INVESTMENTS

2023 GENERAL RATE APPLICATION

July 12, 2022

MANITOBA
PUBLIC INSURANCE

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INV.1 Executive Summary

With over $3.5 billion in investment assets, the Investment Income forecast is a major component of the financial forecast of Manitoba Public Insurance (MPI). At the 2021/22 fiscal year-end (FYE), the investment loss allocated to the universal compulsory automobile insurance line of business (Basic) was $47.2 million. In 2022/23, investment income is forecasted to be $136.1 million. This chapter explains how MPI forecasts the investment income of Basic for FYEs 2022/23 to 2026/27.

INV.1.1 Current Year Investment Themes - Summary

Economic Recovery from Pandemic and Increasing Inflation

Similar to 2020, throughout 2021, the COVID-19 pandemic continued to play a major role in the economy. In the spring of 2021, the COVID-19 vaccine became widely available to most Canadians and the combination of high uptake (over 80% of eligible Canadians were vaccinated by September) and the efficacy of the vaccines resulted in a loosening restrictions in spring and summer of 2021. Markets responded with the S&P/TSX index increasing 11.2% (29.0% annualized) in the five-month span from March 31, 2021 to August 31, 2021.

Increases in cases caused by the highly contagious Delta variant negatively impacted equity markets in September 2021 (the S&P/TSX declined by 2.2%), but the concern was short lived, and the markets rallied in October (5% gain by the S&P/TSX) and continued the upward trend throughout the rest of 2021.

In January of 2022, the Omicron-variant wave led to further lockdowns and restrictions worldwide, including in some Canadian provinces. While this had a negative impact on the markets (-0.13% S&P/ TSX return total for January and February), more importantly, it caused worldwide supply shortages. The Russian invasion of Ukraine put further stress on the supply chains and propelled the

Consumer Price Index (CPI) to a reading of 6.7%, the highest year-over-year (YoY) increase in 30 years.

Within Basic Claims, corporate bonds returned -5.1% while provincial bonds returned -5.6%, mid-duration private debt fund within the Rate Stabilization Reserve (RSR) returned 2.5% while long-duration private debt fund within the Employee Future Benefits (EFB) portfolio returned -5.3%. In 2021/22, the MPI Canadian equity portfolio returned 26.3%, the global equity portfolio returned 8.7%, the infrastructure portfolio grew by 3.4%, while the pooled real estate fund returned 16.8%.

Asset Liability Management Study & Strategy

MPI is close to completing its asset-liability management (ALM) study and filed the reports received from Mercer in accordance with PUB Directive 11.19 from the 2022 General Rate Application (GRA). As Mercer completed its analysis; the next step is for MPI to select the asset mix for each portfolio.

MPI will adopt International Financial Reporting Standards (IFRS) 9 and 17 MPI on April 1, 2023 with a comparative year for IFRS 17 starting on April 1, 2022. MPI asked Mercer to comment on the impacts of implementing IFRS 9 and 17 on its investment strategy in the next ALM study. This issue was addressed in Section 2 of its Phase One Report.

MPI anticipates that there will be no impact to the Basic claims investment portfolio from adopting IFRS 9, other than the fact that MUSH bonds will be reported at market value. Currently the Claims Discount Rate (CDR) is based upon the yield of the underlying assets; under IFRS 17 the CDR will be based on characteristics of the liabilities. As a result of adopting IFRS 17 a market-based yield curve will be used for discounting claims liability cash flows rather than a single discount rate (see INV.2.4).

MPI implemented its then new ALM strategy in June 2021 with the assistance of Addenda Capital in order to better protect MPI from both parallel and non-parallel changes in interest rates. The strategy is a hybrid methodology comprised of cash flow matching and moment matching to manage the interest rate risk associated with the Basic Claims liabilities.

The strategy is working well, with a year-to-date net impact of interest rates of $4.2 million on a corporate-basis ($8.2 million for Basic Claims) at March 31, 2022.

Interest Rate Forecasting

The Board of Directors (BoD) and Management of MPI continue to believe that a naïve interest rate forecast is the best estimate of future interest rates. The forecast for each category of fixed income assets uses the yield on the Government of Canada (GoC) 10-year bond as the base, to which a "spread" is added in order to arrive at the absolute yield for the fixed income asset. The naïve forecast holds the GoC 10-year bond yield as of March 31, 2022 constant for the entire five-year forecast. The actual yield on the GoC 10-year bond on March 31, 2022 was 2.41%; this rate forms the basis for all interest rate forecasts in this application. All fixed income asset types are also assumed to maintain a constant "spread" above the yield of the GoC 10-year bond.

IFRS 17 Discount Rate Methodology

MPI elected use of the Top-Down approach rather than the Bottom-Up approach. For additional information please see our IFRS position papers included as *Appendices to the Pro Forma Section* of the GRA filing.

MPI outsourced to Addenda Capital the development of the discount curves to be used with its adoption of IFRS 17. For over 15 years Addenda generated yield curves for their own use.

INV.1.2 Investment Income Forecast - Summary

MPI forecasts ten asset classes in the financial model. These asset classes include: cash, provincial bonds, corporate bonds, MUSH bonds, Canadian equities, global equities, low volatility global equities, real estate (Cityplace and a pooled fund), infrastructure, and private debt. The forecast also includes the impact of investment fees and pension expenses. This document details the accounting treatment, capital and income return, turnover, and funding assumptions under each asset class. Finally, this document provides a comparison of the investment income forecast of the present year (2023 GRA) to the prior year (2022 GRA). The tables below show figures for the Basic line of business, which includes 100% of the Basic Claims investment portfolio, 100% of the RSR investment portfolio and the allocation assigned to Basic of the EFB investment portfolio (based on the payroll ratio of 74.8% in 2021/22 and over the forecast period).

- **Figure INV-1** provides an investment income summary for the Basic line of business over a 10-year period (four years historical, current projected year-end and five years forecasted). See section *INV.18* for a summary of investment income and asset allocation for the Basic Claims, RSR, and EFB portfolios over the five-year forecast period.
- **Figure INV-2** provides the asset values and percentage of the total combined Basic line of business portfolio for each asset class over the same 10-year period.
- **Figure INV-3** shows the naïve interest rate forecast for the present year based on the GoC 10-year bond rate as of March 31, 2022, compared to the naïve interest rate forecast used in the 2022 GRA.
- **Figure INV-4** provides a summary of the major assumptions used in the 2022 and 2023 GRAs, and the corresponding section in this document where the current assumptions are supported.

Figure INV- 1 Summary of Basic Line of Business Investment Income

Asset Class	Reference Section #	2017/18 Actual	2018/19 Actual	*2019/20 Actual	2020/21 Actual	2021/22 Actual	2022/23 Budget	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
(C$000s, except where noted)											
Interest Income During Period											
Cash/Short Term Investments	INV.3	565	2,192	3,641	454	93	664	586	593	599	599
Provincial Bonds	INV.4	34,147	32,514	80,710	84,694	81,430	38,169	39,967	42,124	43,818	45,230
Corporate Bonds	INV.4	-	3,702	-	-	-	24,780	26,514	27,863	29,269	30,300
MUSH	INV.5	25,349	24,950	-	-	-	19,328	18,254	17,184	16,205	15,142
Private Debt	INV.9	-	-	1,254	2,998	4,800	6,619	7,522	6,812	7,220	6,888
Total		**60,060**	**63,358**	**85,604**	**88,146**	**86,323**	**89,561**	**92,843**	**94,576**	**97,111**	**98,159**
Dividend and other Income											
Canadian Equities	INV.6	7,774	8,781	3,097	3,080	5,258	2,678	2,737	2,881	3,215	3,090
US/Global Equities	INV.7	2,619	2,996	797	1,019	3,578	2,263	2,622	2,933	3,244	3,185
Global Low Volatility	INV.7	-	-	2,182	-	-	1,169	1,312	1,464	1,645	1,539
Investment Properties (CityPlace)	INV.8	2,972	3,094	1,390	(765)	148	350	359	367	374	382
Infrastructure	INV.9	1,731	11,533	2,620	1,621	1,961	1,510	1,002	940	1,056	1,066
Total		**15,096**	**26,404**	**10,086**	**4,955**	**10,945**	**7,970**	**8,033**	**8,584**	**9,534**	**9,262**
Gains During Period - Profit & Loss											
Marketable Bonds Unrealized Gains/(Loss)	INV.4	8,079	8,718	(16,827)	(10,645)	(123,025)	6,325	133	144	149	146
Marketable Bonds Realized Gains/(Loss)	INV.4	(3,490)	5,459	22,346	11,296	(3,975)	(10,254)	(304)	(285)	(299)	(211)
Canadian Equities Realized Gains	INV.6	20,060	48,239	(39,207)	1,028	5,943	25,784	6,942	3,648	4,127	3,621
US/Global Equities Realized Gains	INV.7	4,928	56,550	572	1,561	4,807	9,824	6,577	3,746	4,629	4,294
Global Low Volatility	INV.7	-	-	3,652	6,452	1,571	8,320	2,675	2,124	2,636	2,509
Real Estate	INV.8	25,058	17,443	6,516	(878)	15,342	10,987	7,085	7,725	7,499	7,532
Infrastructure	INV.9	5,376	1,635	7,679	1,945	111	5,869	3,921	3,687	4,137	4,178
Total		**60,011**	**138,046**	**(15,269)**	**10,756**	**(99,226)**	**56,854**	**27,029**	**20,789**	**22,879**	**22,070**
Other											
Investment Fees Paid	INV.10	(3,641)	(3,576)	(4,038)	(4,111)	(4,802)	(4,353)	(4,448)	(4,578)	(4,846)	(4,730)
Amortization of Bond Premium/Discount	INV.10	(3,069)	(3,553)	(6,083)	(8,994)	(6,962)	(2,698)	(3,083)	(3,311)	(3,448)	(3,399)
Pension Expense	INV.10	(11,619)	(12,170)	(10,686)	(11,249)	(11,439)	(11,237)	(11,511)	(11,789)	(11,789)	(11,789)
Venture Capital Income	INV.10	412	-	-	-	-	-	-	-	-	-
Investment Write-Down		(930)	-	-	10,022	(22,023)	-	-	-	-	-
Total		**(18,847)**	**(19,298)**	**(20,807)**	**(14,329)**	**(45,226)**	**(18,288)**	**(19,042)**	**(19,678)**	**(20,083)**	**(19,918)**
Total Basic LOB Investment Income		**116,320**	**208,510**	**59,614**	**89,528**	**(47,184)**	**136,097**	**108,862**	**104,271**	**109,441**	**109,572**

*Includes pro-rata securitiy write-downs.

Figure INV- 2 Investment Portfolio Asset Values for the Basic Line of Business

Line No.	Reference Section #	2017/18 Actual*	2018/19 Actual*	2019/20 Actual*	2020/21 Actual	2021/22 Actual**	2022/23 Budget	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
1	*Ending Asset Values (C$ 000,000's)*										
2	Cash/Short Term Investments	76	166	187	139	153	97	99	100	100	100
3	Provincial Bonds	984	1,111	1,199	1,230	1,036	1,172	1,257	1,337	1,391	1,481
4	Corporate Bonds	99	99	478	617	576	625	651	682	703	739
5	MUSH	527	491	520	494	468	440	413	387	360	337
6	Private Debt	0	0	79	115	137	155	141	150	144	159
7	Canadian Equities	226	267	56	110	118	96	103	110	109	120
8	US/Global Equities	124	133	107	146	139	129	139	148	149	164
9	Global LV Equities	0	0	54	82	78	66	71	75	73	81
10	Real Estate Investments	259	286	97	86	129	115	123	130	131	142
11	Infrastructure & Venture Capital	87	96	77	73	74	65	70	74	75	81
12	**Total Assets**	**2,381**	**2,649**	**2,853**	**3,092**	**2,909**	**2,960**	**3,066**	**3,193**	**3,234**	**3,405**
13	Ending Rebalanced Allocations (%)										
14	Cash/Short Term Investments	3.2%	6.3%	6.5%	4.5%	5.3%	3.3%	3.2%	3.1%	3.1%	2.9%
15	Provincial Bonds	41.3%	42.0%	42.0%	39.7%	35.6%	39.6%	41.0%	41.9%	43.0%	43.5%
16	Corporate Bonds	4.2%	3.7%	16.7%	19.9%	19.8%	21.1%	21.2%	21.4%	21.7%	21.7%
17	MUSH	22.1%	18.5%	18.2%	16.0%	16.1%	14.9%	13.5%	12.1%	11.1%	9.9%
18	Private Debt	0.0%	0.0%	2.8%	3.7%	4.7%	5.2%	4.6%	4.7%	4.4%	4.7%
19	Canadian Equities	9.5%	10.1%	2.0%	3.6%	4.1%	3.2%	3.4%	3.4%	3.4%	3.5%
20	US/Global Equities	5.2%	5.0%	3.7%	4.7%	4.8%	4.4%	4.5%	4.6%	4.6%	4.8%
21	Global LV Equities	0.0%	0.0%	1.9%	2.7%	2.7%	2.2%	2.3%	2.4%	2.3%	2.4%
22	Real Estate Investments	10.9%	10.8%	3.4%	2.8%	4.4%	3.9%	4.0%	4.1%	4.0%	4.2%
23	Infrastructure & Venture Capital	3.6%	3.6%	2.7%	2.4%	2.5%	2.2%	2.3%	2.3%	2.3%	2.4%
24	**Total Assets**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

25 * Actual (2014/15 - 2018/19) based on long-term basic line of business allocation applied to the entire portfolio
26 * 2019/20 and thereafter basic line of business has a segregated allocation and based on Basic Claims, RSR and pro-rata EFB asset values.
27 ** Investment balances reflect March 31, 2022 actuals.

