(3,909)
Pensionable terminations							
Disability	(3)	(5)	(8)	-	-	-	(8)
Death	(19)	(15)	(34)	(4)	(1)	(5)	(39)
Retirement	(867)	(2,010)	(2,877)	(360)	(354)	(714)	(3,591)
Subtotal	(889)	(2,030)	(2,919)	(364)	(355)	(719)	(3,638)
As at 31 March 2016	**4,354**	**10,554**	**14,908**	**2,228**	**1,970**	**4,198**	**19,106**

Table 29 Reconciliation of Regular Force Pensioners

	Male			Female			
	Officer	Other Rank	Total	Officer	Other Rank	Total	Total
Retirement Pensioners							
As at 31 March 2013	16,846	52,911	69,757	1,085	3,281	4,366	74,123
Data corrections	(236)	(1,260)	(1,496)	(67)	(59)	(126)	(1,622)
New pensioners	1,614	3,588	5,202	254	464	718	5,920
Death	(1,247)	(4,189)	(5,436)	(34)	(41)	(75)	(5,511)
Rehired	(185)	(570)	(755)	(43)	(96)	(139)	(894)
As at 31 March 2016	16,792	50,480	67,272	1,195	3,549	4,744	72,016
Disability Pensioners (3A)							
As at 31 March 2013	88	877	965	15	70	85	1,050
Data corrections	(10)	(276)	(286)	-	(7)	(7)	(293)
New pensioners	-	5	5	-	2	2	7
Death	(10)	(104)	(114)	-	(2)	(2)	(116)
As at 31 March 2016	68	502	570	15	63	78	648
Disability Pensioners (3B)							
As at 31 March 2013	1,163	12,080	13,243	308	2,027	2,335	15,578
Data corrections	23	247	270	(16)	(11)	(27)	243
New pensioners	472	3,008	3,480	125	722	847	4,327
Death	(33)	(516)	(549)	(2)	(20)	(22)	(571)
Rehired	-	(4)	(4)	-	-	-	(4)
As at 31 March 2016	1,625	14,815	16,440	415	2,718	3,133	19,573

Table 30 Reconciliation of Reserve Force Pensioners

	Male			Female			
	Officer	Other Rank	Total	Officer	Other Rank	Total	Total
Retirement Pensioners							
As at 31 March 2013	988	2,158	3,146	415	521	936	4,082
Data corrections	14	(185)	(171)	(28)	(71)	(99)	(270)
New pensioners	867	2,010	2,877	360	354	714	3,591
Death	(10)	(9)	(19)	(2)	(1)	(3)	(22)
Rehired	(187)	(325)	(512)	(119)	(57)	(176)	(688)
As at 31 March 2016	1,672	3,649	5,321	626	746	1,372	6,693
Disability Pensioners							
As at 31 March 2013	13	15	28	1	7	8	36
Data corrections	2	(10)	(8)	-	(2)	(2)	(10)
New pensioners	3	5	8	-	-	-	8
Death	(1)	-	(1)	(1)	-	(1)	(2)
Rehired	-	(2)	(2)	-	-	-	(2)
As at 31 March 2016	17	8	25	-	5	5	30

Table 31 Reconciliation of Spouse Survivors

	Regular Force Plan			Reserve Force Plan		
	Widows	Widowers	Total	Widows	Widowers	Total
As at 31 March 2013	22,993	157	23,150	25	3	28
Data corrections	(194)	3	(191)	1	-	1
New from contributors	91	9	100	11	4	15
New from Pensioners	3,370	30	3,400	7	3	10
Spouse deaths	(4,004)	(12)	(4,016)	-	-	-
As at 31 March 2016	22,256	187	22,443	44	10	54

Table 32 Reconciliation of Survivors - Children/Students

	Regular Force Plan			Reserve Force Plan		
	Children	Students	Total	Children	Students	Total
As at 31 March 2013	461	289	750	22	3	25
Data corrections	14	84	98	-	-	-
New from contributors	86	16	102	9	1	10
New from Pensioners	75	32	107	-	-	-
Termination of Benefits	(60)	(315)	(375)	(4)	(3)	(7)
Eligible as Student	(127)	127	-	(3)	3	-
As at 31 March 2016	449	233	682	24	4	28

Appendix 5 - CFSA Valuation Methodology

A. Plan Assets and Accounts

1. Canadian Forces Superannuation Account

The balance of the Superannuation Account forms part of the Public Accounts of Canada. The underlying notional bond portfolio described in Appendix 3 is shown at book value.

The only other Superannuation Account–related amount available for benefits consists of the discounted value of future Regular Force member contributions and government credits in respect of prior service elections. The discounted value of future member contributions was calculated using the projected Superannuation Account yields. The government is assumed to match these future member contributions when paid at a single rate, but no contributions are credited by the government if the member is paying the double rate.

2. Canadian Forces and Reserve Force Pension Funds

For valuation purposes, an adjusted market value method is used to determine the actuarial value of assets in respect of the CFPF and RFPF. The method is unchanged from the previous valuations.

Under the adjusted market value method, the difference between the observed investment returns during a given plan year and the expected investment returns for that year based on the previous report assumptions, is recognized over five years at the rate of 20% per year. The actuarial value of assets is then determined by applying a 10% corridor, such that the actuarial value of assets is within 10% of the market value of assets. As a result, the actuarial value of assets is a five-year smoothed market value where the investment gains or losses are recognized at the rate of 20% per year subject to a 10% corridor to the market value of assets. The value produced by this method is related to the market value of the assets but is more stable than the market value.

The other Pension Fund–related assets consist of:

- the discounted value of future member and government contributions in respect of prior service elections[1]. The discounted value of future member and government contributions was calculated using the assumed rates of return on the Pension Fund;
- the amount payable/receivable from Reserve Force Rollover members[2]; and
- the remaining contributions for processed and unprocessed Reserve Force prior service. This is the estimated amount of contributions for pre-2007 Reserve Force service that Regular Force members and Reserve Force members have committed to purchase.

The actuarial value of the assets determined as at 31 March 2016 under the adjusted market value method is $22,478 million and was determined as follows.

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1 As defined in Appendix 1B.2.b) Elected Prior Service
2 As defined in Appendix 1D.23.

Table 33 Actuarial Value of Canadian Forces Pension Fund Assets
($ millions)

Plan Year	2012	2013	2014	2015	2016	
Actual net investment return (A)	334	1,379	2,470	2,699	159	
Expected investment return (B)	735	821	673	933	1,175	
Investment gains (losses) (A-B)	(401)	558	1,797	1,766	(1,016)	
Unrecognized percentage	0%	20%	40%	60%	80%	
Unrecognized investment gains (losses)	0	112	719	1,060	(813)	
Market value as at 31 March 2016						23,168
Less						
Total unrecognized investment gains (losses)						1,078
Actuarial value as at 31 March 2016 (before application of corridor)						22,090
Impact of the application of corridor[1]						0
Actuarial value as at 31 March 2016 (after application of corridor)						22,090
Plus						
Present value of prior service contributions						267
Amount receivable from Part I.1 - Rollover members						57
Remaining contributions for pre-2007 Reserve Force service						64
Actuarial value as at 31 March 2016						22,478

The actuarial value of the assets determined as at 31 March 2016 under the adjusted market value method is 513 million and was determined as follows.

Table 34 Actuarial Value of Reserve Force Pension Fund Assets
($ millions)

Plan Year	2012	2013	2014	2015	2016	
Actual net investment return (A)	10	38	64	68	4	
Expected investment return (B)	21	23	18	23	27	
Investment gains (losses) (A-B)	(11)	15	46	45	(23)	
Unrecognized percentage	0%	20%	40%	60%	80%	
Unrecognized investment gains (losses)	-	3	18	27	(18)	
Market value as at 31 March 2016						505
Less						
Total unrecognized investment gains (losses)						30
Actuarial value as at 31 March 2016 (before application of corridor)						475
Impact of the application of corridor[1]						-
Actuarial value as at 31 March 2016 (after application of corridor)						475
Less						
Amount payable to Regular Force Plan (Rollover members)						57
Plus						
Present value of prior service contributions						25
Remaining contributions for processed prior service						42
Remaining contributions for unprocessed prior service						28
Actuarial value as at 31 March 2016						**513**

[1] The corridor is 90% - 110% of the market value, that is (20,851 - 25,485) for the CFPF and (455 - 556) for the RFPF.

B. Actuarial Cost Method

As benefits earned in respect of current service will not be payable for many years, the purpose of an actuarial cost method is to assign costs over the working lifetime of the members.

As in the previous valuation, the projected accrued benefit actuarial cost method (also known as the projected unit credit method) was used to determine the current service cost and actuarial liability. Consistent with this cost method, pensionable earnings are projected up to retirement using the assumed annual increases in average pensionable earnings (including seniority and promotional increases). The yearly maximum salary cap and other benefit limits under the *Income Tax Act* described in Appendix 2 were taken into account to determine the benefits payable under CFPF and RFPF and those payable under the RCA.

1. Current Service Cost

Under the projected accrued benefit actuarial cost method, the current service cost, also called the normal cost, computed in respect of a given year, is the sum of the value, discounted in accordance with the actuarial assumptions for the CFPF and RFPF, of all future payable benefits considered to accrue in respect of that year's service. The CFPF and RFPF administrative expenses[1] are deemed to be included in the total current service cost.

Under this method, the current service cost for an individual member will increase each year as the member approaches retirement. However, all other things being equal, the current service cost for the total population, expressed as a percentage of total pensionable payroll, can be expected to remain stable as long as the average age and service of the total population remains constant. For a given year, the government current service cost is the total current service cost reduced by the members' contributions during the year.

The Reserve Force Plan has been in operation since 1 March 2007. As at 31 March 2016 the average age and pensionable service are respectively 33.4 and 6.9 years. Being a young pension plan, the Reserve Force Plan current service cost is expected to increase over the years. In addition, the pension plan's own experience is limited and determining when the current service cost for the total population will become stable is still unknown at this time.

2. Actuarial Liability

The actuarial liability with respect to contributor corresponds to the value, discounted in accordance with the actuarial assumptions, of all future payable benefits accrued as at the valuation date in respect of all previous service to the credit of members. For pensioners and survivors, the actuarial liability corresponds to the value, discounted in accordance with the actuarial assumptions, of future payable benefits.

[1] As defined in Appendix 7-B.-3 Administrative Expenses

3. Actuarial Excess (Deficit)

It is unlikely that the actual experience will conform exactly to the assumptions that underlie the actuarial estimates. Thus, a balancing item must be calculated under this cost method to estimate the necessary adjustments. Adjustments may also be necessary if the terms of the pension benefits enacted by legislation are modified or if assumptions need to be updated.

The actuarial excess or deficit is the difference between the actuarial value of assets and the actuarial liability. The disposition of any actuarial surplus or deficit is defined in the CFSA.

4. Government Contributions

The recommended government contribution corresponds to the sum of:

- the government current service cost;
- the government contributions for prior service; and
- as applicable, special payments in respect of a deficit or, as the case may be, actuarial surplus debits.

C. Projected Yields and Rates of Return

The projected yields (shown in Appendix 6) used to calculate future interest credits to the Superannuation Account are the projected annual yields on the combined book value of the Superannuation Accounts of the Public Service, Canadian Forces and RCMP pension plans.

The projected Superannuation Account yields were determined by an iterative process involving the following:

- the combined notional bond portfolio of the three Superannuation Accounts as at the valuation date;
- the assumed future new money interest rates (also shown in Appendix 6);
- the expected future benefits payable in respect of all pension entitlements accrued up to 31 March 2000;
- the expected future contributions for prior service elections made up to 31 March 2000; and
- the expected future administrative expenses,

taking into account that the quarterly interest credited to the Superannuation Account is calculated as if the principal at the beginning of a quarter remains unchanged during the quarter.

The projected yields (shown in Appendix 6) were then used for the computation of the present value of benefits to determine the liability for service prior to 1 April 2000.

The projected rates of return (shown in Appendix 6) assumed for computing the present value of the benefits accrued or accruing under the CFPF and the RFPF were developed on the basis that the Funds hold a diversified mix of assets.

D. Membership Data

For valuation purposes, individual data on each member were used.

The member data shown in Appendices 4 and 13 was provided as at 31 March 2016. This valuation is based on the member data as at the valuation date.

The information in respect of the contributions for elected prior service was provided as at 31 March 2016. Future member contributions in respect of elected prior service took into account only the payment streams that were still in effect at 31 March 2016. Only payments due after 31 March 2016 were included.

Information regarding unprocessed prior service is taken from a revised supplementary spreadsheet which was provided by DND in August 2016. Any elected prior service which is reported both in the supplemental spreadsheet and also in the data provided as at 31 March 2016 is valued on the basis of the data provided as at 31 March 2016 . The liability for unprocessed prior service is due to elections which were signed by 1 March 2011 deadline and remained unprocessed as at 31 March 2016. As at 31 March 2016 there were a total of 368 Regular Force Plan members and 530 Reserve Force Plan members with such elections.

Supplemental information on amounts transferred to the Regular Force Plan during the year ended 31 March 2017 was provided by DND and PSPC in April 2017. This report incorporates that information into the determination of the amount payable to the Regular Force Plan as at 31 March 2016.

Appendix 6 - CFSA Economic Assumptions

The payment of accrued pension benefits is the responsibility of the government, therefore the likelihood of the plan being wound-up and its obligation not being fulfilled is practically nonexistent, consequently all of the assumptions used in this report are best-estimate assumptions, i.e. they reflect our best judgement of the future long-term experience of the plan and do not include margins.

A. Inflation-Related Assumptions

1. Level of Inflation

Price increases, as measured by changes in the Consumer Price Index (CPI), tend to fluctuate from year to year. In 2016, the Bank of Canada and the Government renewed their commitment to keep inflation between 1% and 3% until the end of 2021. However, with the level of inflation currently lower than the 2% target, it is assumed that the level of inflation will increase from 1.6% in 2017 to its ultimate rate of 2.0% in 2018. The ultimate rate of 2.0% is unchanged from the assumed rate in the previous valuation.

2. Increase in Pension Indexing Factor

The year’s pension indexing factor is required in the valuation process by virtue of its role in maintaining the purchasing power of pensions. It was derived by applying the indexation formula described in Appendix 1, which relates to the assumed Consumer Price Index increases over successive 12-month periods ending on 30 September.

B. Employment Earnings Increases

1. Increase in the Year’s Maximum Pensionable Earnings (YMPE)

The YMPE is required in the Regular Force Plan valuation process because the plan is coordinated with the Canada Pension Plan. The YMPE is required in the Reserve Force Plan valuation process because the plan provides a bridge benefit based on career earnings up to the YMPE. The assumed increase in the YMPE for a given calendar year is derived, in accordance with the *Canada Pension Plan*, to correspond to the increase in the Average Weekly Earnings (AWE), as calculated by Statistics Canada, over successive 12-month periods ending on 30 June. The AWE, and thus the YMPE, is deemed to include a component for seniority and promotional increases. The YMPE is equal to $55,300 for calendar year 2017. Future increases in the YMPE correspond to the assumed real[1] increase in the AWE plus assumed increases in the CPI.

