

75 Re	16 S	66 Dy	4 Be	57 La	34 Se	03 Li	01 H
105 Db	74 W	58 Ce	22 Ti	18 Ar	59 Pa	24 Cr	39 Y
50 Sn	74 Ru	10 Ca	<div>Actuarial Valuation Report as at December 31, 2016</div>				
47 Ag	06 C	13 Al					
28 Ni	07 N	32 Ge					
87 Fr	56 Ba	11 Na	<div>Civil Service Superannuation Fund</div>				
10 Ne	08 O	54 Xe					
36 Kr	92 U	94 Pu					
107 Bh	64 Gd	63 Eu	<div><div><div></div><div></div><div></div></div><div>Ellement</div><div>Pensions   Benefits   Investments</div></div>				
106 Sg	92 U	94 Pu					
40 Zr	64 Gd	63 Eu					
			69 Tm	65 Tb	17 Cl	109 Mt	48 Cd



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## APPENDICES

- I Financial & Membership Data
- II Summary of the Plan
- III Actuarial Assumptions

## I. ACTUARIES' OPINION

This Actuarial Valuation Report (Report/Valuation) has been prepared to determine the funding requirements of the Civil Service Superannuation Fund (Fund) and present the results of the Report on a going concern and solvency test (wind-up) basis, as at December 31, 2016 (Valuation Date), and the adequacy of the contributions being paid to finance basic benefits and pay expenses. This Valuation concerns itself with the basic portion of the benefits (Basic Account) financed by the Fund as defined under the Civil Service Superannuation Act (Plan or CSSA) as at December 31, 2016. A separate report is prepared on the Superannuation Adjustment Account (Indexing Account) which is responsible for indexing of pensions on and after July 1, 1977, and separate employer reports on the portion of the benefits not financed by the Fund.

Actual going concern experience has been less favourable than expected during 2016. In the future, there will be periods when actual experience is more favourable than expected and other periods when actual experience is less favourable than expected, resulting in future gains and losses. The Fund self-insures all benefits and therefore is exposed to investment and demographic risks which must continue to be monitored in the future. Benefits may alternatively be purchased at an insurance carrier to eliminate a portion of these risks. In the future, an asset liability method that is more closely aligned with all or a portion of the liability structure may be considered. This strategy may be cost effective in an appropriate economic climate and should be reviewed on an on-going basis by the Civil Service Superannuation Board (Board).

In our opinion, for the purposes of this Report:

- The financial and the membership data (Appendix I) on which the Valuation is based are sufficient and reliable for the purpose of the Valuation. The total membership counts shown in the Report are different from the amounts reported in the General Manager's Report due to additional new entrants, retirements, disablements, terminations, and deaths following December 31, 2016 that were provided by the Board's staff.
- The benefits used in the calculations are based on the Plan as amended to December 31, 2016 (Appendix II).
- The assumptions and the methods which have been used in this Valuation are appropriate for the purpose of determining the financial position of the Fund and the funding requirements of the Fund on a going concern basis and on a solvency test (wind-up) basis (Appendix III).
- The value of the Fund's assets would be less than the actuarial liabilities if the Fund had been hypothetically wound up on the Valuation Date (solvency test). The solvency test is provided for information only as the Plan is exempt from the funding requirements of the solvency test pursuant to Paragraph 4.5(2)(b) of the Regulations to the Manitoba Pension Benefits Act. However, the Canadian Institute of Actuaries (CIA) requires that the wind-up disclosure calculations be performed as part of accepted actuarial practice.
- Asset and liabilities have been rounded to the nearest dollar in this Report. In the Subsequent Events section of this Report - Page 11, we nevertheless describe the uncertainty implicit in the actuarial calculations. Due to the limited scope of our engagement, other than interest discount sensitivity analysis on Page 9, an analysis of the potential range of future measurements of the Plan's financial health due to alternative actuarial assumptions, future Plan experience, or changes in legislation was not performed.
- Contribution rates in respect of future service were increased by a total of 2.00% of salary (2012-2014), however, no program of contribution increases has been established to eliminate the deficit in respect of past service at this time (refer to Contribution Requirements - Page 5 and Subsequent Events - Page 11).

We hereby certify that, in our opinion, the assets of the Fund, together with future investment income, and the current contribution levels, are inadequate to provide the benefits promised by the Fund, in respect of service completed up to the Valuation Date based on the actuarial assumptions and methodology used in this Report. Without the necessary contribution increases and/or favourable future experience, assets will not be sufficient to provide the benefits. Contribution increases have been recommended in the past and should be considered in the near future if the deficit persists. It is essential that the investment and demographic experience continue to be monitored to evaluate changes in the financial health of the Plan and recommend appropriate actions.

This Valuation has been prepared and this opinion has been given in accordance with accepted actuarial practice in Canada.

This Valuation is subject to approval by the appropriate regulatory authorities. It is recommended the Board continue to monitor the inadequacy of the contribution rates, so that it may ensure the financial health of the Fund, and assist in meeting the increased accounting standards that are now required. The next Valuation is recommended to occur as at December 31, 2017.



Dennis Ellement, FSA, FCIA  
Winnipeg, Manitoba June 22, 2017



Brandon Ellement, FSA, FCIA

## 2. EXECUTIVE SUMMARY

GOING CONCERN VALUATION	31-Dec-2016	31-Dec-2015
Assets Available for Basic Benefits	\$ 4,323,872,000	\$ 4,215,096,000
▪ Expense Reserve	-	-
Liability for Basic Benefits		
▪ Active Participants	(2,214,514,123)	(2,115,126,598)
▪ Other Participants	(129,614,777)	(131,522,366)
▪ Pensions in Payment	(2,556,174,949)	(2,434,183,452)
▪ Adjustments:		
▫ Asset Smoothing Adjustment	(114,216,368)	(251,838,768)
▫ Contribution Deficiency Contingency	-	-
▫ Indexing Contingency	-	-
Surplus/(Unfunded Liability) Before Adjustments	\$ (576,431,849)	\$ (465,736,416)
Surplus/(Unfunded Liability) After Adjustments	\$ (690,648,217)	\$ (717,575,184)
Funding Ratio Before Adjustments	88.24%	90.05%
Funding Ratio After Adjustments	85.91%	84.67%

SOLVENCY TEST	31-Dec-2016	31-Dec-2015
Assets Available for Basic Benefits	\$ 4,323,872,000	\$ 4,215,096,000
▪ Expense Reserve	(21,619,000)	(21,075,000)
Liability for Basic Benefits		
▪ Active Participants	(3,061,486,264)	(2,917,634,872)
▪ Other Participants	(179,524,064)	(187,918,892)
▪ Pensions in Payment	(3,447,681,580)	(3,292,701,375)
▪ Adjustments:		
▫ Asset Smoothing Adjustment	-	-
▫ Contribution Deficiency Contingency	-	-
▫ Indexing Contingency	-	-
Solvency Excess/(Deficiency) Before Adjustments	\$ (2,386,438,908)	\$ (2,204,234,139)
Solvency Excess/(Deficiency) After Adjustments	\$ (2,386,438,908)	\$ (2,204,234,139)
Solvency Ratio Before Adjustments	64.32%	65.55%
Solvency Ratio After Adjustments	64.32%	65.55%

ANNUAL CONTRIBUTION REQUIREMENTS	2017 <CPPE / ≥CPPE	** <CPPE / ≥CPPE	2016 <CPPE / ≥CPPE
Required Contributions for Basic Benefits			
▪ Required Contributions:			
▫ Employee Required Contributions	8.00% / 9.00%		8.00% / 9.00%
▫ Employer (Matching) Required Contributions	7.10% / 9.00%		7.10% / 9.00%
Blended Required Contributions	7.93% / 9.00%		7.92% / 9.00%
▪ Indexing Account Allocation	(0.84%) / (0.92%)		(0.84%) / (0.92%)
Total Required Contributions for Basic Benefits	7.09% / 8.08%		7.08% / 8.08%
Total Theoretical Contributions for Basic Benefits	(6.94%) / (7.90%)		(7.03%) / (8.02%)
Contribution Margin/(Deficiency) for Basic Benefits	0.15% / 0.18%		0.05% / 0.06%

\*\* Contribution Requirements are represented as a percentage of earnings below/above the Canada Pension Plan Earnings (CPPE).

### 3. GOING CONCERN VALUATION\*

	31-Dec-2016		31-Dec-2015	
<b>Assets Available for Basic Benefits (Appendix I)</b>		<b>% of Liabilities</b>		<b>% of Liabilities</b>
▪ Fixed Income Investments (market value)	\$ 1,517,264,000		\$ 1,501,519,000	
▪ Equity Investments (market value)	5,560,394,000		5,383,689,000	
<b>Total Investments</b>	<b>\$ 7,077,658,000</b>		<b>\$ 6,885,208,000</b>	
▪ Net Receivables/Payables (incl. a Province Trust Account)	4,542,000		6,048,000	
▪ Debt due from the Province of Manitoba	1,826,000		1,826,000	
▪ Correctional Officers' Trust Account	(10,424,000)		(9,097,000)	
▪ Employer Trust Accounts	(92,088,000)		(86,899,000)	
▪ Money Purchase Accounts Plan	(36,618,000)		(34,233,000)	
▪ Province Unfunded Pension Liability Trust Accounts	(2,077,951,000)		(2,025,703,000)	
▪ Manitoba Hydro Enhanced Benefit Account	(26,874,000)		(23,809,000)	
<b>Net Assets Available for Benefits</b>	<b>\$ 4,840,071,000</b>		<b>\$ 4,713,341,000</b>	
▪ Superannuation Adjustment Account	(516,199,000)		(498,245,000)	
<b>Total Assets Available for Basic Benefits</b>	<b>\$ 4,323,872,000</b>		<b>\$ 4,215,096,000</b>	
▪ Expense Reserve	-		-	
<b>Actuarial Assets Available for Basic Benefits</b>	<b>\$ 4,323,872,000</b>	<b>88.24%</b>	<b>\$ 4,215,096,000</b>	<b>90.05%</b>
<b>Liabilities for Basic Benefits (Appendix II, III)</b>				
▪ Active Participants:				
▪ not eligible to retire	\$ 1,323,160,881	27.00%	\$ 1,265,943,634	27.05%
▪ eligible to retire reduced	211,493,863	4.32%	174,288,596	3.72%
▪ eligible to retire unreduced	679,859,379	13.87%	674,894,368	14.42%
	<b>\$ 2,214,514,123</b>	<b>45.19%</b>	<b>\$ 2,115,126,598</b>	<b>45.19%</b>
▪ Other Participants:				
▪ not eligible to retire	50,154,554	1.02%	67,042,336	1.43%
▪ eligible to retire reduced	29,368,844	0.60%	24,307,753	0.52%
▪ eligible to retire unreduced	9,763,110	0.20%	9,901,563	0.21%
▪ valuation accounts payable	40,328,269	0.82%	30,270,714	0.65%
	<b>\$ 129,614,777</b>	<b>2.64%</b>	<b>\$ 131,522,366</b>	<b>2.81%</b>
▪ Pensions in Payment:				
▪ retirement pensions	2,412,244,740	49.23%	2,291,708,577	48.96%
▪ survivors' pensions	143,930,209	2.94%	142,474,875	3.04%
	<b>\$ 2,556,174,949</b>	<b>52.17%</b>	<b>\$ 2,434,183,452</b>	<b>52.00%</b>
<b>Total Liabilities for Basic Benefits</b>	<b>\$ 4,900,303,849</b>	<b>100.00%</b>	<b>\$ 4,680,832,416</b>	<b>100.00%</b>
<b>Surplus/(Unfunded Liability) Before Adjustments</b>	<b>\$ (576,431,849)</b>		<b>\$ (465,736,416)</b>	
<b>Adjustments</b>				
▪ Asset Smoothing Adjustment	\$ (114,216,368)		\$ (251,838,768)	
▪ Contribution Deficiency Contingency	-		-	
▪ Indexing Contingency	-		-	
	<b>\$ (114,216,368)</b>		<b>\$ (251,838,768)</b>	
<b>Surplus/(Unfunded Liability) After Adjustments</b>	<b>\$ (690,648,217)</b>		<b>\$ (717,575,184)</b>	
Funding Ratio Before Adjustments	88.24%		90.05%	
Funding Ratio After Adjustments	85.91%		84.67%	
Liability % for those members that are retired or eligible to retire		71.16%		70.87%
Liability % for those members that are <u>not</u> retired or eligible to retire		28.84%		29.13%

\* The Plan is exempt from the funding requirements of the Manitoba Pension Benefits Act. No program of contribution increases has been established to eliminate the unfunded liability in respect of past service at this time. Contribution rate increases have been recommended in the past and should be considered in the near future if the unfunded liability persists.

#### 4. SOLVENCY TEST\*

	31-Dec-2016		31-Dec-2015	
<b>Assets Available for Basic Benefits (Appendix I)</b>		<b>% of Liabilities</b>		<b>% of Liabilities</b>
▪ Fixed Income Investments (market value)	\$ 1,517,264,000		\$ 1,501,519,000	
▪ Equity Investments (market value)	5,560,394,000		5,383,689,000	
<b>Total Investments</b>	<b>\$ 7,077,658,000</b>		<b>\$ 6,885,208,000</b>	
▪ Net Receivables/Payables (incl. a Province Trust Account)	4,542,000		6,048,000	
▪ Debt due from the Province of Manitoba	1,826,000		1,826,000	
▪ Correctional Officers' Trust Account	(10,424,000)		(9,097,000)	
▪ Employer Trust Accounts	(92,088,000)		(86,899,000)	
▪ Money Purchase Accounts Plan	(36,618,000)		(34,233,000)	
▪ Province Unfunded Pension Liability Trust Accounts	(2,077,951,000)		(2,025,703,000)	
▪ Manitoba Hydro Enhanced Benefit Trust Account	(26,874,000)		(23,809,000)	
<b>Net Assets Available for Benefits</b>	<b>\$ 4,840,071,000</b>		<b>\$ 4,713,341,000</b>	
▪ Superannuation Adjustment Accounts	(516,199,000)		(498,245,000)	
<b>Total Assets Available for Basic Benefits</b>	<b>\$ 4,323,872,000</b>		<b>\$ 4,215,096,000</b>	
▪ Expense Reserve	(21,619,000)		(21,075,000)	
<b>Actuarial Assets Available for Basic Benefits</b>	<b>\$ 4,302,253,000</b>	<b>64.32%</b>	<b>\$ 4,194,021,000</b>	<b>65.55%</b>
<b>Liabilities for Basic Benefits (Appendix II, III)</b>				
▪ Active Participants:				
▪ not eligible to retire	\$ 1,547,632,567	23.13%	\$ 1,500,709,432	23.44%
▪ eligible to retire reduced	358,196,677	5.36%	297,260,759	4.65%
▪ eligible to retire unreduced	1,155,657,020	17.28%	1,119,664,681	17.50%
	<b>\$ 3,061,486,264</b>	<b>45.77%</b>	<b>\$ 2,917,634,872</b>	<b>45.59%</b>
▪ Other Participants:				
▪ not eligible to retire	84,846,766	1.27%	108,759,347	1.70%
▪ eligible to retire reduced	40,854,009	0.61%	35,043,258	0.55%
▪ eligible to retire unreduced	13,495,020	0.20%	13,845,573	0.22%
▪ valuation accounts payable	40,328,269	0.60%	30,270,714	0.47%
	<b>\$ 179,524,064</b>	<b>2.68%</b>	<b>\$ 187,918,892</b>	<b>2.94%</b>
▪ Pensions in Payment:				
▪ retirement pensions	3,263,404,048	48.79%	3,107,406,526	48.57%
▪ survivors' pensions	184,277,532	2.76%	185,294,849	2.90%
	<b>\$ 3,447,681,580</b>	<b>51.55%</b>	<b>\$ 3,292,701,375</b>	<b>51.47%</b>
<b>Total Liabilities for Basic Benefits</b>	<b>\$ 6,688,691,908</b>	<b>100.00%</b>	<b>\$ 6,398,255,139</b>	<b>100.00%</b>
<b>Solvency Excess/(Deficiency) Before Adjustments</b>	<b>\$ (2,386,438,908)</b>		<b>\$ (2,204,234,139)</b>	
<b>Adjustments</b>				
▪ Asset Smoothing Adjustment	\$ -		\$ -	
▪ Contribution Deficiency Contingency	-		-	
▪ Indexing Contingency	-		-	
	<b>\$ -</b>		<b>\$ -</b>	
<b>Solvency Excess/(Deficiency) After Adjustments</b>	<b>\$ (2,386,438,908)</b>		<b>\$ (2,204,234,139)</b>	
Solvency Ratio Before Adjustments	64.32%		65.55%	
Solvency Ratio After Adjustments	64.32%		65.55%	
Liability % for those members that are retired or eligible to retire		75.00%		74.39%
Liability % for those members that are <u>not</u> retired or eligible to retire		25.00%		25.61%

\* The solvency test is provided for information only as the Plan is exempt from the funding requirements of the solvency test pursuant to Paragraph 4.5(2)(b) of the Regulations to the Manitoba Pension Benefits Act. However, the Canadian Institute of Actuaries (CIA) requires that the wind up disclosure calculations be performed as part of accepted actuarial practice.

## 5. CONTRIBUTION REQUIREMENTS

The accrued benefit cost method of valuation, with salary projection, has been used in this Valuation. Under this method, the expected cost in each year after the valuation date is equal to the cost of benefits expected to be credited for service in the next year. This expected cost is expressed as a level percentage of salary each year. These percentages are commonly called the theoretical contribution rates or normal actuarial cost for basic benefits.

In the following table, we have compared the required contribution rates and the normal actuarial cost for basic benefit rates (below/above Canada Pension Plan Earnings (CPPE)) on the basis of age, sex, and salary distribution, as exists for present active participants (refer to Appendix II - Page 2).

		2017			2016		
		< CPPE / ≥ CPPE *			< CPPE / ≥ CPPE		
<b>Current Contributions for Basic Benefits</b>							
▪ Employee Current Contributions:							
▫ not eligible to retire	\$ 132,204,875	8.00%	9.00%	\$ 128,856,146	8.00%	9.00%	
▫ eligible to retire	15,778,754	8.00%	9.00%	14,701,869	8.00%	9.00%	
▫ eligible to retire unreduced	21,199,358	8.00%	9.00%	20,998,914	8.00%	9.00%	
▫ indexing account allocation	(17,256,665)	(0.84%)	(0.92%)	(16,784,807)	(0.84%)	(0.92%)	
▪ Employer (Matching) Current Contributions:							
▫ not eligible to retire	14,144,276	7.10%	9.00%	13,926,811	7.10%	9.00%	
▫ eligible to retire	2,172,749	7.10%	9.00%	2,213,850	7.10%	9.00%	
▫ eligible to retire unreduced	1,593,479	7.10%	9.00%	1,658,465	7.10%	9.00%	
▫ indexing account allocation	(1,826,871)	(0.72%)	(0.92%)	(1,815,511)	(0.72%)	(0.92%)	
<b>Total Current Contributions for Basic Benefits</b>	<b>\$ 168,009,955</b>	<b>7.09%</b>	<b>8.08%</b>	<b>\$ 163,755,737</b>	<b>7.08%</b>	<b>8.08%</b>	
<b>Normal Actuarial Cost for Basic Benefits</b>							
▪ Active Participants:							
▫ not eligible to retire	\$ 116,812,485	6.30%	7.18%	\$ 113,648,161	6.28%	7.16%	
▫ eligible to retire reduced	20,636,304	9.08%	10.34%	20,171,996	9.40%	10.73%	
▫ eligible to retire unreduced	26,921,490	9.33%	10.63%	28,593,900	9.95%	11.36%	
Blended Active Participant Theoretical Rate	\$ 164,370,279	6.94%	7.90%	\$ 162,414,057	7.03%	8.02%	
▪ Other Participants	-	0.00%	0.00%	-	0.00%	0.00%	
▪ Pensions in Payment	-	0.00%	0.00%	-	0.00%	0.00%	
▪ Reserves	-	0.00%	0.00%	-	0.00%	0.00%	
<b>Total Normal Actuarial Cost for Basic Benefits</b>	<b>\$ 164,370,279</b>	<b>6.94%</b>	<b>7.90%</b>	<b>\$ 162,414,057</b>	<b>7.03%</b>	<b>8.02%</b>	
<b>Contribution Margin/(Deficiency) for Basic Benefits</b>	<b>\$ 3,639,676</b>	<b>0.15%</b>	<b>0.18%</b>	<b>\$ 1,341,680</b>	<b>0.05%</b>	<b>0.06%</b>	

\* Current contributions are represented as a percentage of earnings below/above the Canada Pension Plan Earnings (CPPE).