Figure INV- 3 Interest Rate Forecast

Line No.	Calendar Year/ *Quarter*	Fiscal Year/ Quarter	91-Day T.Bill Rate 2023 GRA	GoC 10 Yr Rate 2023 GRA	Mrk. Bond Yield 2023 GRA	MUSH Yield 2023 GRA	Claims Discount Rate 2023 GRA	91-Day T.Bill Rate 2022 GRA	GoC 10 Yr Rate 2022 GRA	Mrk. Bond Yield 2022 GRA	MUSH Yield 2022 GRA	Claims Discount Rate 2022 GRA	91-Day T.Bill Rate Difference	GoC 10 Yr Rate Difference	Mrk. Bond Yield Difference	MUSH Yield Difference	Claims Discount Rate Difference
1	**22:01**	**2022/23 Q1**	0.60%	2.41%	2.70%	4.28%	3.51%	0.09%	1.56%	2.46%	4.32%	2.81%	0.51%	0.85%	0.24%	-0.04%	0.71%
2	**22:02**	**2022/23 Q2**	0.60%	2.41%	2.70%	4.28%	3.56%	0.09%	1.56%	2.46%	4.31%	2.80%	0.51%	0.85%	0.24%	-0.02%	0.76%
3	**22:03**	**2022/23 Q3**	0.60%	2.41%	2.70%	4.28%	3.55%	0.09%	1.56%	2.46%	4.30%	2.79%	0.51%	0.85%	0.24%	-0.01%	0.77%
4	**22:04**	**2022/23 Q4**	0.60%	2.41%	2.70%	4.28%	3.55%	0.09%	1.56%	2.46%	4.28%	2.78%	0.51%	0.85%	0.24%	0.00%	0.78%
5	**23:01**	**2023/24 Q1**	0.60%	2.41%	2.70%	4.28%	3.54%	0.09%	1.56%	2.46%	4.27%	2.76%	0.51%	0.85%	0.24%	0.01%	0.78%
6	**23:02**	**2023/24 Q2**	0.60%	2.41%	2.70%	4.28%	3.54%	0.09%	1.56%	2.46%	4.26%	2.75%	0.51%	0.85%	0.24%	0.03%	0.79%
7	**23:03**	**2023/24 Q3**	0.60%	2.41%	2.70%	4.28%	3.53%	0.09%	1.56%	2.46%	4.24%	2.74%	0.51%	0.85%	0.24%	0.04%	0.79%
8	**23:04**	**2023/24 Q4**	0.60%	2.41%	2.70%	4.28%	3.53%	0.09%	1.56%	2.46%	4.23%	2.73%	0.51%	0.85%	0.24%	0.05%	0.80%
9	**24:01**	**2024/25 Q1**	0.60%	2.41%	2.70%	4.29%	3.52%	0.09%	1.56%	2.46%	4.22%	2.72%	0.51%	0.85%	0.24%	0.08%	0.80%
10	**24:02**	**2024/25 Q2**	0.60%	2.41%	2.70%	4.30%	3.52%	0.09%	1.56%	2.46%	4.20%	2.71%	0.51%	0.85%	0.24%	0.10%	0.81%
11	**24:03**	**2024/25 Q3**	0.60%	2.41%	2.70%	4.31%	3.51%	0.09%	1.56%	2.46%	4.19%	2.70%	0.51%	0.85%	0.24%	0.12%	0.81%
12	**24:04**	**2024/25 Q4**	0.60%	2.41%	2.70%	4.32%	3.51%	0.09%	1.56%	2.46%	4.17%	2.69%	0.51%	0.85%	0.24%	0.14%	0.82%
13	**25:01**	**2025/26 Q1**	0.60%	2.41%	2.70%	4.30%	3.50%	0.09%	1.56%	2.46%	4.16%	2.68%	0.51%	0.85%	0.24%	0.14%	0.82%
14	**25:02**	**2025/26 Q2**	0.60%	2.41%	2.70%	4.28%	3.50%	0.09%	1.56%	2.46%	4.15%	2.67%	0.51%	0.85%	0.24%	0.14%	0.83%
15	**25:03**	**2025/26 Q3**	0.60%	2.41%	2.70%	4.27%	3.50%	0.09%	1.56%	2.46%	4.13%	2.66%	0.51%	0.85%	0.24%	0.13%	0.84%
16	**25:04**	**2025/26 Q4**	0.60%	2.41%	2.70%	4.25%	3.50%	0.09%	1.56%	2.46%	4.12%	2.65%	0.51%	0.85%	0.24%	0.13%	0.85%
17	* 2023 GRA is based on the March 2022 Naïve Interest Rate Forecast																

Figure INV- 4 Major Asset Class Summary

Line No.		2022 GRA	2023 GRA
1	**Provincial Bonds**		
2	**Turnover**	20%	20%
3	**Marketable Bonds**	Dynamic Table	Dynamic Table
4	**Overall Duration Gap**	0.0 years	0.0 years
5	**Corporate Bonds**		
6	**Turnover**	46% Basic Claims, 49% RSR, 22% EFB	37% Basic Claims, 65% RSR, 38% EFB
7	**Marketable Bonds**	Dynamic Table	Dynamic Table
8	**Overall Duration Gap**	0.0 years	0.0 years
9	**MUSH**		
10	**MUSH Spread on New Purchases**	Quarterly MUSH purchases forecasted	Quarterly MUSH purchases forecasted
11	**New MUSH Purchases**	$10M Quarterly ($40M Annually)	$5M Quarterly ($20M Annually)
12	**Private Debt**		
13	**Private Debt Spread**	0.85% Long Duration & 1.10% Mid Duration	0.99% Long Duration & 1.35% Mid Duration
14	**Private Debt Purchases**	Initial funding complete, Additional funding continues in 2021/22	Fully funded
15	**Canadian Equities**		
16	**Total Return**	6.6%	6.6%
17	**Dividend Yield**	2.8% 2021/22, 3.0% 2022/23, 2.8% 2023/24 and thereafter	2.9% 2022/23, 2.9% 2023/24, 2.9% 2024/25 and thereafter
18	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
19	**Turnover Ratio (Annual)**	15% for 2021/22 and thereafter	13% for 2022/23 and thereafter
20	**Global Equities**		
21	**Total Return**	6.6%	6.6%
22	**Dividend Yield**	1.9% 2021/22, 2.0% 2022/23 and 2.2% thereafter	2.1% 2022/23, 2.2% 2023/24 and 2.2% thereafter
23	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
24	**Turnover Ratio (Annual)**	14% for 2021/22 and thereafter	12% for 2022/23 and thereafter
25	**Global Low Volatility Equities**		
26	**Total Return**	6.0%	6.0%
27	**Dividend Yield**	1.9% 2021/22, 2.0% 2022/23 and 2.2% thereafter	2.1% 2022/23, 2.2% 2023/24 and 2.2% thereafter
28	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
29	**Turnover Ratio (Annual)**	50% for 2021/22 and thereafter	50% for 2022/23 and thereafter
30	**Real Estate Pooled Fund**		
31	**Return**	CPI + 4%: 5.9% in 2021/22, 6.0% in 2022/23,	CPI + 4%: 7.8% in 2022/23, 6.3% in 2024/25,
32	**Funding**	5.9% in 2023/24 and 6.0% thereafter	and 6.0% thereafter
33		$0 funding over the five year forecast	$0 funding over the five year forecast
34	**Investment Properties (Cityplace)**		
35	**Investment Property Income**	Based on manager's projections	Based on manager's projections
36	**Infrastructure**		
37	**Return**	CPI + 5%: 6.9% in 2021/22, 7.0% in 2022/23,	CPI + 5%: 8.8% in 2022/23, 7.3% in 2023/24,
38	**Funding**	6.9% in 2023/24 and 7.0% thereafter	and 7.0% thereafter

INV.2 Current Year Investment Themes

This section summarizes the investment themes of the current year, which include:

1. Economic Recovery from Pandemic and Increasing Inflation;
2. ALM:
    a) Update on ALM Study;
    b) Update on Current ALM Strategy

INV.2.1 Economic Recovery from Pandemic and Increasing Inflation

As in 2020, the COVID-19 Pandemic continued to play a big role in the economy throughout 2021. Spring of 2021 is when the COVID-19 vaccine became widely available to most Canadians and the combination of high uptake (over 80% of eligible Canadians were vaccinated by September) and the vaccines effectiveness led to loosening restrictions in spring and summer of 2021. The markets responded with the S&P/TSX index increasing 11.2% (29.0% annualized) in the five-month span from March 31, 2021 to August 31, 2021.

Increases in cases caused by the highly contagious Delta variant negatively impacted equity markets in September (the S&P/TSX declined by 2.2%) but the concern was short lived, and the markets rallied in October (5% gain by the S&P/TSX) and continued the upward trend throughout the rest of the calendar year.

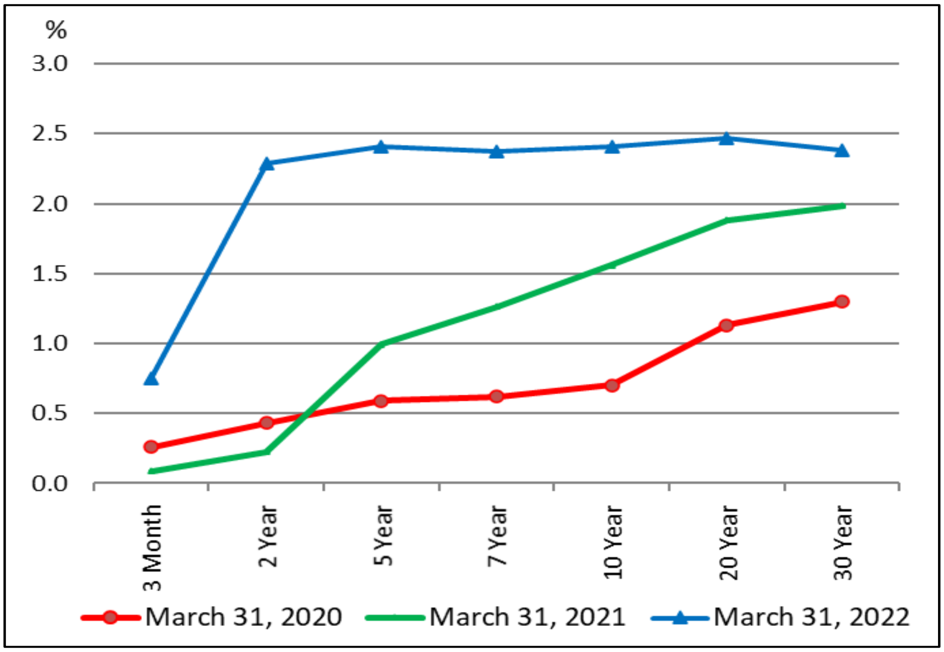
In January of 2022 the Omicron wave led to further lockdowns and restrictions worldwide, including in some Canadian provinces. While this had a negative impact on the markets (-0.13% S&P/ TSX return total for January and February), more importantly, it caused worldwide supply shortages. The Russian invasion of Ukraine put further stress on supply chains and propelled Canadian CPI to the highest YoY reading (6.7%) in 30 years.

As per the chart below, government bond yields declined until mid Aug 2021, with the GoC 10-year bond reaching 1.14% on August 20, 2021 and then rose throughout the year, peaking at 2.55% on March 25, 2022. The yield started the fiscal year at 1.56% and ended at 2.41% on March 31, 2022. As a result of rising bond yields, Provincial bonds within the Basic Claims portfolio declined by 5.6% to March 31, 2022. Since peaking on March 18, the yield on the GoC 10-year bond has remained in a range of 2.40% to 3.1%.

Figure INV- 5 10 Year Government Bond Yields

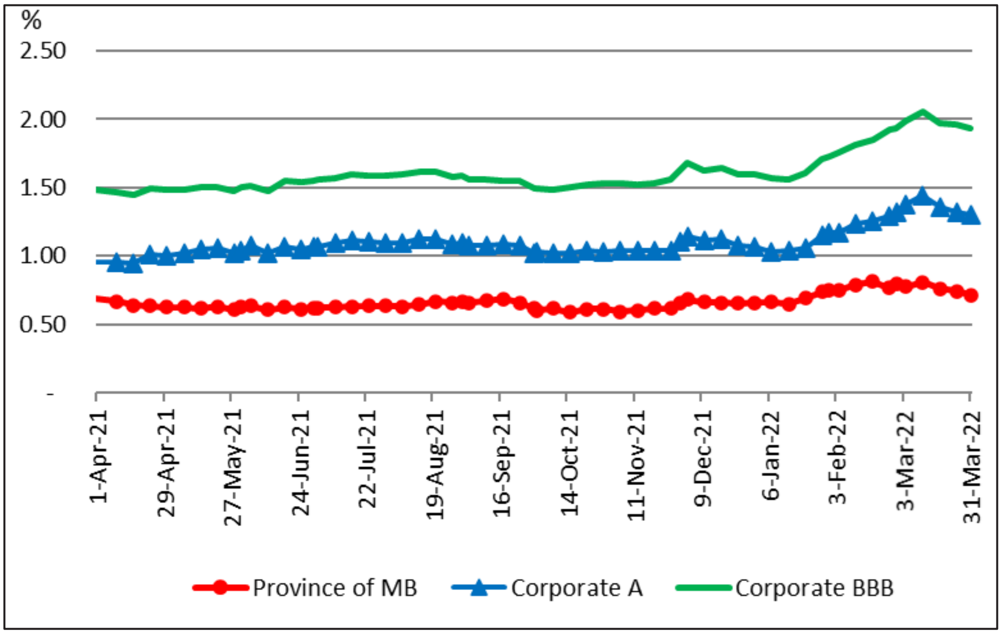
As shown below, the yield curve for government bonds steepened in the short-end of the curve and flattened in the long-end as two year yields increased by 2.06% while three-month yields increased by only 0.66%. The long term 30-year yields increased by only 0.40% from March 2021.