The real-wage differential is developed taking into account historical trends, a possible labour shortage and an assumed moderate economic growth for Canada. Thus, a real-wage differential of 0.6% is assumed for 2018, and is assumed to gradually increase to the ultimate assumption of 1.1% by 2024 (1.2% by 2021 in the previous valuation). The ultimate real-wage differential assumption combined with the ultimate price increase assumption results in an assumed annual increase in nominal wages of 3.1% in 2024 and

[1] Note that all of the real rates presented in this report are actually differentials, i.e. the difference between the effective annual rate and the rate of increase in prices. This differs from the technical definition of a real rate of return, which, for example in the case of the ultimate Fund assumption would be 3.9% (derived from 1.060/1.020) rather than 4.0%.

thereafter. Thus, the ultimate rate of increase for the YMPE is 3.1%, resulting from a 1.1% increase in the real AWE and a 2.0% increase in the CPI.

2. Increase in Pensionable Earnings

Pensionable earnings are applicable to CFSA pension plan members only, whereas the YMPE applies to the general working population in Canada. In addition, increases in pensionable earnings are exclusive of seniority and promotional increases, which are considered under a separate demographic assumption. Thus, the annual increase in pensionable earnings is assumed to be 0.3% lower than the corresponding increase in the YMPE (0.2% lower in the previous valuation), except for years 2017 and 2018 where the annual increase in pensionable earnings is assumed to be 1.7% greater than, and 1.3% lower than the corresponding increase in the YMPE. The ultimate increase in pensionable earnings is 2.8% (3.0% in previous valuation).

3. Increase in Tax Related Maximum Pensionable Earnings (MPE)

The maximum annual pension accrual under a registered defined benefit plan of $2,890.00 for 2016 will increase to $2,914.44 for 2017, in accordance with Income Tax Regulations. Thereafter, the maximum annual pension accrual increases in accordance with the increase in the YMPE, which is the same as the assumed increase in the AWE.

Regular Force Plan
Since the plan is coordinated with the Canada Pension Plan, the tax-related maximum pensionable earnings were derived from both the maximum annual pension accrual under a registered defined benefit plan as previously defined and the YMPE.

Beginning with calendar year 2012, the coordination factor is 0.625%. The MPE is $163,100 for calendar year 2017.

Reserve Force Plan
Since the plan is not coordinated with the Canada Pension Plan, the tax-related maximum pensionable earnings were derived from the maximum annual pension accrual under a registered defined benefit plan.

The MPE is $194,300 for calendar year 2017. As at 31 March 2016, no member had earnings in excess of $194,300.

C. Investment-Related Assumptions

1. New Money Rate

The new money rate is the nominal yield on 10-year-plus Government of Canada bonds and is set for each year in the projection period. The real yield on 10-year-plus federal bonds is equal to the new money rate less the assumed rate of inflation.

Recognizing recent experience, the annual real yield on 10-year-plus federal bonds is assumed to be 0.3% in plan year 2017, and is assumed to increase gradually to its ultimate level of 2.7% first attained in plan year 2028. This increase is consistent with the average of private sector forecasts. The real yield on 10-year-plus bonds is based on historical yields. The ultimate real yield was 2.8% in the previous valuation. The real new money rates over the first eleven years of the projection are on average 0.9% lower than assumed for the corresponding years in the previous valuation.

2. Projected Yields on Superannuation Account

These yields are required for the computation of present values of benefits to determine the liability for service prior to 1 April 2000. The methodology used to determine the projected yields on the Account is described in Section C of Appendix 5. The methodology is unchanged from previous valuations. However, since the real projected yields are determined based on the real new money rates, they are projected to be lower than assumed in the previous valuation and to be lower by 0.1 % ultimately from 2044.

3. Rate of Return on the CFPF & RFPF

The expected annual nominal rates of return on the Funds are required for the computation of present values of benefits to determine the liability and the current service cost. The following sections describe how the rates of return on the Fund are determined.

a) Investment Strategy

Since 1 April 2000, invested assets resulting from transferred amount equal to the government and member contributions, net of benefit payments and administrative expenses, are invested in capital markets through the Public Sector Pension Investment Board (PSPIB). PSPIB invests funds to maximize returns without undue risk of loss according to the investment policy set and approved by its Board of Directors that take into account the needs of contributor and beneficiaries, as well as financial market constraints. For the purpose of this report, the investments have been grouped into three broad categories: equities, fixed income securities and real assets. Equities consist of Canadian, foreign developed market and emerging market equities. Fixed income securities consist of bonds which are usually a mix of federal, provincial, corporate and real return bonds. Real assets include such categories as real estate and infrastructure.

As at 31 March 2016, PSPIB assets consisted of 52% equity, 21% fixed income securities (including private debt and world inflation-linked bonds) and 27% real assets (including asset classes such as real estate, infrastructure and renewable resources). PSPIB has developed a long-term target Policy Portfolio (approved by its Board of Directors on 10 November 2016 and subject to an annual review), which consists of 47% equity, 23% fixed income securities and 30% real assets. The Policy Portfolio asset mix weights represent long-term targets. Therefore, the initial asset mix is derived using the actual investments reported by PSPIB as at 31 March 2016.

As PSPIB Policy Portfolio reflects long-term expectations, it is assumed that the asset mix will converge slowly toward the Policy Portfolio. The ultimate asset mix is reached in plan year 2022 and consists of 47% equity, 23% fixed income securities (including 2% cash) and 30% real assets. Net cash flows (contributions less expenditures, disregarding special payments) are expected to become negative during plan year 2027 for CFPF and 2045 for RFPF. When this happen, a portion of investment income will therefore be required to pay benefits. Changes to the assumed asset mix may be required in the future to reduce funding risks and to take into account the maturity of the plan.

Table 35 shows the assumed asset mix for each plan year throughout the projection period.

Table 35 Asset Mix
(in percentage)

Plan Year	Fixed Income Securities	Cash	Canadian Equity	U.S. and Foreign Equity	Emerging Market Equity	Real Assets
2017	18	2	14	31	8	27
2018	18	2	14	31	8	27
2019	19	2	13	31	7	28
2020	20	2	12	30	7	29
2021	20	2	11	30	7	30
2022+	21	2	10	30	7	30

b) Real Rates of Return by Asset Type

Real rates of return are required in order to discount benefits payable in the future for the determination of the actuarial liability and current service cost. They are assumed for each year of the projection period and for each of the main asset categories in which CFPF and RFPF assets are invested. All real rates of return described in this section are shown before reduction for assumed investment expenses. Subsection c) describes how the returns are adjusted for investment expenses.

In addition, the assumed real rate of return for each asset class includes an allowance for rebalancing and diversification to take into account the beneficial effect of reduced volatility that comes from diversification within a portfolio. If the expected rates of return for each asset class were not increased to reflect their respective share of this allowance, then the expected long-term portfolio rate of return calculated as the weighted average rate of return of each asset class would be underestimated.

The real rates of return were developed by looking at historical returns (expressed in Canadian dollars) and adjusting the returns upward or downward to reflect expectations that differ from the past. Future currency variations will impact the real rates of return over the projection period, creating gains and (losses). However, as the projection period is long, these gains and (losses) are expected to offset each other over time. Hence, it is assumed that currency variations will not have an impact on the long-term real rates of return.

With the exception of fixed income securities and cash, real rates of return for all asset classes are generally assumed to be constant for the entire projection period. The current context of extremely low yields and the general expectations that yield will increase over the coming years are reflected in the expected fixed income securities' short-term real rates of return. A constant real rate of return is assumed for more volatile asset classes, reflecting the difficulty to predict yearly market returns.

Fixed Income Securities

As at 31 March 2016, PSPIB had 21% of its portfolio invested in what this report classifies as fixed income securities, including Canadian fixed income, world government bonds, world inflation-linked bonds, corporate bonds, private debt and cash. It is assumed that the proportion invested in fixed income securities will increase to 23% of Pension Fund assets in plan year 2022 and remain at that level for the projection period.

It is assumed that, excluding cash, fixed income securities' ultimate mix in plan year 2021 will consist of 12% federal bonds, 12% provincial bonds, 33% corporate bonds and private debt and 43% inflation-linked bonds.

The assumed real yield on 10-year-plus federal bonds is expected to increase from 0.3% at the beginning of plan year 2017 to an ultimate of 2.7% at the end of plan year 2028. This increase in real yield is consistent with the average private sector forecasts. The initial spreads over the 10-year-plus federal bond real yield are assumed to be 110 basis points for long-term provincial bonds and 240 basis points for corporate bonds. The corporate spread is higher than in the last report and reflects the current economic environment. The ultimate spreads for provincial and corporate bonds are assumed to be 50 basis points and 160 basis points, respectively, and are reached at the end of plan year 2028. Corporate bond spreads are net of the expected default rate. Real return bonds, on the other hand, usually have a lower real yield than long-term federal bonds, since the real return is guaranteed and will not vary with inflation. Thus, the spread on inflation-linked bonds is assumed to be -70 basis points initially and will reach its ultimate value of -40 basis points at the end of plan year 2028.

Since the current PSPIB policy portfolio and its long-term target Policy Portfolio is composed of universe bonds, it is assumed that fixed income securities are composed of universe bonds for the entire projection period. Due to their shorter duration, the yield on universe bonds is lower than the yield on long-term bonds. The spread between the 10-year-plus federal bonds and the universe of federal bonds is assumed to decrease from 85 basis points at the beginning of plan year 2017 to 55 basis points at the beginning of plan year 2028. Spreads between universe federal bonds and universe provincial, or universe corporate bonds are assumed to be similar to spreads between long-term bonds.

The expected real rates of return for individual bonds take into account the coupons and market value fluctuations due to the expected movement of their respective yield rates. As the economy continues to strengthen (following the 2008-2009 economic downturn), the 10-year-plus federal bond yield is assumed to increase between plan years 2017 and 2027 and to stabilize at the end of plan year 2027. Therefore, bond returns are quite low for the first eleven years of the projection. The assumed ultimate real rate of return for 10-year-plus federal bonds is 2.7% starting in plan year 2028. An ultimate fixed income real rate of return of 2.8% is assumed for 2028 and thereafter.

Equity

Currently, the assets of the pension fund are mostly invested in equity, specifically in developed world equity and emerging markets equity. In the derivation of the real rates of return for these equity investments, consideration was given to the long-term equity risk premiums for these equity classes. The rates of return also include dividends from the equities and market value fluctuations. No distinction is made between realized and unrealized capital gains.

Consistent with the assumption that risk taking must be rewarded, equity returns are developed by adding an equity risk premium to the long-term federal bond real rate of return. The historical equity risk premium over long-term government bond returns for 21 countries, representing about 90% of global stock market value, for the 116-year period starting in 1900 was 3.2% (3.3% for Canada)[1]. Historical equity risk premiums were higher than expected due to several non-repeatable factors (mainly diversification and globalization). As a result, the long-term expected equity risk premium is assumed to be lower than what was realized in the past 116 years. However, the equity risk premium is assumed to be higher in the first eleven years of the projection, reflecting assumed low bond returns over the same period, before reaching its ultimate rate of 2.1% for Canadian and foreign developed markets. The equity risk premium for emerging market equities is expected to be 100 basis points higher than for Canadian and foreign developed market equities, reflecting the additional risk inherent with investments in emerging countries.

As described in the previous section, the 10-year-plus federal bond real rate of return is set at 2.7% for plan years 2028 and thereafter. The real rates of return are thus projected at 4.8% for developed market equities and 5.8% for emerging markets equities.

Real Assets

Real assets such as real estate and infrastructure are considered to be a hybrid of corporate bonds and equity. If these assets are considered to behave 50% like corporate bonds and 50% like developed market equities, then the assumed return should be composed of 50% of the return on corporate bonds and 50% of the return on developed market equities. Considering the inherent difficulties in modelling short-term returns for volatile assets, real assets are projected at 4.3% throughout the projection period.

Table 36 summarizes the assumed real rates of return by asset type throughout the projection period, prior to reduction for investment expenses.

[1] Source: Elroy Dimson, Paul Marsh and Mike Staunton, Credit Suisse Global Investment Returns Yearbook 2016.

Table 36 Real Rate of Return by Asset Type
(before investment expenses)
(in percentage)

Plan Year	Fixed Income Securities	Cash	Canadian Equity	U.S. and Foreign Equity	Emerging Market Equity	Real Assets
2017	(3.2)	(0.9)	4.8	4.8	5.8	4.3
2018	(4.1)	(0.9)	4.8	4.8	5.8	4.3
2019	(3.1)	(0.7)	4.8	4.8	5.8	4.3
2020	(1.1)	(0.3)	4.8	4.8	5.8	4.3
2021	(0.7)	(0.1)	4.8	4.8	5.8	4.3
2022	0.0	0.1	4.8	4.8	5.8	4.3
2023	0.3	0.3	4.8	4.8	5.8	4.3
2024	0.4	0.5	4.8	4.8	5.8	4.3
2025	1.2	0.7	4.8	4.8	5.8	4.3
2026	1.7	0.9	4.8	4.8	5.8	4.3
2027	2.1	1.0	4.8	4.8	5.8	4.3
2028+	2.8	1.0	4.8	4.8	5.8	4.3

c) Investment Expenses

Over the last three plan years, PSPIB's operating and asset management expenses have averaged 0.60% of average net assets. It is assumed that going forward PSPIB investment expenses will average 0.60% of average net assets. The majority of those investment expenses were incurred through active management decisions.

The active management objective is to generate returns in excess of those from the policy portfolio, after reduction for additional expenses. Thus, the additional returns from a successful active management program should equal at least the cost incurred to pursue active management. In seven of the past ten years, PSPIB's additional returns from active management exceeded related expenses. For the purpose of this valuation, it is assumed that additional returns due to active management will equal additional expenses related to active management. Those expenses are assumed to be the difference between total investment expenses of 0.6% and the assumed expenses of 0.2% that would be incurred for passive management of the portfolio considering that part of the portfolio is invested in real estate and infrastructure.

The next section shows the overall rate of return on the fund net of investment expenses.

d) Overall Rate of Return on Assets of the CFPF and the RFPF

The best-estimate rate of return on total assets is derived from the weighted average assumed rate of return on all types of assets, using the assumed asset mix proportions as weights. The best-estimate rate of return is further increased to reflect additional returns due to active management and reduced to reflect all investment expenses. The ultimate real rate of return is developed in Table 37.