In respect of past service, it is recommended that the Province of Manitoba, the Liaison Committee, and the Advisory Committee be informed that the current going concern unfunded liability of \$690,648,217 could be amortized by 15 annual payments of \$76,903,549 (assumes 10.2% is allocated to the Indexing Account) which is equivalent to about 3.50% of salary over the next 15 years. Although the Plan is exempt from the regulatory going concern and solvency funding, the parties must be made aware that it may become a requirement if future excess investment and/or demographic experience is not generated in the Fund.

## 6. ANALYSIS OF RESULTS - GOING CONCERN

### ■ Reconciliation of Financial Position

Operation of the Basic Benefits Account	Assets	Liabilities	Adjustments	Surplus / (Unfunded Liability)
■ 2016 Opening Going Concern Position: 2015 Basis	\$ 4,215,096,000	\$ 4,680,832,416	\$ (251,838,768)	\$ (717,575,184)
▫ Contributions/Benefits Accrued	164,860,496	163,509,765	-	1,350,731
▫ Benefit Experience & Operating Expenses Expected	(276,553,496)	(276,553,496)	-	-
▫ Investment Experience Net: Expected 6.00%	249,587,547	277,458,633	-	(27,871,086)
▫ Investment Experience Net: Actual 5.30% vs 6.00%	(29,118,547)	-	-	(29,118,547)
▫ ITA Maximum Pensionable Salary Limit Change	-	1,922,080	-	(1,922,080)
▫ Salary Loss 1-Year Experience (reflects retroactive increases)	-	18,762,928	-	(18,762,928)
▫ Demographic Retirement Gain 1-Year Experience	-	(2,713,569)	-	2,713,569
▫ Demographic Termination Loss 1-Year Experience	-	34,068,045	-	(34,068,045)
▫ Demographic Death Gain 1-Year Experience	-	(1,173,236)	-	1,173,236
▫ Asset Smoothing Adjustment	-	-	137,622,400	137,622,400
▫ Methodology and Unexplained	-	4,190,283	-	(4,190,283)
■ 2016 Preliminary Going Concern Position	\$ 4,323,872,000	\$ 4,900,303,849	\$ (114,216,368)	\$ (690,648,217)
▫ Continue 6.00% Annual Interest Discount Rate	-	-	-	-
▫ Continue CPM2014 PUBLIC Scale B	-	-	-	-
▫ Continue Demographic Assumptions	-	-	-	-
■ 2016 Closing Going Concern Position: 2016 Basis	\$ 4,323,872,000	\$ 4,900,303,849	\$ (114,216,368)	\$ (690,648,217)

## 7. ANALYSIS OF RESULTS - SOLVENCY TEST

- The solvency test interest rate assumption for annuity purchases has increased by about 0.09% from 3.03% to 3.12%. The solvency test less than 10-year interest rate assumption for cash settlements has increased by 0.10% from 2.10% to 2.20%, and the solvency test greater than 10-year interest rate assumption for cash settlements has decreased by 0.20% from 3.70% to 3.50%. Overall, after reflecting experience and the assumption changes, this has resulted in an overall blended increase in solvency liabilities.
- Pursuant to the Standards of the Canadian Institute of Actuaries, it is now required to disclose the incremental cost in the next year on a hypothetical wind-up/solvency basis. This incremental cost is estimated to be equal to \$340,819,980 as at December 31, 2016. This incremental cost in essence reflects the present value of the estimated increase in solvency liabilities in the next year plus the annual benefit payments expected to be made.

## 8. AVERAGE ACTUARIAL FACTORS

### Going Concern

Category	Age	# Members				Fund Pension	Actuarial Factor *			Liability
31-Dec-16										
▪ Active Participants	44.82	30,760	x	12	x	\$ 636.87	x	9.4202	=	\$ 2,214,514,123
▪ Other Participants	49.22	3,345	x	12	x	319.79	x	10.0975	=	129,614,777
▪ Pensions in Payment	70.94	20,793	x	12	x	890.39	x	11.5057	=	2,556,174,949
Total/Average	54.98	54,898	x	12	x	\$ 713.57	x	10.4243	=	\$ 4,900,303,849
31-Dec-15										
▪ Active Participants	44.76	31,065	x	12	x	\$ 614.62	x	9.2316	=	\$ 2,115,126,598
▪ Other Participants	49.21	3,338	x	12	x	276.55	x	11.8729	=	131,522,366
▪ Pensions in Payment	70.69	20,183	x	12	x	872.62	x	11.5176	=	2,434,183,452
Total/Average	54.62	54,586	x	12	x	\$ 689.34	x	10.3664	=	\$ 4,680,832,416

\* Larger actuarial factors mean more reserves per member due to changing demographics and actuarial assumptions.

### Solvency

Category	Age	# Members				Fund Pension	Actuarial Factor *			Liability
31-Dec-16										
▪ Active Participants	44.82	30,760	x	12	x	\$ 636.87	x	13.0231	=	\$ 3,061,486,264
▪ Other Participants	49.22	3,345	x	12	x	319.79	x	13.9856	=	179,524,064
▪ Pensions in Payment	70.94	20,793	x	12	x	890.39	x	15.5185	=	3,447,681,580
Total/Average	54.98	54,898	x	12	x	\$ 713.57	x	14.2288	=	\$ 6,688,691,908
31-Dec-15										
▪ Active Participants	44.76	31,065	x	12	x	\$ 614.62	x	12.7342	=	\$ 2,917,634,872
▪ Other Participants	49.21	3,338	x	12	x	276.55	x	16.9640	=	187,918,892
▪ Pensions in Payment	70.69	20,183	x	12	x	872.62	x	15.5797	=	3,292,701,375
Total/Average	54.62	54,586	x	12	x	\$ 689.34	x	14.1699	=	\$ 6,398,255,139

\* Larger actuarial factors mean more reserves per member due to changing demographics and actuarial assumptions.

## 9. FUND BASIC BENEFIT LIABILITIES EMPLOYER PROFILE

Name of Employer	Code	Active Participants	Other Participants	Pensions in Payment	2016 Total	%
<b>Non-Matching Employers</b>						
1 Province of Manitoba Civil Service	CS	\$ 951,226,265	\$ 63,750,138	\$ 1,414,520,663	\$ 2,429,497,066	49.58%
2 Sport Manitoba	SM	151,629	16,538	408,832	576,999	0.01%
3 Venture Manitoba Tours Ltd.	VT	165,620	-	65,959	231,579	0.00%
4 Paletta & Company Hotels Ltd.	PCH	52,934	-	2,625	55,559	0.00%
5 Manitoba Hydro	MH	581,560,244	14,667,215	587,787,173	1,184,014,632	24.16%
6 Manitoba Public Insurance Corporation	AI/AIE	112,610,446	8,395,133	112,794,258	233,799,837	4.77%
7 MPIC - Division of Driver and Vehicle Licensing	AIL	6,350,718	56,587	4,492,653	10,899,958	0.22%
8 Red River College	RCC	81,812,492	4,947,850	55,240,591	142,000,933	2.90%
9 Manitoba Agricultural Services Corporation	AC	2,328,271	236,370	3,368,054	5,932,695	0.12%
10 The Addictions Foundation of Manitoba	AF	13,096,846	1,438,100	16,387,301	30,922,247	0.63%
11 Assiniboine Community College	ACC	16,981,291	936,077	12,755,487	30,672,855	0.63%
12 The University College of The North	KCC	17,849,996	1,785,633	9,028,109	28,663,738	0.58%
13 The Legal Aid Services Society of Manitoba	LA	14,361,320	379,171	10,875,597	25,616,088	0.52%
14 Manitoba Centennial Centre Corporation	CC	2,282,888	165,246	4,650,140	7,098,274	0.14%
15 Teachers' Retirement Allowances Fund	TR	3,409,218	127,103	1,927,372	5,463,693	0.11%
16 Communities Economic Development Fund	CE	1,380,110	184,994	989,423	2,554,527	0.05%
17 The Council on Post-Secondary Education	UG	700,593	86,866	774,055	1,561,514	0.03%
18 The Horse Racing Commission	RC	179,118	79,462	184,562	443,142	0.01%
19 Diagnostic Services of Manitoba	DSM	2,923,794	50,326	1,739,308	4,713,428	0.10%
20 WRHA - Health Sciences Centre	RWA	11,594,853	490,140	12,690,757	24,775,750	0.51%
21 Prairie Mountain Health	PMH et al	14,903,623	1,128,654	21,797,481	37,829,758	0.77%
22 Interlake-Eastern Regional Health Authority	IEH et al	2,692,120	156,562	6,520,399	9,369,081	0.19%
23 Northern Health Region	NRH et al	1,474,163	94,706	2,101,639	3,670,508	0.07%
24 Southern Health-Santé Sud	SRH et al	5,042,929	301,398	6,026,986	11,371,313	0.23%
25 Manitoba Development Corporation	MDC	129,701	8,873	-	138,574	0.00%
26 Workers' Compensation Board	WC	-	-	6,447	6,447	0.00%
27 WECO	WEC	-	-	277,511	277,511	0.01%
		\$ 1,845,261,182	\$ 99,483,142	\$ 2,287,413,382	\$ 4,232,157,706	86.37%
<b>Matching Employers</b>						
1 Manitoba Liquor Lotteries Corporation	LC/LF/LL	\$ 155,904,537	\$ 7,911,688	\$ 97,712,575	\$ 261,528,800	5.34%
2 Manitoba Housing Authority	HA	31,928,504	2,480,577	25,067,004	59,476,085	1.21%
3 WCFS CUPE Support Workers	CSW	9,603,590	219,795	499,328	10,322,713	0.21%
4 Manitoba Agricultural Services Corporation	MAS	12,797,829	1,686,713	4,162,804	18,647,346	0.38%
5 Manitoba Crop Insurance	CI/CIC	11,980,609	432,512	15,599,022	28,012,143	0.57%
6 Manitoba Government Employees Association	EA	12,817,899	1,287,091	15,101,069	29,206,059	0.60%
7 Manitoba Hydro Utilities Services	MHU	2,275,609	421,456	39,877	2,736,942	0.06%
8 ANCR Family Services	ANR	5,926,244	1,130,813	564,966	7,622,023	0.16%
9 The Civil Service Superannuation Board	SB	9,056,944	1,338,723	8,101,402	18,497,069	0.38%
10 Gaming Control Commission	GC	6,277,579	630,515	1,380,792	8,288,886	0.17%
11 Travel Manitoba	TM	2,130,001	413,259	1,262,417	3,805,677	0.08%
12 Teranet	TN	2,562,976	25,582	222,526	2,811,084	0.06%
13 Food Development Centre	FD	3,295,701	345,272	531,241	4,172,214	0.09%
14 Manitoba East Side Road Authority	MFA	988,517	4,991,930	2,108,984	8,089,431	0.17%
15 Dairy Farmers of Manitoba	MC	2,519,332	80,648	2,611,820	5,211,800	0.11%
16 Industrial Technology Centre	IT	3,471,233	345,161	908,183	4,724,577	0.10%
17 Hams Marketing Services Co-Op Inc.	HM	1,119,938	283,531	4,372,815	5,776,284	0.12%
18 Manitoba Health Research Council	HRC	327,467	90,569	43,586	461,622	0.01%
19 Manitoba Film & Sound	MFS	988,158	-	-	988,158	0.02%
20 Manitoba Pork Council	PC	1,062,109	87,340	801,115	1,950,564	0.04%
21 Manitoba Arts Council	MA	896,417	217,639	410,700	1,524,756	0.03%
22 Manitoba Chicken Producers	CB	880,776	-	144,087	1,024,863	0.02%
23 Crown Corporations Council	CR	1,173,306	50,757	1,231,287	2,455,350	0.05%
24 Horizon Lab Ltd.	MTR	102,514	108,764	-	211,278	0.00%
25 Manitoba Cattle Enhancement Council	MCE	-	161,247	-	161,247	0.00%
26 Turkey Producers Marketing Board	TB	242,618	7,658	533,207	783,483	0.02%
27 Economic Innovation and Technology Council	MR	1,124,410	554,986	3,925,112	5,604,508	0.11%
28 Manitoba Development Corporation	DFP	78,465	91,259	384,456	554,180	0.01%
29 Manitoba Hazardous Waste	HW	-	-	468,616	468,616	0.01%
30 Manitoba Water Services Board	WS	-	85,713	396,002	481,715	0.01%
31 Human Resources and Employment Centres	R's/HE	696,320	274,997	2,646,409	3,617,726	0.07%
32 Manitoba Beef Commission	BC	61,311	-	403,873	465,184	0.01%
33 Local Government Districts	LG	-	-	101,787	101,787	0.00%
34 Manitoba Mineral Resources Limited	MM	-	-	36,780	36,780	0.00%
35 Manitoba Data Services	DS	-	-	293,956	293,956	0.01%
36 Money Purchase Plan Annuity	MPP	102,314	-	6,795,549	6,897,863	0.14%
37 No Billing (Charged to Fund)	NB	86,859,714	4,375,440	69,898,220	161,133,374	3.29%
		\$ 369,252,941	\$ 30,131,635	\$ 268,761,567	\$ 668,146,143	13.63%
31-Dec-16 Total Fund Liabilities for Basic Benefits		\$ 2,214,514,123	\$ 129,614,777	\$ 2,556,174,949	\$ 4,900,303,849	100.00%
31-Dec-15 Total Fund Liabilities for Basic Benefits		\$ 2,115,126,598	\$ 131,522,366	\$ 2,434,183,452	\$ 4,680,832,416	100.00%

## 10. SENSITIVITY TEST (DURATION)

The impact on pension liabilities of changes in the actuarial assumptions depends largely upon the number of years over which benefits will be paid and the exact pattern of the expected benefit cash flow. The demographics of the group covered by a valuation have an impact on the resulting change in liability for a given change in an actuarial assumption. Different parts of the valuation are affected differently by a change in a specific valuation assumption. Two of the more significant assumptions are the real rate of return and the assumed inflation rate expected in the future. There are rules of thumb to estimate the effect upon liabilities of a change in the assumed real rate or assumed inflation rate. These rules of thumb can be expressed mathematically by introducing the concept of duration where:

$$\% \text{ change in liability} = - \text{duration} \times \% \text{ change in assumed rate}$$

The approximation is usually quite good for small changes in the assumed rate (we will test a negative ¼% change). For larger changes, the concept of convexity must be introduced which we will not explore in this Report. The following table summarizes the application of the above formula to the Fund data as at December 31, 2016.

<b>GOING CONCERN</b>		Decrease Real Rate ¼%		
Real Rate	4.00%	3.75%		
Inflation Rate	2.00%	2.00%		
Nominal Rate	6.00%	5.75%		
Mortality	CPM2014PUB-Scale B	CPM2014PUB-Scale B	% Change in	Estimated
Liability Category	Liability	Liability	Liability	Duration
Active Participants	\$ 2,214,514,123	\$ 2,314,578,353	4.52%	18.07
Other Participants	129,614,777	133,925,201	3.33%	13.30
Pensions in Payment	2,556,174,949	2,616,449,379	2.36%	9.43
Adjustments	114,216,368	114,216,368	-	-
Surplus/(Unfunded)	(690,648,217)	(855,297,301)	-	-
Total	\$ 4,323,872,000	\$ 4,323,872,000	3.28%	13.13
Increase/(Decrease) in Liabilities		\$ 164,649,084		

<b>SOLVENCY TEST</b>		Decrease Real Rate ¼%		
Cash Settlements 1st 10 years	2.20%	1.95%		
Cash Settlements thereafter	3.50%	3.25%		
Annuity Purchases	3.12%	2.87%		
Mortality	CPM2014COM-Scale B	CPM2014COM-Scale B	% Change in	Estimated
Liability Category	Liability	Liability	Liability	Duration
Active Participants	\$ 3,061,486,264	\$ 3,218,232,796	5.12%	20.48
Other Participants	179,524,064	187,570,035	4.48%	17.93
Pensions in Payment	3,447,681,580	3,547,891,573	2.91%	11.63
Adjustments	21,619,000	21,619,000	-	-
Excess/(Deficiency)	(2,386,438,908)	(2,651,441,404)	-	-
Total	\$ 4,323,872,000	\$ 4,323,872,000	3.95%	15.80
Increase/(Decrease) in Liabilities		\$ 265,002,496		

## **II. PROVISION FOR FUTURE ADVERSE DEVIATIONS (PfADs)**

The actuarial assumptions must be, individually and in aggregate, appropriate for the purpose of the Valuation. The assumptions are the sum of the actuarial best estimate plus a PfAD.

### **Asset Smoothing Adjustment**

An asset smoothing adjustment to buffer past and possible future adverse investment experience has been utilized for this Report and is equal to \$114,216,368 on the going concern Valuation Balance Sheet (please refer to Appendix III - Page 3). This reserve is a write-down of assets for this Valuation which may or may not mitigate in full, or in part, past and possible future adverse investment experience. No such adjustment was made for the solvency test.

### **Contingency Adjustment**

A contingency adjustment provides for the possibility of future adverse investment and/or demographic experience. There is no explicit contingency adjustment on the going concern or solvency test balance sheets.

### **Assumed Rate of Return**

Currently, there is an estimated PfAD contained implicitly in the assumed rate of return of 6.00% per year, which is estimated to equal to 0.13% (please refer to Appendix III - Page 4 for further detail). This provision may or may not prove to be adequate in the future. Consideration should be given to lowering the current real rate of 4.00% per year in the future.

### **Salary Increase Rate**

The assumed salary rate increase is equal to 2.75%, before service and merit increases.

### **Retirement Rate**

Current expected retirement rates allow for higher retirements than the best estimate of actual retirement experience to date. Given the large number of “baby boomer” retirees expected in the near future, these rates may or may not prove to be adequate. Continued monitoring of retirement experience should occur.

### **Mortality Rate**

The most current CPM 2014 Composite Mortality projected using Scale B (CPM2014COM-Scale B) was used for the solvency test. The CPM 2014 Public Mortality projected using Scale B (CPM2014PUB-Scale B) has been continued for the going concern calculations in this valuation.

### **Indexing Contingency**

No provision for indexing has been made on the going concern Valuation Balance Sheet other than for existing deferred pensioners (1.33% per year in the deferral period). A separate report is prepared on the Indexing Account that makes some provision for indexing of pensions in payment.

### **Contribution Deficiency Contingency**

No provision for a contribution deficiency has been made on the going concern Valuation Balance Sheet as the contribution rates are currently in balance for future service accruals.

No contribution schedule has been established to eliminate the past service deficit at this time.