Figure INV- 6 Canadian Government Yield Curve



As shown below, corporate bond spreads increased by about 50 basis points during the year. The spread was steady most of the year, but high inflation and central bank rate hikes increased the spread in March 2022.

Figure INV- 7 Spread Over GoC 10 Year Bond Yield



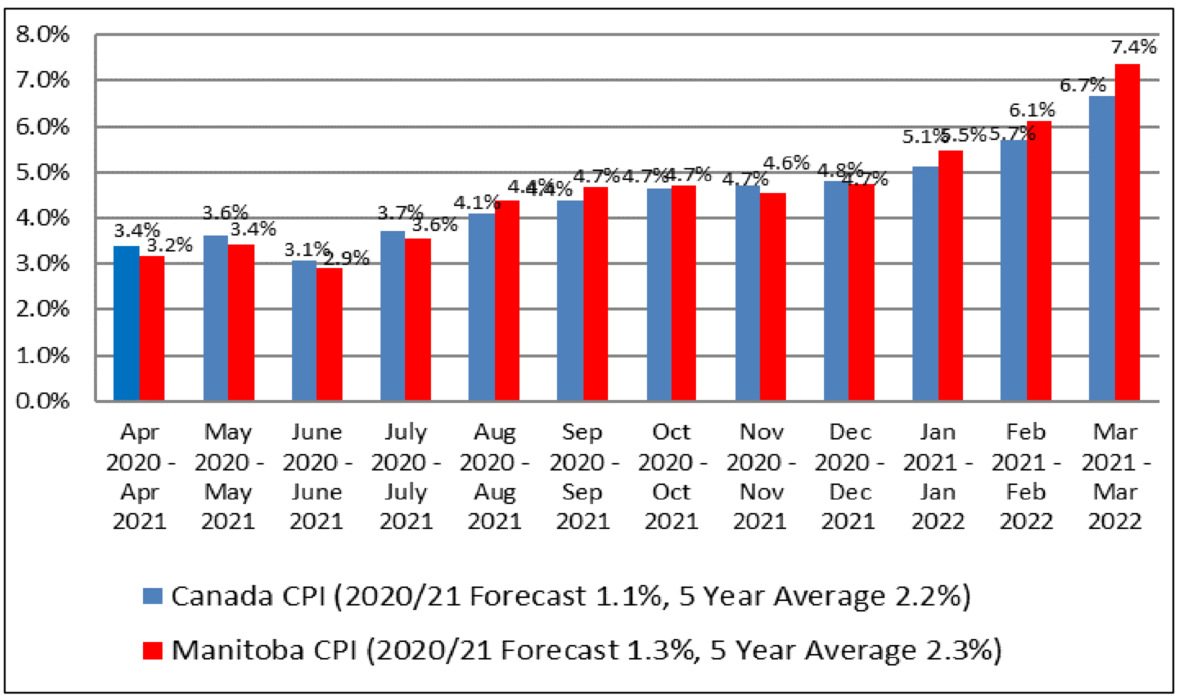
Canadian average annual CPI increased from 2.2% at March 31, 2021 to 6.7% at March 31, 2022 (as shown in the chart below). March 2021 was the last month where inflation was close to the long-term target of the Bank of Canada of 2.0%. Inflation jumped sharply in April 2021 (from 2.2% to 3.4%) followed by gradual increases for most of the 2021 calendar year (ending at 4.8%). The initial jump in April 2021 was caused by base-year effects resulting from a steep decline in prices in April 2020 (caused by COVID-19 lockdowns worldwide). The increases for the remainder of the 2021 calendar year were largely due to unfavorable weather conditions during the growing season and supply chain disruptions that put upward pressure on prices. Supply chain disruptions also led to higher prices for durable goods, including passenger vehicles and household appliances, while higher construction costs and the increased frequency and severity of weather events contributed to rising home and mortgage insurance costs.

Inflation continued to rise in early 2022 with big jumps in February (1.0% m/m) and March (1.4% m/m), in part due to the unexpected conflict in Ukraine, which resulted in substantial supply constraints and had an impact on energy, commodity and agricultural markets. Part of the increase was also as a result of sustained price pressure in the Canadian housing market.

Since March 2021 inflation has continued to increase (6.8% In April 2022) and is expected to climb over 7% in May. Part of the expected May increase is due to Statistics Canada updating the basket weights for CPI and introducing used vehicles into the CPI calculation. Additionally, big jumps in energy prices will also contribute to the increase.

One area that may pull down CPI for the next year is housing. The combination of historically low interest rates and a lessening house supply led to surging real estate prices across Canada in 2021, especially in the largest markets like Toronto and Vancouver. By the end of 2021 the Canadian MLS home price index was up a record 26.6%, or nearly $170,000 YoY. Rising interest rates have started to lead to falling home prices (especially in the GTA and Vancouver markets) which may continue to decline up to 10%.

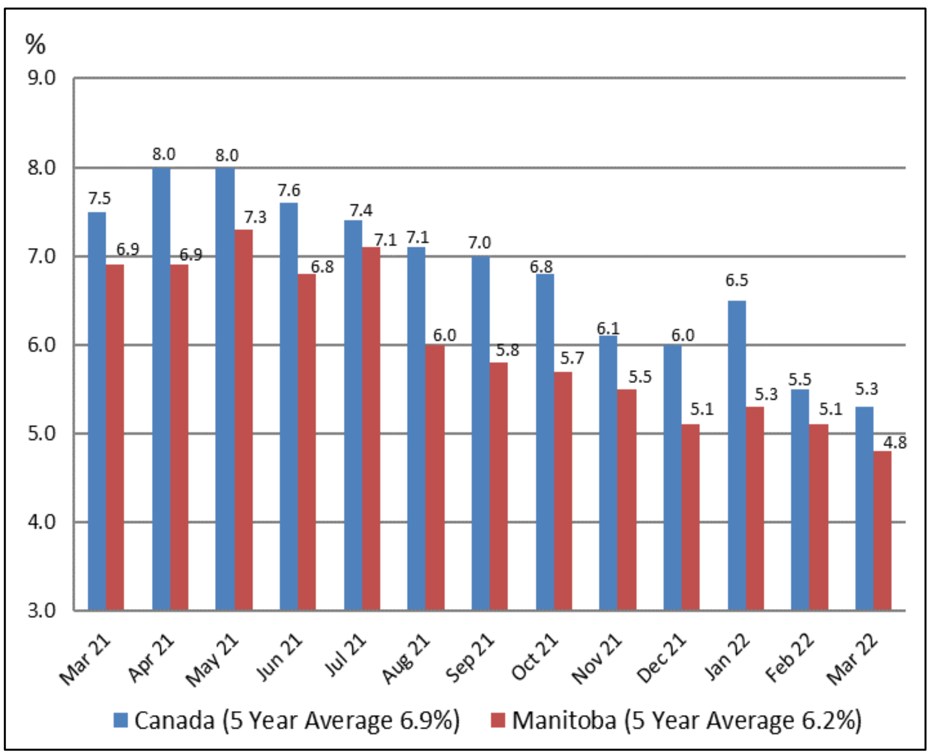
Figure INV- 8 Consumer Price Index



The Russian invasion of Ukraine has had a drastic impact on commodity prices, most notably oil. West Texas intermediate (WTI) futures reached a high of $123.70 USD in early March after ending 2021 at $75.21 USD (a 64% increase). Russia is the second largest oil producer in the world and accounts for roughly 10% of the global market. Since the start of the war sanctions imposed on Russia by other major economies have reduced Russian oil sales and as a result reduced global supplies, leading to price increases.

The Canadian unemployment rate fell from a peak of 8.0% in April 2021 to 5.3% in March 2022, which is 1.7% below the five-year average, as businesses fully reopened and fiscal and monetary stimulus encouraged spending. Employment returned to pre-pandemic level in September 2021. The unemployment rate in March 2022 (5.3%) was the lowest on record since comparable data became available in 1976.

Figure INV- 9 Unemployment Rate



Impact on Fixed Income Portfolio

In 2022/23 all bond yields increased. The table below depicts the yield of corporate bonds rated “A” and “BBB” as well as the yield Provincial and Federal bonds.

Figure INV- 10 Bond Yield Changes

Line No.	Bond Type	Yield at 3/31/2021	Yield at 3/31/2022	Change
1	**Corporate BBB**	2.59%	4.07%	1.48%
2	**Corporate A**	2.13%	3.62%	1.49%
3	**Provincial**	2.06%	3.05%	0.99%
4	**GCAN 10 year**	1.56%	2.41%	0.85%
5	Source: FTSE Russell – Debt Market Indices Report & Bloomberg			

As shown in *Figure INV-10* above, from March 31, 2021 to March 31, 2022 corporate bond yields increase by 148 bps for BBB rated bonds and by 149 bps for A rated bonds. In addition, the yield on the GoC 10-year bond increased by 85 bps.

The yield on the Basic Claims corporate bond portfolio increased by 109 bps over the year, resulting in a return of -5.1%. Over the same period the yield on the Basic Claims Provincial bond portfolio increased by 94 bps, resulting in a return of -5.6%. Over the 12 months ended at March 31, 2022 the yield on the mid-duration private debt fund within the RSR portfolio increased by 108 bps, while the yield on the long-duration private debt fund within the EFB portfolio increased by 55 bps, producing returns of -2.5% and -5.3%, respectively. Since bond prices move inversely with interest rates, rising interest rates produce capital losses on bond investments.

Impact on Equity Portfolio

Equity markets continued to have strong performance, especially in Canada, in early 2021 as the availability and the effectiveness of the vaccine allowed for loosening of restrictions in most of the developed nations across the world, including Canada. The S&P/TSX index had only two months in the year with negative returns (September and January) and both coincided with increased concerns over COVID-19 cases due to new highly contagious variants (Delta and Omicron). Global markets, particularly in the

United States, saw a sharp drop in the first quarter of 2022 as the fast-rising inflation, and breakout of war in Ukraine led to a sell off. The MSCI world index was up 17.4% from March 31, 2021 - December 31, 2021, then declined -7.4% in the first two months of 2022. In 2021/22, the MPI Canadian equity portfolio returned 26.3% and its global equity portfolio returned 8.7%. Both portfolios outperformed their benchmarks (7.9% for Canadian equity and 1.2% for Global equity).

Over the 12 months ended at March 31, 2022, the MPI infrastructure portfolio increased by 3.4% while the pooled real estate fund returned 16.8% over the same period.

Impact on Forecasts

The forecast of bond yields is based upon two components: the GOC 10-year bond yield and spreads. The forecast of the GOC 10-year bond yield is based upon the actual yield at March 31, 2022, which was 85 bps higher than the yield at March 31, 2021 (2.41% vs. 1.56%). The forecasted spreads for marketable bonds are based upon actual spreads at March 31, 2022 which are 79 bps higher than the spreads in the 2022 GRA (172 bps vs. 93 bps). *See Figure INV-3* for details. Income generated by the fixed income portfolio is based upon the actual weighted average coupon rate of the portfolio at March 31, 2022 and is only impacted by changes in market yields to the extent that there is turnover within the portfolio and bonds are purchased at current yields.

INV.2.2 Asset-Liability Management

Update on ALM Study

MPI issued a request for proposals (RFP) for a consultant to assist with completing an asset-liability management study on November 17, 2021 (see ~~*Appendix 12*~~ *Attachment A for the RFP*); responses were received on December 7. After reviewing the responses Mercer was selected and work began on the study in late December.

MPI sent detailed data to Mercer regarding its claims liabilities and current investment portfolio, sensitivity of Basic/Special Risk Extension (SRE)/Extension/EFB liabilities to changes in interest rates & inflation, Investment Policy Statement, Asset-Liability Management policy, returns for MPI & other institutional investors and information related to its pension plan (from December 21 to January 20).

Phase One - Mercer report covered the following topics: (~~*Appendix 13*~~ *Attachment B*)

- IFRS 9 & 17 – Impact on Investment Strategy
- Merits of Adding New Fixed Income Asset Classes
- Merits of Adding Non-Fixed Income Asset Classes for Long Tail Basic Liabilities
- Interest Rate Risk Management Policy – Review
- Capital Markets Assumptions
- MPI Forecasting Methodology

Phase Two – Mercer completed the following reports: (~~*Appendices 14-19*~~ Attachment C- H)

- Phase Two Report
- New Asset Classes for Consideration
- Comparison of MPI returns vs. Other Institutional Investors
- Discussion Paper on Levered Bonds, Real Return Bonds & Mortgages
- Asset Mix Optimization: Efficient Frontier Analysis for Basic Insurance Component
- Asset Mix Optimization: Efficient Frontier Analysis for RSR, EXT, SRE and EFB Portfolios

New asset classes being considered for the Basic Claims portfolio include:

- Real Return Bonds
- Commercial Mortgages
- Real Estate
- 3x Levered Long Provincial Bonds
- 3x Levered Real return Bonds

- Canadian & Global Equities

MPI is currently reviewing the optimizations for the basic & non-basic portfolios and considering the merits of the recommended asset classes and evaluating the various asset mixes. We are currently gathering information regarding levered bond strategies as we view the inclusion or exclusion of leverage as a key decision. No decisions have been made at this point.