Table 37 Overall Rate of Return on Assets of the CFPF and RFPF

	Nominal	Real
Weighted average rate of return	6.2%	4.2%
Additional returns due to active management	0.4%	0.4%
Expected investment expenses		
Expenses due to passive management	(0.2%)	(0.2%)
Additional expenses due to active management	(0.4%)	(0.4%)
Total expected investment expenses	(0.6%)	(0.6%)
Net rate of return	6.0%	4.0%

The resulting nominal and real rates of return for each projection year are as follows:

Table 38 Rates of Return on Assets in Respect of the CFPF and the RFPF
(in percentage)

Plan Year	Nominal	Real
2017	4.6	3.0
2018	4.8	2.8
2019	4.9	2.9
2020	5.2	3.2
2021	5.3	3.3
2022	5.4	3.4
2023	5.5	3.5
2024	5.5	3.5
2025	5.7	3.7
2026	5.8	3.8
2027	5.9	3.9
2028+	6.0	4.0
2017-2021	5.0	3.0
2017-2026	5.3	3.3
2017-2036	5.6	3.6

It is assumed that the ultimate real rate of return on investments will be 4.0% in 2028, net of all investment expenses. This represents a reduction of 0.1% from the previous valuation. The real rates of return over the first eleven years of the projection are on average 0.6% lower than assumed in the previous valuation. The real rate of return on assets takes into account the assumed asset mix as well as the assumed real rate of return for all categories of assets. The nominal returns projected for the Funds are simply the sum of the assumed level of inflation and the real return.

Using the variable real rates of return on assets in the previous table is equivalent to using a flat real discount rate of 3.7% for the purpose of calculating the liability at 31 March 2016 for service since 1 April 2000.

4. Transfer Value Real Interest Rate

Interest rates for transfer values are determined in accordance with the Standards of Practice published by the Canadian Institute of Actuaries. In particular, the real interest rates to be used for the computation of commuted values as at a particular date are as follows:

First 10 years: r_7 + 0.90%

After 10 years: $r_L + 0.5 \times (r_L - r_7)$ + 0.90%

Where

$r_7 = r_L \times (i_7/i_L)$

r_L is the long-term real-return Government of Canada bond yield, annualized

i_L is the long-term Government of Canada benchmark bond yield, annualized and

i_7 is the 7-year Government of Canada benchmark bond yield, annualized

The obtained rates of interest are rounded to the nearest multiple of 0.10%.

For example, for plan year 2019, the assumed real rates of interest are 1.6% for the first 10 years and 2.0% thereafter. The rates are derived from the assumed CPI increase, the assumed 10-year-plus Government of Canada benchmark bond yield which corresponds to the new money rate in this valuation and the assumed spreads[1] between the new money rate and the long-term real-return Government of Canada bond yield, the long-term Government of Canada benchmark bond yield and the 7-year Government of Canada benchmark bond yield. Table 39 shows the assumed transfer value real interest rates used in this report:

Table 39 Transfer Value
(As a percentage)

					Real Interest Rates	
Plan Year	r_L	i_L	i_7	r_7	First 10 Years	After 10 Years
2017	0.46	2.04	1.07	0.24	1.10	1.50
2018	0.51	2.52	1.59	0.32	1.20	1.50
2019	0.95	3.01	2.10	0.66	1.60	2.00
2020	1.31	3.39	2.51	0.97	1.90	2.40
2021	1.49	3.59	2.72	1.12	2.00	2.60
2022	1.75	3.88	3.03	1.37	2.30	2.80
2023	1.93	4.07	3.23	1.53	2.40	3.00
2024	2.02	4.17	3.34	1.61	2.50	3.10
2025	2.20	4.36	3.55	1.79	2.70	3.30
2026	2.39	4.56	3.74	1.97	2.90	3.50
2027	2.49	4.66	3.84	2.06	3.00	3.60
2028+	2.59	4.76	3.94	2.15	3.00	3.70

[1] The spreads for the first year are based on the October 2016 actual spreads of 17, 14 and -82 basis points between 10-year-plus Government of Canada bond yield and the bonds underlying r_L, i_L and i_7 respectively. The ultimate spreads of -7, 6 and -74 basis points, starting in fiscal year 2025, are based on the average spreads over the last 10 years. An interpolation reflecting the variation in new money rates is applied for intermediate years.

5. Summary of Economic Assumptions

The economic assumptions used in this report are summarized in the following table.

Table 40 Economic Assumptions[1]
(As a percentage)

	Inflation		Employment Earning Increases			Interest		
Plan Year	CPI Increase[2]	Pension Indexing[3]	YMPE[3]	Pensionable Earnings[4]	Maximum Pensionable Earnings[3]	New Money Rate	Projected Yield on Account	Projected Return on Funds
2017	**1.6**	**1.3**	**0.8**	2.5	**0.8**	1.9	4.4	4.6
2018	2.0	1.9	2.6	1.3	2.6	2.4	4.2	4.8
2019	2.0	2.0	2.7	2.4	2.7	2.9	4.0	4.9
2020	2.0	2.0	2.8	2.5	2.8	3.3	3.8	5.2
2021	2.0	2.0	2.9	2.6	2.9	3.5	3.7	5.3
2022	2.0	2.0	3.0	2.7	3.0	3.8	3.6	5.4
2023	2.0	2.0	3.0	2.7	3.0	4.0	3.5	5.5
2024	2.0	2.0	3.1	2.8	3.1	4.1	3.4	5.5
2025	2.0	2.0	3.1	2.8	3.1	4.3	3.4	5.7
2026	2.0	2.0	3.1	2.8	3.1	4.5	3.3	5.8
2027	2.0	2.0	3.1	2.8	3.1	4.6	3.2	5.9
2030	2.0	2.0	3.1	2.8	3.1	4.7	3.1	6.0
2035	2.0	2.0	3.1	2.8	3.1	4.7	3.5	6.0
2040	2.0	2.0	3.1	2.8	3.1	4.7	4.4	6.0
2044+	2.0	2.0	3.1	2.8	3.1	4.7	4.7	6.0

As a reference, for periods ending December 2015, the following table was prepared based on the Canadian Institute of Actuaries Report on Canadian Economic Statistics 1924-2015.

Period of Years Ending 2015	15	25	50
Level of Inflation	1.8%	1.9%	4.1%
Real Increases in Pensionable Earnings	0.7%	0.5%	0.8%
Real Yield of Long-Term Canada Bonds	2.1%	3.4%	3.2%
Real Return on Long-Term Canada Bonds	5.1%	7.0%	4.0%
Average Real Return on Diversified Portfolios	4.3%	6.6%	4.4%

1 Bold figures denote actual experience.
2 Assumed to be effective during the Plan Year.
3 Assumed to be effective as at 1 January.
4 Assumed to be effective as at 1 April. Exclusive of seniority and promotional increases.

Appendix 7 - CFSA Demographic and Other Assumptions

A. Demographic Assumptions

Given the size of the Regular Force Plan population subject to the CFSA, the plan's own experience, except where otherwise noted, was deemed to be the best model to determine the demographic assumptions. As mentioned in Appendix 1, demographic assumptions based on service were derived from the pension plan experience of the last five years and those assumptions from the previous valuation not based on 'service' were updated to reflect past experience to the extent it was deemed credible.

The Reserve Force Plan is a young plan, with little experience, providing little predictable information for establishing appropriate demographic assumptions. Except where otherwise noted, the experience of the Regular Force members covered under Part I of the CFSA was deemed to be the best source of data to determine the demographic assumptions.

1. Seniority and Promotional Salary Increases

Seniority means length of service within a classification and promotion means moving to a higher paid classification.

The assumption for seniority and promotional salary increase for both the Regular Force Plan and Reserve Force Plan are determined by studying the experience for the Regular Force Plan.

The seniority and promotional salary increase assumption was marginally revised to reflect the intervaluation experience. The revised assumption had very minimal impact on the financial results. The following table provide sample rates of seniority and promotional increases for both pension plans.

Table 41 Sample of Assumed Seniority and Promotional Salary Increases
(Percentage of annual earnings)

Completed Years of Qualifying Service[1]	Officer	Other Rank	Completed Years of Qualifying Service	Officer	Other Rank
0	6.7	20.2	10	3.8	0.8
1	7.3	17.8	11	3.6	0.9
2	14.9	5.1	12	3.4	1.0
3	24.6	9.0	13	3.0	1.1
4	11.6	2.6	14	2.6	1.1
5	6.6	2.0	15	2.3	1.2
6	7.4	1.8	20	1.8	1.2
7	5.4	1.5	25	1.3	1.1
8	4.4	1.0	30	1.1	0.9
9	4.0	0.9	40	0.5	0.6

[1] For the Reserve Force pension plan, completed years of pensionable service

2. New Contributor

It is assumed that the distribution of new members by age and sex will be the same as that of members with less than one year of service at the valuation date, and that the number of new contributors will be such that the total number of contributors remains constant over the projection period.

The initial salary of new Regular Force Plan members or the initial earnings of new Reserve Force Plan members of a given age and sex in plan year 2017 is assumed to be the same as the corresponding experience in plan year 2016 with an economic salary increase for plan year 2017. Initial salary for Regular Force Plan members or the initial earnings for Reserve Force Plan members are assumed to increase in future years in accordance with the assumption for average earnings increases.

3. Any Occupation Disability Retirement (3A)

Disability retirement 3A under the Regular Force Plan and the disability retirement under the Reserve Force Plan are applicable to Canadian Forces member retiring with a disability pension due to the inability to perform any occupations. The same definition is used under both pension plans and consequently the same 3A disability incidence rate assumption is applicable to both pension plan.

After reviewing the intervaluation experience of the Regular Force Plan, the any occupation disability retirement assumption of the previous valuation has been carried forward without any modifications. Starting with this valuation report, the same assumption will be used for both the Regular Force and the Reserve Force Plans. The following table provides sample rates of the 3A disability incidence assumption.

Table 42 Sample of Assumed Rates of Any Occupation Disability Retirement (3A)
(Per 1,000 individuals)

Age Last Birthday	Male	Female	Age Last Birthday	Male	Female
25	0.1	0.2	50	0.3	1.3
30	0.0	0.3	52	0.4	1.4
35	0.1	0.4	54	0.5	1.6
40	0.2	0.6	56	0.7	1.8
45	0.1	0.9	58	0.8	2.2

4. Own Occupation Disability (3B) Retirement – Regular Force Plan

For the Regular Force Plan, the review of the intervaluation experience has shown a large increase in the number of 3B disabilities. The Office of the Chief Actuary received information from the Department of National Defence (DND) which anticipates a large increase in the number of disability 3B in the near future. DND is projecting the number of disability 3B terminations/retirements under the Regular Force Plan to reach approximately 2,200 in plan year 2017, up from a yearly terminations/retirements average of 1,300 observed between plan years 2012 to 2014.

However, it is unclear at this time if the recent increase in the number of disability 3B terminations/retirements and DND expected level of disability 3B of 2,200 per year will be the new steady state going forward. The recent increase in disability 3B terminations/retirements is likely due to the strict application of the principle of

"Universality of Service[1]". After taking into account the recent available information, the 3B disability incidence rates have been modified to incorporate a 10-year select period which will produce approximately 2,200 such terminations/retirements in plan year 2017 reducing linearly over 10 years to attain a steady state of approximately 1,300 disability terminations/retirements per year starting in plan year 2027.

In addition, the increase in the number of 3B disability terminations/retirements is not expected to increase the total number of terminations (withdrawal, disability, death and retirement combined) historically observed under the Regular Force Plan. Accordingly, the increase number of 3B disability terminations/retirements will generate an equivalent decrease in the overall number of withdrawals and terminations over the same 10-year select period. The following table provides a sample of 3B disability incidence rates for the Regular Force Plan.

Table 43 Sample of Assumed 3B Disability Incidence Rates (Own Occupation) - Regular Force Plan
(Per 1,000 individuals)

Completed Years of Qualifying Service	Male Officer		Male Other Rank		Female	
	2017	2027+	2017	2027+	2017	2027+
1	1.0	1.2	9.1	4.3	12.8	6.6
5	9.3	4.5	13.4	7.4	22.8	12.3
10	8.5	4.6	25.8	15.3	31.4	21.1
15	10.6	4.8	28.6	21.2	40.6	25.1
20	16.7	11.0	55.5	40.8	49.8	49.1
25	21.1	12.8	65.2	44.2	78.6	61.1
30	28.0	17.9	73.1	54.8	110.2	78.8
35	80.7	35.6	161.2	119.9	133.5	116.1

There are no 3B disability incidence rates (own occupation) for the Reserve Force Plan as there are no such similar benefits provided under the Reserve Force Plan.

5. Pensionable Retirement

Members of the Canadian Forces may qualify for retirement using either their total qualifying Canadian Forces service or the pensionable service to their credit. For the Regular Force Plan, the assumed rates of pensionable retirement were revised to reflect the intervaluation experience (2014-16). In general, the number of retirements decreased as compared to the 2011-2013 observation period of the previous report. As explained in Section 4 above, the intervaluation experience has shown an increase in the number of 3B disability retirements which had the direct impact of reducing the number of pensionable retirements.

To recognize the projected increase in the 3B disability incidence rates assumption over the next 10 years, as explained in section 4 above, the updated pensionable retirement assumption, developed on the experience of the last three years, is further reduced to absorb the corresponding increase in the projected number of 3B disability retirements. The pensionable retirement assumption of plan year 2027 has been developed on the

1 The requirement to be physically fit, employable and deployable for general operational duties.

basis of the 2012-2014 plan experience further modified downward to account for the marginal increase in the projected 2027 3B disability retirement assumption. The retirement assumptions for plan year 2018 to 2026 have been linearly interpolated between the updated retirement rates of plan year 2017 and 2027. The following tables provide sample rates of pensionable retirement for member of the Regular Force Plan.

Table 44 Sample of Assumed Rates of Retirement - Regular Force Plan - Old Terms of Service
(Per 1,000 individuals)

	Officer				Other Rank			
	Male		Female		Male		Female	
Completed Years of Qualifying Service	2017	2027+	2017	2027+	2017	2027+	2017	2027+
19	43	75	107	144	24	58	18	42
20	55	63	93	109	47	69	22	60
21	56	42	95	60	53	59	49	49
22	38	34	73	44	52	51	40	39
23	34	17	35	55	60	57	33	48
24	54	43	53	96	66	63	50	61
25	65	63	59	83	60	67	78	86
30	87	80	87	86	76	78	55	80
35	341	336	351	422	268	304	359	296

Table 45 Sample of Assumed Rates of Retirement - Regular Force Plan - New Terms of Service
(Per 1,000 individuals)

	Officer				Other Rank			
	Male		Female		Male		Female	
Completed Years of Qualifying Service	2017	2027+	2017	2027+	2017	2027+	2017	2027+
24	63	78	43	175	81	80	23	112
25	66	64	138	146	66	89	76	88
26	57	61	103	126	63	71	59	74
27	53	54	77	139	45	57	68	63
28	51	48	95	115	42	59	65	86
29	60	59	89	81	78	72	57	96
30	87	80	86	86	76	81	55	83
35	339	334	344	420	263	305	359	288

After a review of the Reserve Force Plan intervaluation experience, the retirement rates for less than 13 years of pensionable service were modified. Retirement rates after 12 years of pensionable service are the same as those in the previous report. Table 46 provides sample rates of pensionable retirement for the Reserve Force Plan.