## 12. SUBSEQUENT EVENTS

- This Valuation does not reflect the change in the going concern or solvency test interest rates after the Valuation date, nor is it required. A valuation report is a snapshot of a plan's estimated financial condition at a particular point in time; it does not predict the pension plan's future financial condition or its ability to pay benefits in the future.

Over time, the Plan's actual cost will depend on a number of factors, including the level of the benefits in the Plan, the number of individuals' paid benefits, the amount of Plan expenses, and the amount earned on any assets invested to pay the benefits. These amounts and other variables are uncertain and unknowable at the valuation date.

To prepare this Report, actuarial assumptions, as described in Appendix III, are used to select a single scenario from the range of possibilities. The results of that single scenario are included in this Report. However, the future is uncertain and the Plan's actual experience will differ from those assumptions; these differences may be significant or material. In addition, different assumptions or scenarios may also be within the reasonable range and results based on those assumptions would be different. Actuarial assumptions may also be changed from one valuation to the next because of changes in regulatory requirements, plan experience, changes in expectations about the future and other factors.

Because actual Plan experience will differ from the assumptions, decisions about benefit changes, investment policy, funding amounts, benefit security and/or benefit-related issues should be made only after careful consideration of alternative future financial conditions and scenarios, and not solely on the basis of a valuation report or reports.

- In respect of future service, contribution rates of employees and matching employers to the Basic Account were increased to eliminate the contribution deficiency so that future benefit accruals do not cause an unfunded liability in the Fund. A small future service contribution margin now exists but should be monitored closely, especially if a more cautious actuarial basis is adopted or if the average age of the actives increases significantly in the future.
- In respect of past service, it is recommended that the Province of Manitoba, the Liaison Committee, and the Advisory Committee be informed that the current going concern unfunded liability of \$690,648,217 could be amortized by 15 annual payments of \$76,903,549 (assumes 10.2% is allocated to the Indexing Account) which is equivalent to about 3.50% of salary over the next 15 years. Although the Plan is exempt from the regulatory going concern and solvency funding, the parties must be made aware that it may become a requirement in the future if future excess investment and/or demographic experience is not generated in the Fund.
- Any contribution increase to employees in excess of 9.00% (on a blended basis) of salary will require the approval of the Canada Revenue Agency to ensure continued tax deductibility of such employee contributions.
- We are not aware of any other matters or subsequent events occurring since the completion of this Report which would materially adversely affect the financial position as at December 31, 2016.

## **APPENDIX I**

### **Financial & Membership Data**

#### **I. Total Assets Available for Basic Benefits (Source: Audited Financial Statements)**

	31-Dec-2016	31-Dec-2015
<b>Assets</b>		
Fixed Income Investments (market value)	\$ 1,517,264,000	\$ 1,501,519,000
Equity Investments (market value)	5,560,394,000	5,383,689,000
	<u>\$ 7,077,658,000</u>	<u>\$ 6,885,208,000</u>
Net Receivables/Payables (includes a Province Trust Account) (Note 5)	4,542,000	6,048,000
Debt due from the Province of Manitoba (Note 1)	1,826,000	1,826,000
Correctional Officers' Trust Account (Note 2)	(10,424,000)	(9,097,000)
Employer Trust Accounts (Note 3)	(92,088,000)	(86,899,000)
Money Purchase Accounts Plan (Note 4)	(36,618,000)	(34,233,000)
The Province of Manitoba Unfunded Pension Liability Trust Account 1 & 2 (Note 5)	(2,077,951,000)	(2,025,703,000)
Manitoba Hydro Enhanced Benefit Trust Account (Note 6)	(26,874,000)	(23,809,000)
	<u>\$ 4,840,071,000</u>	<u>\$ 4,713,341,000</u>
Superannuation Adjustment Account	(516,199,000)	(498,245,000)
<b>Total Assets Available for Basic Benefits</b>	<u><u>\$ 4,323,872,000</u></u>	<u><u>\$ 4,215,096,000</u></u>

Note 1: Under Section 24(1) of the CSSA, the Province of Manitoba assumed an accrued liability of \$1,826,000 for its employees and pensioners as at May 1, 1939. The Province of Manitoba pays semi-annual interest at 4.00% per annum on this amount.

Note 2: Effective November 19, 1996, employees who are members of the Province of Manitoba's Corrections Component are required to contribute an additional 1.00% of pensionable earnings. These additional contributions, which are credited to this trust account, are intended to fund the additional pension benefits for eligible employees who may retire as early as age 50 with no reduction for early retirement providing age and qualifying service is equal to a total of 75 or greater.

Note 3: The Fund is responsible for providing enhanced benefits enacted in the 1992 legislation agreed to by the Employee Liaison Committee and the Employer Pension Advisory Committee. These benefits are 100% financed from the Fund's net assets available for benefits. To facilitate this funding, trust accounts were established for most employers participating in the Fund for their share of the actuarial valuation of these future benefit enhancements. Specific contributions from eligible employees are being transferred to the applicable trust account.

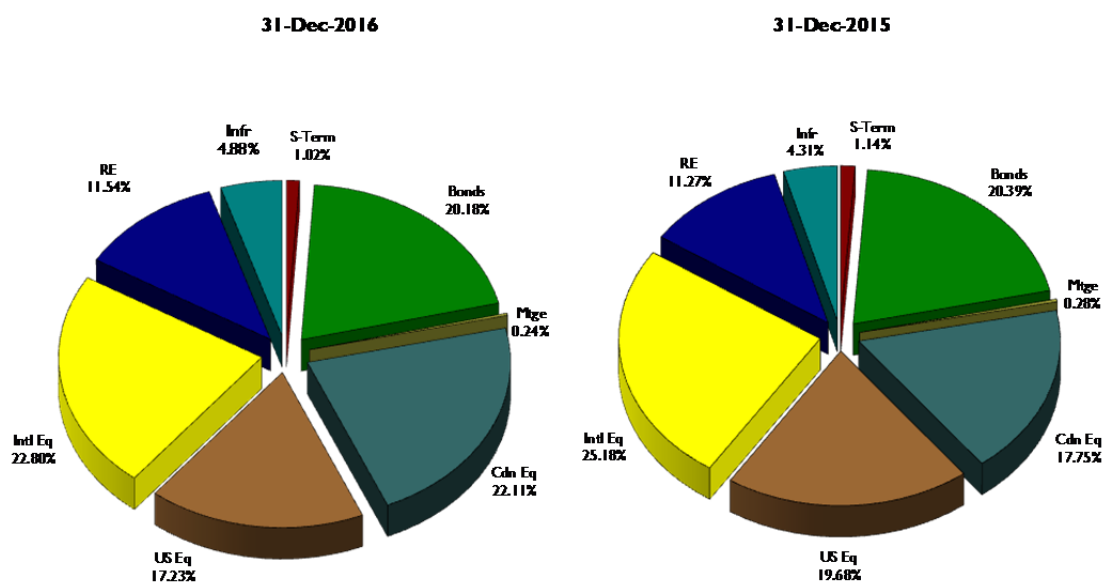
Note 4: Effective January 2, 1985, a separate Money Purchase Accounts Plan was established to enhance the portability of pensions. Contributors include employees, recipients of superannuation allowances, annuities, or pensions payable under the CSSA, or persons on whose behalf the Board is required or requested to transfer moneys to this Plan. Refunds are made upon written request by the contributor. Administrative costs are recovered by the Board.

Note 5: The Province of Manitoba has established a fund for the purpose of accumulating funds for the eventual retirement of the Province of Manitoba's unfunded pension obligation. Under the terms of March 6, 2001 and March 30, 2009 agreements between the Province of Manitoba and the Board, the Province of Manitoba established funds with the Board and the Province of Manitoba to which it is making the required payments to these funds. As well, the Province of Manitoba is making payments to this fund that are related to the Special Operating Agencies' unfunded pension liabilities. Payments received by the Board from the Province of Manitoba are held by the Board in trust for and on behalf of the Province of Manitoba and are invested by the Board on behalf of the Province of Manitoba. The payments received are not assets of the Plan and accordingly, they are accounted for by the Fund in the Unfunded Pension Liability Trust Accounts. These trust accounts earn investment income at a rate of return equal to the rate of return earned by the Fund. The Board receives an investment management fee for its services. The payments made by the Province of Manitoba to the Board do not reduce the accrued pension benefit obligations of the Fund. The Trust Agreements have been recently amended to make the trusts irrevocable. Accordingly, the assets in the Trust Accounts cannot be used for any purposes other than to fund the payments of pension benefits for which the Province of Manitoba is responsible and to pay the costs and expenses that are directly attributable to the administration of the Trust Accounts. In October 2007, The Financial Administration Act was amended to allow for withdrawals from the fund to pay, or fund the payment of, pension benefits for which the Province of Manitoba is responsible.

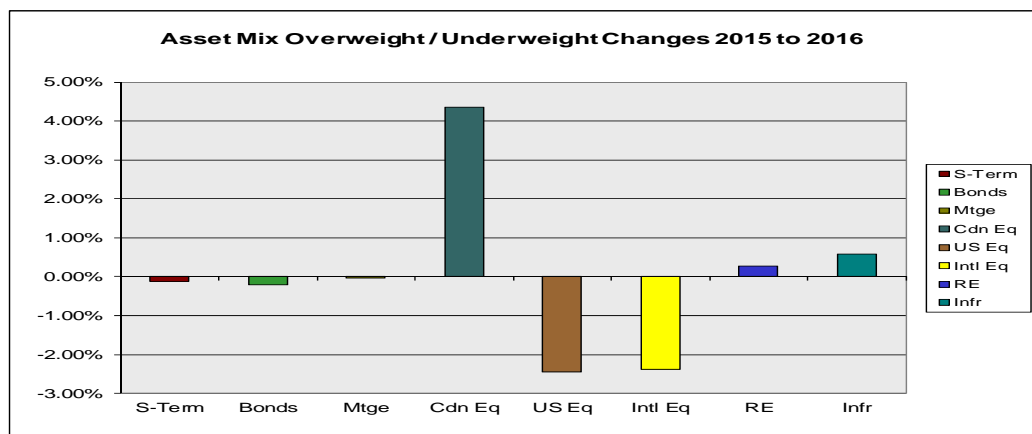
Note 6: Effective January 1, 2012, Manitoba Hydro employees with pensionable service after May 31, 2006 are eligible for an additional benefit. The Enhanced Hydro Benefit Plan enhances the formula used in calculating pension benefits from 1.6% to 1.7% of earnings up to the Canada Pension Plan average Yearly Maximum Pensionable Earnings at the time of retirement. Manitoba Hydro will fund the enhanced pension benefit through contributions to a trust account that will be used to fund the additional benefit to employees.

## 2. Asset Mix Distribution

	31-Dec-2016		31-Dec-2015	
1. Short Term (S-Term)	\$ 72,366,000	1.02%	\$ 78,501,000	1.14%
2. Bonds and Debentures (Bonds)	1,427,965,000	20.18%	1,403,589,000	20.39%
3. Mortgages (Mtge)	16,933,000	0.24%	19,429,000	0.28%
Fixed Income	\$ 1,517,264,000	21.44%	\$ 1,501,519,000	21.81%
4. Canadian Equities (Cdn Eq)	1,564,923,000	22.11%	1,222,221,000	17.75%
5. U.S. Equities (US Eq)	1,219,693,000	17.23%	1,354,914,000	19.68%
6. Non-North American Equities (Intl Eq)	1,613,587,000	22.80%	1,733,711,000	25.18%
7. Real Estate (RE)	816,695,000	11.54%	776,293,000	11.27%
8. Infrastructure (Infr)	345,496,000	4.88%	296,550,000	4.31%
Equity	\$ 5,560,394,000	78.56%	\$ 5,383,689,000	78.19%
	\$ 7,077,658,000	100.00%	\$ 6,885,208,000	100.00%



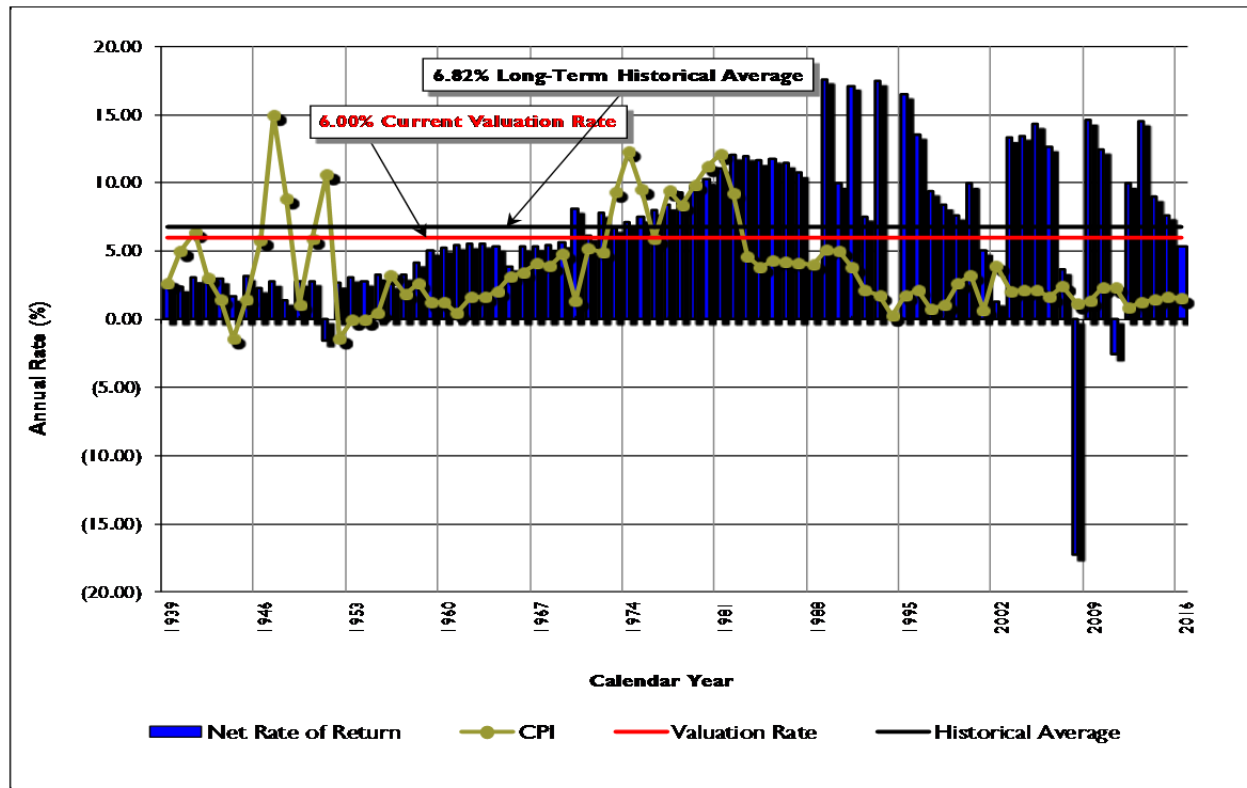
To limit the exposure to interest rate fluctuation and to obtain the best possible return at an acceptable risk, the Board amended the long-term investment asset mix policy to be currently about 27% fixed income and 73% equity.