Update on Current ALM Strategy

A new AL strategy was implemented in June 2021 with the assistance of Addenda Capital in order to better protect MPI from both parallel and non-parallel changes in interest rates. The new strategy is a hybrid methodology comprised of cash flow matching and moment matching to manage the interest rate risk associated with the Basic Claims liabilities. A portion of the Basic Claims liabilities have been carved out by Addenda to match the cash flows from the MUSH bond portfolio; a duration-based comparison is used to monitor this portion of the strategy. The remaining liabilities are matched to the marketable bond portfolio through a moment matching approach.

Addenda Capital is responsible for ensuring that the duration of the MUSH bond portfolio matches the duration of the associated claims liabilities on a daily basis. Addenda also monitors the first and second moments (similar in concept to duration and convexity) of the Provincial bonds and corporate bonds and will adjust the first and second moments of the completion portfolio as required in order to ensure that the total marketable bond portfolio has a similar sensitivity to interest rate changes as the Basic claims liabilities.

The strategy is working well, with a year-to-date net impact of interest rates of $4.2 million on a corporate basis ($8.2 million for Basic Claims) at March 31, 2022.

The asset allocation targets remain unchanged.

Figure INV- 11 Asset Allocation Targets

Line No.	Target Weights	Basic Claims	RSR	Employee Future Benefits
1	**Fixed Income**			
2	**Provincial Bonds**	60.0%	20.0%	0.0%
3	**Corporate Bonds**	20.0%	10.0%	20.0%
4	**MUSH**	20.0%	0.0%	0.0%
5	**Private Debt**	0.0%	20.0%	20.0%
6	**Total Fixed Income**	**100.0%**	**50.0%**	**40.0%**
7	**Public Equities**			
8	**Canadian Equities**	0.0%	12.0%	10.0%
9	**Global Equities**	0.0%	13.0%	18.0%
10	**Global Low Volatility**	0.0%	10.0%	7.0%
11	**Total Equities**	**0.0%**	**35.0%**	**35.0%**
12	**Alternatives**			
13	**Canadian Real Estate**	0.0%	10.0%	15.0%
14	**Infrastructure**	0.0%	5.0%	10.0%
15	**Total Alternatives**	**0.0%**	**15.0%**	**25.0%**

INV.2.3 Naïve Interest Rate Forecast

Interest rate forecasting risk continues to be a significant concern for MPI. Inaccurate forecasts have in the recent past had material negative impacts on the financial results of the Basic line of business. Interest rate forecasting risk, for the purpose of this GRA, is the uncertainty related to setting premium rates based on forecasted interest rates rather than based on future actual interest rates, and the impact of the difference between those interest rates.

PUB Order 159/18 Directive 11.21 states:

> *"The Naïve interest rate forecast shall be used for rate-setting and the target capital analysis purposes."*

MPI is required to base its GRA on best estimates, and for the 2023 GRA, its BoD and management continue to believe that the naïve forecast is the best estimate.

INV.2.4 IFRS 17 Discount Rate Methodology

The discount rate methodology under IFRS 17 will be a change from current practice. Under IFRS 17, the claims discount rate is independent of assets and cannot reflect asset-specific characteristics. There will no longer be a direct linkage between the insurance liabilities and the backing assets. Accordingly, the insurance liabilities will only have an indirect relationship; that is, only to the extent that underlying financial variables are common. The claims discount rate must reflect the characteristics of the insurance liabilities (regardless of the characteristics of the assets which back them). For example, with non-fixed income instruments, excess spreads are generally viewed to be entirely attributable to the assets and therefore would not affect the claims discount rate.

The standard outlines two approaches, Top-Down or Bottom-Up, but puts minimal constraints on the application of the approaches other than making use of market information where available. The Canadian Institute of Actuaries (CIA) has released reference yield curves (i.e., liquid/illiquid curves) for both observable and unobservable periods. The IFRS 17 discount rate should be compliant with the standard and calibrated considering the CIA references and, where appropriate, leverage methods or inputs released by the CIA.

Top-Down vs. Bottom-Up approach and differences between the methodologies:

The standard does not stipulate the application of a specific methodology, but instead, requires that the discount rate used in the calculation of the insurance contract liability must be based on the characteristics of the insurance liability, incorporating characteristics such as currency, duration and liquidity. The curve is required to be consistent with financial instruments with similar cash flows and liquidity characteristics.

This curve can be determined in one of two ways:

1. A "Bottom-Up" approach which calculates the rate based on adding a liquidity premium to a risk-free rate, or

2. A "Top-Down" approach which uses a reference portfolio and removes items that are not aligned with the characteristics of the insurance liability (such as credit risk) from the yield curve, but is not required to adjust the yield curve for differences in liquidity characteristics of the insurance contracts and the reference portfolio

MPI has selected the Top-Down approach as:

Based on the attributes listed in the comparison table above, many of the cons are the same between the two approaches (e.g., subjectivity in parameters and extrapolation beyond the observable period). While Bottom-Up is expected to be more common in industry, Top-Down is more consistent with the current approach.

Two typically key relevant factors limiting the application of the Top-Down approach within the Canadian P&C industry are operational complexity (i.e., determining and monitoring asset portfolios) and materiality (i.e., limited impact of discounting on short term P&C liabilities). Companies often do not wish to develop new complicated procedures with limited impact to their financials. However, MPI does not align with many Canadian P&C insurers given the following characteristics of its business and capabilities:

- Relatively long duration of policy liabilities, which are more sensitive to interest rate changes
- its robust existing ALM process, which can be leveraged
- Cost efficient and highly experienced resources from a third-party capital management firm (i.e., ADDENDA Capital) for the calibration and justification of key inputs (i.e., credit risk adjustments, etc.)

The major cons considered by other companies are thus irrelevant in the case of MPI. MPI has determined it will apply the Top-Down approach to minimize the impact of the move from the current approach as well as to facilitate the ALM exercises as much as possible. MPI will be taking prescriptive guidelines from the CIA as reference to derive the key inputs.

As we have chosen the Top-Down Approach – we will need the following inputs:

- Confirmation of adoption of the Top-Down approach
- Selection of the reference portfolio
- Selection of the credit risk adjustment
- Execution plan that considers processes, information technology and data requirements

INV.3 Cash/Short Term

The actual 2021/22 FYE cash balance represented 5.3% of the Basic line of business, which includes 100% of the Basic Claims portfolio, 100% of the RSR portfolio and the allocation of the EFB portfolio assigned to Basic. Cash has a target weight of 0%, and a projected weight of 3.3% to 2.9% throughout the forecast. The projected weight reflects a maximum of $100 million cash balance which is held for operational purposes; the forecast assumes zero cash within the investment portfolios.

INV.3.1 Summary Table

Figure INV- 12 Short Term Summary

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**Ending Market Value**	97,438	98,508	100,000	100,000	100,000
3	**Total Investment Income**	664	586	593	599	599
4	**Forecasted Yield**	0.60%	0.60%	0.60%	0.60%	0.60%
5	**% of the Portfolio**	3.3%	3.2%	3.1%	3.1%	2.9%

INV.3.2 Definition and Accounting Treatment

Definition: Cash and Short-Term holdings are defined as cash and fixed income investments having a maturity of less than one year at the time of purchase. Cash and short-term securities are managed by the Department of Finance.

Accounting: Cash is reported at face value on the financial statements. Interest income flows through the Profit and Loss statement.

INV.3.3 Return Assumption

The five year forecasted cash returns are based on the GoC three-month Treasury-bill yield from Bloomberg as of March 31, 2022.

INV.4 Marketable Bonds

Marketable bonds made up 55.4% of the Basic line of business as of 2021/22 FYE, which consisted of 35.6% provincial bonds and 19.8% corporate bonds (as per *Figure INV-2*). The Government bond portfolio was renamed Provincial bonds at the end of Q4 2018/19 as very few GoC bonds are actually held within this portfolio and the portfolio primarily consists of Provincial bonds.

The target weights for Provincial bonds are 60% for Basic claims, 20% for RSR and 0% for EFB. For corporate bonds, the target weights are 20% for Basic claims, 10% for RSR and 20% for EFB.

INV.4.1 Basic Summary Tables

Figure INV- 13 Total Marketable Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**Interest**	62,950	66,482	69,987	73,087	75,530
3	**Unrealized Gains/(Losses)**	6,325	133	144	149	146
4	**Realized Gains/(Losses)**	(10,254)	(304)	(285)	(299)	(211)
5	**Total Investment Income**	**59,021**	**66,310**	**69,846**	**72,937**	**75,465**
6	**Market Value**	1,797,004	1,908,158	2,018,616	2,093,906	2,219,993
7	**% of Portfolio**	60.7%	62.2%	63.2%	64.7%	65.2%
8	**GoC 10 Year Rate end of year forecast**	2.41%	2.41%	2.41%	2.41%	2.41%
9	**Marketable Bond Yield**	4.85%	4.85%	4.85%	4.85%	4.85%
10	**(GoC 10 Yr Bond Rate + Spread)**					

Figure INV- 14 Provincial Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Interest*	38,169	39,967	42,124	43,818	45,230
3	Unrealized Gains/(Losses)	2,052	180	189	196	193
4	Realized Gains/(Losses)	(3,404)	(255)	(214)	(218)	(206)
5	**Total Investment Income**	**36,817**	**39,893**	**42,099**	**43,797**	**45,217**
6	Market Value	1,172,152	1,257,429	1,336,644	1,391,155	1,481,062
7	% of Portfolio	39.6%	41.0%	41.9%	43.0%	43.5%
8	GoC 10 Year Rate end of year forecast	2.41%	2.41%	2.41%	2.41%	2.41%
9	Government/Provincial Bond Yield	3.12%	3.10%	3.09%	3.08%	3.07%
10	(GoC 10 Yr Bond Rate + Spread)					

Figure INV- 15 Corporate Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Interest*	24,780	26,514	27,863	29,269	30,300
3	Unrealized Gains/(Losses)	4,273	(48)	(45)	(47)	(47)
4	Realized Gains/(Losses)	(6,850)	(49)	(71)	(82)	(4)
5	**Total Investment Income**	**22,203**	**26,417**	**27,747**	**29,140**	**30,249**
6	Market Value	624,852	650,729	681,972	702,750	738,931
7	% of Portfolio	21.1%	21.2%	21.4%	21.7%	21.7%
8	GoC 10 Year Rate end of year forecast	2.41%	2.41%	2.41%	2.41%	2.41%
9	Corporate Bond Yield	4.13%	4.13%	4.13%	4.13%	4.13%
10	(GoC 10 Yr Bond Rate + Spread)					

INV.4.2 Definition and Accounting Treatment

Definition: Marketable bonds include all fixed income securities with a maturity of one year or more at the time of purchase and include Canada, Manitoba, other Provincial, municipal, corporate bonds, floating rate notes, and debentures that are tradable in the fixed income market. The Department of Finance manages a portion of the Provincial bonds and all cash/short-term investments; Addenda Capital manages all corporate bonds and some government bonds (in the completion portfolio which is used to implement the moment matching ALM strategy); private debt is managed by Sun Life.

Accounting: Unrealized and realized gains/losses, amortization, and interest income flow through the Profit and Loss statement because marketable bonds within the Basic claims portfolio are classified as FVTPL. Note: newly purchased corporate bonds within the EFB and RSR portfolios will be classified as Available for Sale (AFS).

INV.4.3 Interest and Capital Return Assumptions

Income from the marketable bond portfolio is separated into two components: interest income and capital return (both realized and unrealized gains/losses).

INV.4.3.1 Interest Income

Marketable bond interest income is calculated on a quarterly basis using the weighted average coupon rate for bonds currently within the portfolio, the yield for newly purchased bonds, and the forecasted bond turnover rate. In each quarter, the weighted average coupon yield of the previous quarter is adjusted by: (1) the marketable bond turnover rate; and (2) the forecasted marketable bond yield in order to calculate the new weighted average coupon yield for the entire marketable bond portfolio for that quarter. These components are discussed in further detail below. The interest income calculation is the same for both provincial and corporate bonds. With that said, it is important to note that spreads have minimal impact on interest income, other than through the coupon yields of newly purchased bonds.

INV.4.3.2 Weighted Average Coupon for Existing Bonds

The weighted average coupon is used to calculate the interest from the marketable bond portfolio (Provincial bonds and corporate bonds). To illustrate the concept of the weighted average coupon, a theoretical $1 billion dollar bond held at par value with a weighted average coupon of 5.0% will generate $50 million dollars in interest within one year.

The weighted average coupon for provincial bonds as of March 31, 2022 was 3.86% in Basic and 2.88% in RSR. Whereas the weighted average coupon for corporate bonds was 4.03% in Basic, 3.26% in RSR and 4.45% in EFB. These coupon rates were used as the initial coupon rate in the model in Q1 2022/23. Coupon rate differentials are attributable to the compositional and duration differences of the underlying marketable bonds within Basic, RSR, and EFB portfolios. Provincial and corporate bond yields are lower within the RSR portfolio due to shorter duration bonds held within the portfolio. Provincial coupon rates were provided by Bloomberg for Basic and the PC Bond Index for RSR as of March 31, 2022. Whereas corporate coupon rates were provided by the corporate bond manager for the Basic, RSR, and EFB portfolios as of March 31, 2022.