Table 46 Sample of Assumed Rates of Retirement - Reserve Force members
(Per 1,000 individuals)

Completed Years of Pensionable Service	Age - Male 49	Age - Male 54	Age - Male 59	Age - Female 49	Age - Female 54	Age - Female 59
5	28	62	179	38	40	136
10	19	40	178	23	31	162
15	8	18	169	11	27	197
25	7	13	245	13	28	322
30	15	232	307	19	281	342
35	35	577	417	35	530	307

6. Withdrawal

Withdrawal means ceasing to be a member of the Regular Force Plan for reasons other than death or retirement with an immediate annuity or an annual allowance. Under the Regular Force Plan, the withdrawal assumptions were revised to reflect the intervaluation experience. Except for the Male Officer under the old terms of service group, the experience has shown an average decrease of 16% in the number of withdrawals during the observed period of 2013-16. As explained in section 4 above, the intervaluation experience has shown an increase in the number of 3B disability retirements and withdrawals which had the direct impact of reducing the number of withdrawals.

To recognize the projected increase in the 3B disability retirement assumption over the next 10 years, as explained in section 4 above, the updated withdrawal assumption, developed on the experience of the last three years, is further reduced to absorb the corresponding increase in the projected number of 3B disability retirements. The withdrawal assumption of plan year 2027 has been developed on the basis of the 2012-2014 plan experience further modified downward to account for the marginal increase in the projected 2027 3B disability retirement assumption. The withdrawal assumptions for plan year 2018 to 2026 have been linearly interpolated between the updated withdrawal rates of plan year 2017 and 2027. The following tables provide sample rates of withdrawal for members of the Regular Force Plan.

Table 47 Sample of Assumed Withdrawal Rates - Regular Force Plan - Old Terms of Service
(Per 1,000 individuals)

Completed Years of Qualifying Service	Officer				Other Rank			
	Male		Female		Male		Female	
	2017	2027+	2017	2027+	2017	2027+	2017	2027+
0	96	97	89	94	84	78	67	68
1	36	49	30	40	23	33	26	20
5	20	28	21	17	58	55	32	34
10	21	25	14	16	22	22	23	24
15	12	13	6	19	7	10	3	4
18	8	13	10	25	0	12	4	18

Table 48 Sample of Assumed Withdrawal Rates - Regular Force Plan - New Terms of Service
(Per 1,000 individuals)

Completed Years of Qualifying Service	Officer				Other Rank			
	Male		Female		Male		Female	
	2017	2027+	2017	2027+	2017	2027+	2017	2027+
0	96	97	99	104	84	78	97	98
1	36	49	30	40	22	32	26	20
5	20	28	21	17	59	55	32	34
10	21	25	14	16	22	22	23	24
15	12	13	6	19	8	10	3	4
20	8	12	25	20	12	7	30	23
23	6	20	6	30	38	36	9	34

For the Reserve Force Plan, the withdrawal assumption are determined based on the Plan own experience. The withdrawal assumption has been modified to take into account the experience of the last 3 years. Rates were mainly changed for service below 10 years, reflecting the period from the inception of the Reserve Force Plan in 2007. The rates of withdrawals were also extended between the ages of 50 to 60 to reflect the experience of those members who terminate their participation in the Reserve Force Plan by reason of a rollover to the Regular Force Plan.

Starting with this valuation, part time reserve force members under the Regular Force Plan are being valued on the basis of their accrued pensionable service under the Canadian Forces instead of the qualifying service as currently done for Regular Force members. To this end, the withdrawal assumption of the Reserve Force Plan has been modified to remove the impact of those members rolling over to the Regular Force Plan that is imbedded in the withdrawal assumption.

The following four tables provide sample rates of withdrawal for Reserve Force members under both the Regular Force and Reserve Force Plans.

Table 49 Sample of Assumed Withdrawal Rates for Reserve Force Members - Male Officer
(Per 1,000 individuals)

Age Last Birthday	Completed Years of Pensionable Service											
	Reserve Force Plan						Regular Force Plan					
	0	1	5	10	15	20+	0	1	5	10	15	20+
20	53	90	27	-	-	-	38	55	15	-	-	-
25	47	68	40	31	-	-	38	56	28	24	-	-
30	54	64	47	31	11	-	43	58	37	25	11	-
35	60	56	52	30	11	9	47	53	46	26	11	9
40	59	46	56	29	11	9	49	45	49	26	11	9
45	44	44	61	26	11	9	38	45	52	24	11	9
50	18	16	12	11	14	17	18	-	-	-	-	-
55	36	16	12	11	14	17	36	-	-	-	-	-

Table 50 Sample of Assumed Withdrawal Rates for Reserve Force Members - Male Other Rank
(Per 1,000 individuals)

Age Last Birthday	Completed Years of Pensionable Service											
	Reserve Force Plan						Regular Force Plan					
	0	1	5	10	15	20+	0	1	5	10	15	20+
20	92	111	88	-	-	-	64	87	73	-	-	-
25	88	106	101	47	-	-	64	82	79	36	-	-
30	75	85	89	42	11	-	57	68	64	35	11	-
35	57	68	67	35	11	9	47	59	54	31	11	9
40	39	58	60	33	11	9	33	49	55	29	11	9
45	25	50	57	31	11	9	23	37	53	28	11	9
50	22	16	12	11	14	17	22	-	-	-	-	-
55	38	16	12	11	14	17	38	-	-	-	-	-

Table 51 Sample of Assumed Withdrawal Rates for Reserve Force Members - Female Officer
(Per 1,000 individuals)

Age Last Birthday	Completed Years of Pensionable Service											
	Reserve Force Plan						Regular Force Plan					
	0	1	5	10	15	20+	0	1	5	10	15	20+
20	47	50	52	-	-	-	-	43	48	-	-	-
25	30	51	52	40	-	-	-	43	48	29	-	-
30	24	53	52	38	12	-	-	45	49	30	12	-
35	27	54	50	35	12	10	10	46	47	31	12	10
40	31	55	49	34	12	10	10	46	46	32	12	10
45	29	54	48	34	12	10	10	46	45	33	12	10
50	18	16	12	11	14	17	17	-	-	-	-	-
55	23	16	12	11	14	17	17	-	-	-	-	-

Table 52 Sample of Assumed Withdrawal Rates for Reserve Force Members - Female Other Rank
(Per 1,000 individuals)

Age Last Birthday	Completed Years of Pensionable Service											
	Reserve Force Plan						Regular Force Plan					
	0	1	5	10	15	20+	0	1	5	10	15	20+
20	75	91	99	-	-	-	57	80	73	-	-	-
25	89	92	98	40	-	-	64	81	74	27	-	-
30	95	93	99	40	12	-	66	81	75	27	12	-
35	86	95	101	40	12	9	58	81	75	27	12	9
40	62	93	103	40	12	9	43	79	74	27	12	9
45	34	92	103	40	12	9	26	78	74	27	12	9
50	23	16	12	11	14	17	23	-	-	-	-	-
55	22	16	12	11	14	17	22	-	-	-	-	-

7. Proportion of Members Opting for a Deferred Annuity

Not all vested members transfer the commuted value of their deferred pension upon withdrawal, and an assumption must be made as to the proportion of members opting for a deferred annuity. For members of the Regular Force Plan, this assumption was revised to reflect the intervaluation experience. For members under the old terms of service, the proportions are reduced by an average of 26%. For members under the new terms of service, the proportions were revised at all ages and the overall impact represents an average increase of 1% in the proportions.

For Reserve Force members who are valued under the Regular Force Plan, we have used the newly introduced proportions of members opting for a deferred annuity under the Reserve Force Plan, modified to exclude members that are terminating and are rolling over to the Regular Force Plan. The resulting proportions were further analysed by completed years of qualifying service instead of age last birthday as done for the Reserve Force Plan. The following table shows a sample of the assumed proportions of members electing a deferred annuity upon withdrawal.

Table 53 Sample of Assumed Proportions of Members Electing a Deferred Annuity
(Per 1,000 individuals)

Regular Force Plan				Reserve Force Plan	
	Regular Member				
Completed Years of Qualifying Service	Old Terms of Service	New Terms of Service	Reservist	Age Last Birthday	Reservist
1	100	100	440	15	184
5	170	170	540	20	251
10	240	240	650	25	323
15	270	270	670	30	312
18	490	490	670	35	331
19	-	610	680	40	338
21	-	720	680	48	358
22	-	690	680	-	-
23	-	560	690	-	-
24+	-	-	690	-	-

8. Mortality

Mortality rate assumptions for contributors, retired pensioners, disabled pensioners, surviving spouses and longevity improvement factors are the same for both Regular Force Plan and Reserve Force Plan.

The mortality rate assumptions were revised based on the intervaluation experience. For contributors and retirement pensioners aged 30 to 90, the assumed male mortality rates decreased by an average of 5% for officers and 2% for other ranks. For 3B (own occupation) disability pensioners, the mortality rates assumption is the same as that for contributors and retirement pensioners. For 3A (any occupation) other rank male disability pensioners between the ages of 30 and 90, the assumed mortality rates increased by an average of 7%. For female surviving spouses aged 30 to 90, the assumed mortality rates decreased by an average of 3%. The remaining assumptions, shown in Table 54, were not modified and were set equal to the 2014 base mortality projected to plan year 2017 using the longevity improvement factors of the previous actuarial report.

The following table provides sample rates of mortality.

Table 54 Sample of Assumed Rates of Mortality
(Per 1,000 individuals)

Age Last Birthday	Contributors and Retirement Pensioners: Male Officer	Male Other Rank	Female	Disability (3A) Pensioners: Male Officer	Male Other Rank	Female	Surviving Spouses: Male	Female
30	0.5	0.6	0.4	0.6	3.0	0.4	0.9	0.2
40	0.6	0.8	0.5	1.0	4.1	1.0	1.4	1.7
50	1.0	2.3	1.2	6.3	7.1	2.5	3.1	3.2
60	3.0	6.8	3.5	14.0	13.6	6.4	8.5	7.0
70	10.6	18.6	11.1	25.8	29.2	16.0	21.8	16.9
80	41.5	57.4	33.4	60.0	66.6	43.2	57.3	42.3
90	137.6	156.1	105.3	134.3	163.5	120.5	153.8	116.6
100	306.6	319.8	281.6	304.3	329.4	279.5	331.2	308.4
110	500.0	500.0	500.0	500.0	500.0	500.0	500.0	500.0

As shown in the 27th Actuarial Report on the Canada Pension Plan, life expectancy in Canada has been increasing constantly over the years. This trend is also observed in the Canadian Forces membership as supported by analysis of past mortality experience. Mortality rates are reduced in the future in accordance with the same longevity improvement assumption[1] used in the 27th Actuarial Report on the Canada Pension Plan. Mortality improvements are expected to continue in the future but at a slower pace than most recently observed over the 15-year period ending in 2011. Further, it is assumed that, ultimately, mortality improvement rates for males will decrease to the same level as females.

Factors shown in the 27th Actuarial Report of the Canada Pension Plan are based on calendar years. These factors have been interpolated to obtain plan year longevity improvement factors.

The average annual mortality improvement rates experienced in Canada over the 15-year period from 1996 to 2011 by age and sex were used as the basis for projecting annual mortality.

The ultimate longevity improvement factors for plan years 2033 and thereafter were established by analysing the trend by age only and not by sex or calendar year. The ultimate mortality improvement rates are derived by analyzing Canadian experience over the period 1921 to 2011.

[1] In this report 'longevity improvement assumption' is equivalent to the 'mortality improvement assumption' discussed in the 27th Actuarial Report on the Canada Pension Plan.

A sample of assumed longevity improvement factors is shown in following table.

Table 55 Sample of Assumed Longevity Improvement Factors

Age Last Birthday	Initial and Ultimate Plan Year Mortality Reductions (%)			
	Male		Female	
	2018	2033+	2018	2033+
30	1.72	0.80	0.98	0.80
40	1.73	0.80	1.30	0.80
50	1.31	0.80	0.64	0.80
60	1.97	0.80	1.56	0.80
70	2.41	0.80	1.69	0.80
80	2.37	0.80	1.82	0.80
90	1.48	0.62	1.36	0.62
100	0.61	0.28	0.63	0.28

The following table shows the calculated life expectancy for contributors and healthy pensioners based on the mortality assumptions described in this section.

Table 56 Life Expectancy of Contributors and Healthy Pensioners
(Years)

Age Nearest	As at 31 March 2016			As at 31 March 2033		
	Male			Male		
	Officer	Other Rank	Female	Officer	Other Rank	Female
60	28.0	25.2	29.0	29.0	26.3	30.0
65	23.2	20.7	24.3	24.1	21.8	25.2
70	18.6	16.5	19.8	19.5	17.5	20.7
75	14.3	12.7	15.7	15.1	13.6	16.5
80	10.5	9.5	11.9	11.3	10.3	12.6
85	7.5	6.9	8.7	8.1	7.5	9.3
90	5.4	5.0	6.1	5.8	5.4	6.5

The assumptions on rates of mortality and longevity improvement factors represent best-estimate assumptions regarding future demographic trends. Given the length of the projection period, it is unlikely that the actual experience will develop precisely in accordance with best-estimate assumptions. The following table measures the effect on the life expectancy when longevity improvement factors are varied.

Table 57 Sensitivity of Life Expectancy to Variation in Longevity Improvement Factors

Longevity improvement factors	Age 65 Life Expectancy in 2016			Age 65 Life Expectancy in 2033		
	Male			Male		
	Officer	Other Rank	Female	Officer	Other Rank	Female
Current basis	23.2	20.7	24.3	24.1	21.8	25.2
- if 0%	21.7	19.2	22.9	21.7	19.2	22.9
- if ultimate 50% higher	23.6	21.1	24.7	25.0	22.7	26.0
- if ultimate 50% lower	23.1	20.6	24.1	23.6	21.3	24.6
- if kept at 2017 level	24.2	21.7	25.1	26.5	24.4	27.0

9. Family Composition[1]

The assumptions regarding spouse survivors for both Regular and Reserve Force members were revised based on the intervaluation experience. The probability of leaving, upon death, a spouse eligible for a survivor pension was decreased from the previous valuation by an average of 5% for male members while the previous assumption for female members were decreased by an average of 1%. The assumption for the age difference of the spouse at the time of death of the member was marginally reduced for male members but remains unchanged from the previous valuation for female members.

Table 58 Assumptions for Survivor Spouse Allowances

Age Last Birthday	Probability of an Eligible Spouse at Death of Member		Spouse Age Difference	
	Male	Female	Male	Female
30	0.51	0.49	(2)	1
40	0.67	0.51	(2)	2
50	0.70	0.52	(2)	1
60	0.76	0.52	(2)	0
70	0.74	0.49	(3)	(1)
80	0.62	0.43	(3)	(1)
90	0.40	0.26	(4)	(5)
100	0.12	0.00	(8)	(6)

The assumptions regarding the average number of eligible children for both Regular and Reserve Force members were revised for male members based on the intervaluation experience. The assumptions for female members remained unchanged from the previous valuation.

For male members, age 30 and below, the average number of children assumption was increased on average by 25%. Between the ages of 31 and 50, the average number children assumed to be eligible for a survivor allowance decreased by an average of 3%. Above age 50, the average number of children decreased by an average of 25%.