### 3. Historical Cash Flow: 78 Years (Basic Account and Indexing Account)

[1] Year**	Opening Assets	[2] Fund & Pay-As-You-Go Contributions	[3] Benefits	[4] Expenses	[5] Investment Fees	[6] Investment Income	[7] Closing Assets	[8] Net Return****
1939	\$ 5,022,908	\$ 452,383	\$ (117,994)	\$ (4,151)	\$ -	\$ 123,003	\$ 5,476,149	2.37%
1940	5,476,149	462,964	(172,927)	(8,018)	-	130,602	5,888,770	2.33%
1941	5,888,770	594,089	(200,751)	(7,086)	-	181,856	6,456,878	2.99%
1942	6,456,878	455,779	(208,762)	(9,488)	-	189,072	6,883,479	2.88%
1943	6,883,479	440,959	(228,891)	(6,852)	-	203,731	7,292,426	2.92%
1944	7,292,426	441,331	(237,906)	(6,801)	-	121,812	7,610,862	1.65%
1945	7,610,862	476,802	(279,094)	(8,365)	-	243,235	8,043,440	3.16%
1946 *	8,043,440	495,588	(284,104)	(6,597)	-	184,284	8,432,611	2.26%
1947	8,432,611	778,339	(328,404)	(7,869)	-	236,658	9,111,335	2.73%
1948 *	9,111,335	792,068	(372,476)	(10,715)	-	(218,081)	9,302,131	1.34%
1949	9,302,131	905,065	(421,390)	(9,473)	-	262,446	10,038,779	2.75%
1950	10,038,779	994,024	(469,602)	(9,293)	-	286,002	10,839,910	2.78%
1951 *	10,839,910	1,179,579	(527,278)	(12,349)	-	(179,115)	11,300,747	(1.60%)
1952 *	11,300,747	1,344,962	(553,862)	(11,919)	-	(1,265,915)	10,814,013	2.60%
1953	10,814,013	1,462,734	(666,186)	(12,101)	-	341,695	11,940,155	3.05%
1954	11,940,155	1,611,842	(690,616)	(15,320)	-	341,770	13,187,831	2.76%
1955	13,187,831	1,663,647	(773,936)	(12,476)	-	434,896	14,499,962	3.19%
1956	14,499,962	1,790,935	(859,146)	(13,597)	-	384,823	15,802,977	2.57%
1957	15,802,977	2,130,165	(798,404)	(19,480)	-	523,979	17,639,237	3.18%
1958 *	17,639,237	2,395,882	(917,013)	(23,360)	-	764,898	19,859,644	4.16%
1959 *	19,859,644	2,661,599	(1,035,623)	(27,240)	-	1,039,120	22,497,500	5.03%
1960	22,497,500	4,144,352	(1,154,232)	(31,120)	-	1,246,736	26,703,236	5.20%
1961	26,703,236	2,927,316	(1,403,725)	(28,990)	-	1,485,022	29,682,859	5.41%
1962	29,682,859	3,196,204	(1,605,710)	(28,171)	-	1,668,806	32,913,988	5.48%
1963	32,913,988	3,558,599	(1,759,225)	(36,677)	-	1,873,563	36,550,248	5.54%
1964 *	36,550,248	3,877,559	(2,219,502)	(38,149)	-	1,979,089	40,149,245	5.30%
1965 *	40,149,245	3,160,279	(2,014,266)	(29,849)	-	1,570,949	42,836,358	3.86%
1966	42,836,358	3,725,529	(3,651,008)	(52,977)	-	2,274,524	45,132,426	5.31%
1967	45,132,426	4,369,950	(2,643,540)	(48,180)	-	2,449,109	49,259,765	5.33%
1968	49,259,765	5,053,832	(2,676,421)	(64,800)	-	2,701,658	54,274,034	5.36%
1969	54,274,034	5,854,684	(3,005,217)	(75,977)	-	3,091,166	60,138,690	5.55%
1970	60,138,690	6,680,379	(3,486,690)	(94,068)	-	4,980,327	68,218,638	8.07%
1971	68,218,638	7,799,868	(4,149,289)	(104,499)	-	4,261,235	76,025,953	6.09%
1972	76,025,953	9,167,547	(4,838,136)	(143,101)	-	6,082,486	86,294,749	7.79%
1973	86,294,749	10,468,999	(5,931,048)	(144,955)	-	5,923,884	96,611,629	6.69%
1974	96,611,629	13,415,988	(7,519,676)	(187,266)	-	7,034,969	109,355,644	7.07%
1975	109,355,644	17,478,089	(8,729,977)	(277,474)	-	8,459,738	126,286,020	7.45%
1976	126,286,020	21,560,004	(10,893,728)	(328,456)	-	10,454,455	147,078,295	7.95%
1977	147,078,295	25,723,575	(12,527,475)	(420,893)	-	12,779,529	172,633,031	8.33%
1978	172,633,031	28,820,421	(15,566,709)	(464,754)	(267)	16,514,075	201,935,797	9.22%
1979	201,935,797	30,972,133	(18,939,495)	(426,237)	(5,006)	20,277,643	233,814,835	9.76%
1980	233,814,835	35,610,583	(22,105,591)	(501,376)	(7,389)	24,502,748	271,313,810	10.19%
1981	271,313,810	40,077,511	(24,347,203)	(562,043)	(16,508)	30,878,819	317,344,386	11.07%
1982	317,344,386	46,310,086	(26,696,402)	(574,946)	(20,929)	39,173,814	375,536,009	11.98%
1983	375,536,009	55,246,946	(32,486,301)	(1,649,451)	(13,059)	46,079,767	442,713,911	11.93%
1984	442,713,911	55,247,692	(41,641,651)	(726,172)	(81,599)	52,113,402	507,625,583	11.58%
1985	507,625,583	60,726,998	(44,840,057)	(769,761)	(115,395)	60,619,735	583,247,103	11.74%
1986	583,247,103	66,731,516	(51,745,686)	(701,556)	(214,827)	67,587,082	664,903,632	11.41%
1987	664,903,632	74,154,000	(60,044,000)	(958,000)	(22,000)	71,783,368	749,817,000	10.69%
1988	749,817,000	82,966,000	(68,349,000)	(1,127,000)	(722,000)	30,951,000	793,536,000	4.00%
1989	793,536,000	87,444,000	(75,248,000)	(1,233,000)	(1,067,000)	141,327,000	944,759,000	17.55%
1990	944,759,000	95,317,000	(87,829,000)	(818,000)	(1,198,000)	94,997,000	1,045,228,000	9.89%
1991	1,045,228,000	104,335,000	(93,946,000)	(670,000)	(1,364,000)	180,752,000	1,234,335,000	17.08%
1992	1,234,335,000	107,405,000	(115,873,000)	(791,000)	(1,290,000)	93,632,000	1,317,418,000	7.51%
1993	1,317,418,000	114,699,000	(119,806,000)	(900,000)	(1,116,000)	230,089,000	1,540,384,000	17.42%
1994	1,540,384,000	117,886,000	(129,598,000)	(969,000)	(1,520,000)	3,382,000	1,529,565,000	0.12%
1995	1,529,565,000	121,492,000	(137,521,000)	(894,000)	(1,845,000)	252,094,000	1,762,891,000	16.45%
1996	1,762,891,000	127,112,000	(151,650,000)	(982,000)	(2,777,000)	239,112,000	1,973,706,000	13.50%
1997 ***	1,973,706,000	104,920,000	(546,688,000)	(736,000)	(2,117,000)	166,119,000	1,695,204,000	9.36%
1998	1,695,204,000	122,261,000	(129,544,000)	(785,000)	(1,981,000)	142,888,000	1,828,043,000	8.33%
1999	1,828,043,000	115,219,000	(135,216,000)	(712,000)	(2,398,000)	139,931,000	1,944,867,000	7.57%
2000	1,944,867,000	125,361,000	(147,650,000)	(964,000)	(2,664,000)	193,804,000	2,112,754,000	9.89%
2001	2,112,754,000	136,764,000	(156,626,000)	(845,000)	(2,164,000)	107,407,000	2,197,290,000	5.01%
2002	2,197,290,000	149,320,000	(168,974,000)	(1,037,000)	(2,490,000)	30,846,000	2,204,955,000	1.30%
2003	2,204,955,000	155,824,000	(179,152,000)	(1,274,000)	(3,142,000)	293,631,000	2,470,842,000	13.25%
2004	2,470,842,000	167,480,000	(194,500,000)	(1,283,000)	(4,019,000)	333,733,000	2,772,253,000	13.42%
2005	2,772,253,000	191,600,000	(213,939,000)	(1,478,000)	(4,312,000)	398,284,000	3,142,408,000	14.27%
2006	3,142,408,000	212,647,000	(237,555,000)	(1,540,000)	(4,035,000)	397,998,000	3,509,923,000	12.59%
2007	3,509,923,000	214,854,000	(260,704,000)	(1,482,000)	(5,459,000)	130,119,000	3,587,251,000	3.58%
2008	3,587,251,000	232,626,000	(284,319,000)	(1,265,000)	(2,152,000)	(613,093,000)	2,919,048,000	(17.28%)
2009	2,919,048,000	247,149,000	(294,503,000)	(1,484,000)	(3,409,000)	423,890,000	3,290,691,000	14.53%
2010	3,290,691,000	261,179,000	(319,276,000)	(1,461,000)	(3,743,000)	408,391,000	3,635,781,000	12.41%
2011	3,635,781,000	275,798,000	(350,744,000)	(1,485,000)	(2,370,000)	(92,444,000)	3,464,536,000	(2.64%)
2012	3,464,536,000	309,576,000	(401,978,000)	(1,623,000)	(1,928,000)	340,396,000	3,708,979,000	9.90%
2013	3,708,979,000	343,643,000	(436,905,000)	(1,696,000)	(3,236,000)	533,038,000	4,143,823,000	14.47%
2014	4,143,823,000	423,880,000	(450,026,000)	(1,785,000)	(2,833,000)	371,883,000	4,484,942,000	8.94%
2015	4,484,942,000	394,059,000	(500,425,000)	(1,816,000)	(3,302,000)	339,883,000	4,713,341,000	7.60%
2016	4,713,341,000	417,161,000	(535,611,000)	(2,159,000)	(3,059,000)	250,398,000	4,840,071,000	5.32%
		\$ 6,229,568,375	\$ (7,352,921,325)	\$ (45,006,448)	\$ (74,208,979)	\$ 6,077,616,469		6.82%

- \* Some numbers in 1958, 1959, and 1964 were estimated. 1946 is an 11-month "year", and 1965 is a 9-month "year". (Adjusted Book Value" 1939-1990 | Market Value: 1991-2007). In 1948, 1951 and 1952 transfers to reserves for possible future losses on account of investment principal were made, and special adjustments under the CSSA occurred.
- \*\* Years 1939 to 1945 commenced on May 1, years 1946 to 1964 commenced on April 1. Thereafter, calendar years are reported.
- \*\*\* The large decrease in assets in 1997 was due to the privatization of MTS.
- \*\*\*\* Rates of return are arithmetical and are calculated on the basis of mid-year cashflow.
- The volatility in recent asset values is due to the Auditor's requirement that market values be reported. Previously, adjusted book values were used. The Valuation Balance Sheet separately reflects a smoothing asset adjustment reserve to partially mitigate or neutralize this volatility.
- \*\*\*\*\* The contributions for 2014 include the entry amount for employer liability funding equal to \$59,672,000 (including indexing).



### Historical Cash Flow: 5 Years (Basic Account)

[1] Year	[2] Opening Assets	[3] Fund & Pay-As-You-Go Contributions	[4] Benefits	[5] Expenses	[6] Investment Fees	[7] Investment Income	[8] Closing Assets	[9] Net Return
2012	\$3,103,654,000	\$ 296,514,000	\$ (379,618,000)	\$ (1,623,000)	\$ (1,928,000)	\$ 305,626,000	\$3,322,625,000	9.92%
2013	3,322,625,000	328,760,000	(413,285,000)	(1,696,000)	(3,236,000)	479,136,000	3,712,304,000	14.51%
2014	3,712,304,000	379,782,000	(407,472,000)	(1,785,000)	(2,833,000)	333,847,000	4,013,843,000	8.95%
2015	4,013,843,000	376,454,000	(474,589,000)	(1,816,000)	(3,302,000)	304,506,000	4,215,096,000	7.60%
2016	4,215,096,000	398,681,000	(508,215,000)	(2,159,000)	(3,059,000)	223,528,000	4,323,872,000	5.30%
		\$1,780,191,000	\$ (2,183,179,000)	\$ (9,079,000)	\$ (14,358,000)	\$1,646,643,000		9.26%

#### 4. Membership Summary (records processed for liability calculations)

Category	31-Dec-2016			31-Dec-2015		
	Males	Females	Total	Males	Females	Total
Active Participants	15,600	15,160	30,760	15,738	15,327	31,065
Other Participants						
- Long-Term Disability *	38	101	139	38	101	139
- Deferred Annuities	1,479	1,667	3,146	1,486	1,643	3,129
- Transfers	39	21	60	41	29	70
	<u>1,556</u>	<u>1,789</u>	<u>3,345</u>	<u>1,565</u>	<u>1,773</u>	<u>3,338</u>
Pensions in Payment						
- Pensioners	9,879	7,874	17,753	9,652	7,547	17,199
- Survivors	351	2,689	3,040	345	2,639	2,984
	<u>10,230</u>	<u>10,563</u>	<u>20,793</u>	<u>9,997</u>	<u>10,186</u>	<u>20,183</u>
Total	<u>27,386</u>	<u>27,512</u>	<u>54,898</u>	<u>27,300</u>	<u>27,286</u>	<u>54,586</u>

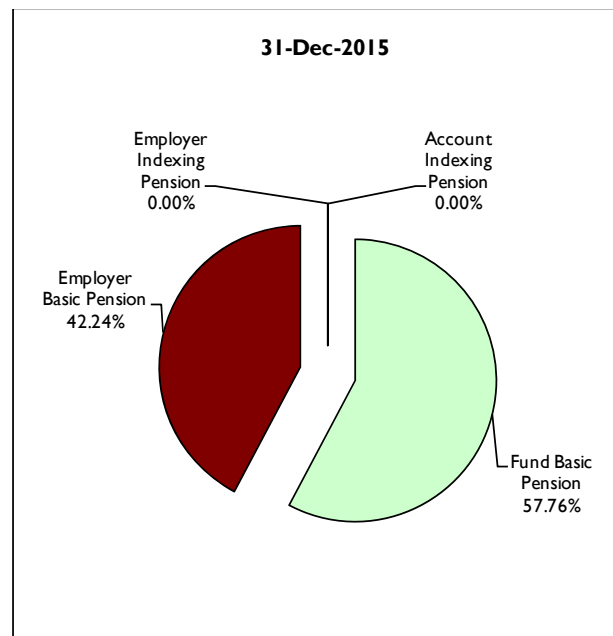
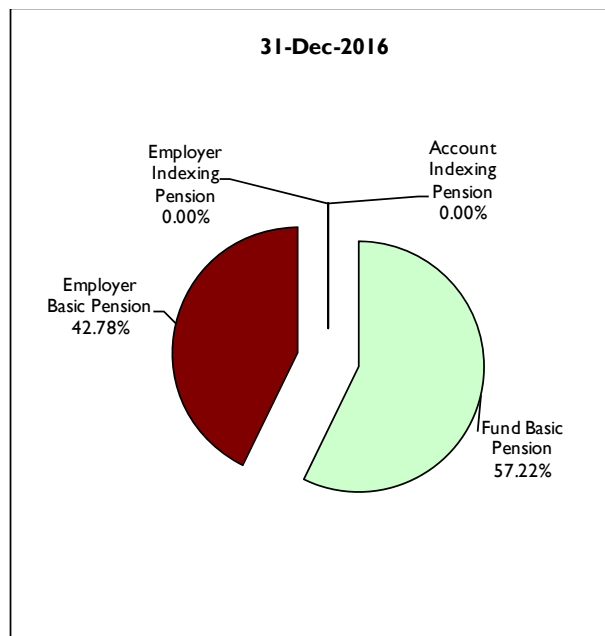
\* The LTD recipients who will receive an enhanced disability benefit (not a responsibility of the Fund) on cessation of LTD income are also reflected in the number of pensions in payment (a portion of which is the liability of the Fund).

	31-Dec-2016			31-Dec-2015		
	Number	Average Age	Fund Average Monthly Pension	Number	Average Age	Fund Average Monthly Pension
Active Participants	30,760	44.82	\$ 636.87	31,065	44.76	\$ 614.62
Other Participants	3,345	49.22	319.79	3,338	49.21	276.55
Pensions in Payment	20,793	70.94	890.39	20,183	70.69	872.62
Total	<u>54,898</u>	<u>54.98</u>	<u>\$ 713.57</u>	<u>54,586</u>	<u>54.62</u>	<u>\$ 689.34</u>

- The active participant average monthly pension which is the responsibility of the Fund has been estimated from salary and service data as these participants have not yet retired, disabled, terminated, or died and therefore have not had their pension determined explicitly by the Board.
- The total membership counts shown in the Report are different from the amounts reported in the General Manager's Report due to additional new entrants, retirements, disablements, terminations, and deaths following December 31, 2016, that were provided by the staff of the Board.
- This Report is in respect of Fund obligations. The Fund average monthly pension has been shown above which represents approximately 55% of the total pensions paid to participants prior to reflecting indexing. Additional information is shown on the following pages that detail Fund pension amounts as well as the pension amounts payable outside the Fund by the Indexing Account and the pay-as-you-go employers. The valuation of the obligations not belonging to the Fund is reported separately.

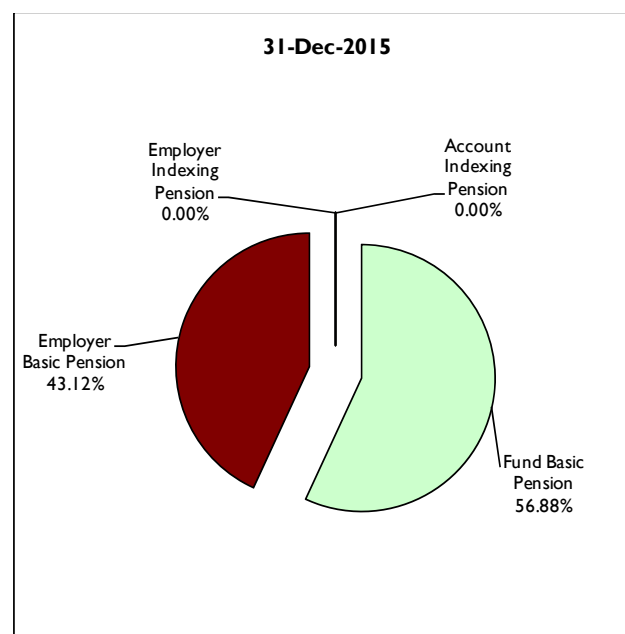
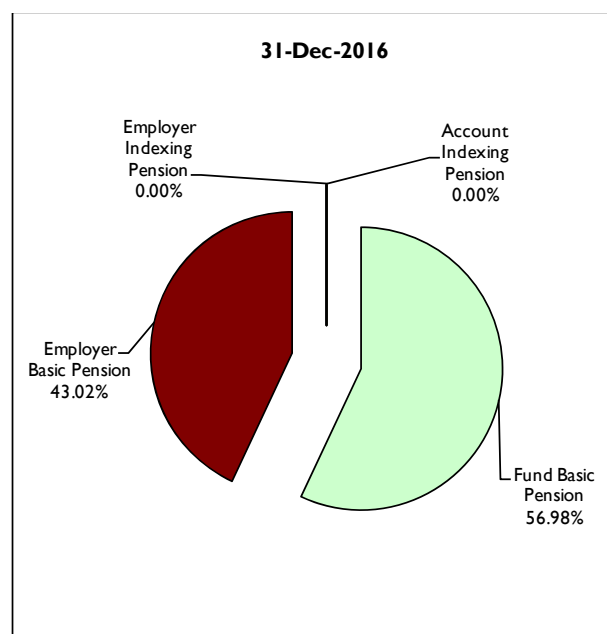
**5. Active Participants Age Profile** (This Report is in respect of Fund obligations only. Employer in the information below refers to pay-as-you-go employers. The Fund includes matching employer pension information.)

		Average Monthly Pension				
Age Band	Number	Basic Pension		Indexing		Total
		Fund	Employer	Employer	Account	
15 - 19	33	\$ 13.13	\$ 7.66	\$ -	\$ -	\$ 20.79
20 - 24	951	49.97	31.57	-	-	81.54
25 - 29	2,526	138.65	94.26	-	-	232.91
30 - 34	3,515	258.26	185.72	-	-	443.98
35 - 39	3,987	388.70	273.58	-	-	662.28
40 - 44	4,086	516.92	370.54	-	-	887.46
45 - 49	4,156	726.21	517.15	-	-	1,243.36
50 - 54	5,062	973.49	752.07	-	-	1,725.56
55 - 59	3,853	1,030.68	795.33	-	-	1,826.01
60 - 64	1,982	1,069.90	811.60	-	-	1,881.50
65 - 69	609	959.83	810.17	-	-	1,770.00
70 - 74	-	-	-	-	-	-
75 - 79	-	-	-	-	-	-
80 - 84	-	-	-	-	-	-
85 - 89	-	-	-	-	-	-
90 - 94	-	-	-	-	-	-
95 - 99	-	-	-	-	-	-
100 - 104	-	-	-	-	-	-
31-Dec-2016	30,760	\$ 636.87	\$ 476.22	\$ -	\$ -	\$ 1,113.09
31-Dec-2015	31,065	\$ 614.62	\$ 449.55	\$ -	\$ -	\$ 1,064.17



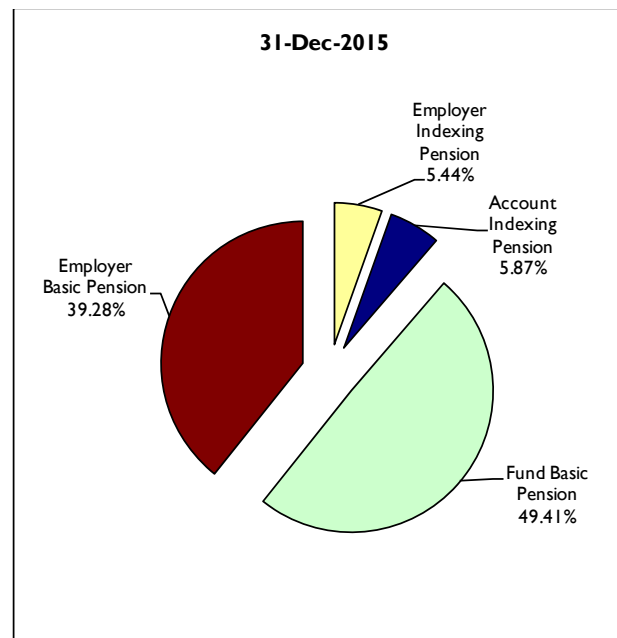
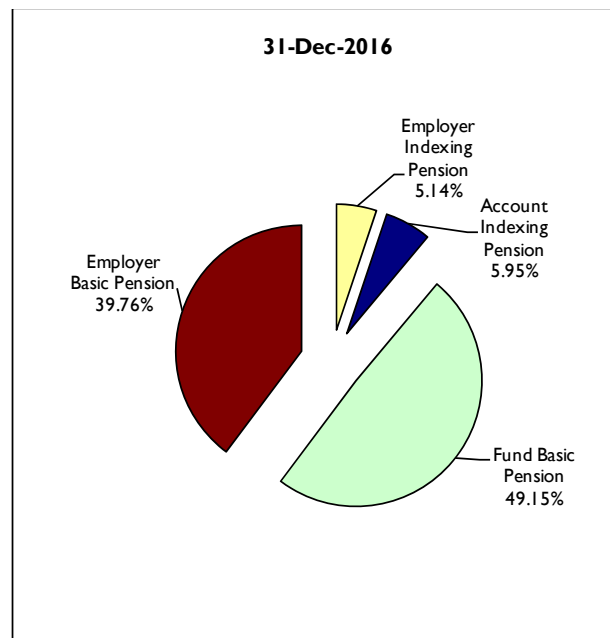
**6. Other Participants Age Profile** (This Report is in respect of Fund obligations only. Employer in the information below refers to pay-as-you-go employers. The Fund includes matching employer pension information.)