INV.4.3.3 Turnover

The weighted average coupon of the marketable bond portfolio (Provincial bonds and corporate bonds) for each successive quarter is calculated by adjusting the weighted average coupon of the previous quarter for the impact of turnover (i.e., buying and selling of bonds) in the current quarter. If new bonds are purchased at a lower (higher) yield than the weighted average coupon in the model, then the weighted average coupon of the marketable bond will decrease (increase).

Turnover indicates how often marketable bond holdings are sold in the portfolio. Turnover can be reported in two ways: the percentage of the portfolio holdings sold in one year (turnover ratio) or the number of years to turn over the entire portfolio (which is the inverse of the turnover ratio).

Since August 31, 2019 corporate bond management has since been outsourced to Addenda Capital. Turnover within the Provincial bond portfolio managed by the Province of Manitoba is projected to be 20% in the Basic claims portfolio (see *Figure INV-16*) and 0% in the RSR and EFB portfolios based on the minimal trading that has occurred within those portfolios. Corporate bond turnover was provided by Addenda Capital and is expected to be 37% for the corporate bonds within the Basic claims portfolio, 65% for the pooled fund within the RSR portfolio and 38% for the long-duration pooled fund within the EFB portfolio. *Figure INV-17* shows the sensitivity of marketable bond turnover on Basic investment income.

Figure INV- 16 Provincial Bond Turnover

Line No.	Date*	Beginning	End Period	Average	Minimum Buys/Sells	Ratio	Years to Turnover the Portfolio
1	*(C$000s, except where noted)*						
2	**Mar 2022**	1,311,148	1,150,787	1,230,967	340,362	28%	3.62
3	**Mar 2021**	1,242,782	1,311,148	1,276,965	268,312	21%	4.76
4	**Mar 2020**	1,304,588	1,242,782	1,273,685	255,447	20%	4.99
5	*Fiscal year-ends						

Figure INV- 17 Marketable Bond Turnover Sensitivity on Basic Investment Income

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**0.00**	136,765	108,586	106,191	111,786	112,333
3	**0.20**	136,203	107,275	103,942	108,292	109,200
4	**0.35**	135,802	106,410	102,813	106,867	107,643
5	**0.40**	135,657	106,179	102,445	106,555	107,297
6	**0.60**	135,132	105,315	101,504	105,768	105,156
7	**0.80**	134,558	104,668	100,906	105,332	104,801
8	**1.00**	134,041	104,222	100,540	105,092	104,631

Assumption: The turnover ratio for provincial bonds is forecasted to be 0.20 within Basic claims, 0.00 within RSR and EFB; turnover for corporate bonds in Basic Claims is forecasted to be 0.37, within RSR 0.65 and within EFB 0.38 over the five-year forecast period. Income generated due to turnover within the EFB portfolio over the forecast period is applied to the pension liability and not included within the Basic line of business.

INV.4.3.4 Yield to Maturity Calculation

There are two marketable fixed income asset classes which are modeled separately for the Basic claims and the RSR portfolios: 1) Provincial bonds; and 2) Corporate bonds.

Provincial Bond Spread for Basic Claims

The Provincial bond duration spread over the GoC 10-year bond rate as of March 31, 2022 is calculated using the March 31, 2022 FTSE Russel Provincial Bond index (previously the PC Bond Index). Duration spreads were gathered based on three-, five-, 10- and 15-year duration values and then linearly interpolated. The spread of Provincial bonds over GoC 10-year bonds was used as a proxy for the provincial bond portfolio yield.

Given the sensitivity of the claims duration to changes in interest rates, marketable bonds that have duration between 3 years and 16 years are linearly interpolated by the model.

To illustrate how the provincial bond spread is calculated using the naïve interest rate forecast:

- The actual duration of the Provincial bond portfolio was 12.68 years at March 31, 2022. The duration spread over the GoC 10-year bond at 12.68 years is 71 basis points. Therefore, the Provincial bond yield to maturity as at March 31, 2022 is 3.12% (2.41% GoC 10-year bond rate plus 0.71%). In the 2022 GRA, the duration of the Provincial bond portfolio was 10.43 years as of March 31, 2021. The duration spread over the GoC 10-year bond at 10.43 years was 64 basis points. Therefore, the forecasted Provincial bond yield to maturity as at March 31, 2021 was 2.20% (1.56% GoC 10-year bond rate plus 0.64%). The 7 bps increase in spreads over the year largely reflects market concerns related to uncertainty and volatility due to looming fears of recession due to the increasing inflationary environment.

- By Q4 of 2026/27, the duration of the Provincial bond portfolio falls to 9.71 years, causing the duration spread to equal 66 basis points resulting in a Provincial bond yield to maturity of 3.07% (2.41% GoC 10-year bond rate plus 0.66%).

Figure INV- 18 Provincial Bond Yield Spread

Line No.	**Duration**	**Provincial Bond Spread**
1	**7.0 years**	51 bps
2	**8.0 years**	57 bps
3	**9.0 years**	62 bps
4	**10.0 years**	68 bps
5	**11.0 years**	73 bps
6	**12.0 years**	77 bps
7	**13.0 years**	81 bps

Provincial Bond Spread for RSR

The duration for Provincial bonds in the RSR portfolio is based on 50% of the FTSE Russel Short-Term Provincial Bond Index (2.71 years) and 50% of the FTSE Russell Mid-Term Provincial Bond Index (6.65 years) for a combined duration of 4.68 years as at March 31, 2022 (4.74 duration in 2022 GRA). A Provincial bond with a duration of 4.68 years is assumed to have a spread over a GoC 10-year bond of 0.37% based on the Provincial bond spread as at March 31, 2022. As a result, the yield to maturity for Provincial bonds in the RSR portfolio with the naïve forecast is 2.78% (2.41% GoC 10-year bond yield plus 0.37% duration spread). In the 2022 GRA, the projected yield for Provincial bonds was 1.29% (1.56% GoC 10-year bond yield plus -0.27% spread). The 64 bps YoY increase in spreads largely reflects the increased liquidity premiums due to the looming fear of recession caused by the increasing inflationary environment.

Corporate Bond Spread for Basic Claims

The duration for corporate bonds in the Basic Claims portfolio was 10.22 years based on information received from the Financial Reporting Department of MPI as at March 31, 2022 (10.43 duration in the 2022 GRA). The weighted average yield on the corporate bond holdings was 4.13%, implying a spread of 172 bps over the GoC 10-

year bond yield of 2.41%. In the 2022 GRA, corporate bonds had a projected yield of 3.17% (1.56% GoC 10-year bond yield plus 1.61% spread). The 11 bps YoY increase in spreads largely reflects an increased liquidity and credit premiums present at the onset of the inflation concerns.

Corporate Bond Spread for RSR

The duration for corporate bonds in the RSR portfolio was 6.40 years based on the corporate bond pooled fund holdings as at March 31, 2022. The weighted average yield on the pooled fund holdings was 3.85%, implying a spread of 144 bps over the GoC 10-year bond yield of 2.41%. In the 2022, GRA corporate bonds in the RSR portfolio had a yield of 2.19% (1.56% GoC 10-year bond yield plus 0.63% spread). The 81 bps YoY increase in spreads largely reflects an increased liquidity and credit premiums present at the onset of inflation concerns.

INV.4.3.5 Capital Return

Rising interest rates and increased spreads result in unrealized losses in the marketable bond portfolio and falling interest rates and decreased spreads result in unrealized gains. The model uses the forecasted GoC 10-year bond rate to calculate the change in interest rates on a quarterly basis (which is zero since we assume that the yield at March 31, 2022 is unchanged). Additionally, spreads are assumed to be static throughout the forecast period. The marketable bond duration, convexity, and change in interest rate are used to calculate the capital return.

INV.4.3.6 Duration

Duration measures the impact of changes in interest rates on the market values of fixed income assets. The higher the duration, the greater the interest rate sensitivity of a bond. The duration of the Basic claims fixed income portfolio as of March 31, 2022 was 11.14 years as per Addenda (10.3 year duration in the 2022 GRA). The duration increased mainly because of the implementation of the moment matching strategy in mid-2021.

As per Section 8.4 of the IPS (*Appendix 1 – Investment Policy Statement*), the marketable bond duration is matched to the Basic claims duration to minimize the interest rate risk to MPI.

Within the model the Provincial bond duration changes so that the total marketable bond portfolio duration (Provincial and corporate bonds) is matched to the claims duration of the previous quarter. This quarter lag between matching the Provincial bond duration and claims liability duration reflects the reality that the claims liability duration must be known before the fixed income duration can be changed to match. Corporate bond duration is assumed to be static at 10.22 years (10.43 duration in the 2022 GRA) for the entire five-year forecast.

Figure INV-19 provides the forecasted marketable and non-marketable bond duration, the claims duration and the duration gap that is calculated by the model at each year end.

Figure INV- 19 Duration Assumption in Model

Line No.	Year Ending	Marketable and Non Marketable Bond Duration	Claims Duration with PfAD (prior quarter)	Duration Gap
1	**Mar 22**	9.3	9.3	-
2	**Mar 23**	9.2	9.2	-
3	**Mar 24**	9.2	9.2	-
4	**Mar 25**	9.1	9.1	-
5	**Mar 26**	9.1	9.1	-

Section *INV.11* on rebalancing discusses the dollar matching of the fixed income portfolio to Basic claims liabilities on an annual basis. Please see *Appendix 2 – Operational ALM Policy* for more detailed information on the Operational ALM Policy of the Investment Committee Working Group. Finally, please see section *INV.16* for a discussion of interest rate risk and further detail on the ALM program.

Assumption: A duration gap target of 0.0 years is assumed for the entire forecast period.

INV.4.3.7 Convexity

Convexity[1] measures the changes in bond prices that are not explained by duration.

- Convexity of the Basic claims Provincial bond portfolio was 1.85 as of March 31, 2022, as calculated by Bloomberg (1.72 in the 2022 GRA).
- Convexity of the Basic claims corporate bond portfolio was 1.51 as of March 31, 2022, as provided by the corporate bond manager (1.63 in the 2022 GRA).
- Convexity for Provincial bonds within RSR was 0.31, based on 50/50 FTSE Russell Short & Mid-Term Provincial Bond Index as at March 31, 2022 (0.32 in the 2022 GRA).
- Convexity for corporate bonds within RSR was 0.80, as provided by the corporate bond manager and based on our actual pooled fund holdings as at March 31, 2022 (0.89 in the 2022 GRA).

[1] Convexity accounts for the non-linearity of changes in bond prices due to changes in interest rates (i.e., the amount of curvature in the price/interest rate graph). It is the second order derivative of the change in bond price.

INV.5 Non-Marketable Bonds (MUSH) And Private Debt

Non-marketable bonds made up 16.1% of the Basic line of business[2] at 2021/22 FYE. Annual purchases of MUSH bonds are forecasted to be $20 million[3]. As a result, MUSH bonds are forecasted to represent 9.9% of the Basic line of business portfolio by the end of 2026/27.

Private debt funding began in July 2019; the initial commitments from MPI have been fully drawn by Sun Life, follow-on commitments were not fully drawn at March 31 (see *INV 2.2* for more information). Private debt comprised 5.2% of the Basic line of business at 2022/23 FYE. Private debt has a target weight of 0% for Basic claims, 20% for RSR and 20% for EFB.

INV.5.1 Summary Table

Figure INV- 20 MUSH Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	***MUSH Book Value***	440,475	413,036	386,568	360,135	337,390
3	**Total Investment Income**	19,328	18,254	17,184	16,205	15,142
4	**End of Period MUSH Yield**	4.30%	4.32%	4.34%	4.39%	4.37%
5	**% of Portfolio**	14.9%	13.5%	12.1%	11.1%	9.9%

[2] The Basic line of business includes 100% of the Basic claims portfolio, 100% of the RSR portfolio and the allocation assigned to Basic of the EFB portfolio based on the payroll ratio.
[3] Additional purchases of MUSH bonds will be limited as only $20 million of new MUSH bonds are expected to be issued annually (mostly by municipalities).

Figure INV- 21 Private Debt Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Market Value (Mid-duration)*	90,643	74,429	79,778	70,667	82,732
3	Market Value (Long-duration)	64,096	66,943	69,917	73,023	76,266
4	Total Investment Income	6,619	7,522	6,812	7,220	6,888
5	End of Period Yield (Mid-duration)	5.06%	5.06%	5.06%	5.06%	5.06%
6	End of Period Yield (Long-duration)	4.37%	4.37%	4.37%	4.37%	4.37%
7	% of Portfolio (Mid & Long-duration)	5.2%	4.6%	4.7%	4.4%	4.7%

INV.5.2 Definition and Accounting Treatment

Definition: MUSH bonds are bonds and debentures issued by Manitoba rural municipalities, school divisions, and health care facilities which are not traded in the fixed income market. All MUSH bonds are managed by the Treasury Division of the Province of Manitoba.

Private debt is privately held debt that is not traded publicly in the market. Private debt is investment grade and managed by an external pooled fund manager (Sun Life).

Accounting: MUSH bonds are held at book value on the financial statements as they are classified as Held to Maturity. Interest payments flow through the Profit and Loss statement. Private debt will be classified as Available for Sale. Unrealized gains/losses will flow through Accumulated Other Comprehensive Income (AOCI) until realized and interest income will flow through the Profit and Loss statement.