The assumption regarding the average age of eligible children was changed from the previous report by one year at select ages. As in the previous valuation, to determine the value of pensions payable to eligible children, the rates of pension termination were assumed to be 0% prior to age 17 and 16% per annum thereafter until expiry of the benefit on the 25th birthday.

Table 59 Assumptions for Survivor Children Allowances

Age Last Birthday at Death	Average Number of Children		Average Age of Children	
	Male	Female	Male	Female
30	0.7	0.7	4	5
40	1.3	0.8	11	13
50	0.4	0.3	15	17
60	0.1	0.0	18	-
70	0.0	0.0	-	-

[1] Survivor pensions are not payable if the deceased member has less than two years of pensionable service.

B. Other Assumptions

1. Pension Benefits Division/Optional Survivor Benefit/Leave Without Pay

The division of pension benefits has almost no effect on the valuation results because the liability is reduced, on average, by approximately the amount paid to the credit of the former spouse. Consequently, no future pension benefits divisions were assumed in estimating the current service cost and liability. However, past pension benefits divisions were fully reflected in the liability. Two other provisions, namely the optional survivor benefit and the suspension of membership while on leave without pay, were also treated like pension benefits divisions for the same reason.

2. Minimum Post-Retirement Death Benefit

This valuation does not take into account the minimum death benefit described in Note 21 in Appendix 1 D, with respect to deaths occurring after retirement. The resulting understatement of the accrued liability and current service cost is not material since the majority of the relatively few pensioners who die in the early years of retirement leave an eligible survivor.

3. Administrative Expenses

The operating expenses of the PSPIB continue to be recognized implicitly in this report. Beside the additional administration cost associated with the Pension Modernization, all other pension plan administrative expenses are charged to the Superannuation Account, the CFPF and the RFPF.

For the Regular Force Plan, the annual administrative expenses assumption was increased from 0.5% to 0.75% of total pensionable payroll and from 1.25% to 1.75% of total pensionable payroll for the Reserve Force Plan. These revisions are based on discussions with DND regarding their expectations going forwards. For plan year 2017, the Superannuation Account is assumed to be charged with 58.1% of total administrative expenses, reducing by 2.5% each year thereafter. The future expenses expected to be charged to the Superannuation Account have been capitalized and are shown as a liability, whereas the expenses to the CFPF and RFPF have been recognized as a part of the annual current service cost.

4. Wage Measure

Under the Reserve Force Plan, the retirement benefit is based on the career average of the updated earnings. Past earnings are updated using the wage measure as defined in the schedule of the Reserve Force Pension Plan Regulations. The regulations also prescribe the wage measures for calendar year 2007 and later as the greater of:

- the standard basic rate of pay for a period of duty or training of six hours or more, before any retroactive adjustment , that was prescribed or established under the *National Defence Act* to be paid on October 1 of the preceding year to a member at the rank of Corporal (class A), and
- the wage measure of the previous year.

The wage measure for calendar years up to 2016 is shown in the following table.

Table 60 Wage Measure - RFPF

Calendar Year	Rate of Pay ($)	Calendar Year	Rate of Pay ($)
2017	131.74	1988	47.27
2016	131.74	1987	43.90
2015	131.74	1986	41.50
2014	131.74	1985	40.00
2013	129.16	1984	38.25
2012	125.08	1983	36.25
2011	125.08	1982	33.25
2010	123.24	1981	29.25
2009	121.42	1980	25.75
2008	116.70	1979	25.75
2007	113.70	1978	24.50
2006	113.70	1977	21.00
2005	104.18	1976	21.00
2004	104.18	1975	17.37
2003	101.64	1974	12.20
2002	97.72	1973	12.20
2001	89.52	1972	12.10
2000	89.52	1971	10.50
1999	83.42	1970	10.10
1998	80.82	1969	7.17
1997	61.68	1968	7.17
1996	60.36	1967	7.17
1995	60.36	1966	7.17
1994	60.36	1965	6.50
1993	60.36	1964	6.50
1992	58.60	1963	6.50
1991	58.60	1962	6.23
1990	54.50	1961	6.23
1989	50.80	1960	5.67

5. Financing of Elected Prior Service

The assumed future government credits in respect of prior service elections vary according to the financing vehicle (i.e. the Superannuation Account, the CFPF or the RFPF) into which the contributions are credited. The government matches member contributions made to the Superannuation Account for prior service elections; however, it makes no contributions if the member is paying the double rate. Government credits to the Pension Funds in respect of elected prior service are as described for the current service.

6. Outstanding Terminations

Amounts paid from 1 April 2016 onward for terminations that occurred prior to that date were estimated from actual payments made using historical information provided in the valuation data at 31 March 2016. For this valuation, after reviewing the information, a total of $51 and $1 million were set aside respectively for the CFPF and the RFPF.

7. Disability Incidence Rates for Pensioners Under Age 60

Both deferred pensioners and pensioners receiving an annual allowance while under age 60 were assumed to have a 0% disability rate. The resulting understatement of liability and current service cost is negligible.

8. Recovery Rates for Disability Pensioners

No recoveries are assumed for disability pensioners. The resulting overstatement of liability and current service cost is negligible.

9. Sex of Surviving Spouses

The sex of each eligible surviving spouse is assumed to be the opposite of the deceased member's.

Appendix 8 - RCA Valuation Methodology and Assumptions

A. Valuation of the Amounts Available for Benefits

The amounts available for benefits comprise the recorded balance in the Retirement Compensation Arrangements Account (RCA), which forms part of the Accounts of Canada, as well as a tax credit (CRA refundable tax).

Interest is credited every three months in accordance with the actual average yield on a book value basis for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces - Regular Force and Royal Canadian Mounted Police pension plans. The actuarial value of the amounts available for benefits is equal to the book value.

B. Valuation of Liabilities

Described in this appendix are the liability valuation methodologies used and any differences in economic assumptions from those used in the CFSA valuation.

1. Terminally Funded RCA Benefits

The following RCA benefits are being terminally funded (i.e. not prefunded but on an occurrence basis):

- pre-retirement survivor benefits
- minimum death benefit

The above benefits are terminally funded because they are uncommon or of little financial significance. The pre-retirement survivor benefit becomes payable only when the average salary is less than 1.4 times the YMPE. As well, the minimum death benefit is expected to occur only with deaths at younger ages where the mortality rates are low.

2. Post-Retirement Survivor Benefits

The limit on the amount of spousal annual allowance that can be provided under the CFSA decreases at the same time the member’s pension reduces due to the CPP coordination, usually at age 65.

This benefit was valued conservatively by assuming the plan limit is always coordinated with the CPP. The liability overstatement is minor because the probability of the former contributor dying prior to age 65 is small. (This overstatement tends to be offset by the understatement of accrued liability caused by terminally funding the pre-retirement survivor benefit.) The projected accrued benefit cost method was used to estimate the liabilities and current service cost for this RCA benefit.

3. Excess Pensionable Earnings

The projected accrued benefit cost method was used to estimate plan liabilities and current service costs for benefits in excess of the Maximum Pensionable Earnings (MPE).

This valuation applies the same valuation methodology that was used in the previous report. Officers are divided into specialists (doctors, dentists, etc.) and non-specialists. Also included in the specialist group are officers with salary as at 31 March 2016 in excess of the 2016 MPE. The specialists, who represent more than 70% of the RCA liabilities, are valued using the actuarial assumptions described in Appendix 6, as was the case in the previous report.

4. Administrative Expenses

To compute the liabilities and current service cost, no provision was made regarding the expenses incurred for the administration of the RCA Account. These expenses, which are not debited to the RCA Account, are borne entirely by the government and are commingled with all other government expenses.

C. Actuarial Assumptions

The valuation economic assumptions described in Appendix 6 were used without any modifications. In prior actuarial valuations, the valuation interest rates used to determine the present value of the RCA liabilities and RCA current service cost were half of the interest rate used to determine the present value of the Superannuation Account liabilities. For this valuation, the valuation interest discount rate is equaled to the yield projected on the combined Superannuation Accounts.

D. Valuation Data

The RCA pension benefits in payment were provided as at 31 March 2016. RCA benefits expected to be paid in respect of contributor and accrued spousal allowances of current retired members were all derived from the membership data described in Appendix 4 and shown in Appendix 13.

Appendix 9 - Canadian Forces Superannuation Account Projection

Prior to 1 April 2000, the CFSA Superannuation Account tracked all government pension benefit obligations related to the CFSA. The Superannuation Account is now debited only with benefit payments made in respect of service earned before that date and administrative expenses; it is credited with prior service related to elections made prior to 1 April 2000 and interest earnings.

The results of the following projection were computed using the amounts available for benefits described in Appendix 3, the data described in Appendices 4 and 13, the methodology described in Appendix 1 and the assumptions described in Appendices 6 and 7.

The projection shows the expected cash flows and balance of the Superannuation Account if all assumptions are realized. Emerging experience that differs from the corresponding assumptions will result in gains or losses to be revealed in subsequent valuation reports.

Table 61 Canadian Forces Superannuation Account Projection
($ millions)

Plan Year	Beginning Account Balance	Present value of prior service contributions	Beginning Liability	Capitalized Administrative Expenses	Special Credit at End of Plan Year	Net Payments[1]	Interest Earnings
2017	45,695	23	47,153[2]	232	-	2,499	1,956
2018	45,152	22	46,694	220	1,813	2,505	1,844
2019	46,305	21	46,118	208	-	2,528	1,802
2020	45,579	20	45,403	195	-	2,547	1,684
2021	44,716	19	44,552	183	-	2,559	1,608
2022	43,764	17	43,611	170	-	2,567	1,530
2023	42,727	16	42,586	157	-	2,568	1,451
2024	41,611	15	41,481	144	-	2,562	1,372
2025	40,420	14	40,303	132	-	2,550	1,331
2026	39,201	13	39,095	119	-	2,532	1,252
2027	37,921	12	37,827	107	-	2,507	1,174
2028	36,588	11	36,505	94	-	2,476	1,132
2029	35,244	11	35,171	82	-	2,442	1,089
2030	33,890	10	33,829	71	-	2,406	1,014
2031	32,498	9	32,447	60	-	2,370	971
2032	31,099	8	31,058	49	-	2,333	958
2033	29,725	8	29,692	40	-	2,294	943
2040	20,971	4	20,974	-	-	1,971	880
2050	10,925	1	10,925	-	-	1,377	481

1 Benefit payments plus administrative expenses minus prior service contributions and pension modernization cost.
2 Includes pension modernization cost of $12 million.

Appendix 10 - Canadian Forces Pension Fund Projection

Starting 1 April 2000, the CFSA is financed through the Canadian Forces Pension Fund (CFPF). Government and member contributions, investment earnings and prior service contributions for elections since 1 April 2000 are added to the CFPF. Benefit payments made in respect of service earned since that date and administrative expenses are subtracted from the CFPF.

The results of the following projection were computed using the data described in Appendices 4 and 13, the methodology described in Appendix 5 and the assumptions described in Appendices 6 and 7.

The projection shows the expected growth of the CFPF if all assumptions are realized. According to the projection, cash flows are expected to be positive until plan year 2028. Emerging experience that differs from the corresponding assumptions will result in gains or losses to be revealed in subsequent valuation reports.

Table 62 Canadian Forces Pension Fund Projection
($ millions)

Plan Year	Expected Unrecognized Investment (Gains)/Losses	Present value of prior service contributions	Beginning Market Value of Assets	Contributions[1]	Payments	Investment Earnings	Special Payments[2]	Beginning Actuarial Liability
2017	(1,078)	267	23,289[3]	1,318	721	1,085	170	24,047
2018	(456)	248	25,140	1,313	716	1,221	145	25,732
2019	53	231	27,103	1,316	787	1,341	145	27,549
2020	203	216	29,117	1,327	869	1,526	145	29,414
2021	-	202	31,247	1,343	956	1,666	145	31,388
2022	-	189	33,445	1,362	1,052	1,814	145	33,425
2023	-	176	35,715	1,386	1,155	1,971	145	35,526
2024	-	163	38,062	1,414	1,259	2,098	145	37,695
2025	-	151	40,460	1,445	1,365	2,308	145	39,906
2026	-	139	42,993	1,482	1,477	2,494	145	42,241
2027	-	127	45,637	1,526	1,588	2,691	145	44,677
2028	-	116	48,410	1,573	1,704	2,901	145	47,230
2029	-	106	51,326	1,620	1,824	3,074	145	49,913
2030	-	97	54,341	1,667	1,948	3,252	145	52,682
2031	-	90	57,457	1,714	2,083	3,437	145	55,541
2032	-	84	60,670	1,760	2,230	3,626	145	58,483
2033	-	79	63,972	1,806	2,385	3,821	-	61,498
2040	-	49	88,102	2,156	3,693	5,241	-	84,312
2050	-	22	128,024	2,807	5,973	7,588	-	121,171

1 Total current service cost plus prior service contributions.
2 The special payments are based on a 15-year amortization period. The President of the Treasury Board may select a shorter period of time over which to make payments.
3 As at 31 March 2016, this item includes $64 million of remaining contributions for pre-2007 Reserve Force service as well as $57 million of receivable asset from the Reserve Force Plan for members that have rolled over to the Regular Force Plan.

Appendix 11 - Reserve Force Pension Fund Projection

Since the inception of the Reserve Force Plan on 1 March 2007, the plan has been financed through the RFPF. Government and member contributions, investment earnings and prior service contributions are added to the RFPF. Benefit payments and administrative expenses are subtracted from the RFPF.

The results of the following projection were computed using the data described in Appendices 4 and 13, the methodology described in Appendix 5 and the assumptions described in Appendices 6 and 7.

The projection shows the expected growth of the RFPF if all assumptions are realized. According to the projection, cash flows are expected to be positive until plan year 2044. Emerging experience that differs from the corresponding assumptions will result in gains or losses to be revealed in subsequent valuation reports.

Table 63 Reserve Force Pension Fund Projection
($ millions)

Plan Year	Expected Unrecognized Investment (Gains)/Losses	Present value of prior service contributions	Beginning Market Value of Assets	Contributions[1]	Payments	Investment Earnings	Special Payments[2]	Beginning Actuarial Liability
2017	(30)	25	518[3]	54	36	24	4	566
2018	(13)	23	564	54	31	28	5	608
2019	(1)	21	621	57	31	31	5	658
2020	(4)	19	683	60	32	36	5	714
2021	-	17	752	63	34	41	5	776
2022	-	16	827	66	35	46	5	845
2023	-	14	909	70	38	51	5	920
2024	-	12	998	74	40	56	5	1,001
2025	-	10	1,093	78	42	63	5	1,088
2026	-	8	1,198	82	44	71	5	1,185
2027	-	6	1,311	86	48	78	5	1,290
2028	-	4	1,434	91	51	87	5	1,404
2029	-	3	1,566	96	54	95	5	1,528
2030	-	2	1,708	101	58	104	5	1,661
2031	-	2	1,860	107	62	113	5	1,804
2032	-	1	2,023	113	67	123	5	1,957
2033	-	1	2,197	119	72	133	-	2,122
2040	-	-	3,735	170	125	225	-	3,621
2050	-	-	6,744	225	308	402	-	6,539

1 Total current service cost plus prior service contributions.
2 The special payments are based on a 15-year amortization period.
3 As at 31 March 2016, this item includes $42 million and $28 million of remaining contributions for processed and unprocessed prior service and excludes $57 million of payable asset to the Regular Force Plan for members that have rolled over to the Regular Force Plan.