		Average Monthly Pension				
Age Band	Number	Basic Pension		Indexing		Total
		Fund	Employer	Employer	Account	
15 - 19	-	\$ -	\$ -	\$ -	\$ -	\$ -
20 - 24	1	123.17	168.21	-	-	291.38
25 - 29	64	144.20	100.89	-	-	245.09
30 - 34	220	213.23	134.71	-	-	347.94
35 - 39	340	294.87	205.37	-	-	500.24
40 - 44	435	354.90	261.99	-	-	616.89
45 - 49	557	402.16	287.83	-	-	689.99
50 - 54	762	407.38	323.07	-	-	730.45
55 - 59	575	242.26	210.19	-	-	452.45
60 - 64	321	226.52	157.56	-	-	384.08
65 - 69	64	172.12	133.10	-	-	305.22
70 - 74	5	250.10	217.97	-	-	468.07
75 - 79	1	100.65	-	-	-	100.65
80 - 84	-	-	-	-	-	-
85 - 89	-	-	-	-	-	-
90 - 94	-	-	-	-	-	-
95 - 99	-	-	-	-	-	-
100 - 104	-	-	-	-	-	-
31-Dec-2016	3,345	\$ 319.79	\$ 241.43	\$ -	\$ -	\$ 561.22
31-Dec-2015	3,338	\$ 276.55	\$ 209.63	\$ -	\$ -	\$ 486.18



**7. Pensions in Payment Age Profile** (This Report is in respect of Fund obligations only. Employer in the information below refers to pay-as-you-go employers. The Fund includes matching employer pension information.)

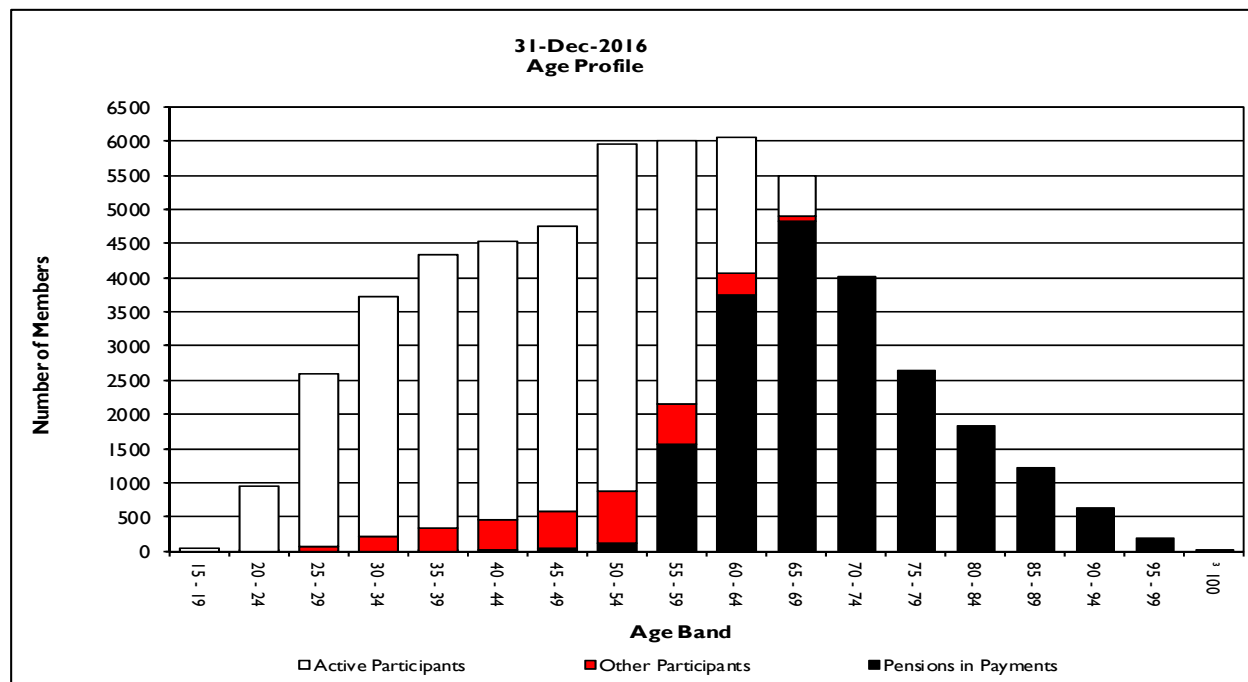
		Average Monthly Pension				
Age Band	Number	Basic Pension		Indexing		Total
		Fund	Employer	Employer	Account	
15 - 19	-	\$ -	\$ -	\$ -	\$ -	\$ -
20 - 24	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-
30 - 34	-	-	-	-	-	-
35 - 39	5	362.20	296.72	2.78	3.59	665.29
40 - 44	19	222.25	187.56	5.94	6.77	422.52
45 - 49	35	317.52	265.20	10.21	12.28	605.21
50 - 54	124	516.54	901.49	24.93	22.80	1,465.76
55 - 59	1,572	1,261.04	992.76	12.90	15.31	2,282.01
60 - 64	3,740	1,203.70	952.23	37.41	44.90	2,238.24
65 - 69	4,829	1,011.39	817.57	65.87	77.51	1,972.34
70 - 74	3,983	864.49	702.80	102.39	119.85	1,789.53
75 - 79	2,615	657.97	552.27	136.72	153.69	1,500.65
80 - 84	1,829	559.38	449.89	164.82	189.34	1,363.43
85 - 89	1,212	465.45	384.87	182.54	205.94	1,238.80
90 - 94	627	398.41	311.88	191.62	231.49	1,133.40
95 - 99	181	326.83	279.26	226.52	252.52	1,085.13
≥ 100	22	203.88	188.43	201.05	203.23	796.59
31-Dec-2016	20,793	\$ 890.39	\$ 720.39	\$ 93.08	\$ 107.74	\$ 1,811.60
31-Dec-2015	20,183	\$ 872.62	\$ 693.74	\$ 96.10	\$ 103.64	\$ 1,766.10



**8. Total Membership Age Profile** (This Report is in respect of Fund obligations only. Employer in the information below refers to pay-as-you-go employers. The Fund includes matching employer pension information.)

		Average Monthly Pension				
Age Band	Number	Basic Pension		Indexing *		Total
		Fund	Employer	Employer	Account	
15 - 19	33	\$ 13.13	\$ 7.66	\$ -	\$ -	\$ 20.79
20 - 24	952	50.05	31.71	-	-	81.76
25 - 29	2,590	138.79	94.42	-	-	233.21
30 - 34	3,735	255.61	182.72	-	-	438.33
35 - 39	4,332	381.31	268.25	0.00	0.00	649.57
40 - 44	4,540	500.16	359.37	0.02	0.03	859.59
45 - 49	4,748	685.18	488.39	0.08	0.09	1,173.74
50 - 54	5,948	891.44	700.23	0.52	0.48	1,592.66
55 - 59	6,000	1,015.48	790.98	3.38	4.01	1,813.85
60 - 64	6,043	1,107.91	863.89	23.15	27.79	2,022.74
65 - 69	5,502	995.92	808.79	57.81	68.03	1,930.55
70 - 74	3,988	863.72	702.19	102.26	119.70	1,787.87
75 - 79	2,616	657.76	552.06	136.67	153.63	1,500.11
80 - 84	1,829	559.38	449.89	164.82	189.34	1,363.43
85 - 89	1,212	465.45	384.87	182.54	205.94	1,238.80
90 - 94	627	398.41	311.88	191.62	231.49	1,133.40
95 - 99	181	326.83	279.26	226.52	252.52	1,085.13
≥ 100	22	203.88	188.43	201.05	203.23	796.59
31-Dec-2016	54,898	\$ 713.57	\$ 554.40	\$ 35.26	\$ 40.81	\$ 1,344.04
31-Dec-2015	54,586	\$ 689.34	\$ 525.11	\$ 35.53	\$ 38.32	\$ 1,288.30

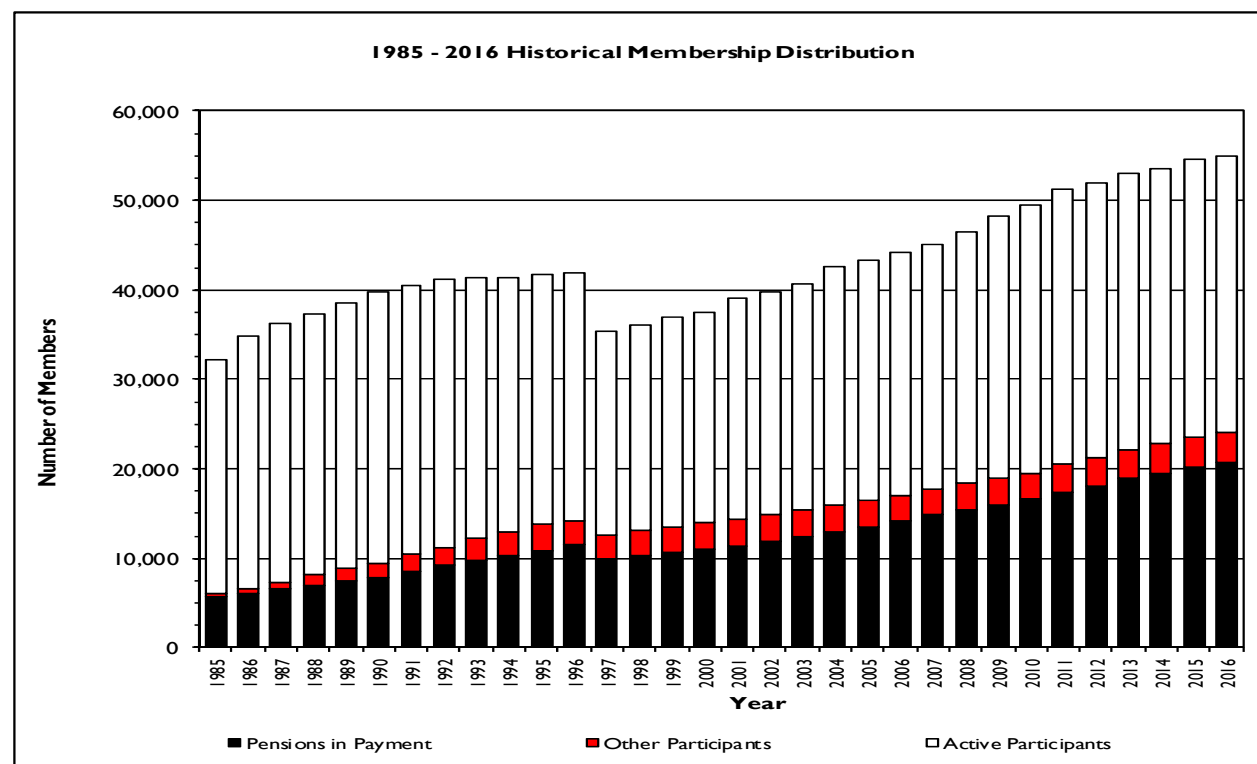
\* The indexing shown above is averaged over the total membership at each age band.



## 9. Membership Distribution by Year (extracted from General Manager's Report, unless noted)

Year	Participants			Pensions in Payment				Grand Total
	Actives	Other	Total	Pensioners	Beneficiaries	Spouses	Total	
1985	26,027	454	26,481	4,830	456	355	5,641	32,122
1986	28,182	568	28,750	5,191	489	370	6,050	34,800
1987	28,832	794	29,626	5,614	529	398	6,541	36,167
1988	29,107	1,153	30,260	6,003	597	423	7,023	37,283
1989	29,665	1,370	31,035	6,368	663	444	7,475	38,510
1990	30,350	1,562	31,912	6,670	719	482	7,871	39,783
1991	30,106	1,864	31,970	7,254	798	514	8,566	40,536
1992	29,921	2,058	31,979	7,739	870	545	9,154	41,133
1993	29,209	2,344	31,553	8,356	930	542	9,828	41,381
1994	28,544	2,608	31,152	8,679	1,031	558	10,268	41,420
1995	27,952	2,885	30,837	9,165	1,113	591	10,869	41,706
1996	27,629	2,705	30,334	9,690	1,188	604	11,482	41,816
1997	22,658	2,774	25,432	8,308	1,060	528	9,896	35,328
1998	22,980	2,842	25,822	8,573	1,160	533	10,266	36,088
1999	23,350	2,827	26,177	8,883	1,279	535	10,697	36,874
2000	23,575	2,933	26,508	9,096	1,313	590	10,999	37,507
2001	24,640	2,961	27,601	9,446	1,438	549	11,433	39,034
2002	24,885	2,982	27,867	9,874	1,509	542	11,925	39,792
2003	25,136	2,996	28,132	10,322	1,587	545	12,454	40,586
2004	26,659	2,952	29,611	10,772	1,674	553	12,999	42,610
2005	26,792	2,958	29,750	11,225	1,747	556	13,528	43,278
2006	27,112	2,893	30,005	11,704	1,829	568	14,101	44,106
2007	27,403	2,893	30,296	12,354	1,886	572	14,812	45,108
2008	27,978	3,024	31,002	12,908	1,961	581	15,450	46,452
2009	29,353	2,857	32,210	13,429	2,007	587	16,023	48,233
2010	29,983	2,901	32,884	14,011	1,992	658	16,661	49,545
2011	30,659	3,155	33,814	14,632	2,061	677	17,370	51,184
2012	30,693	3,270	33,963	15,253	2,110	665	18,028	51,991
2013	30,916	3,170	34,086	16,028	2,225	663	18,916	53,002
2014	30,675	3,276	33,951	16,580	2,357	579	19,516	53,467
2015	31,065	3,338	34,403	17,199	2,413	571	20,183	54,586
2016	30,760	3,345	34,105	17,753	2,470	570	20,793	54,898 *

\* The actual membership records processed for liability calculations is shown in the above table and will differ from the General Manager's Report due to the inclusion of members who entered or retired between the end of 2016 and the date the valuation file was sent to the actuary.



## 10. Reconciliation

### Participant Reconciliation (extracted from General Manager's Report, unless noted)

Year	Jan. 1	Entered*	Withdrew	Retired	Disabled	Died	Dec. 31
1985	25,673	2,271	(908)	(468)	(28)	(59)	26,481
1986	26,481	3,857	(1,028)	(489)	(29)	(42)	28,750
1987	28,750	2,787	(1,272)	(541)	(52)	(46)	29,626
1988	29,626	2,655	(1,387)	(536)	(52)	(46)	30,260
1989	30,260	2,710	(1,307)	(528)	(49)	(51)	31,035
1990	31,035	2,718	(1,273)	(470)	(50)	(48)	31,912
1991	31,912	2,311	(1,389)	(768)	(42)	(54)	31,970
1992	31,970	1,844	(1,125)	(640)	(31)	(39)	31,979
1993	31,979	1,739	(1,296)	(808)	(31)	(30)	31,553
1994	31,553	1,438	(1,189)	(575)	(32)	(43)	31,152
1995	31,152	1,675	(1,324)	(569)	(30)	(67)	30,837
1996	30,837	2,353	(1,992)	(763)	(54)	(47)	30,334
1997	30,334	(3,272)	(1,082)	(478)	(41)	(29)	25,432
1998	25,432	2,155	(1,182)	(494)	(47)	(42)	25,822
1999	25,822	2,040	(991)	(585)	(52)	(57)	26,177
2000	26,177	2,024	(1,105)	(505)	(48)	(35)	26,508
2001	26,508	2,803	(1,017)	(598)	(35)	(60)	27,601
2002	27,601	2,068	(1,016)	(683)	(56)	(47)	27,867
2003	27,867	1,993	(909)	(710)	(68)	(41)	28,132
2004	28,132	3,196	(858)	(751)	(60)	(48)	29,611
2005	29,611	2,074	(1,060)	(755)	(63)	(57)	29,750
2006	29,750	2,388	(1,251)	(777)	(63)	(42)	30,005
2007	30,005	2,538	(1,172)	(948)	(65)	(62)	30,296
2008	30,296	3,126	(1,408)	(906)	(53)	(53)	31,002
2009	31,002	3,415	(1,243)	(841)	(72)	(51)	32,210
2010	32,210	2,860	(1,171)	(907)	(61)	(47)	32,884
2011	32,884	3,050	(1,033)	(965)	(68)	(54)	33,814
2012	33,814	2,950	(1,764)	(933)	(55)	(53)	33,959
2013	33,959	2,869	(1,730)	(898)	(58)	(56)	34,086
2014	34,086	2,595	(1,680)	(936)	(54)	(60)	33,951
2015	33,951	3,327	(1,784)	(977)	(56)	(58)	34,403
2016	34,403	2,469	(1,728)	(955)	(47)	(37)	34,105
		<u>75,026</u>	<u>(40,674)</u>	<u>(22,757)</u>	<u>(1,602)</u>	<u>(1,561)</u>	

### Pensioner (excludes survivors) Reconciliation (extracted from General Manager's Report, unless noted)

Year	Jan. 1	Other*	Retired	Disabled	Died	Dec. 31
1985	4,519	-	468	28	(185)	4,830
1986	4,830	1	489	29	(158)	5,191
1987	5,191	-	541	52	(170)	5,614
1988	5,614	(6)	536	52	(193)	6,003
1989	6,003	(9)	528	49	(203)	6,368
1990	6,368	(18)	470	50	(200)	6,670
1991	6,670	5	768	42	(231)	7,254
1992	7,254	34	640	31	(220)	7,739
1993	7,739	12	808	31	(234)	8,356
1994	8,356	-	575	32	(284)	8,679
1995	8,679	142	569	30	(255)	9,165
1996	9,165	-	763	54	(292)	9,690
1997	9,690	(1,649)	478	41	(252)	8,308
1998	8,308	16	494	47	(292)	8,573
1999	8,573	-	585	52	(327)	8,883
2000	8,883	(20)	505	48	(320)	9,096
2001	9,096	(1)	598	35	(282)	9,446
2002	9,446	(8)	683	56	(303)	9,874
2003	9,874	(24)	710	68	(306)	10,322
2004	10,322	(24)	751	60	(337)	10,772
2005	10,772	(29)	755	63	(336)	11,225
2006	11,225	(28)	777	63	(333)	11,704
2007	11,704	(23)	948	65	(340)	12,354
2008	12,354	(25)	906	53	(380)	12,908
2009	12,908	(38)	841	72	(354)	13,429
2010	13,429	(16)	907	61	(370)	14,011
2011	14,011	(16)	965	68	(396)	14,632
2012	14,632	(17)	933	55	(350)	15,253
2013	15,253	243	898	58	(424)	16,028
2014	16,028	8	936	54	(446)	16,580
2015	16,580	14	977	56	(428)	17,199
2016	17,199	(47)	955	47	(401)	17,753
		<u>(1,523)</u>	<u>22,757</u>	<u>1,602</u>	<u>(9,602)</u>	

\* This category reflects other adjustments. For example, in 1997, this category reflects the privatization of MTS.

\*\* The actual membership records processed for liability calculations is shown in the above table and will differ from the General Manager's Report due to the inclusion of members who entered or retired between the end of 2016 and the date the valuation file was sent to the actuary.