INV.5.3 Interest Income Assumption

MUSH bonds provide additional yield over a GoC 10-year bond and the yield on the existing portfolio was forecasted for the next five years. There are $20M in annual MUSH purchases forecasted ($5M per quarter) over the five-year forecast horizon (last year $40M in MUSH bond purchases were assumed and approximately $21.2M were actually purchased). These purchases are projected to be comprised primarily of municipal issuances which have attractive yields relative to regular MUSH bonds.

Private debt is forecasted to have a yield of 5.06% (3.29% in the 2022 GRA) for the mid-duration fund and a yield of 4.37% (3.66% in the 2022 GRA) for the long-duration fund (1.35% spread over the FTSE Russell Canada All Corporate Bond Index and 0.99% spread over the FTSE Russell Canada Long Term Overall Bond Index respectively at March 31, 2022). Expected yields for both mid and long-term durations are a function of the credit composition of the underlying assets. The yield earned on private debt does not impact the new money yield used for rate setting purposes as private debt is not held in the Basic claims portfolio.

INV.5.4 MUSH Book Value and Yield Forecasting

MUSH book values and forecasted MUSH yields were calculated over the five-year forecast and entered into the financial model. The ending book values were based on the forecasted principal amortization of the existing MUSH holdings as of Q4 2021/22.

INV.5.5 Private Debt Capital Returns

Private debt has an assumed duration of 6.1 years (6.6 years in the 2022 GRA) within the RSR portfolio and 15.2 years (15.3 years in the 2022 GRA) within the EFB portfolio (based upon actual durations at March 31, 2022). Changes in the forecasted GoC 10-year bond yield are forecasted to not impact private debt capital returns as exposure to the asset class is held within a pooled fund investment vehicle, underlying debt issuances are held-to-maturity, and no turnover of the pooled fund units is assumed to occur over the forecast period.

INV.6 Canadian Equities

In the RSR portfolio, Canadian equities have a 12% target allocation, with a range of 7% to 17%. Whereas, in the EFB portfolio Canadian equities have a 10% target allocation, with a range of 5% to 15%. Canadian equities have a 0% weight in the Basic claims portfolio.

INV.6.1 Summary Table

Figure INV- 22 Canadian Equity Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**Dividend Income**	2,678	2,737	2,881	3,215	3,090
3	**Realized Gains/(Losses) (P&L)**	25,784	6,942	3,648	4,127	3,621
4	**Total Investment Income**	**28,462**	**9,680**	**6,529**	**7,343**	**6,711**
5	**Forecasted Dividend Yield**	2.76%	2.92%	2.88%	2.88%	2.88%
6	**Ending Market Value**	95,547	103,010	110,117	108,809	120,484
7	**% of Portfolio**	3.2%	3.4%	3.4%	3.4%	3.5%

INV.6.2 Definition and Accounting Treatment

Definition: The Canadian equity portfolio includes publicly traded common stocks and preferred shares which are listed on a Canadian stock exchange. The Canadian equity portfolio is managed by two active managers under contract with the Province of Manitoba (Foyston, Gordon & Payne and QV Investors).

Accounting: Realized gains/losses and dividend income flow through the Profit and Loss statement. Unrealized gains/losses are located in the Other Comprehensive Income statement.

INV.6.3 Total Return Assumption

As per the forecasting methodology directed by PUB Order 157/12, the annual total return on Canadian equity investments is forecasted to be 6.6% (6.6% in the 2022 GRA) over the five -year forecast period. The 6.6% return is based on the 5th percentile 20-year Canadian equity return using index data starting in 1956 to March 31, 2022.

The model splits total return into dividend yield and capital return:
Total Return = Dividend Yield + Capital Return.

INV.6.4 Dividend Yield

The dividend yield is used to calculate the dividend income in the model. Dividend income for each quarter is calculated using the quarterly market value of the Canadian equity portfolio multiplied by the quarterly dividend yield. All dividends are re-invested back into the Canadian equity portfolio.

The dividend yield for Canadian equities is based upon a forecast obtained from Bloomberg. Bloomberg only forecasts dividend yields three years into the future. The forecasted dividend yield for the S&P/TSX for the next 3 fiscal years is as follows:

- 2022/23: 2.8%
- 2023/24: 2.9%
- 2024/25 and thereafter: 2.9%

Assumption: The Canadian equity dividend yield is forecasted to be 2.8%, 2.9% and 2.9% in 2022/23, 2023/24 and 2024/25 respectively. 2.9% is used for 2025/26 and 2026/27. (2.8%, 3.0% and 2.8% in the 2022 GRA)

INV.6.5 Capital Return

The capital return determines the increase of the Canadian equity portfolio in market value over each period. Increases in market value from the capital return are unrealized gains, which are held in AOCI. Therefore, the capital return component does not impact net income unless there are sales (turnover) of holdings within the portfolio. The capital return for each forecasted year is determined by subtracting the dividend yield from the total rate of return of 6.6%.

INV.6.6 Turnover

The turnover ratio, as programmed in the model, indicates how often equity holdings are sold. When equities are sold, the corresponding unrealized gains in AOCI are then realized and flow through net income. All equity investments are held through pooled funds; no units of the pooled funds are expected to be sold. However, there will be turnover of the holdings within the pooled funds and any gains as a result of this turnover will be distributed at the FYE of the fund. The forecasted turnover rate is based on manager turnover expectations for the holdings within the fund over the forecast period.

Assumption: The forecasted equity turnover ratio is a weighted average based on the turnover expectations of the manager and is projected to be 13% in 2022/23 and thereafter. There will be turnover of the holdings within the pooled funds and any gains realized as a result of this turnover will be distributed at the FYE of the fund.

INV.7 Global Equities and Global Low Volatility

For 2022/23, the target weights for global equities are 0% for Basic Claims, 13% for RSR and 18% for EFB. For low volatility global equities, the target weights are 0% for Basic Claims, 10% for RSR and 7% for EFB.

INV.7.1 Summary Table

Figure INV- 23 Global Equities Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Dividend Income	2,263	2,622	2,933	3,244	3,185
3	Realized Gains/(Losses) (P&L)	9,824	6,577	3,746	4,629	4,294
4	**Total Investment Income**	**12,087**	**9,200**	**6,679**	**7,873**	**7,479**
5	Forecasted Dividend Yield	1.93%	2.05%	2.15%	2.15%	2.15%
6	Ending Market Value	129,128	138,915	148,432	148,952	163,667
7	% of Portfolio	4.4%	4.5%	4.6%	4.6%	4.8%

Figure INV- 24 Global Low Volatility Equities Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Dividend Income	1,169	1,312	1,464	1,645	1,539
3	Realized Gains/(Losses) (P&L)	8,320	2,675	2,124	2,636	2,509
4	**Total Investment Income**	**9,489**	**3,987**	**3,587**	**4,281**	**4,048**
5	Forecasted Dividend Yield	1.93%	2.05%	2.15%	2.15%	2.15%
6	Ending Market Value	65,652	70,742	75,449	73,049	81,367
7	% of Portfolio	2.2%	2.3%	2.4%	2.3%	2.4%

INV.7.2 Definition and Accounting Treatment

Definition: Global equities are publicly traded stocks, which are listed on a recognized stock exchange in the U.S., Europe, or Asia (developed markets predominately with potential for limited emerging market exposure).

Global low volatility equities are publicly traded stocks in the same markets as global equities. Low volatility stocks have less volatility than other stocks in their parent index.

Accounting: Unrealized and Realized gains/losses and dividends flow through the Profit and Loss statement.

INV.7.3 Total Return Assumption

The total return on the global equity portfolio is forecasted to be 6.6% (6.6% in the 2022 GRA), which matches the Canadian equity total return. The forecasted total return for global low volatility stocks is 6.0%, which is 0.6% lower. This return difference is based on the capital market assumptions provided by Mercer in the 2018 and 2022 ALM studies[4]. In the 2022 GRA, the identical methodology applied (i.e., the forecasted return for global low volatility equities was 6.0%, which is 0.6% lower).

INV.7.4 Dividend Yield

The dividend yield is used to calculate the global equity/ low volatility global equity dividend income in the financial model. Dividend income for each quarter is calculated by using the quarterly market value of the equity portfolio multiplied by the quarterly dividend yield. All dividends are re-invested back into the global equity/ low volatility global equity portfolio.

The dividend yield for the global equity/ low volatility global equity portfolio is based upon a forecast from Bloomberg. Bloomberg only forecasts 3-years into the future.

For the global equity and low volatility global equity, the MSCI World Index forecasted dividend yield was used for 2022/23 and thereafter.

[4] The return difference in the 2022 capital market assumptions provided by Mercer was 0.5%

Figure INV- 25 Bloomberg Expected Dividend Yield Forecast

Line No.	Index	MSCI World
1	**2022/23**	1.9%
2	**2023/24**	2.1%
3	**2024/25**	2.2%
4	**Thereafter**	2.2%

Assumption: The global equity and low volatility global equity dividend yield is forecasted to be 1.9% for 2022/23, 2.1% for 2023/24 and 2.2% thereafter. (1.90%, 2.04% and 2.16% thereafter in the 2022 GRA).

INV.7.5 Capital Return

The capital return determines the increase of the global equity/ low volatility global equity portfolio in market value over each quarter. Increases in market value from the capital return create unrealized gains, which are held in AOCI. Therefore, the capital return component does not impact net income unless there are sales (turnover) in the portfolio. The capital return for each year is determined by subtracting the dividend yield (section *INV.7.4*) for each forecasted year from the total equity return (6.6% and 6.0%) for global equity and low volatility global equity respectively (section *INV.7.3*).

INV.7.6 Turnover Ratio

The turnover ratio is based on manager turnover expectations and forecasted to be 12% for global equities and 50% for low volatility global equities in 2022/23 and thereafter. Both asset classes will be held within pooled funds; no units of the pooled fund are expected to be sold. However, there will be turnover of the holdings within the pooled funds and any gains as a result of this turnover will be distributed at the FYE of the fund. The forecasted turnover rate is based on manager turnover expectations for the holdings within the fund over the forecast period.

Assumption: The turnover ratio for global equity/ low volatility global equities for 2022/23 and beyond is forecasted to be 12% and 50% respectively.

INV.8 Real Estate

As of 2022/23 FYE, the real estate portfolio had an actual weight of 3.9% within the Basic line of business. There are two main components to the real estate portfolio; first are holdings in a real estate pooled fund managed by TD Asset Management, which had a weight of 3.7%. The second is the investment portion of Cityplace (MPI-owned office and retail complex), which had a weight of 0.2%. Target weights for real estate are 0% for Basic claims, 10% for RSR, and 15% for EFB.

INV.8.1 Real Estate Summary Table

Figure INV- 26 Real Estate Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	***Real Estate Pooled Fund***					
3	**Ending Market Value**	109,001	117,047	124,991	125,541	136,986
4	**% of Portfolio**	3.7%	3.8%	3.9%	3.9%	4.0%
5	**Forecasted Return**	7.8%	6.3%	6.0%	6.0%	6.0%
6	**Real Estate Gains (P&L)**	10,987	7,085	7,725	7,499	7,532
7	**Investment Properties (Cityplace)**					
8	**Ending Market Value**	5,757	5,603	5,448	5,293	5,138
9	**% of Portfolio**	0.2%	0.2%	0.2%	0.2%	0.2%
10	**Investment Property Income**	350	359	367	374	382

INV.8.2 Accounting Treatment of the Pooled Fund

Assets in the real estate portfolio are separated into two categories, the Real Estate Pooled Fund and Investment Properties since they have different accounting treatments. Investment Properties (e.g., Cityplace) are discussed in section *INV.8.4*.

Definition: As of March 31, 2022, approximately $181.9M was invested in a diversified Canadian real estate pooled fund (total portfolio), which is managed by TD Asset Management.

Accounting: All unrealized and realized gains/losses flow through the Profit and Loss statement. Realized gains/losses would only arise if fund units were sold.

INV.8.3 Real Estate Pooled Fund Return Assumption

The return on the Real Estate portfolio of MPI is based on the forecast for the Canadian Consumer Price Index (CPI) plus a spread of 4%. This assumption for real estate has been unchanged since the first investment by MPI in the asset class in 2009. Please see *Figure INV-39* for the Canadian CPI forecast. As per *Figure INV-26* the forecasted return was 7.8% to 6.0%. In the 2022 GRA, forecasted pooled fund returns were 5.9% in 2021/22, 6.0% in 2022/23, 5.9% in 2023/24 and 6.0% thereafter.

INV.8.4 Cityplace Accounting Treatment

Definition: Investment Property includes an investment in the parking lots surrounding Cityplace with an appraised value of approximately \$21.6M[5].

Accounting: The value of the investment property is measured at amortized cost; as such, changes in the appraised market value are not reflected in investment income or other comprehensive income. Income from investment property is in the form of rental income from the portion of the property rented to commercial tenants. All rental income from Cityplace is net of rental expenses and amortization and flows through the Profit and Loss statement.

INV.8.5 Cityplace Return Assumption

The return forecast is based on projections provided by the property manager fewer capital improvements and associated depreciation.

[5] The parking lots have a book value of \$13.7 million. The CityPlace building was reclassified from an investment asset to a corporate asset on March 31, 2021.

INV.9 Infrastructure

The target allocations for infrastructure are 0% for Basic claims, 5% for RSR, and 10% for EFB. Like real estate, infrastructure is privately held and is not a liquid asset class.