Appendix 12 - Uncertainty of Results

A. Introduction

The projected financial status of the CFPF depends on many demographic and economic factors, including new contributors, average earnings, inflation, level of interest rates and investment returns. The projected long-term financial status of the CFPF is based on best-estimate assumptions; the objective of this section is to present alternative scenarios. The alternatives presented illustrate the sensitivity of the long-term projected financial position of the CFPF to changes in the future economic outlook. In this appendix, any references, in sections B and C, to assets, liabilities, surplus/(deficit), annual special payments and service cost relate to the CFPF, unless indicated otherwise.

Section B examines the sensitivity of the CFPF to different asset allocations. Alternative investment portfolios are described, along with the volatility of each portfolio and the resulting impact on the CFPF's funding ratio and current service cost. The impact of financial market volatility on the financial status of the Pension Fund is explored in section C, where severe one-time financial shocks are applied to three investment portfolios with the purpose of quantifying the impact on the funding ratio over the short term. Lastly, the impacts of prolonged low bond yields on the Superannuation Account and on the CFPF due to slower than expected economic growth are analyzed in section D.

B. Sensitivity of Investment Policy

A major risk all pension plans face is funding risk – the risk that pension assets are insufficient to meet pension obligations. If funding deficiencies or surpluses continue for an extended period of time, risk is transferred from one generation to another and may ultimately take the form of an increase or a decrease in the contribution rate.

Historically, equities have shown greater volatility than fixed income instruments (such as bonds). Similarly, long-term bonds have historically shown greater volatility than shorter fixed income instruments. For instance, in the twenty-five years ending in 2015, the volatility (standard deviation) of Canadian equity returns (indicated by the S&P/TSX Total Return Index) was 16.5%, as given in the Canadian Institute of Actuaries' Report on Canadian Economic Statistics 1924 – 2015. This compares with the volatility of returns of long-term federal bonds (10+ years) of 9.9% and with the volatility of returns of medium-term federal bonds (5-10 years) of 6.9% over the same period. Higher volatility of a security's returns implies a greater risk since the range of possible outcomes of returns widens. Hence, equities are viewed as being more risky than bonds and long-term bonds are viewed as more risky than medium- or short-term bonds.

Investing in a greater proportion of equities represents a higher level of risk and hence the possibility of realizing a wider range of returns. Conversely, investing in lower risk fixed income instruments will tend to produce lower returns.

The Regular Force Plan represents a long-term obligation to pay pension benefits. Thus, a long-term approach must be taken to fund these obligations. Long-term Government of Canada bonds are considered risk-free and their yields are considered low. The real yield on long-term federal bonds was around 0.3% in March 2016. This is significantly below the ultimate best-estimate real return on assets of 4.0% that is currently used to determine the liabilities and contributions rates.

The Government created the PSPIB to invest amounts equal to contributions in excess of benefits and administrative expenses with respect to service since 1 April 2000 with the purpose of maximizing investment returns without undue risk of loss. The current service cost is less than it would have been if the investment policy had been restricted to long-term government bonds.

The current service cost is reduced by diversifying the portfolio and by investing in securities that offer a higher rate of return than risk-free[1] long-term federal bonds, but that also have a higher degree of risk or volatility. By investing in riskier assets, investors hope to realize the equity risk premium as their reward for taking on additional risk. An equity risk premium is the difference between the expected return on the risky asset (equities) and the expected return on a risk-free asset, such as the Government of Canada long-term bond mentioned above.

Of course, these higher returns are expected but not guaranteed, creating the possibility that the market will not perform as expected and liabilities will grow at a faster rate than investments for an extended period of time. Even if investment returns materialize as expected, other assumptions may not, causing liabilities to grow at a faster rate than assets. For example, salaries or inflation may increase more than expected. The amount of risk assumed by the plan sponsor depends on many factors, including the current funding status and economic outlook, among other things. Thus, the investment policy must balance the desire for a high real rate of return with the sponsor's tolerance or capacity for taking risk.

The following table shows the impact that various asset mixes would have on the funding ratio and the long-term service cost, as well as their relative volatility.

Table 64 Impact of Various Investment Policies - CFPF

Portfolio	Asset Mix			Real Rate of Return		1-year Standard Deviation	Funding Ratio as at 31 March 2016	Annual Special Payment ($ millions)	Long-term Service Cost
	Fixed Income	Equity	Real Assets	First 5 Years	Ultimate				
#1	100%[2]	0%	0%	(4.8%)	2.7%	8.8%	48%	1,576	35.6%
#2	100%[3]	0%	0%	(2.8%)	3.5%	8.7%	62%	1,018	28.5%
#3	60%	35%	5%	0.8%	3.7%	7.7%	79%	540	26.6%
#4	45%	40%	15%	1.6%	3.8%	8.9%	84%	396	25.8%
Best-Estimate	23%	47%	30%	3.0%	4.0%	11.2%	93%	145	24.4%
#5	0%	100%	0%	4.3%	4.4%	16.1%	107%	0	22.0%

The last three columns of the previous table present the funding ratio, annual special payments over the next 15 years, and the long-term current service cost if the investment policy were changed to reflect the asset mix of the alternative portfolios. These deterministic outcomes do not take the expected portfolio volatility into account.

1 Long-term federal bonds are considered risk-free since they have no risk of default. However, their market value is volatile and therefore long-term federal bonds do exhibit market and funding risk over the course of their life.
2 Nominal long-term federal bonds only.
3 Diversified portfolio of long-term bonds (portfolio 3 to 5 and Best Estimate use a diversified portfolio of bonds with various maturities, that is, bond universe).

Portfolio #1 is invested in 10-year plus federal bonds. This portfolio does not result in a feasible scenario due to its prohibitive cost. Other portfolios with lower volatility and higher expected returns are available.

Portfolio #2 is invested in a marketable bond portfolio consisting of long-term federal, provincial, corporate and real return bonds. This diversification into four bond asset categories that are not perfectly correlated increases the real rate of return and reduces the volatility compared to the first portfolio. This portfolio produces a higher real rate of return compared to portfolio #1, while maintaining a lower current service cost. This is also a low risk, low return portfolio. A portfolio with greater diversification in variable income assets is required in order to keep funding cost to a lower level.

Portfolio #3 and portfolio #4 are more diversified than the first two portfolios and are invested 35% and 40%, respectively, in equity. This diversification, into three broad asset categories that are not perfectly correlated, combined with shorter fixed income maturities increases the real rate of return earned on these portfolios and keeps their volatility comparable to the first two portfolios. These portfolios have lower expected current service cost than portfolio #1 and portfolio #2 due to their higher expected return. However, despite an increased real return, these portfolios are still not sufficient to maintain the current funded ratio and an increase in the plan's current service cost would be required with both portfolios.

Portfolio #5 is considered riskier because it is less diversified and has no allocation to fixed income securities. This portfolio is heavily invested in equity, which has much more volatile returns than bonds. Although this portfolio (portfolio #5) leads to the highest expected return, the highest funding ratio and the lowest long-term service cost, its volatility is significantly higher which may lead to significant additional contribution requirements as illustrated in the next table.

Table 65 presents the expected median and 10 percent downside real returns over the next 3 years[1], the resulting funding ratio, and the ensuing expected contributions assuming the plan is fully funded as at 31 March 2016 under each portfolio. It further assumes that the ultimate real rate of return applies for the full discounting period (no select period with lower real rate of return and lower inflation).

1 The 10 percent downside real returns over the next 3 years represent the expected 10th percentile average return over that period. That is, there is a 10% probability that the average real returns over the next 3 years will be lower than the 10 percent downside real returns.

Table 65 Median and 10% Downside Returns, Funding Ratio and Contributions for Various Portfolios - CFPF

Portfolio		Expected Average Annual Real Returns (2017-2019)[1]		Funding Ratio (31 March 2019)		Contributions (2019-20) (% of pensionable payroll)		
	1-year Standard Deviation	Downside 10th Pct	Median	Downside 10th Pct	Median	Current Service Cost (downside and median)	Special Payments (downside)	Total (downside)
#3	7.7%	(2.0%)	3.7%	94%	100%	26.2%	4.0%	30.2%
#4	8.9%	(2.9%)	3.8%	91%	100%	25.6%	5.5%	31.1%
Best-Estimate	11.2%	(4.4%)	4.0%	86%	100%	24.4%	8.1%	32.5%
#5	16.1%	(7.7%)	4.4%	77%	100%	22.3%	13.1%	35.4%

The previous table highlights the trade-off between risk and return as well as between higher current service cost with low downside risk and lower current service cost and high downside risk. A portfolio (portfolio #3) exhibiting low volatility of returns has a high current service cost, but a low downside risk. Alternatively, a risky portfolio (portfolio #5) would produce a much lower current service cost; however, the volatility of this portfolio is quite high, resulting in significant downside risk and total downside contributions compared to portfolio #3 and greater than the best-estimate portfolio. By investing in a diversified portfolio, a reasonable current service cost can still be achieved along with lower volatility and lower downside risk than portfolio #5, and therefore, a lower probability of significant losses and large unforeseen additional contributions.

The best-estimate portfolio is invested 23% in fixed income securities, 47% in equity and 30% in real assets in the long-term, which is close to PSPIB's current long-term asset-mix objective. Such a portfolio produces an ultimate annual real return of 4.0% net of all investment expenses (assumed to total 0.20% of assets) with a standard deviation of 11.2%.

C. Financial Market Tail Events

This section focuses on the volatility present in the best-estimate portfolio and the extreme outcomes that could result. During plan year 2009, the nominal return on PSPIB assets was (22.7%) due to the economic slowdown. Such an event could be characterized as low probability (also referred to as a "tail event"). However, when these events do occur, the impact on the funding ratio is significant. This section analyzes the impacts that tail events returns would have on the Pension Fund's funding ratio. To illustrate this, returns other than the best-estimate are assumed to occur in plan year 2019. Two alternative portfolios were selected from section B to show the potential variation in tail returns of a less risky (Portfolio 4: 40% equity, 15% real assets, 45% fixed income) and a more risky (Portfolio 5: 100% equity) portfolio in relation to the best-estimate portfolio.

It is assumed that the returns of the three portfolios follow a normal distribution. The long-term mean and annual standard deviation for each portfolio is given in Table 64. Returns at two probability levels were selected to analyze: 1/10 and 1/50. The probabilities of earning

[1] For illustration purposes, it is assumed that ultimate returns apply for the entire projection period. Annual returns are assumed to follow a normal distribution and are assumed to be independent between the years (no mean reversion).

these returns can be thought of as once every 10 and 50 years, respectively. Since the normal distribution has two tails, a left tail and a right tail, both were examined. The left tail event is the occurrence of a nominal return such that the probability of earning that return or less is equal to 1/10 (or 1/50). The right tail event is the occurrence of a nominal return such that the probability of earning that return or more is equal to 1/10 (or 1/50).

For each portfolio a nominal return is calculated at the two probability levels. The nominal returns are given in the following table.

Table 66 Tail Event Portfolio Returns - CFPF

		Portfolio 4: 40% Equities/ 45% Fixed Income/ 15% Real Assets	Best-Estimate Portfolio: 47% Equities/ 23% Fixed Income/ 30% Real Assets	Portfolio 5: 100% Equities
Probability of return[1]	Tail	Nominal Return	Nominal Return	Nominal Return
1/50	Left	(12.2%)	(16.4%)	(25.4%)
1/10	Left	(5.3%)	(7.8%)	(12.9%)
1/10	Right	17.7%	21.0%	28.3%
1/50	Right	24.6%	29.7%	40.8%

Table 67 shows the impact on the projected surplus/(deficit) as at 31 March 2019 (the expected date of the next actuarial review) if the nominal return for plan year 2019 happens to be equal to the returns presented in Table 66 for the best-estimate scenario. Following the various portfolio returns in plan year 2019, it is assumed that the return will revert back to its best-estimate value for plan year 2020.

Table 67 Sensitivity of the Projected CFPF Surplus/(Deficit) as at 31 March 2019
($ millions)

Assumption(s) Varied	Actuarial Value of Assets	Liability	Surplus/ (Deficit)	Annual Special Payments[2]
None (i.e. current basis)	29,537	29,414	123	0
Investment return				
- Left Tail event at 1/50th probability	25,823	29,414	(3,591)	366
- Left Tail event at 1/10th probability	28,435	29,414	(979)	89
- Right Tail event at 1/10th probability	30,419	29,414	1,005	0
- Right Tail event at 1/50th probability	32,523	29,414	3,109	0

D. Impact of Lower Bond Yields

This section explores the consequences of slower than expected economic growth through a reduction in expected bond yields and variable income securities over the full projection period. Current bond yields are much lower than their historical averages and, without stronger economic growth, might well remain low over the next few years. Over the last 15- and 50-year periods ending 31 December 2015, the average real yield of long-term

[1] The probability of earning the positive returns in the table corresponds to the probability that the annual return is greater than or equal to the indicated return. Similarly, the probability of earning the negative returns in the table corresponds to the probability that the annual return is less than or equal to the indicated return.

[2] Equal annual special payments to amortize the deficit over the next 15 years starting 31 March 2021

Government of Canada bonds was 2.1% and 3.2%, respectively. This is much higher than the 0.3% real yield on long-term federal bonds as at March 2016. This section looks at the impact of keeping the current 0.3% real yield for another year and reducing all subsequent long-term federal bond yields by at least 0.3% prolonging the current period of low bond yields for another year and reducing all subsequent long-term federal bond yields by 0.3%.

The best-estimate scenario assumes that the long-term federal bond real (nominal) yield reaches its ultimate value of 2.7% (4.7%) at the beginning of plan year 2028. This scenario assumes that economic growth will remain weak for another year and moderate thereafter. Consequently, the long-term federal bond nominal yield would not increase above its current level before the third year of projection, and would reach its ultimate real (nominal) value of 2.4% (4.4%) at the beginning of plan year 2028. As a result, the new money rate will also be affected and would be about 0.3% lower over the full projection period. In addition, returns for equities and real assets would also be lower for the entire projection period. Thus, returns would be 0.3% per year lower on average over the next 10 years and thereafter than under the best estimate scenario.

Table 68 shows the impact that such a scenario would have on the expected short-term investment returns and new money rate, as well as the impact on accrued liabilities and annual special credits/payments required to fund the Superannuation Account shortfall and the CFPF deficit.