## II. Membership Distribution by Employer

Name of Employer	Code	Active Participants	Other Participants	Pensions in Payment	2016 Total
<b>Non-Matching Employers</b>					
1 Province of Manitoba Civil Service	CS	14,938	2,058	12,869	29,865
2 Sport Manitoba	SM	1	1	4	6
3 Venture Manitoba Tours Ltd.	VT	2	-	3	5
4 Paletta & Company Hotels Ltd.	PCH	2	-	1	3
5 Manitoba Hydro	MH	6,024	306	3,404	9,734
6 Manitoba Public Insurance Corporation	AI/AIE	1,899	194	749	2,842
7 MPIC - Division of Driver and Vehicle Licensing	AIL	102	4	129	235
8 Red River College	RCC	1,534	139	668	2,341
9 Manitoba Agricultural Services Corporation	AC	-	7	30	37
10 The Addictions Foundation of Manitoba	AF	346	45	205	596
11 Assiniboine Community College	ACC	343	42	168	553
12 The University College of The North	KCC	320	65	119	504
13 The Legal Aid Services Society of Manitoba	LA	152	17	61	230
14 Manitoba Centennial Centre Corporation	CC	57	2	75	134
15 Teachers' Retirement Allowances Fund	TR	36	4	13	53
16 Communities Economic Development Fund	CE	12	3	11	26
17 The Council on Post-Secondary Education	UG	17	5	13	35
18 The Horse Racing Commission	RC	3	2	5	10
19 Diagnostic Services of Manitoba	DSM	58	4	65	127
20 WRHA - Health Sciences Centre	RWA	93	14	186	293
21 Prairie Mountain Health	PMH et al	107	14	333	454
22 Interlake-Eastern Regional Health Authority	IEH et al	17	2	91	110
23 Northern Health Region	NRH et al	13	7	31	51
24 Southern Health-Santé Sud	SRH et al	29	5	88	122
25 Manitoba Development Corporation	MDC	-	-	-	-
26 Workers' Compensation Board	WC	-	-	1	1
27 WECO	WEC	-	-	26	26
		<u>26,105</u>	<u>2,940</u>	<u>19,348</u>	<u>48,393</u>
<b>Matching Employers</b>					
1 Manitoba Liquor Lotteries Corporation	LC/LF/LL	2,583	170	534	3,287
2 Manitoba Housing Authority	HA	491	52	237	780
3 WCFS CUPE Support Workers	CSW	519	6	14	539
4 Manitoba Agricultural Services Corporation	MAS	151	12	46	209
5 Manitoba Crop Insurance	CI/CIC	114	16	142	272
6 Manitoba Government Employees Association	EA	96	8	52	156
7 Manitoba Hydro Utilities Services	MHU	69	18	1	88
8 ANCR Family Services	ANR	174	34	11	219
9 The Civil Service Superannuation Board	SB	52	12	26	90
10 Gaming Control Commission	GC	90	4	20	114
11 Travel Manitoba	TM	30	9	17	56
12 Teranet	TN	115	-	10	125
13 Food Development Centre	FD	51	9	4	64
14 Manitoba East Side Road Authority	MFA	3	6	20	29
15 Dairy Farmers of Manitoba	MC	22	4	15	41
16 Industrial Technology Centre	IT	19	5	10	34
17 Hams Marketing Services Co-Op Inc.	HM	10	5	19	34
18 Manitoba Health Research Council	HRC	9	1	1	11
19 Manitoba Film & Sound	MFS	10	-	-	10
20 Manitoba Pork Council	PC	9	2	6	17
21 Manitoba Arts Council	MA	15	3	4	22
22 Manitoba Chicken Producers	CB	7	-	1	8
23 Crown Corporations Council	CR	3	1	5	9
24 Horizon Lab Ltd.	MTR	6	3	-	9
25 Manitoba Cattle Enhancement Council	MCE	-	2	-	2
26 Turkey Producers Marketing Board	TB	2	1	5	8
27 Economic Innovation and Technology Council	MR	-	12	40	52
28 Manitoba Development Corporation	DPP	1	1	6	8
29 Manitoba Hazardous Waste	HW	-	-	3	3
30 Manitoba Water Services Board	WS	-	1	11	12
31 Human Resources and Employment Centres	R's/HE	-	5	12	17
32 Manitoba Beef Commission	BC	-	-	1	1
33 Local Government Districts	LG	-	-	2	2
34 Manitoba Mineral Resources Limited	MM	-	-	1	1
35 Manitoba Data Services	DS	-	3	2	5
36 Money Purchase Plan Annuity	MPP	4	-	167	171
37 No Billing (Charged to Fund)	NB	-	-	-	-
		<u>4,655</u>	<u>405</u>	<u>1,445</u>	<u>6,505</u>
31-Dec-2016 Total Membership		<u>30,760</u>	<u>3,345</u>	<u>20,793</u>	<u>54,898</u>
31-Dec-2015 Total Membership		<u>31,065</u>	<u>3,338</u>	<u>20,183</u>	<u>54,586</u>

## 12. Data Checks (Source: Staff of the Civil Service Superannuation Board)

- Active Participants: An electronic file which provided information for each active participant as at December 31, 2016. Details of the information provided included: employer code, social insurance number, employee number, sex, date of birth, date of entry into the Fund, full-time annual salary at December 31, 2016, salary rate at December 31, 2016, the proportion of 2016 worked, qualifying service, required employee contributions and total interest on these contributions accumulated to the valuation date. In addition, average monthly pension at the valuation date, including retroactive salary increases, was provided, split between onside, LTD and other offside amounts. Any reductions in pension as a result of marriage break-up cases, which have been processed, were also provided. We had available copies of prior Actuarial Valuation Reports on the financial position of the Fund.

The file was checked for missing information and illogical information.

- Pensions in Payment: An electronic file which provided information for each pensioner as at December 31, 2016. Details of the information provided included: employer code, name, social insurance number, sex, date of birth, date of commencement of pension, type of pension, and amount of monthly pension. For each pensioner, the portion of the pension charged to the Fund, now and in the future, was also provided. Similar information was provided for each beneficiary or potential beneficiary.

The pensioner information was provided in 64,922 separate records (trailers) in respect of the 20,793 pensions in payment, which gave details on the pension payable from various sources.

Billing Type	Number	Basic Pension		Indexing	
		Fund	Employer	Employer	Account
A	142	\$ 1,927	\$ 5,906	\$ 5,113	\$ 180
B	46,546	18,500,423	14,351,288	1,887,519	2,223,523
C	3,140	(64,303)	(57,330)	-	-
D	1	37	-	-	-
E	44	-	459	-	-
F	2,174	50,443	34,977	1,319	1,740
H	1,538	-	30,716	-	-
I	785	86,671	31,931	-	-
J	2,834	60,305	19,893	4,144	9,200
K	45	-	147,961	11,171	-
L	1,154	383	230,538	-	-
M	10	-	537	12	-
N	474	-	278,541	20,116	-
O	4,924	(140,247)	(136,921)	-	-
P	1,002	17,942	6,758	2,948	5,506
Q	2	-	2	1	-
U	3	299	299	-	-
W	67	20	230	336	29
X	28	-	25,157	2,838	-
Y	9	-	8,118	-	-
	<u>64,922</u>	<u>\$ 18,513,900</u>	<u>\$ 14,979,059</u>	<u>\$ 1,935,516</u>	<u>\$ 2,240,177</u>

Average Monthly Pension	\$890.39	\$720.39	\$93.08	\$107.74
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- The General Manager's and Chief Investment Officer's Reports for 2016. This Report included detailed lists of investments held and financial statements of the Fund, including balance sheets, and income and expenditure statements.
- The Annual Report of the Superannuation Board for 2016.
- A copy of the CSSA, with amendments, to December 31, 2016.
- An electronic file containing the billing percentages to be used to allocate payments and liabilities amongst the participating employers pursuant to subsection 22(11) of the CSSA.

## DATA CERTIFICATE

with respect to

**The Civil Service Superannuation Fund**

forming part of

**The Actuarial Valuation Report as at December 31, 2016**

I hereby certify that, to the best of my knowledge and belief, the data on which the valuation is based is a complete and accurate representation of all persons at the valuation date who are entitled to benefits or will become entitled to benefits under the terms of the Civil Service Superannuation Act (CSSA). It is appropriate to value the benefits of these persons in accordance with the provisions of the CSSA at the valuation date.

DR/pawid  
Signed

Director - Client Services  
Title

June 20, 2017  
Date

## **A P P E N D I X   I I**

### **Summary of the Plan**

The calculations in this Report are based on the Civil Service Superannuation Act (CSSA) as amended to the valuation date. The Civil Service Superannuation Board (Board) is responsible for administering the CSSA. The Fund is a contributory defined benefit final pay pension plan that covers eligible employees of the Province of Manitoba and its participating Agencies. The following is a brief summary of the benefits as they existed at the valuation date. For a more complete description of the benefits, reference should be made to the CSSA.

#### **I.      Effective Date:**

The Board and Fund were established under the CSSA in May, 1939.

#### **2.      Recent Changes:**

In 2014, Manitoba Liquor Control Commission, after its amalgamation with Manitoba Lotteries Corporation, became a matching employer and paid to the Fund its unfunded employer benefit obligations.

Contribution rates to the Plan increased over a four year period until the contribution rates are 2% higher than they were previously. The increased contributions are not intended to provide increased pension benefits, but are necessary to fund existing benefits in the future.

Effective May 31, 2010, the Manitoba Pension Benefits Act was amended to provide immediate vesting (previously 2 years of service required) which has been reflected in this Valuation. Other changes dealing with the payment of commuted values, interest credits, marriage breakups, etc. are not expected to have a material cost to the Plan.

Effective January 1, 2001, the employee contribution rate will be 6.0% of pensionable earnings up to Canada Pension Plan (CPP) maximum pensionable earnings and 7.0% of pensionable earnings above the CPP maximum each year. On pensionable earnings up to the CPP maximum, the matching employer contribution rate remains the same at 5.1%.

Effective September 1, 2000, the CSSA was amended to provide benefit improvements. The most significant benefit improvement was to amend the pension formula to increase the pension benefits payable effective September 1, 2000 from 1.4% to 1.6% of average earnings below the average CPP maximum. There were also changes to buy back provisions respecting pensionable service as well as to other administrative matters. The cost of these benefit improvements will be funded by the Fund and by an increase in employee contribution rates.

Employer Billings: Effective January 1, 1998, pursuant to subsection 22(11) of the CSSA, employer funding for employees of more than one non-matching Agency shall be on a pro-rata basis in accordance with the portion of the amount paid or transferred to the employee in respect of which no employer matching contributions were made effective for events on or after January 1, 1998.

Correctional Officers Rule of 75: Effective November 19, 1996, employees who are members of the Province of Manitoba's Corrections Component are required to contribute an additional 1.00% of pensionable earnings. These additional contributions, which are credited to the Correctional Officers' Trust Account, are intended to fund the additional pension benefits for

eligible employees who may retire as early as age 50 with no reduction for early retirement providing age and qualifying service are equal to a total of 75 or greater.

### 3. Eligibility:

Each full-time employee of the Province of Manitoba or an Agency immediately begins to participate in the Fund.

Each part-time, temporary or term employee must become a participant upon completing 2 consecutive years of employment in which salary exceeds 25% of the Year's Maximum Pensionable Earnings as defined in the Interpretation Section of the Canada Pension Plan. Any such employee has the option to participate in the Fund any time after employment commences.

### 4. Contributions:

The Fund is financed by contributions required to be made by employees who are participants in the Fund and by participating employers.

Recently, a contribution rate was changed to the Plan to increase the rates by 2.00% of salary (matched by employers).

The rates of required contributions for employees who are participants in the Fund are scheduled as follows:

For pay periods ending:	Contribution rate on salary up to CPP earnings	Contribution rate on salary over CPP earnings
before July 1, 2012	6.00%	7.00%
on or after July 1, 2012 but before 2013	6.50%	7.50%
in 2013	7.00%	8.00%
in 2014	7.50%	8.50%
after 2014	8.00%	9.00%

In accordance with the CSSA, 10.2% of the contributions are allocated to the Indexing Account.

Some of the participating employers are "matching" the contributions made by their employees. The remaining employers are financing their portion of benefits on a pay-as-you-go basis. Correctional Officers are required to contribute an additional 1.00% of salary.

### 5. Pension Formula:

The lifetime pension formula equals:

- 2.00% of a member's best 5-year average pensionable earnings multiplied by pensionable service, minus
- .4% of the average Canada Pension Plan's earnings for the same period multiplied by pensionable service since January 1, 1966.

The lifetime pension is subject to an overall maximum of 70% of the average earnings. Some pensions for members retiring prior to age 60 are subject to an early retirement reduction.

## **6. Retirement:**

A participant receives an unreduced pension if such a participant retires on the last day of the calendar year in which the member attains age 71; on or after age 65 with one year of qualifying service; on or after age 60 with 10 years of qualifying service; or on or after age 55 if age plus qualifying service is equal to 80.

A participant is eligible to receive a reduced pension if such a participant retires on or after age 55 having completed 10 years of qualifying service. The 10-year service requirement has been eliminated after May 31, 2010.

Eligible members of the Province of Manitoba's Corrections Component may retire as early as age 50 if their age plus qualifying service total 75 or more.

The pension is paid for as long as a retired participant lives. If the participant dies before the total of the pension payments is at least equal to the participant's contributions with interest, the excess amount of these contributions over the pension payments made is paid to the participant's beneficiary or estate, whichever is applicable.

If the participant has a spouse at the date of retirement, a joint annuity is payable during the lives of the participant and the spouse. This annuity is reduced by one-third on the death of the participant. This annuity is reduced so that it is actuarially equivalent in value to the pension that would otherwise be payable. This form of payment is also guaranteed so that the total payments are at least equal to the participant's contributions with interest.

This form of payment can be waived if the spouse signs the appropriate waiver form.

## **7. Termination:**

Pension entitlements are protected (vested) for participants immediately (previously 2 or more years of qualifying service required). These entitlements are portable and may be transferred to another pension plan or to a suitable locked-in vehicle. Calculation of a commuted value of pension in respect of service is performed at the time of termination, death, or retirement. A test is made to ensure that the participant's required contributions plus interest (less 10.2% allocated to the Indexing Account) provide no more than 50% of the benefit in respect of eligible service. This test may cause an additional benefit to be paid for such eligible service.

## **8. Disability:**

A participant who has 10 or more years of qualifying service, has not reached age 60 and suffers from a disability may apply for a disability allowance.

If the disability is total and permanent, the participant qualifies immediately for an allowance calculated as a normal retirement pension.

Average annual salaries are determined at the date of disablement.

## **9. Death:**

If a participant dies prior to retirement and has not 10 completed years of qualifying service, the death benefits are equal to the commuted value of the participant's accrued pension. This amount may be paid as an annuity if there is a surviving spouse.

If a participant dies prior to retirement and has completed 10 years of qualifying service, the participant's spouse receives an annuity equal to 60% of the participant's accrued pension. The value of the spouse's annuity must be at least equal to the commuted value of the participant's accrued pension.

If a participant dies prior to retirement and has completed 10 years of qualifying service but there is no surviving spouse, the value of the death benefit must be at least equal to the commuted value of the participant's accrued pension.

If there is no spouse, the commuted value benefit will be paid to the estate. If the participant dies prior to retirement and does not have a spouse, the death benefit is at least the commuted value of the participant's accrued pension.

## **10. Indexing:**

Post-retirement: Increases to pensions in payment of up to 2/3 of the change in the Consumer Price Index (CPI) are granted if there is a sufficient amount available in the Indexing Account and there is an increase in the cost of living. A separate report has been prepared on the Indexing Account. Such amounts are not charged to the basic part of the Fund.

Pre-retirement: Increases to deferred annuities of up to 2/3 of the change in CPI are prefunded on the Valuation Balance Sheet between the date of termination and date of pension commencement. Such amounts are charged to the basic part of the Fund.

## **11. Valuation Process:**

For each event and resulting benefit in the actuarial valuation, we examine the eligibility criteria, benefit amount and maturity value in order to determine the value of that benefit. A description of these items follows:

- Eligibility - benefits usually depend on some combination of attained age and years of qualifying service recognized in the CSSA.
- Benefit Amount - pensions are based on the number of years of pensionable service and the average of the best 5 years' pensionable earnings.
- Maturity Value - a lump-sum cash settlement and/or a pension. If the benefit is a pension, the normal form of payout is life refunding if single. If married, the normal form of payout is joint-life, reducing to 2/3 on the participant's death (actuarially equivalent to life refunding). Other optional forms of payout are available with different death benefits.

Vested and locked-in pensions can be commuted and transferred to a suitable locked-in vehicle.

## APPENDIX III

### Actuarial Assumptions

#### A. Going Concern

Actuarial Assumptions and Methods	31-Dec-2016	31-Dec-2015
1. Actuarial Cost Method		
▪ accrued benefit cost method (ABCM)	ABCM with salary projection	same
▪ contribution deficiency contingency	nil	same
▪ funding methodology	excludes pay-as-you-go	same
2. Asset Valuation Method		
▪ accrued assets	market value	same
▪ asset smoothing adjustment	\$114,216,368 write-down	\$251,838,768 write-down
3. Expenses		
▪ explicit valuation balance sheet reserve	none	same
▪ explicit contribution rate allowance	none	same
▪ implicit assumed rate of return MER	0.12%	0.20%
4. Assumed Rate of Return		
▪ inflation rate	2.00%	same
▪ real rate	<u>4.00%</u>	<u>same</u>
total nominal rate	6.00%	same
5. Assumed Salary Increase Rate		
▪ inflation rate	2.00%	same
▪ real rate	0.75%	same
▪ service, merit, & promotion (SMP) - average	<u>1.00%</u>	<u>same</u>
total nominal rate	3.75%	same
▪ vacation pay allowance (currently 45 days)	3.45%	same
6. Indexing		
▪ if retired or eligible to retire	none	same
▪ existing deferreds during deferral period	1.33%	same
▪ indexing reserve	none	same
7. Annual Employee Contributions Interest Credit	4.00%	same
8. Annual Rate of Increase in CPP Earnings Maximum	2.75%	same
9. Rate of CRA Maximum Pension Increase	2016: \$2,890 2017: \$2,914 increased at 2.75% thereafter	2015: \$2,819 2016: \$2,890 same
10. Retirement Rates		
▪ if retired	immediate	same
▪ otherwise	vary by age & sex	same
11. Termination Rates	vary by age & sex	same
12. Disability Rates	vary by age & sex	same
13. Mortality Rates		
▪ pre-retirement	CPM 2014 Public Mortality Projected Using Scale B 90%(male) / 71%(female) -5/+3 or exact, if available  sex distinct 64% males/36% females	same
▪ post-retirement		
▪ spousal proportion (generally)		same
▪ spousal ages		same
▪ unisex weightings		
- if retired or eligible to retire		same
- otherwise		same

## I. Actuarial Cost Method

The actuarial cost method for the 2016 Valuation continues to be the accrued benefit cost method (ABCM) with salary projection. ABCM anticipates that the current service cost with interest, when added to the opening liabilities, will be sufficient to finance the liabilities at the end of the next year, after reflecting expected retirements, terminations, disablements, and deaths. This method of valuation is used by approximately 90% of defined benefit pension plans in funding their benefit promises. This method is however more sensitive to an aging demographic active population and will result in an increasingly higher current service cost as the population ages. The ABCM method is the preferred method used in the accounting profession for reporting financial obligations of pension plans.