INV.9.1 Summary Table

Figure INV- 27 Infrastructure Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**Income**	1,510	1,002	940	1,056	1,066
3	**Infrastructure Gains (P&L)**	5,869	3,921	3,687	4,137	4,178
4	**Forecasted Return**	8.8%	7.3%	7.0%	7.0%	7.0%
5	**MV**	65,343	69,829	73,871	74,613	80,818
6	**% of Portfolio**	2.2%	2.3%	2.3%	2.3%	2.4%

INV.9.2 Definition and Accounting Treatment

Definition: Infrastructure is defined as an essential service with high barriers to entry that often operate in a monopolistic and regulated environment. Infrastructure investment contracts are held by the Province of Manitoba.

Accounting: Income and unrealized gains/losses flow through the Profit and Loss statement. Realized gains or losses were not included in the model since sales of infrastructure were not originally forecasted during the five-year forecast period.

INV.9.3 Return Assumption

Infrastructure is expected to provide a total return of 8.8% for 2022/23, 7.3% for 2023/24, and 7.0% thereafter. This forecasted return is based on the Canadian CPI forecast plus a spread of 5%. Please see *Figure INV-34* for the CPI forecast for the current year. In the 2022 GRA, infrastructure was expected to provide a total return of 6.9% for 2021/22, 7.0% for 2022/23, 6.9% for 2023/24 and 7.0% thereafter.

The total infrastructure return is comprised of two components: yield and capital return. Capital return is projected to represent 80% of the total return on infrastructure and yield the remaining 20%, which is based on historical returns and unchanged from the assumption of the previous year.

INV.10 Other Investment Income Impacts

This section discusses the other investment income impacts: investment management fees; pension expense; bond amortization; venture capital; and line of business allocations.

INV.10.1 Investment Management Fees

In order to forecast fees for the Basic line of business, investment management fees were split into four categories by type of manager. The first category includes the fees paid to the Department of Finance. The second category includes the fees paid to the corporate bond manager. The third category includes fees paid to equity managers. The fourth category includes fees paid to all other managers (real estate, private debt, and infrastructure managers).

Figure INV- 28 Investment Manager Fees

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	**Fees to the Department of Finance**	1205	1203	1227	1232	1172
3	**Fees to the Corporate Bond Manager**	680	722	751	787	812
4	**Fees to the Equity Managers**	1020	1065	1136	1264	1220
5	**Fees to the Alternative Assets**	1448	1459	1464	1563	1526
6		**4,353**	**4,448**	**4,578**	**4,846**	**4,730**

INV.10.1.1 Department of Finance

100% of the Provincial bond fixed income portfolio was managed by the Department of Finance until May 31, 2021, at which time Addenda Capital started to manage some Provincial bonds as part of the implementation of the moment matching strategy (referred to as the "completion portfolio"). The Department of Finance charges a management fee of 7.5 basis points on the first $2 billion for fixed income, with no fees on assets above that. For all other asset classes, the fee charged by the Department of Finance is 3.0 basis points.

INV.10.1.2 Corporate Bond Manager

The corporate bond portfolio is managed by an external bond manager (Addenda Capital). The investment management fees are based on assets under management. For the first $100 million the fee is 0.20%, on the next $100 million the fee is 0.14%, on the next $200 million the fee is 0.10%; for amounts greater than $400 million (on the excess) the fee is 0.08%. The weighted average investment fee is forecasted to be 0.11%.

INV.10.1.3 Alternative Assets

The investment management fees are based on assets under management for public equities, real estate and private debt.

INV.10.1.4 Canadian Equities

A weighted average fee of 0.33% was used based on March 31, 2022 relative Canadian Equity manager weights and associated management fees charged by Foyston, Gordon & Payne and QV Investors.

INV.10.1.5 Global Equities/Global Low Volatility

Guardian Capital manages global equities, and their forecasted fee is 0.44%. Acadian manages Global Low volatility equity, and their forecasted fee is 0.30%.

INV.10.1.6 Real Estate Pooled Fund

The sliding fee schedule for the real estate pooled fund managed by TD Asset Management was used to forecast investment fees. For the first $10 million the fee is 1.00%, for the next $25 million the fee is 0.80%, for the next $65 million the fee is 0.60%, on the balance over $100 million the fee is 0.50%.

INV.10.1.7 Private Debt Manager

The private debt portfolio is managed by an external manager (SLC Asset Management or Sun Life). The weighted average investment management fee is based on assets under management and is forecasted to be 0.38%. Fees are calculated based upon invested capital. As of March 31, 2022 100% of the total commitment of MPI to the Sun Life long duration fund (within the EFB portfolio) has been drawn. Follow-on commitments to the Sun Life mid-duration fund (within the EXT and SRE portfolio) were fully drawn in early 2022/23.

INV.10.1.8 Infrastructure

The infrastructure portfolio consists of assets held in funds and through direct investment. The weighted average investment fee is forecasted to be 0.41%.

INV.10.2 Pension Expense

The pension expense line, in investment income, is calculated by applying the pension discount rate to the opening pension liability. The pension discount rate has been used in the March 31, 2022 actuarial analysis of the provision for EFB. The pension discount rate was determined by applying the pension liability cash flows to the Canadian Institute of Actuaries Method Accounting Discount Rate Curve published by Fiera Capital; the rate was set at 4.01% (3.34% at March 31, 2021).

For 2019/20 and thereafter, investment assets and the underlying income have been segregated and are calculated independently for each investment portfolio. Investment assets on the Statement of Financial Position and investment income on the Income Statement for the Basic Financial statements will include both Basic claims and RSR portfolio assets and investment income as well as the portion of the EFB portfolio assets and investment income relating to Basic.

The figure below represents the forecasted investment income earned on the employee future benefit investment asset portfolio, net of the pension expense (or interest cost) requirement (which is not additive when compared with Basic line of business). Investment income is accounted for in the "Provision for EFB" within the Statement of Financial Position.

Figure INV- 29 Investment Income on Employee Future Benefits

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	4,027	4,298	4,525	4,730	4,926
3	Dividend and Other Income During Period	9,648	10,204	10,796	11,469	12,124
4	Gains During Period - Profit & Loss	22,527	19,666	19,893	20,205	21,067
5	Investment Fees Paid	(2,218)	(2,354)	(2,463)	(2,580)	(2,722)
6	Amortization/Accretion During Period	(88)	(85)	(81)	(78)	(74)
7	Pension Expense	(15,020)	(15,386)	(15,758)	(15,758)	(15,758)
8	**Investment Income**	**18,876**	**16,343**	**16,912**	**17,988**	**19,564**

INV.10.2.1 Defined Benefit Pension Plan Funding

MPI currently operates its defined benefit pension plan as a payment funding employer within the plan administered by the Civil Service Superannuation Fund (CSSF). Funding of the employer portion (MPI) to the CSSF occurs as benefits are paid. To prepare and ensure adequate funds will be available in the future, a specific investment fund has been established by MPI with a tailored investment approach and funding policy.

The BoD approved Management to engage Government to seek a change of the funding status from payment funding to pre-funding under the Civil Service Superannuation Act (CSSA). MPI is currently working with the relevant stakeholders within Government to seek the appropriate authorizations and if approved, the change would be expected to take place in fiscal 2023/24.

The primary motivation for seeking this change is the reduction of financial statement volatility. As a payment funding employer, MPI carries a pension obligation on its balance sheet and sets aside assets dedicated to backing the pension liability. Prior to 2019 MPI placed a general provision against its general assets equal to the amount of the pension liability. After execution of the 2018 asset liability strategy the corporation now has a specific portfolio designated to meets its pension obligations.

The defined benefit obligation is measured as the present value of the estimated future cash outflows, using a discount rate based on market yields for high quality corporate fixed income securities. Because this market yield, known as the Fiera curve, changes constantly the valuation of the pension liability also changes constantly. As the liability is backed by approximately 30% fixed income securities, 70% of the liability remains unhedged.

Pension valuation changes flow through Other Comprehensive Income and will continue to do so, however the mark to market of the corresponding assets will flow through the statement of profit and loss upon adoption of IFRS 9 in 2023/24, adding additional volatility to the P&L.

Prefunding participants are required to match contributions contributed to the Fund by the employees at prescribed rates, which are recorded as operating expenses. Under the CSSA, corporations have no further pension liabilities.

There are no material impacts to Basic rate setting, however depending on market rates and conditions at time of a potential transition, there may be an accounting gain (or loss) that will impact the total equity position of MPI (and Basic). Because the going concern yield assumption is currently higher than the accounting discount rate, a gain would be anticipated upon implementation of this change. Based upon 2021/22 year-end values this gain is estimated to be approximately $150 million. This amount is subject to change based upon interest rate movements leading up to the settlement transaction and the final actuarial determination of the amount required to settle and transfer to the CSSF.

This funding change and resulting transaction is subject to Government review and approval and as such are not reflected in the financial forecasts in the 2023 GRA.

INV.10.3 Amortization of Bond Premium/Discount

The financial model calculates the amortization of the bond premium/discount for provincial and corporate bonds. The premium or discount is calculated as the difference between the face value of the bond and the actual purchase price. A bond purchased at a higher (lower) price than its face value will have a premium (discount) that is amortized over the remaining time to maturity of the bond. The amortization of this premium (discount) effectively reduces (increases) the interest income received based on the coupon rate of the bond.

INV.10.4 Venture Capital

At March 31, 2022 venture capital represented 0.0% of the total portfolio. Given the limited allocation to venture capital, investment income from venture capital is not forecasted in the model. Please see the summary investment *Figure INV-1* to see the historical investment income from venture capital.

INV.10.5 Allocation of Investment Income to Lines of Business

The allocation of investment income throughout the forecast period has been reviewed and approved by the BoD. The 2022/23 and subsequent forecast period applies investment income based on the direct proportion of investment assets available to each line of business with the exception of EFB which uses the payroll ratio (with 74.8% allocated to Basic Claims). No changes have been made to the allocation methodology since March 1, 2019. The current Investment Income Allocation Policy is provided in *Appendix 8 – Investment Income Allocation Policy*.

INV.10.6 Impaired Securities

As of March 31, 2022, there were $29.2M in impaired securities (corporate total). Corporate bonds, private debt and provincial bonds were written down by $14.5M, $13.9M and $0.8M. From the total write-downs, $28.4M were allocated to the EFB portfolio (corporate bonds and private debt) and $0.8M to the RSR portfolio (provincial bonds). As of March 31, 2022, there were no write-downs within the Basic Claims portfolio. From March 31, 2021 to March 31, 2022, corporate and provincial bonds declined by 4.6% and 5.6% respectively, due to rising interest rates.

INV.10.7 Investment Portfolio Performance in 2021/2022

Transitional benchmarks were developed for each portfolio which more closely reflected the actual asset allocation of the portfolios until Fiscal Year 2020/21. By July

2021, the transitions to the new asset allocation as defined in the 2018 ALM Study were substantially funded, and the calculation of transitional benchmarks was discontinued.

Performance is presented for the Basic Claims, RSR & EFB portfolios over the 12 months ended at March 31, 2022.

The Basic Claims portfolio returned -2.8%, outperforming the IPS benchmark by 2.0% (see *Appendix 9 – Actual vs. Benchmark Returns)*. This was attributed primarily to outperformance of MUSH bonds, which are reported at book value (i.e., with no capital gains or losses). If MUSH bonds were reported at their implied market value (i.e., marked to market using the current yield on newly issued MUSH bonds) the total portfolio return would have decreased to -5.4% and underperformed the benchmark by 0.6%. The transitional benchmark calculations for this portfolio were discontinued after March 2020 as the portfolio was substantially funded at that time. Investment income was -$47.2 million in 2021/22.

The RSR portfolio returned 4.8%, outperforming the IPS benchmark by 1.0%. This was mainly due to large & small-cap Canadian equities, real estate, private debt and low volatility global equites outperforming their benchmarks by 6.8%, 6.3%, 2.2%, 2.0% and 0.2%, respectively. Provincial bonds, global equities and infrastructure underperformed their benchmarks. The transitional benchmark calculations for this portfolio were discontinued after June 2021 as the portfolio was substantially funded. Investment income was $24.9 million in 2021/22.

The EFB portfolio returned 6.2%, outperforming the IPS benchmark by 1.5%. This was largely due to large & small-cap Canadian equites, real estate and private debt outperforming their benchmarks by 8.2%, 6.3%, 5.9% and 0.3%, respectively. Global equities and infrastructure underperformed their benchmarks. Investment income was -$2.4 million in 2021/22 (-$17.7 million after the provision for pension).

Similar to the Basic Claims portfolio, the transitional benchmark calculations for this portfolio were discontinued after March 2020 as the portfolio was substantially funded. By June 2020, the initial allocation to Private Debt was entirely funded.

INV.10.8 MPI Performance Relative to Other Institutional Investors

Minimum Filing Request C.5 stated:

> *"Please provide a 5-year comparison of the Corporation's total annual investment return rates with the corresponding annual return rates of:*
>
> *a) Insurance Corporation of British Columbia, and*
>
> *b) Saskatchewan Auto Fund, and please provide commentary on any significant differences."*

The performance of the consolidated investment portfolio belonging to MPI was compared against the Insurance Corporation of British Columbia (ICBC) and Saskatchewan Government Insurance (SGI), Workers' Compensation Board Manitoba (WCB), Civil Service Superannuation Board (CSSB), and the Manitoba Teachers' Retirement Allowance Fund (TRAF) over the last five years.