Table 68 Impact on the Superannuation Account / CFPF of Prolonged Low Bond Yields
($ millions)

Superannuation Account	Best-Estimate	Low Bond Yields	Difference
2017-2021 Average New Money Rate	2.8%	2.5%	(0.3%)
2017-2026 Average New Money Rate	3.5%	3.2%	(0.3%)
Total Actuarial Liability	47,385	48,104	719
Actuarial Excess/(Shortfall)	(1,667)	(2,386)	(719)
Special Credits	152	218	66
CFPF	Best-Estimate	Low Bond Yields	Difference
2017-2021 Average New Money Rate	5.0%	4.8%	(0.2%)
2017-2026 Average New Money Rate	5.3%	5.0%	(0.3%)
Total Actuarial Liability	24,048	25,302	1,254
Actuarial Surplus/(Deficit)	(1,570)	(2,824)	(1,254)
Special Payments	145	270	125

Prolonging low bond yields for an additional year and reducing the ultimate long-term federal bond yields by 0.3% result in higher actuarial liability and higher special credits/payments for both, the Superannuation Account and the CFPF.

Appendix 13 - Detailed Information on Membership Data

In this appendix, the 'Age' and 'Service' nomenclature refers to completed years calculated at the beginning of the plan year.

Table 69 Regular Force Male Officers
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	326 $20,199								326 $20,199
20-24	890 $33,191	313 $60,136							1,203 $40,201
25-29	613 $56,854	1,022 $77,872	277 $86,519						1,912 $72,386
30-34	282 $63,725	771 $88,054	917 $96,551	182 $104,436					2,152 $89,872
35-39	93 $65,780	355 $91,141	747 $102,504	775 $107,163	146 $117,066				2,116 $101,695
40-44	60 $77,592	153 $92,178	360 $100,666	536 $110,325	659 $115,356	200 $120,133			1,968 $108,831
45-49	59 $81,424	110 $97,519	147 $103,153	243 $105,708	353 $115,564	793 $119,352	126 $127,148		1,831 $113,513
50-54	23 $87,459	77 $100,583	102 $103,562	92 $106,795	163 $112,829	531 $118,976	750 $120,872	91 $129,329	1,829 $117,078
55-59	3 $97,058	37 $118,241	36 $104,672	29 $106,138	53 $112,022	119 $112,834	264 $123,510	126 $118,103	667 $117,488
60+[2]		2 $72,579	1 $105,057	5 $91,170			6 $93,436	2 $130,817	16 $95,520
All Ages	2,349 $45,477	2,840 $83,010	2,587 $98,536	1,862 $107,540	1,374 $115,163	1,643 $118,854	1,146 $122,026	219 $122,884	14,020 $94,008

	31 March 2016	31 March 2013
Average age:	38.1	38.4
Average pensionable service:	14.7	15.0
Annualized pensionable payroll[3]:	$1,317,989,709	$1,243,420,040
Total PBDA[4] indexed reduction to basic annuity:	$4,044,409	$4,149,135
Total PBDA[4] indexed reduction adjustment:	$705,478	$752,057

1 As defined in Note 1 of Appendix 2-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.
4 PBDA means the Pension Benefits Division Act.

Table 70 Regular Force Male Other Ranks
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	934 $36,966								934 $36,966
20-24	5,366 $46,429	652 $60,916							6,018 $47,998
25-29	3,131 $49,768	5,958 $62,668	555 $65,380						9,644 $58,636
30-34	958 $51,325	3,628 $63,227	4,118 $66,609	307 $69,729					9,011 $63,729
35-39	328 $51,093	1,310 $63,437	2,797 $67,214	2,400 $70,485	141 $74,512				6,976 $67,020
40-44	138 $51,500	546 $62,867	1,015 $66,914	1,619 $70,242	1,417 $74,550	348 $77,570			5,083 $69,979
45-49	77 $53,294	238 $63,140	396 $65,811	487 $68,927	806 $73,073	2,055 $78,700	209 $81,809		4,268 $74,152
50-54	36 $51,417	128 $62,649	190 $65,585	184 $66,014	265 $69,709	881 $75,836	1,430 $81,475	141 $85,473	3,255 $76,289
55-59	10 $52,758	33 $64,302	46 $66,990	51 $67,682	68 $67,261	115 $71,088	274 $78,390	190 $81,765	787 $74,900
60+[2]				2 $75,160	3 $59,557	2 $67,993	1 $80,524		8 $68,188
All Ages	10,978 $47,277	12,493 $62,841	9,117 $66,700	5,050 $70,022	2,700 $73,432	3,401 $77,579	1,914 $81,069	331 $83,345	45,984 $63,297

	31 March 2016	31 March 2013
Average age:	34.4	34.8
Average pensionable service:	11.4	11.9
Annualized pensionable payroll[3]:	$2,910,652,558	$2,832,355,612
Total PBDA[4] indexed reduction to basic annuity:	$6,181,203	$6,838,473
Total PBDA[4] indexed reduction adjustment:	$1,544,662	$1,797,924

1 As defined in Note 1 of Appendix 2-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.
4 PBDA means the Pension Benefits Division Act.

Table 71 Regular Force Female Officers
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	63 $19,696								63 $19,696
20-24	190 $32,905	85 $59,874							275 $41,241
25-29	114 $63,056	278 $79,993	66 $88,003						458 $76,932
30-34	77 $61,525	174 $96,159	269 $95,719	74 $104,653					594 $92,528
35-39	25 $71,193	115 $90,369	193 $98,122	208 $106,971	38 $114,425				579 $99,668
40-44	10 $70,491	44 $89,769	89 $105,866	135 $112,533	127 $113,909	24 $111,295			429 $108,173
45-49	13 $68,538	28 $86,485	49 $103,624	70 $111,831	89 $112,316	80 $115,432	12 $111,013		341 $107,863
50-54	5 $112,768	17 $94,738	30 $100,275	28 $109,597	50 $104,693	74 $119,442	60 $120,163	5 $143,804	269 $112,467
55-59		7 $105,667	4 $125,527	12 $103,363	15 $108,555	12 $94,627	17 $127,260	3 $161,453	70 $112,768
60+[2]			1 $105,057	2 $85,718					3 $92,164
All Ages	497 $46,998	748 $84,456	701 $97,874	529 $108,686	319 $111,830	190 $115,157	89 $120,285	8 $150,422	3,081 $91,560

	31 March 2016	31 March 2013
Average age:	36.4	35.8
Average pensionable service:	12.6	12.1
Annualized pensionable payroll[3]:	$282,097,867	$253,328,042
Total PBDA[4] indexed reduction to basic annuity:	$96,514	$59,629
Total PBDA[4] indexed reduction adjustment:	$15,344	$7,746

1 As defined in Note 1 of Appendix 2-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.
4 PBDA means the Pension Benefits Division Act.

Table 72 Regular Force Female Other Ranks
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	54 $37,834								54 $37,834
20-24	575 $46,153	53 $60,281							628 $47,345
25-29	554 $47,971	680 $61,739	48 $65,481						1,282 $55,929
30-34	270 $48,637	611 $62,190	510 $64,414	43 $68,410					1,434 $60,616
35-39	161 $48,382	335 $61,712	512 $64,820	339 $68,245	6 $69,977				1,353 $62,976
40-44	69 $49,280	210 $62,227	349 $64,984	302 $67,359	182 $69,676	44 $76,606			1,156 $65,347
45-49	36 $49,729	100 $60,785	216 $65,092	148 $67,397	160 $69,113	264 $76,608	19 $81,521		943 $68,648
50-54	14 $50,441	67 $60,488	116 $64,241	87 $66,008	84 $66,014	150 $72,604	121 $79,385	5 $88,155	644 $69,000
55-59	3 $42,466	13 $57,672	37 $59,876	27 $65,576	36 $64,402	33 $69,644	26 $76,801	9 $83,750	184 $66,470
All Ages	1,736 $47,294	2,069 $61,768	1,788 $64,647	948 $67,539	469 $68,404	492 $74,915	166 $79,225	14 $85,323	7,682 $61,547

	31 March 2016	31 March 2013
Average age:	36.8	36.9
Average pensionable service:	11.0	11.1
Annualized pensionable payroll[2]:	$472,802,042	$462,148,161
Total PBDA[3] indexed reduction to basic annuity:	$101,980	$70,120
Total PBDA[4] indexed reduction adjustment:	$28,427	$19,559

1 As defined in Note 1 of Appendix 2-D.
2 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.
3 PBDA means the Pension Benefits Division Act.

Table 73 Reserve Force - Male Officers
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	3 $15,672								3 $15,672
20-24	370 $12,449	7 $20,805							377 $12,604
25-29	440 $13,168	304 $16,364	12 $24,455						756 $14,633
30-34	152 $12,477	342 $14,770	91 $16,081	17 $15,341					602 $14,405
35-39	113 $10,797	290 $10,551	33 $14,321	86 $19,313	14 $22,382				536 $12,550
40-44	118 $11,809	249 $12,279	20 $14,230	31 $11,504	85 $17,855	37 $18,384			540 $13,500
45-49	130 $12,119	247 $13,786	10 $12,722	13 $17,659	32 $14,484	86 $24,222	19 $18,987		537 $15,353
50-54	105 $9,840	215 $11,448	11 $24,108	18 $18,908	17 $19,972	26 $24,156	66 $23,337	20 $21,055	478 $14,705
55-59	66 $9,141	184 $12,749	20 $20,366	11 $22,908	14 $22,516	17 $25,676	17 $19,669	57 $24,604	386 $15,795
60+[2]	33 $7,075	127 $9,235	10 $11,285	9 $16,344	3 $8,557	3 $6,434	10 $26,116	17 $12,849	212 $10,334
All Ages	1,530 $12,028	1,965 $13,066	207 $16,554	185 $17,553	165 $18,030	169 $22,764	112 $22,290	94 $21,723	4,427 $14,030

	31 March 2016	31 March 2013
Average age:	39.7	39.6
Average pensionable service:	9.0	6.0
Annualized pensionable payroll[3]:	$60,068,961	$68,524,496

1 As defined in Note 1 of Appendix 1-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.

Table 74 Reserve Force - Male Other Ranks
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	285 $12,066								285 $12,066
20-24	3,098 $13,605	404 $15,449							3,502 $13,818
25-29	1,070 $14,086	1,740 $15,498	111 $14,878						2,921 $14,957
30-34	326 $13,768	833 $11,889	224 $14,090	76 $15,242					1,459 $12,821
35-39	194 $10,612	312 $12,029	34 $17,809	133 $14,960	44 $14,187				717 $12,596
40-44	119 $11,320	248 $8,995	11 $14,124	34 $15,951	130 $13,840	77 $13,821			619 $11,533
45-49	113 $9,845	196 $9,766	12 $9,350	13 $12,679	26 $14,731	92 $15,914	33 $16,754		485 $11,760
50-54	80 $9,780	151 $10,923	11 $14,868	8 $17,468	19 $12,447	9 $17,531	52 $16,169	29 $17,603	359 $12,481
55-59	40 $8,268	84 $10,741	9 $10,588	9 $6,620	7 $16,136	16 $16,462	8 $17,178	30 $13,840	203 $11,413
60+[3]	51 $5,794	32 $7,325			2 $7,363			3 $35,125	88 $7,386
All Ages	5,376 $13,221	4,000 $13,449	412 $14,416	273 $14,852	228 $13,906	194 $15,203	93 $16,463	62 $16,630	10,638 $13,494

	31 March 2016	31 March 2013
Average age:	29.9	28.9
Average pensionable service:	6.3	4.5
Annualized pensionable payroll[4]:	$142,515,113	$166,186,539

1 As defined in Note 1 of Appendix 1-D.
2 As defined in Note 1 of Appendix 1-D.
3 As at 31 March 2016 these members are treated as pensioners.
4 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.

Table 75 Reserve Force - Female Officers
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	0 $0								0 $0
20-24	222 $9,586	1 $26,739							223 $9,663
25-29	255 $10,029	218 $11,311	8 $27,166						481 $10,895
30-34	90 $11,166	256 $8,624	38 $13,303	9 $11,268					393 $9,719
35-39	68 $11,950	162 $10,181	10 $12,758	36 $12,159	2 $3,239				278 $10,912
40-44	64 $9,252	124 $10,465	2 $21,450	12 $17,821	24 $20,952	8 $15,419			234 $11,849
45-49	60 $11,976	106 $10,332	3 $6,015	4 $13,767	8 $22,423	16 $22,782	4 $24,896		201 $12,589
50-54	54 $9,278	76 $12,364	8 $15,088	5 $3,681	2 $18,058	7 $17,278	11 $16,815	4 $9,694	167 $11,740
55-59	26 $8,020	87 $9,074	4 $11,696	6 $10,484	4 $8,409	2 $17,386	2 $5,745	7 $18,843	138 $9,561
60+[2]	13 $6,961	39 $10,990	3 $9,319	4 $14,467	1 $6,696	2 $9,182	1 $20,034	2 $7,398	65 $10,228
All Ages	852 $10,110	1,069 $10,196	76 $14,563	76 $12,463	41 $18,662	35 $18,913	18 $17,560	13 $14,267	2,180 $10,778

	31 March 2016	31 March 2013
Average age:	37.0	36.6
Average pensionable service:	7.0	5.1
Annualized pensionable payroll[3]:	$23,311,164	$28,206,683

1 As defined in Note 1 of Appendix 1-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.

Table 76 Reserve Force - Female Other Ranks
Number and Average Annual Earnings[1] as at 31 March 2016

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	All Years of Service
15-19	28 $13,650								28 $13,650
20-24	498 $15,705	69 $19,579							567 $16,177
25-29	220 $18,188	358 $16,028	24 $15,251						602 $16,786
30-34	61 $21,551	162 $15,710	70 $16,069	15 $5,761					308 $16,464
35-39	51 $18,620	69 $11,738	3 $2,275	44 $13,767	13 $17,039				180 $14,409
40-44	41 $16,759	43 $18,346	3 $17,976	8 $15,472	15 $25,909	6 $19,787			116 $18,630
45-49	35 $20,374	32 $18,864	1 $8,959	5 $26,334	3 $36,868	15 $15,926	7 $13,601		98 $19,409
50-54	25 $14,798	27 $17,484	4 $15,551	1 $18,815	3 $6,083	6 $18,913	13 $17,583	3 $15,662	82 $16,223
55-59	13 $23,459	17 $10,622	3 $31,369	3 $21,981		2 $21,081	2 $19,458	5 $14,820	45 $17,795
60+[2]	2 $7,066	4 $7,064							6 $7,065
All Ages	974 $17,000	781 $16,027	108 $15,897	76 $13,584	34 $21,735	29 $17,699	22 $16,487	8 $15,136	2,032 $16,516

	31 March 2016	31 March 2013
Average age:	30.7	29.9
Average pensionable service:	6.5	5.0
Annualized pensionable payroll[3]:	$33,439,523	$38,475,409

1 As defined in Note 1 of Appendix 1-D.
2 As at 31 March 2016 these members are treated as pensioners.
3 The aggregate pensionable earnings of all contributors with less than 35 years of pensionable service.