The Fund consists of the accumulation of those contributions and other payments that were made during the period of employment of the present members. This accumulation will be used to finance a portion or all of the benefits which these members have been promised under the CSSA. The portion of the benefits so financed includes:

- 100% of the pensions and other benefits to be paid to employees for service if employed by an employer who matched the contributions made by employees,
- 50% of the pensions to be paid to those employees who are employed by an employer who is not matching employee contributions,
- 50% of the commuted value of pensions or benefits generated as a result of all service,
- 100% of the value of the excess contributions paid by employees as a result of service on or after January 1, 1985,
- the value of employee contributions transferred under reciprocal agreements,
- a specified portion of each pension currently being paid, excluding that part of the pension which is charged to the Indexing Account, plus
- notwithstanding the above cost sharing, the Fund is responsible for 100% of the 0.2% benefit formula improvement, which was effective September 1, 2000.

The remainder of the benefits is financed by the Province of Manitoba and its Agencies on a pay-as-you-go-basis (non-matching) or is withdrawn out of amounts set aside in accounts established within the Fund for this purpose. This actuarial valuation relates to the benefits which accrued during employment and the assets and contributions available to finance these benefits. The portion of the benefits to be financed by the Province of Manitoba and its Agencies by payments to the Fund is not considered to be a liability of the Fund.

Pursuant to CSSA subsection 22(1), employer funding for employees of more than one non-matching Agency shall be on a pro rata basis in accordance with the portion of the amount paid or transferred to the employee in respect of which no employer matching contributions were made effective for events on or after January 1, 1998.

## 2. Asset Smoothing Adjustment

Calendar Year	Net Investment Income	Rate of Return		Investment Gain/ (Loss)	Asset Smoothing Adjustment	
		Net	Assumed		Proportion	Amount
2012	\$ 303,698,000	9.92%	6.00%	\$ 120,009,694	0.00%	\$ -
2013	475,900,000	14.51%	6.00%	279,111,578	20.00%	55,822,316
2014	331,014,000	8.95%	6.00%	109,105,173	40.00%	43,642,069
2015	301,204,000	7.60%	6.00%	63,411,368	60.00%	38,046,821
2016	220,469,000	5.30%	6.00%	(29,118,547)	80.00%	(23,294,838)
Calculated Asset Smoothing Adjustment: Preliminary						\$ 114,216,368
Minimum Asset Smoothing Adjustment (-10.00% of assets): Min						(432,387,200)
Maximum Asset Smoothing Adjustment (+10.00% of assets): Max						432,387,200
As-Adj						114,216,368
Provision for future Adverse Deviation: PfAD						-
Final Asset Smoothing Adjustment 31-Dec-2016: As-Adj+PfAD						\$ 114,216,368

## 3. Expenses

- Valuation Balance Sheet Reserve

No explicit expense reserve has been held on the going concern Valuation Balance Sheet, but \$21,619,000 has been held in the Solvency Test.

- Contribution Rate Allowance

No explicit expense allowance has been made in the development of the normal actuarial cost of basic benefits.

- Assumed Rate of Return MER

An implicit management expense rate (MER) has been held in the development of the nominal assumed rate of return found as shown below and on the following page.

2016 Expense	Amount	Assets Under	
		Management	MER
Investment	\$ 3,059,000	\$ 4,323,872,000	0.07%
Administration	2,159,000	4,323,872,000	0.05%
Provision for future Adverse Deviation (PfAD)			0.00%
Total			0.12%

#### 4. Development of the Going Concern Discount Rate

The discount rate assumption is 6.00% per year.

The overall expected return (“best estimate”) is 5.80%, which is based on an inflation rate of 2.00%, resulting in a real rate of return on the pension fund assets of 3.80% per year. This best estimate rate of return was developed using best estimate returns for each major asset class in which the pension fund is invested and then using a building block approach, based on the Plan’s investment policy, to develop an overall best estimate rate of return for the entire pension fund. Any additional gains from rebalancing and diversification have been included.

Inflation	2.00%
Real Rate of Return (portfolio policy mix)	3.80%
Overall expected return	5.80%
Expenses	
Investing	(0.07%)
Operating	(0.05%)
Additional returns due to active management	0.05%
Rebalancing and Diversification	0.40%
Margin for adverse deviations	(0.13%)
<b>Discount Rate</b>	<b>6.00%</b>

## 5. Assumed Salary Increase Rate

The 2015 general salary increase rate (SINR = inflation plus productivity) has been continued at 2.75% per year as noted below and the service merit and promotional rates (SMP) are also continued for the 2016 Report. The expected SINR exceeds the recent actual SINR (prior to any full-time equivalent annual salary adjustments) and as a result provides a reasonable best estimate of Plan experience plus a possible provision for future adverse deviation (PfAD). In addition, SMP rates start at age 16, are unisex, and reach 0.00% at age 55.

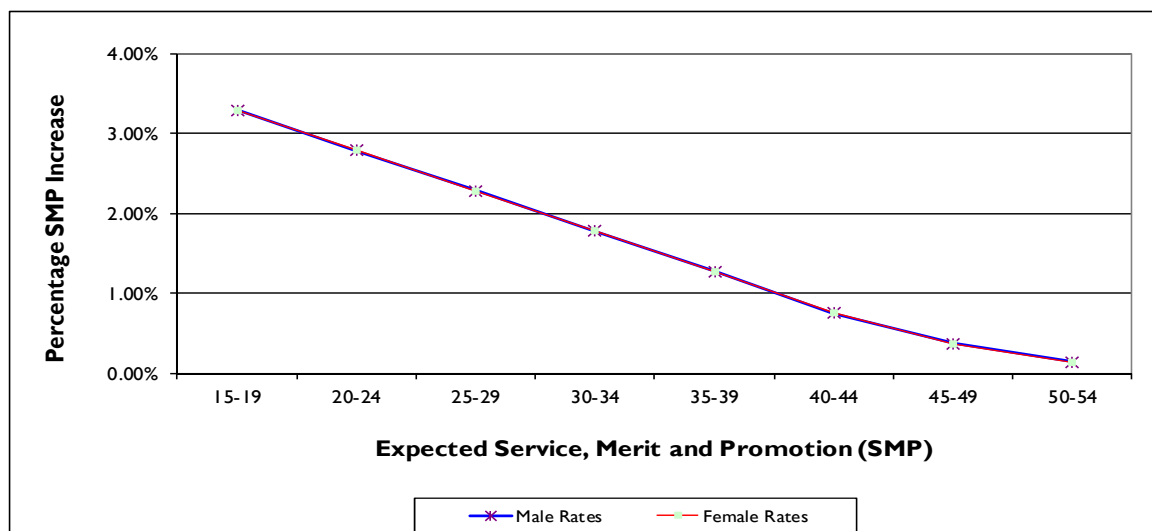
Salary Increase Rate Components	2015 Report	50-Year Average	25-Year Average	2016 Report
Inflation (source CIA Economic Statistics)	2.00%	4.08%	1.85%	2.00%
Productivity (source CIA Economic Statistics)	0.75%	0.81%	0.48%	0.75%
General Salary Increase Rate (SINR)	2.75%	4.89%	2.33%	2.75%
SMP (varies by age as shown in chart below)	1.00%	1.00%	1.00%	1.00%
Total Salary Increase Rate *	3.75%	5.89%	3.33%	3.75%

\*To allow for the fact that up to 50 days vacation pay may be used to enhance the best 5 years of salary used in the pension calculation, we have increased liabilities by 3.45% (also 3.45% in 2015) which is based on 45 days of vacation being used ( $3.45\% = 45/261 * 1/5$ ). In future, it may be necessary to increase this allowance.

Males					Females				
Age	Active Employees	Average Service	Average Salary	Expected SMP Rates	Age	Active Employees	Average Service	Average Salary	Expected SMP Rates
15-19	21	0.44	35,697	3.29%	15-19	12	0.34	38,600	3.29%
20-24	526	1.50	44,934	2.79%	20-24	425	1.28	42,315	2.79%
25-29	1,296	3.65	57,639	2.29%	25-29	1,230	2.81	51,494	2.29%
30-34	1,816	5.68	65,536	1.78%	30-34	1,699	4.78	58,899	1.78%
35-39	1,991	7.62	69,838	1.28%	35-39	1,996	6.50	62,701	1.28%
40-44	2,083	9.35	71,794	0.76%	40-44	2,003	8.52	65,715	0.76%
45-49	2,088	12.64	76,232	0.38%	45-49	2,068	11.05	66,468	0.38%
50-54	2,450	17.15	76,874	0.15%	50-54	2,612	15.67	67,364	0.15%
55-59	1,921	18.03	76,142	0.00%	55-59	1,932	16.92	65,442	0.00%
60-64	1,029	18.70	73,364	0.00%	60-64	953	17.44	64,770	0.00%
>=65	379	17.66	73,211	0.00%	>=65	230	16.73	64,657	0.00%
31-Dec-16	15,600	11.51	70,751	1.00%	31-Dec-16	15,160	10.45	62,992	1.00%

2017 Expected Average SMP 1.00%

2017 Expected Average SMP 1.00%



## **6. Indexing**

- If retired or eligible to retire

No allowance for post-retirement indexing of the basic benefits in this Valuation. Separately, a report is prepared on the Indexing Account and separate reports for each of the pay-as-you-go employers which allows for some post-retirement indexing.

- Existing deferred pensions during deferral period.

For the 2016 Report, the existing terminated employees who have elected a deferred pension in the Fund continue to have indexation of their otherwise static pension by 2/3rds of the increase in inflation, equal to 1.33% for this Valuation.

## **7. Annual Employee Contributions Interest Credit**

The annual employee contribution interest credit is equal to 4.00% for the 2016 Report. This rate is based on 5-year personal fixed term deposits (CANSIM V122515, effective May 31, 2010) and generally assumed to be 2.00% lower than the nominal assumed rate of return, currently equal to 6.00%.

## **8. Annual Rate of Increase in CPP Earnings Maximum**

The annual rate of increase in the CPP Earnings Maximum is equal to 2.75% for the 2016 Report. The rate continues to be based on the general salary increase rates (SINR = inflation plus productivity) found in this Report.

## **9. Rate of CRA Maximum Pension Increase**

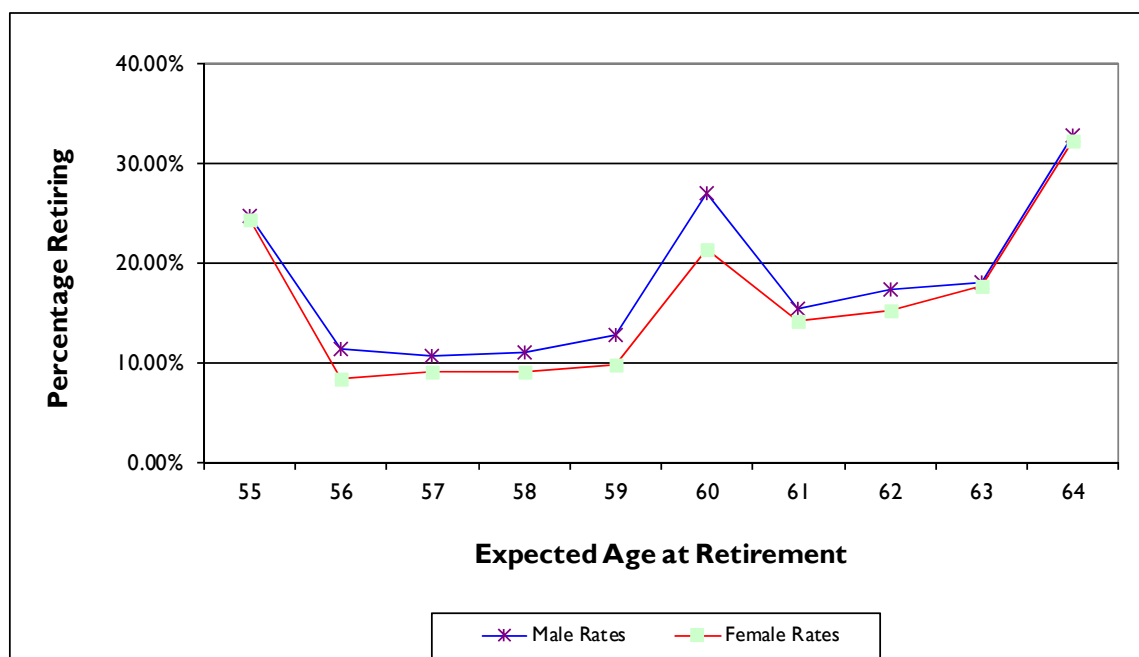
The rate of increase in the CRA Maximum Pension is equal to 2.75% for the 2016 Report. The rate continues to be based on the general salary increase rates (SINR = inflation plus productivity) found in this Report, after the stipulated rate for 2016 encoded in the Income Tax Act, has occurred.

## 10. Retirement Rates

The 2015 retirement rates are continued for the 2016 Report. The expected retirements exceed the recent actual retirements and as a result, they may provide a reasonable best estimate of Plan experience plus a provision for future adverse deviation (PfAD). There is some concern that the number of retirements may increase substantially in the future. Rates start at age 55, vary by sex, and reach 100.00% at age 65.

Males				Females			
Age	Participants Exposed	Expected Retirements	Expected Rates	Age	Participants Exposed	Expected Retirements	Expected Rates
15-49	10,363	-	0.00%	15-49	9,985	-	0.00%
50-54	2,771	-	0.00%	50-54	2,993	-	0.00%
55	508	126.29	24.86%	55	631	154.53	24.49%
56	484	55.71	11.51%	56	504	42.39	8.41%
57	459	49.07	10.69%	57	452	41.22	9.12%
58	419	46.80	11.17%	58	382	35.14	9.20%
59	371	47.49	12.80%	59	404	40.12	9.93%
60	373	101.08	27.10%	60	346	74.22	21.45%
61	283	43.92	15.52%	61	284	40.38	14.22%
62	234	40.95	17.50%	62	257	39.50	15.37%
63	203	36.76	18.11%	63	211	37.39	17.72%
64	194	63.69	32.83%	64	173	55.91	32.32%
>=65	494	494.00	100.00%	>=65	327	325.00	99.39%
	17,156	1,105.76			16,949	885.80	

		In-Year	2016 Exposure
2014	Actual Male & Female Retirements	936	940.25
2015	Actual Male & Female Retirements	977	968.54
2016	Actual Male & Female Retirements	955	955.00
2017	Expected Total Retirements	2015 QAR RATE =>	1,991.56 USED
2017	Expected Total Retirements	110% * 2015 QAR RATE =>	2,190.72 TESTED

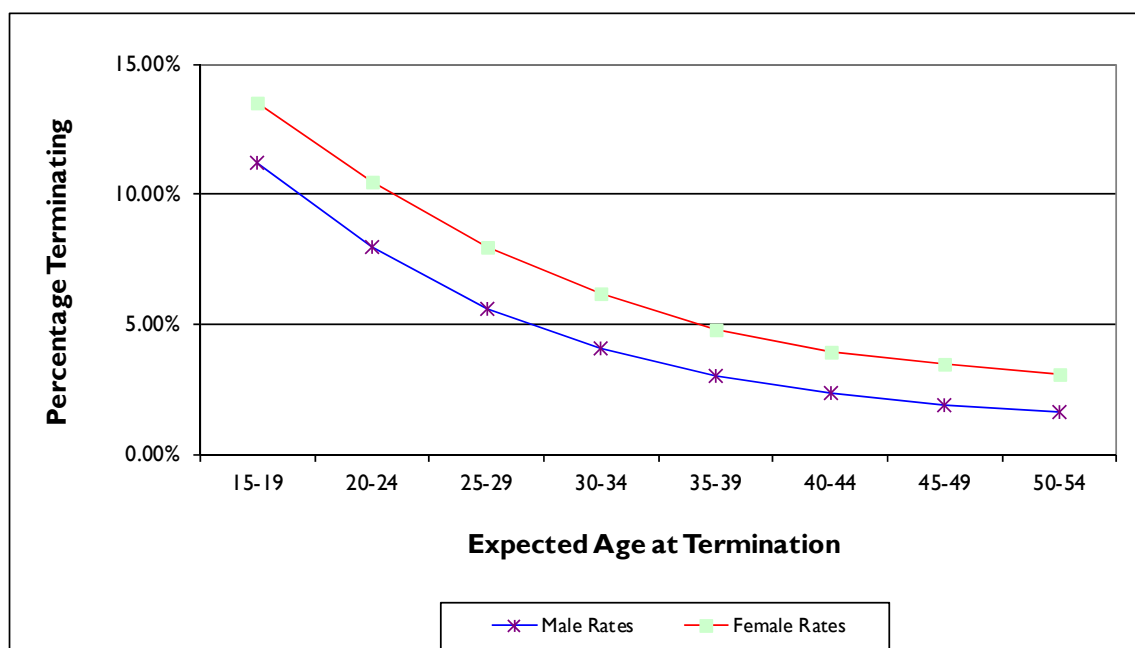


## II. Termination Rates

The 2015 termination rates are continued for the 2016 Report. The expected terminations are less than recent actual terminations, which in turn mean that more participants are assumed to continue in the work force and eventually retire, and as a result, they provide a reasonable best estimate of Plan experience plus a provision for future adverse deviation (PfAD). Rates start at age 16, vary by sex, and reach 0.00% at age 55.

Males				Females			
Age	Participants Exposed	Expected Terminations	Expected Rates	Age	Participants Exposed	Expected Terminations	Expected Rates
15-19	10	1.12	11.20%	15-19	6	0.81	13.50%
20-24	450	35.95	7.99%	20-24	356	37.38	10.50%
25-29	1,235	68.75	5.57%	25-29	1,183	94.59	8.00%
30-34	1,932	78.90	4.08%	30-34	1,741	107.33	6.16%
35-39	2,146	64.30	3.00%	35-39	2,145	103.33	4.82%
40-44	2,236	52.47	2.35%	40-44	2,281	90.67	3.98%
45-49	2,354	44.75	1.90%	45-49	2,273	78.56	3.46%
50-54	2,771	44.87	1.62%	50-54	2,993	91.56	3.06%
55-59	2,241	-	0.00%	55-59	2,373	-	0.00%
60-64	1,287	-	0.00%	60-64	1,271	-	0.00%
>=65	494	-	0.00%	>=65	327	-	0.00%
17,156		391.11		16,949		604.23	

		In-Year	2016 Exposure
2014	Actual Male & Female Terminations	1,680	1,687.62
2015	Actual Male & Female Terminations	1,784	1,768.55
2016	Actual Male & Female Terminations	1,728	1,728.00
2017	Expected Total Terminations	2015 QAW RATE =>	995.34 USED
2017	Expected Total Terminations	110% * 2015 QAW RATE =>	1,094.87 TESTED

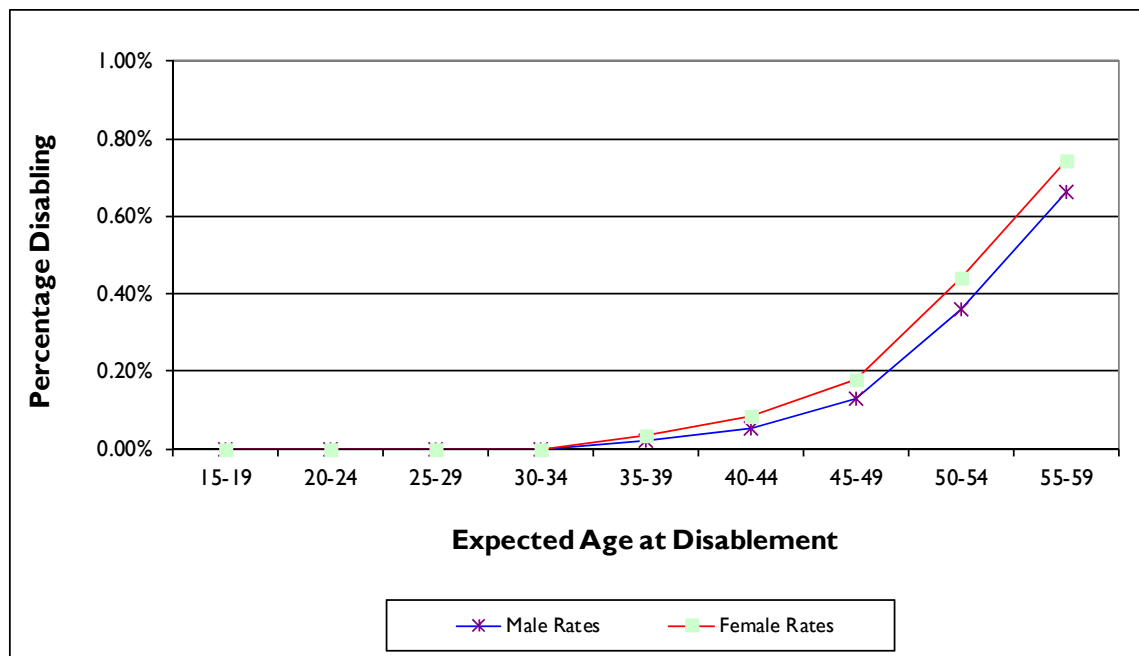


## 12. Disability Rates

The 2015 disability rates are continued for the 2016 Report. The expected disablements are greater than the recent actual disablements, and as a result, they provide a reasonable best estimate of Plan experience plus a provision for future adverse deviation (PfAD). Rates start at age 35, vary by sex, and reach 0.00% at age 60.