Table 77 Regular Force - Officer Male - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable)[1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	-	-	-	47	799	-	-
25-29	-	-	-	-	48	3,762	-	-
30-34	-	-	-	-	57	11,257	-	-
35-39	15	45,224	1	9,900	83	13,392	2	6,101
40-44	225	42,243	4	36,876	60	13,176	2	1,162
45-49	651	40,726	18	25,094	40	18,050	1	7,824
50-54	1,681	42,168	39	17,602	65	18,025	1	9,903
55-59	2,246	51,468	112	14,148	44	16,215	3	2,289
60-64	2,173	57,728	127	9,353	-	-	-	-
65-69	2,168	46,240	96	5,288	-	-	-	-
70-74	2,296	44,302	36	1,469	-	-	-	-
75-79	1,813	45,926	4	537	-	-	-	-
80-84	1,416	46,575	-	-	-	-	-	-
90-94	527	41,380	-	-	-	-	-	-
95-99	130	38,457	-	-	-	-	-	-
100+	9	33,508	-	-	-	-	-	-
All Ages	16,348	$47,110	437	$10,596	444	$12,092	9	$4,347

	31 March 2016	31 March 2013
Average age	67.4	67.7
Average age at retirement	48.3	48.1

Table 78 Regular Force - Officer Female - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	$-	12	$1,150	-	$-
25-29	-	-	-	-	10	3,790	-	-
30-34	-	-	-	-	25	9,111	-	-
35-39	9	41,794	-	-	26	13,377	1	8,491
40-44	77	41,582	1	29,228	15	9,560	3	2,169
45-49	118	36,406	8	23,992	11	17,436	-	-
50-54	193	35,954	7	15,159	19	19,305	1	5,857
55-59	195	44,321	7	24,916	13	19,513	2	3,884
60-64	167	47,563	12	9,026	-	-	-	-
65-69	135	38,310	4	4,585	-	-	-	-
70-74	55	32,682	3	2,178	-	-	-	-
75-79	36	36,743	-	-	-	-	-	-
80-84	26	33,970	-	-	-	-	-	-
90-94	22	28,809	-	-	-	-	-	-
95-99	5	17,843	-	-	-	-	-	-
100+	2	21,821	-	-	-	-	-	-
All Ages	1,064	$39,542	42	$15,116	131	$12,084	7	$4,089

	31 March 2016	31 March 2013
Average age	57.8	59.6
Average age at retirement	45.2	46.2

[1] Includes annual allowance adjustments, PBDA reductions and CPP coordination if in effect at the valuation date.

Table 79 Regular Force - Other Rank Male - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	-	333	$1,357	-	-
25-29	1	11,938	-	-	477	4,160	-	-
30-34	3	13,611	-	-	511	5,586	-	-
35-39	26	20,602	-	-	262	7,031	-	-
40-44	519	27,988	-	-	115	9,634	-	-
45-49	2,357	27,766	-	-	75	12,596	-	-
50-54	6,134	25,597	-	-	107	13,521	-	-
55-59	7,535	24,548	-	-	91	14,607	-	-
60-64	5,458	30,550	-	-	-	-	-	-
65-69	6,006	24,246	-	-	-	-	-	-
70-74	5,645	24,009	-	-	-	-	-	-
75-79	6,177	23,318	-	-	-	-	-	-
80-84	5,202	22,464	-	-	-	-	-	-
90-94	856	22,840	-	-	-	-	-	-
95-99	208	22,347	-	-	-	-	-	-
100+	10	18,895	-	-	-	-	-	-
All Ages	48,509	$24,918	-	-	1,971	$6,068	-	-

	31 March 2016	31 March 2013
Average age	66.0	66.3
Average age at retirement	44.5	44.9

Table 80 Regular Force - Other Rank Female - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	-	26	$1,299	-	-
25-29	-	-	-	-	26	3,949	-	-
30-34	1	3,697	-	-	51	5,813	-	-
35-39	1	13,489	-	-	48	7,185	-	-
40-44	52	27,285	-	-	39	9,647	-	-
45-49	278	26,257	-	-	27	10,991	-	-
50-54	852	22,721	-	-	48	11,229	-	-
55-59	1,084	20,785	-	-	23	10,537	-	-
60-64	565	26,883	-	-	-	-	-	-
65-69	265	21,515	-	-	-	-	-	-
70-74	63	21,307	-	-	-	-	-	-
75-79	60	19,730	-	-	-	-	-	-
80-84	23	18,719	-	-	-	-	-	-
90-94	5	16,564	-	-	-	-	-	-
All Ages	3,261	$22,914	-	-	288	$7,750	-	-

	31 March 2016	31 March 2013
Average age	56.4	55.4
Average age at retirement	42.5	42.5

[1] Includes annual allowance adjustments, PBDA reductions and CPP coordination if in effect at the valuation date.

Table 81 Regular Force - Officer Male - 3B Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	$-	4	$2,086	-	$-
25-29	2	11,371	-	-	17	5,275	-	-
30-34	15	18,216	-	-	11	6,408	-	-
35-39	47	22,256	3	5,631	8	9,312	-	-
40-44	80	33,285	6	16,931	14	12,323	-	-
45-49	129	38,945	5	18,179	4	30,392	-	-
50-54	341	45,910	14	14,610	5	37,704	-	-
55-59	372	56,347	13	13,076	5	37,413	1	16,364
60-64	295	57,583	14	13,059	-	-	-	-
65-69	149	47,214	3	682	-	-	-	-
70-74	72	43,631	4	7,289	-	-	-	-
75-79	35	42,758	-	-	-	-	-	-
80-84	13	32,737	-	-	-	-	-	-
90-94	2	21,027	-	-	-	-	-	-
All Ages	1,557	$48,103	62	$12,870	68	$13,422	1	$16,364

	31 March 2016	31 March 2013
Average age	56.5	56.5
Average age at retirement	47.5	47.4

Table 82 Regular Force - Officer Female - 3B Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	$-	-	$-	-	$-
25-29	-	-	-	-	7	4,774	-	-
30-34	9	19,456	-	-	7	7,478	-	-
35-39	28	19,377	1	6,660	3	13,834	1	6,995
40-44	45	31,142	3	9,450	3	20,056	-	-
45-49	53	34,295	2	17,140	5	5,496	-	-
50-54	84	44,845	8	15,029	2	35,308	-	-
55-59	78	48,325	9	13,153	4	18,772	1	3,656
60-64	53	48,058	2	8,970	-	-	-	-
65-69	27	41,129	2	17,943	-	-	-	-
70-74	6	29,495	-	-	-	-	-	-
75-79	-	-	-	-	-	-	-	-
80-84	1	31,877	-	-	-	-	-	-
All Ages	384	$39,946	27	$13,397	31	$11,633	2	$5,326

	31 March 2016	31 March 2013
Average age	52.0	56.5
Average age at retirement	44.6	47.4

[1] Includes annual allowance adjustments, PBDA reductions and CPP coordination if in effect at the valuation date.

Table 83 Regular Force - Other Rank Male - 3B Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	-	8	$2,247	-	-
25-29	17	11,481	-	-	106	6,092	-	-
30-34	245	13,955	-	-	110	7,239	-	-
35-39	554	16,025	-	-	69	9,468	-	-
40-44	1,100	20,585	-	-	33	9,510	-	-
45-49	2,470	24,097	-	-	28	14,895	-	-
50-54	3,916	27,154	-	-	22	10,706	-	-
55-59	2,745	30,686	-	-	17	11,281	-	-
60-64	1,206	31,744	-	-	-	-	-	-
65-69	759	23,413	-	-	-	-	-	-
70-74	480	19,422	-	-	-	-	-	-
75-79	423	17,537	-	-	-	-	-	-
80-84	318	15,368	-	-	-	-	-	-
90-94	28	15,698	-	-	-	-	-	-
95-99	8	16,915	-	-	-	-	-	-
All Ages	14,422	$25,367	-	-	393	$8,324	-	-

	31 March 2016	31 March 2013
Average age	54.6	54.4
Average age at retirement	42.4	42.2

Table 84 Regular Force - Other Rank Female - 3B Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate Annuity (includes PBDA,CPP if applicable) [1]				Deferred annuity			
	SA/CFPF		RCA		SA/CFPF		RCA	
Age	Number	Pension	Number	Pension	Number	Pension	Number	Pension
To 24	-	$-	-	-	3	$3,356	-	-
25-29	2	11,483	-	-	25	5,431	-	-
30-34	50	13,436	-	-	29	6,428	-	-
35-39	118	15,522	-	-	27	7,809	-	-
40-44	221	19,195	-	-	22	8,669	-	-
45-49	521	22,280	-	-	22	11,766	-	-
50-54	825	25,140	-	-	13	8,578	-	-
55-59	578	27,016	-	-	13	13,715	-	-
60-64	201	27,091	-	-	-	-	-	-
65-69	44	20,659	-	-	-	-	-	-
70-74	1	25,261	-	-	-	-	-	-
75-79	1	25,189	-	-	-	-	-	-
80-84	1	17,455	-	-	-	-	-	-
All Ages	2,564	$23,854	-	-	154	$8,328	-	-

	31 March 2016	31 March 2013
Average age	51.1	50.4
Average age at retirement	42.6	42.1

[1] Includes annual allowance adjustments, PBDA reductions and CPP coordination if in effect at the valuation date.

Table 85 Reserve Force Officer Male - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate annuity		Deferred annuity	
Age	Number	Pension	Number	Number
To 29	-	$-	99	$726
30-34	-	-	168	965
35-39	-	-	138	1,302
40-44	-	-	110	1,847
45-49	-	-	121	2,574
50-54	9	6,795	116	4,745
55-59	50	11,535	127	4,040
60-64	238	6,511	-	-
65-69	240	3,354	-	-
70-74	40	2,715	-	-
All Ages	577	$5,375	879	$2,266
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	64.4	63.5	42.3	41.5
Average age at retirement	60.8	62.3	39.4	39.6

Table 86 Reserve Force Officer Female - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate annuity		Deferred annuity	
Age	Number	Pension	Number	Number
To 29	-	$-	79	$442
30-34	-	-	124	578
35-39	-	-	61	940
40-44	-	-	50	1,452
45-49	-	-	40	2,793
50-54	7	1,821	36	1,871
55-59	13	8,036	41	2,885
60-64	46	6,480	-	-
65-69	61	2,871	-	-
70-74	6	2,757	-	-
All Ages	133	$4,564	431	$1,238
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	64.0	63.3	38.8	38.0
Average age at retirement	60.8	61.0	35.7	35.9

Table 87 Reserve Force Other Rank Male - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate annuity		Deferred annuity	
Age	Number	Pension	Number	Pension
To 29	-	$-	1,540	$779
30-34	-	-	681	1,208
35-39	-	-	314	1,607
40-44	-	-	193	2,112
45-49	-	-	106	2,974
50-54	13	3,957	79	4,451
55-59	36	7,720	82	3,108
60-64	110	5,144	-	-
65-69	19	3,577	-	-
70-74	7	282	-	-
All Ages	186	$5,190	2,995	$1,287
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	61.5	61.0	32.1	31.1
Average age at retirement	58.3	58.4	29.3	29.1

Table 88 Reserve Force Other Rank Female - Retirement Pensioners
Number and Average Annual Pension as at 31 March 2016

	Immediate annuity		Deferred annuity	
Age	Number	Pension	Number	Pension
To 29	-	$-	266	$842
30-34	-	-	154	1,218
35-39	-	-	89	1,691
40-44	-	-	51	2,536
45-49	-	-	30	4,109
50-54	8	12,963	25	7,179
55-59	15	4,210	22	3,050
60-64	20	7,391	-	-
65-69	2	1,739	-	-
All Ages	45	$7,070	637	$1,666
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	59.3	58.5	33.9	32.3
Average age at retirement	55.9	56.5	30.9	30.3

Table 89 Reserve Force Officer - Disability Pensioners
Number and Average Annual Pension as at 31 March 2016

	Male Officer		Female Officer	
Age	Number	Pension	Number	Pension
45-49	1	$2,011	-	-
50-54	2	3,572	-	-
55-59	1	12,900	-	-
60-64	10	1,286	-	-
65-69	1	422	-	-
All Ages	15	$2,356	-	-
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	60.1	58.9	N/A	N/A
Average age at retirement	56.3	55.7	N/A	N/A

Table 90 Reserve Force Other Rank - Disability Pensioners
Number and Average Annual Pension as at 31 March 2016

	Male Other Rank		Female Other Rank	
Age	Number	Pension	Number	Pension
40-44	-	$-	1	$14,152
45-49	2	4,826	-	-
50-54	1	9,335	1	8,689
55-59	2	8,053	3	13,008
60-64	2	1,427	-	-
All Ages	7	$5,421	5	$12,373
	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	54.6	55.8	53.9	54.9
Average age at retirement	49.6	52.7	48.8	51.4

Table 91 Regular Force Surviving Spouses
Number and Average Annual Pension as at 31 March 2016

	Number			RCA			
				Spouse Allowance for Service since 1992		Maximum Earnings Limit for service since 1995	
Age	Widower	Widow	Allowance	Number	Allowance	Number	Pension
To 24	-	2	$1,986	-	-	-	-
25-29	-	20	4,731	3	121	-	-
30-34	2	45	5,501	9	167	-	-
35-39	4	62	8,596	9	104	-	-
40-44	1	101	10,433	22	1,698	-	-
45-49	9	209	12,748	44	152	-	-
50-54	25	438	12,509	123	400	3	6,445
55-59	37	641	13,786	176	693	-	-
60-64	22	952	14,457	142	1,325	2	4,104
65-69	20	1,710	14,832	66	3,683	1	5,677
70-74	16	2,549	14,535	11	1,614	2	1,341
75-79	19	3,818	13,792	8	1,348	-	-
80-84	19	4,421	13,423	-	-	-	-
85-89	8	3,854	13,438	-	-	-	-
95-99	1	696	13,340	-	-	-	-
100-104	-	84	12,451	-	-	-	-
105+	-	1	6,076	-	-	-	-
All Ages	187	22,256	$13,728	613	$1,106	8	$4,488

	31 March 2016	31 March 2013
Male average age	65.3	63.5
Female average age	79.0	78.6
Male average age at death of member	56.4	54.5
Female average age at death of member	64.6	63.3
Total annual allowances payable - $ millions	307.1	298.1

Table 92 Reserve Force Surviving Spouses
Number and Average Annual Allowance as at 31 March 2016

	Widow		Widower	
Age	Number	Allowance	Number	Allowance
To 29	1	$2,238	-	$-
30-34	4	2,111	-	-
35-39	5	1,612	1	1,817
40-44	3	2,564	-	-
45-49	4	1,118	1	991
50-54	6	1,725	2	360
55-59	9	4,065	-	-
60-64	4	1,539	2	5,697
65-69	2	1,994	1	479
70-74	3	1,739	-	-
All Ages	41	$2,273	7	$2,200

	31 March 2016	31 March 2013	31 March 2016	31 March 2013
Average age	50.8	47.7	54.6	44.0
Average age at death of member	47.9	45.8	52.2	42.4

Appendix 14 - Acknowledgements

The Department of National Defence provided relevant valuation input data on active members, pensioners and survivors. Superannuation Directorate of the Department of Public Services and Procurement Canada provided additional information in respect of pensioners and survivors.

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