Males				Females			
Age	Participants Exposed	Expected Disablements	Expected Rates	Age	Participants Exposed	Expected Disablements	Expected Rates
15-19	10	-	0.00%	15-19	6	-	0.00%
20-24	450	-	0.00%	20-24	356	-	0.00%
25-29	1,235	-	0.00%	25-29	1,183	-	0.00%
30-34	1,932	-	0.00%	30-34	1,741	-	0.00%
35-39	2,146	0.48	0.02%	35-39	2,145	0.74	0.03%
40-44	2,236	1.17	0.05%	40-44	2,281	1.91	0.08%
45-49	2,354	3.01	0.13%	45-49	2,273	4.10	0.18%
50-54	2,771	9.96	0.36%	50-54	2,993	13.21	0.44%
55-59	2,241	14.88	0.66%	55-59	2,373	17.65	0.74%
60-64	1,287	-	0.00%	60-64	1,271	-	0.00%
>=65	494	-	0.00%	>=65	327	-	0.00%
17,156		29.50		16,949		37.61	

		In-Year	2016 Exposure
2014	Actual Male & Female Disablements	54	54.24
2015	Actual Male & Female Disablements	56	55.51
2016	Actual Male & Female Disablements	47	47.00
2017	Expected Total Disablements	2015 QAI RATE =>	67.11 USED
2017	Expected Total Disablements	110% * 2015 QAI RATE =>	73.82 TESTED



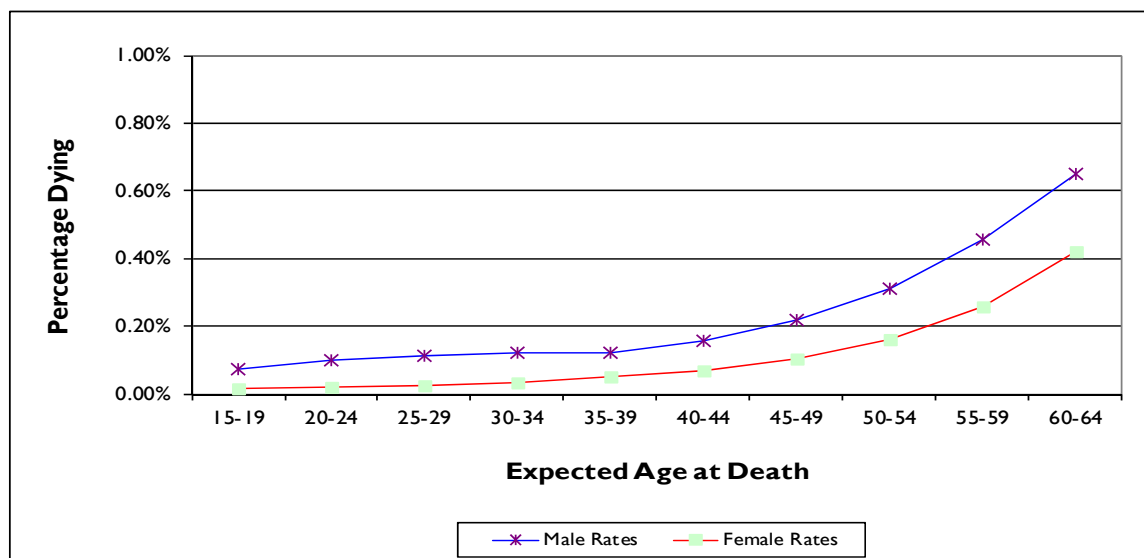
### 13. Death Rates - Pre-Retirement

The pre-retirement death rates CPM2014PUB-Scale B have been continued for the 2016 Report. The expected death rates are greater than the recent actual pre-retirement deaths, however they are consistent with the more dominant mortality used for post-retirement experience. Rates start at age 16, vary by sex, and reach 0.00% at age 65. We note that lump-sum commuted value payouts are to be prescribed on the basis of the CPM2014COM-Scale B at the valuation date.

Spousal status was assumed where required in calculating pre-retirement death benefits, generally 90% males and 71% females assumed to have a spouse at the higher ages and lower proportions at the younger ages. Spouse age difference was assumed generally to be minus 5 if a male participant and plus 3 if a female participant. All liabilities were valued on a sex distinct basis.

Males				Females			
Age	Participants Exposed	Expected Deaths	Expected Rates	Age	Participants Exposed	Expected Deaths	Expected Rates
15-19	10	0.01	0.07%	15-19	6	0.00	0.02%
20-24	450	0.45	0.10%	20-24	356	0.08	0.02%
25-29	1,235	1.42	0.12%	25-29	1,183	0.32	0.03%
30-34	1,932	2.34	0.12%	30-34	1,741	0.60	0.03%
35-39	2,146	2.66	0.12%	35-39	2,145	1.07	0.05%
40-44	2,236	3.49	0.16%	40-44	2,281	1.62	0.07%
45-49	2,354	5.19	0.22%	45-49	2,273	2.37	0.10%
50-54	2,771	8.67	0.31%	50-54	2,993	4.78	0.16%
55-59	2,241	10.24	0.46%	55-59	2,373	6.14	0.26%
60-64	1,287	8.38	0.65%	60-64	1,271	5.34	0.42%
>=65	494	4.86	0.98%	>=65	327	2.21	0.67%
	17,156	47.71			16,949	24.53	

		In-Year	2016 Exposure
2014	Actual Male & Female Deaths	60	60.27
2015	Actual Male & Female Deaths	58	57.50
2016	Actual Male & Female Deaths	37	37.00
2017	Expected Total Deaths	CPM2014PUB SCALE B =>	72.24 USED



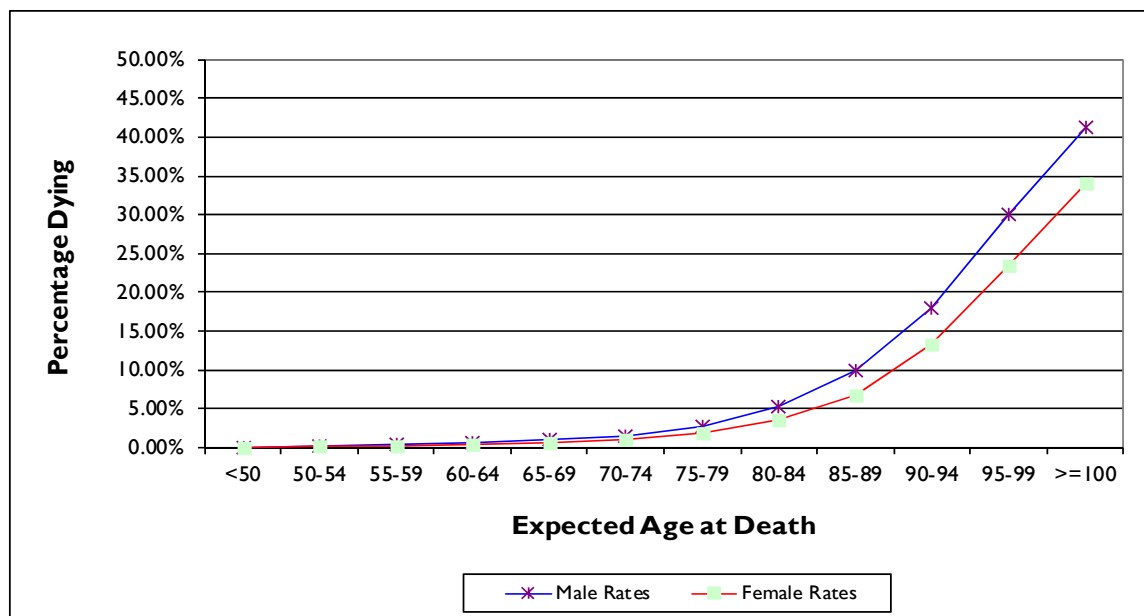
## 14. Death Rates - Post-Retirement

The post-retirement death rates CPM2014PUB-Scale B have been continued for the 2016 Report. The expected death rates are less than the recent actual post-retirement deaths, and as a result, they provide a reasonable best estimate of Plan experience plus a provision for future adverse deviation (PfAD). Rates start at age 16, vary by sex, and reach 100.00% at age 115. We note that lump-sum commuted value payouts are to be prescribed on the basis of the CPM2014COM-Scale B at the valuation date.

Exact spousal status and spouse age were used for those pension options that were joint or for survivor pensions in payment. All liabilities were valued on a sex distinct basis.

Males (excludes Survivors)				Females (excludes Survivors)			
Age	Pensioners Exposed	Expected Deaths	Expected Rates	Age	Pensioners Exposed	Expected Deaths	Expected Rates
<50	9	-	0.00%	<50	31	0.01	0.03%
50-54	25	0.08	0.32%	50-54	38	0.06	0.16%
55-59	634	3.03	0.48%	55-59	826	2.32	0.28%
60-64	1,730	11.72	0.68%	60-64	1,767	7.74	0.44%
65-69	2,448	24.04	0.98%	65-69	1,998	13.79	0.69%
70-74	2,118	32.63	1.54%	70-74	1,364	14.72	1.08%
75-79	1,284	35.69	2.78%	75-79	869	16.38	1.88%
80-84	870	46.25	5.32%	80-84	475	17.43	3.67%
85-89	482	48.05	9.97%	85-89	310	21.28	6.86%
90-94	220	39.43	17.92%	90-94	155	20.54	13.25%
95-99	56	16.84	30.07%	95-99	36	8.42	23.39%
>=100	3	1.24	41.33%	>=100	5	1.70	34.00%
	9,879	259.00			7,874	124.39	

		In-Year	2016 Exposure
2014	Actual Male & Female Deaths	446	477.55
2015	Actual Male & Female Deaths	428	441.79
2016	Actual Male & Female Deaths	401	401.00
2017	Expected Total Deaths	CPM2014PUB SCALE B =>	383.39 USED



## B. Solvency Test\*

Actuarial Assumptions and Methods	31-Dec-2016			31-Dec-2015		
1. Actuarial Cost Method						
▪ accrued benefit cost method (ABCM)	ABCM with no salary projection			same		
▪ contribution deficiency contingency	none			same		
▪ funding methodology	excludes pay-as-you-go			same		
2. Asset Valuation Method						
▪ accrued assets	market value			same		
▪ asset smoothing reserve	nil			same		
3. Expenses						
▪ explicit valuation balance sheet reserve	.50% of assets (\$21,619,000)			.50% of assets (\$21,075,000)		
▪ explicit contribution rate allowance	none			same		
▪ implicit assumed rate of return MER	none			same		
4. Assumed Rate of Return	Annuity	<u>Cash Settlements</u>		Annuity	<u>Cash Settlements</u>	
	<u>Purchases</u>	<u>&lt;10 Yrs</u>	<u>&gt;10 Yrs</u>	<u>Purchases</u>	<u>&lt;10 Yrs</u>	<u>&gt;10 Yrs</u>
▪ inflation rate	2.61%	1.06%	2.17%	2.38%	0.82%	1.88%
▪ real rate	0.51%	1.14%	1.33%	0.65%	1.28%	1.82%
total nominal rate	<u>3.12%</u>	<u>2.20%</u>	<u>3.50%</u>	<u>3.03%</u>	<u>2.10%</u>	<u>3.70%</u>
5. Assumed Salary Increase Rate						
▪ inflation rate	none			same		
▪ real rate	none			same		
▪ service, merit & promotion (SMP) -average	none			same		
total nominal rate	none			same		
▪ vacation pay allowance (currently 45 days)	3.45%			same		
6. Indexing						
▪ if retired or eligible to retire	none			same		
▪ existing deferreds during deferral period	none			same		
▪ indexing reserve	none			same		
7. Annual Employee Contributions Interest Credit	none			same		
8. Annual Rate of Increase in CPP Earnings Maximum	none			same		
9. Rate of CRA Maximum Pension Increase	2017: \$2,914 Indexed at 0.00% thereafter			2016: \$2,890 same		
10. Retirement Age						
▪ if retired or eligible to retire	immediate			same		
▪ otherwise	first age possible			same		
11. Termination Rates	commuted value			same		
12. Disability Rates	commuted value			same		
13. Mortality Rates						
▪ pre-retirement	none			same		
▪ post-retirement	CPM 2014 Composite Mortality Projected Using Scale B			same		
▪ spousal proportion (generally)	90%(male) / 71%(female)			same		
▪ spousal ages	-5/+3 or exact, if available			same		
▪ unisex weightings						
- if retired or eligible to retire	sex distinct			same		
- otherwise	64% males/36% females			same		

\* The Plan is exempt from the funding requirements of the solvency test pursuant to Paragraph 4.5(2)(b) of the Regulations to the Manitoba Pension Benefits Act. However, it is a requirement of the Canadian Institute of Actuaries to report the wind-up position.

## Development of the Annuity Purchase Rate - Non-Indexed

On March 1, 2017, the Canadian Institute of Actuaries (CIA) released an Educational Note "Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between December 31, 2016 and December 30, 2017" outlining how to determine the annuity purchase rate to be used for solvency valuations as at December 31, 2016. The cost of purchasing non-indexed annuities would be estimated based on the following process:

Determine the duration of the portion of the liabilities assumed to be settled through the purchase of annuities, based on a discount rate of 3.11% (CANSIM V39062 plus 90 bps at December 31, 2016).

Liabilities were calculated for the members who were retired as at December 31, 2016 using a discount rate of 3.11% and 3.12% to determine the duration.

Using these liabilities, duration was determined to be 11.37 for this group of members retired. To determine the spread above the unadjusted CANSIM V39062, we interpolated using the following table:

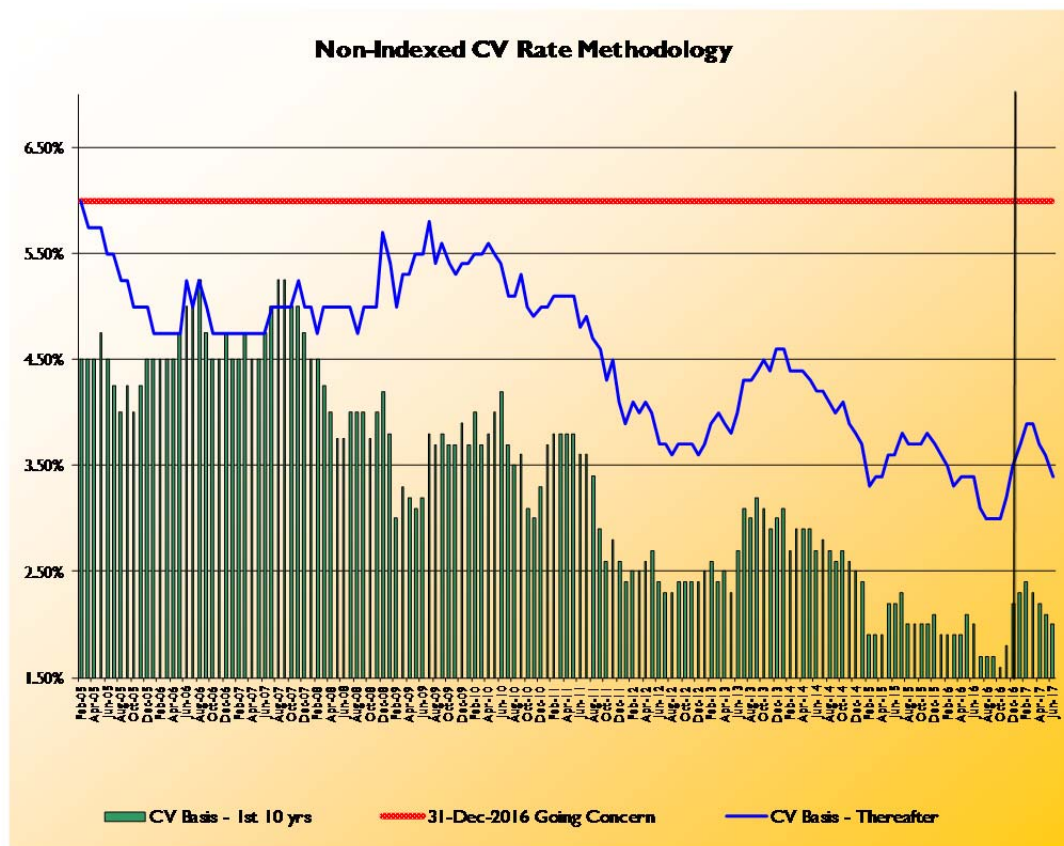
Illustrative Block	Duration based on 3.11% discount rate	Spread above unadjusted CANSIM V39062
Low Duration	8.5	+ 70 bps
Medium Duration	11.0	+ 90 bps
High Duration	13.5	+ 100 bps

The spread calculated was 0.91%. Therefore, the CANSIM V39062 as December 31, 2016 (2.21%) plus the spread (0.91%) is equal to the Annuity Purchase Rate of 3.12%.

## Development of the Cash Settlement Rate - Non-Indexed

The discount rates for cash settlements in the solvency valuation are based on the same rates that are used for the commuted value calculations including the 1-month lag as required by the Canadian Institute of Actuaries (CIA) standards. Effective for events commencing in October, 2015, the CIA standards utilize the CPM2014COM-Scale B, and the dual interest rates, one applicable to the first 10 years and the other applicable thereafter. These rates are based on the following CANSIM series and formulas:

Lump Sum Formula	Solvency Spot Rate	Solvency Used Rate
CANSIM VI22542 NOVEMBER, 2016 RATE ( $i_7$ ) =	1.27%	n/a
CANSIM VI22544 NOVEMBER, 2016 RATE ( $i_L$ ) =	2.16%	n/a
First 10 Years: = $i_7 + 0.90\%$ =	2.17%	2.20%
After 10 Years: = $i_L + 0.50 * (i_L - i_7) + 0.90\%$ =	3.51%	3.50%





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Airport Executive Centre  
503 – 1780 Wellington Avenue  
Winnipeg, Manitoba  
Canada R3H 1B3

P: 204.954.7300  
TF: 888.840.1045  
F: 204.954.7310  
[contact.us@ellement.ca](mailto:contact.us@ellement.ca)  
[www.ellement.ca](http://www.ellement.ca)