During this period SGI, ICBC and MPI changed their FYEs to March 31; SGI changed from December 31 in 2016, ICBC changed from December 31 in 2017 and MPI changed from February 28 in 2020. The FYE of other funds is December 31. As a result, the performance for each fund is reported for their appropriate FYE along with the performance of MPI over the same period. The result is that in each year, the performance of MPI is reported over the 12 months ended at both March 31 and December 31. This ensures that its performance is always calculated over a period that matches the reporting periods of the other funds.

The return for MPI was presented for the consolidated portfolio (i.e., the total of all five new portfolios) for 2021 to be consistent with prior periods.

In 2021, the investment portfolio of MPI underperformed ICBC & SGI by 2.3% and 9.5% respectively. In addition, the investment portfolio of MPI also underperformed TRAF, CSSB & WCB by 13.5%, 7.9% and 6.8% respectively (see *Figure INV-30*). Over the last five years, MPI outperformed ICBC by 0.6% but underperformed TRAF, CSSB, SGI and WCB by 3.3%, 2.4%, 2.3% and 2.0% respectively.

The asset allocation of these funds is very different than the asset allocation of the MPI fund. When the asset allocations of other funds were adjusted to match its asset allocation, MPI outperformed ICBC by 0.1%, but underperformed TRAF by 4.5%, WCB by 1.8%, CSSB by 1.3% and SGI by 0.9% (see *Figure INV-31*) in 2021. Adjusted returns are presented for 2019, 2020 and 2021 only because the data required to calculate adjusted returns was not available for every fund prior to 2019.

Figure INV- 30 Fiscal Year Gross Annual Returns

Line		TRAF	CSSB	WCB	ICBC	SGI	MPI	
No.	Year-end Period	31-Dec	31-Dec	31-Dec	31-Mar	31-Mar	31-Dec	31-Mar
1	2017	9.2%	10.8%	8.3%	5.2%	8.3%	6.3%	6.0%
2	2018	3.1%	-0.9%	1.5%	1.7%	7.2%	4.9%	4.8%
3	2019	12.0%	13.7%	12.4%	5.3%	5.6%	8.8%	6.5%
4	2020	6.9%	9.0%	9.0%	1.4%	0.4%	7.9%	1.5%
5	2021	16.6%	11.0%	9.9%	11.2%	18.4%	3.1%	8.9%
6	Annualized Return							
7	over the 5 year period:	9.5%	8.6%	8.2%	4.9%	7.8%	*6.2% / 5.5% / 5.5%	
8	MPI Value Added	-3.3%	-2.4%	-2.0%	0.6%	-2.3%		
9	*6.2% : Comparative return to TRAF, CSSB, WCB (returns to Dec 31), 5.5% : Comparative return to ICBC, 5.5% : Comparative return to SGI							

Figure INV- 31 Fiscal Year Gross Annual Returns – Adjusted

Line		TRAF	CSSB	WCB	ICBC	SGI	MPI	
No.	Year-end Period	31-Dec	31-Dec	31-Dec	31-Mar	31-Mar	31-Dec	31-Mar
1	2019	9.7%	10.8%	8.6%	5.1%	5.8%	8.8%	6.5%
2	2020	7.2%	8.8%	8.1%	2.0%	3.7%	7.9%	1.5%
3	2021	7.6%	4.4%	4.9%	8.8%	9.8%	3.1%	8.9%
4	MPI Value Added	-4.5%	-1.3%	-1.8%	0.1%	-0.9%		

MPI asked Mercer to review its performance relative to these institutional investors as part of the ALM study. Mercer concluded that MPI should compare the performance of its investment managers to relevant benchmarks set out in its Investment Policy Statement and relevant peer universes for each asset manager. Mercer further concluded that MPI should not “continue with peer comparison at the total fund return level”. In other words, MPI should not compare itself to pension plans or even other insurance companies as they may have very different liability profiles, regulatory requirements, risk appetites and performance objectives.

INV.11 Rebalancing

Rebalancing is a major component of the financial model and ensures that the asset classes stay within the tolerance ranges defined in the IPS. This section discusses the rebalancing assumptions in the model for:

- Basic claims portfolio supporting the claims liabilities; and
- RSR and EFB.

INV.11.1 Basic Claims Portfolio supporting Basic Claims Liabilities Rebalancing

The Basic claims portfolio rebalancing rules are as follows:

- The dollar amount of the Basic fixed income portfolio is rebalanced to match the present value of Basic claims liabilities on an annual basis.
- The marketable bond duration is matched to the claims duration of the previous quarter. Duration matching occurs in the first quarter of each fiscal year based on the claim duration at the previous FYE.
- Rebalancing to ensure dollar matching occurs within the financial model only once a year and only if the dollar difference between Basic claims assets and Basic claims liabilities exceeds +/- $20 million. Any transfers would be funded by the RSR portfolio.

Figure INV- 32 Basic Claims Portfolio Asset Allocation

Line No.	Basic Claims Asset Allocation	Minimum	Target	Max
1	**Fixed Income**			
2	**Provincial Bonds**	50.0%	60.0%	70.0%
3	**Corporate Bonds**	10.0%	20.0%	30.0%
4	**MUSH**	0.0%	20.0%	30.0%
5	**Total Fixed Income**		**100.0%**	
6	**Public Equities**			
7	**Canadian Equities**		0.0%	
8	**Global Equities**		0.0%	
9	**Global Low Volatility**		0.0%	
10	**Total Equities**		**0.0%**	
11	**Alternatives**			
12	**Canadian Real Estate**		0.0%	
13	**Infrastructure**		0.0%	
14	**Total Alternatives**		**0.0%**	

Rebalancing

In order to ensure dollar matching is maintained within the model, any surplus (or deficit) between the Basic claims fixed income portfolio and Basic claims liabilities is transferred to (or funded from) the liquid asset classes within the RSR portfolio. The allocation ratios are shown in the figure below.

Figure INV- 33 Allocation Ratio

Line No.	Description	Target Weight	Allocation Ratio
1	**Basic Line of Business Portfolio**		
2	**Provincial Bonds**	60.0%	75.0%
3	**Corporate Bonds**	20.0%	25.0%
4	**Total**	**80.0%**	**100.0%**
5	**RSR Asset Classes**		
6	**Provincial Bonds**	20.0%	30.8%
7	**Corporate Bonds**	10.0%	15.4%
8	**Canadian Equities**	12.0%	18.5%
9	**Global Equities**	13.0%	20.0%
10	**Global Low Volatility**	10.0%	15.4%
11	**Total**	**65.0%**	**100.0%**

To illustrate, using a hypothetical $100 million dollar shortfall in Q1 between the Basic claims fixed income portfolio and the Basic claims liabilities, the model will transfer $30.8M, $15.4M, $18.5M, $20.0M and $15.4M from the Provincial, corporate, Canadian equity, global equity and global low volatility asset classes in the RSR portfolio, respectively. This money will be invested in Provincial and corporate bonds within the Basic claims portfolio in a 75%/25% ratio.

INV.11.2 RSR and EFB Rebalancing Assumptions

The next two figures show the RSR and EFB asset allocations.

Figure INV- 34 RSR Asset Allocation

Line No.	Description	Minimum	Target	Max
1	**Fixed Income**			
2	**Provincial Bonds**	10.0%	20.0%	30.0%
	Corporate Bonds	0.0%	10.0%	20.0%
3	**MUSH Bonds**	0.0%	0.0%	0.0%
4	**Private Debt**	15.0%	20.0%	25.0%
5	**Total Fixed Income**	**40.0%**	**50.0%**	**60.0%**
6	**Public Equities**			
7	**Canadian Equities**	7.0%	12.0%	17.0%
8	**Global Equities**	8.0%	13.0%	18.0%
9	**Global Low Volatility**	5.0%	10.0%	15.0%
10	**Total Equities**	**25.0%**	**35.0%**	**45.0%**
11	**Alternatives**			
12	**Canadian Real Estate**	7.0%	10.0%	20.0%
13	**Infrastructure**	2.0%	5.0%	8.0%
14	**Total Alternatives**	**10.0%**	**15.0%**	**20.0%**

Figure INV- 35 Employee Future Benefits Asset Allocation

Line No.	Description	Minimum	Target	Max
1	**Fixed Income**			
2	**Corporate Bonds**	10.0%	20.0%	30.0%
3	**Private Debt**	10.0%	20.0%	30.0%
4	**Total Fixed Income**	**30.0%**	**40.0%**	**50.0%**
5	**Public Equities**			
6	**Canadian Equities**	5.0%	10.0%	15.0%
7	**Global Equities**	13.0%	18.0%	23.0%
8	**Global Low Volatility**	2.0%	7.0%	12.0%
9	**Total Equities**	**25.0%**	**35.0%**	**45.0%**
10	**Alternatives**			
11	**Canadian Real Estate**	12.0%	15.0%	18.0%
12	**Infrastructure**	7.0%	10.0%	13.0%
13	**Total Alternatives**	**20.0%**	**25.0%**	**30.0%**

The rebalancing rules for the RSR and EFB portfolios are summarized below.

1. **Marketable Bonds (Provincial and Corporate Bonds)**
   If Provincial and corporate bonds remain outside their tolerance ranges for two consecutive quarters, the asset class will be adjusted to the target weight in the following quarter. The total portfolio reallocation requirements will be sourced from or reallocated from the equity portfolio.

2. **Equities**
   For Canadian equities, global equities and global low volatility equities, when the asset class remains outside the maximum or minimum allocation limit for two consecutive quarters, then the asset class will be adjusted to the target weight in the following quarter. Inflows or outflows required for rebalancing will come from marketable bonds.

3. **Illiquid Asset Classes (MUSH, Private Debt, Real Estate, Infrastructure)**
   MUSH, private debt, real estate and infrastructure are illiquid and are not automatically rebalanced in the model (as a result of asset class modeling constraints). However, transfers from Extension to RSR are modeled to rebalance all assets classes (independent of illiquidity) to target. The forecasted MUSH and real estate values do not fall outside of their respective tolerance ranges during the five-year forecast period. Private debt within the RSR portfolio is within the tolerable ranges during the five-year forecast period as this is expected to be fully funded in 2022/23.

INV.12 Comparison of Forecast

This section compares the forecasts of the current and previous years. *Figure INV-36* provides detailed investment income information from the 2023 GRA interest rate forecast scenario. *Figure INV-37* provides information from the 2022 GRA and *Figure INV-38* compares the difference between *Figure INV-36* and *Figure INV-37*.

Figure INV- 36 2023 GRA Investment Income (Basic Line of Business)

Line No.	Category	2021/22P	2022/23F	2023/24F	2024/25F	2025/26F
1	*('000s)*					
2	**Short Term Interest**	93	664	586	593	599
3	**Marketable Bonds**	81,430	62,950	66,482	69,987	73,087
4	**MUSH**	0	19,328	18,254	17,184	16,205
5	**Long-Term Bond Income**	**81,430**	**82,278**	**84,735**	**87,171**	**89,292**
6	**Marketable Unrealized Gains/(Loss)**	(123,025)	6,325	133	144	149
7	**Marketable Realized Gains/(Loss)**	(3,975)	(10,254)	(304)	(285)	(299)
8	**Total Marketable Gain/Loss**	**(127,000)**	**(3,929)**	**(172)**	**(141)**	**(150)**
9	**Income**	4,800	6,619	7,522	6,812	7,220
10	**Gain/Loss**	0	0	(1,348)	0	(757)
11	**Private Debt**	**4,800**	**6,619**	**6,174**	**6,812**	**6,463**
12	**Total Fixed Income**	**(40,677)**	**85,632**	**91,323**	**94,435**	**96,204**
13	**Canadian Equities**	5,258	2,678	2,737	2,881	3,215
14	**Global Equities**	3,578	2,263	2,622	2,933	3,244
15	**Global Low Vol**		1,169	1,312	1,464	1,645
16	**Equity Dividends**	**8,836**	**6,110**	**6,672**	**7,277**	**8,105**
17	**Canadian Equities**	5,943	25,784	6,942	3,648	4,127
18	**Global Equities**	4,807	9,824	6,577	3,746	4,629
19	**Global Low Vol**	1,571	8,320	2,675	2,124	2,636
20	**Equity Realized Gain/Loss**	**12,321**	**43,928**	**16,195**	**9,518**	**11,393**
21	**Total Equities**	**21,157**	**50,038**	**22,867**	**16,795**	**19,497**
22	**Real Estate (Pooled Fund)**	15,342	10,987	7,085	7,725	7,499
23	**Real Estate (CityPlace)**	148	350	359	367	374
24	**Infrastructure**	2,072	7,379	4,922	4,627	5,192
25	**Venture Capital**	0	0	0	0	0
26	**Total Alternatives**	**17,562**	**18,716**	**12,366**	**12,719**	**13,066**
27	**Management Fees**	(4,802)	(4,353)	(4,448)	(4,578)	(4,846)
28	**Pension Expense**	(11,439)	(11,237)	(11,511)	(11,789)	(11,789)
29	**Bond Amortization**	(6,962)	(2,698)	(3,083)	(3,311)	(3,448)
30	**Investment Write-Down**	(22,023)	0	0	0	0
31	**Total Other**	**(45,226)**	**(18,288)**	**(19,042)**	**(19,678)**	**(20,083)**
32	**Basic LOB Total**	**(47,184)**	**136,097**	**107,515**	**104,271**	**108,684**

Figure INV- 37 2022 GRA Investment Income (Basic Line of Business)

Line No.	Category	2021/22F	2022/23F	2023/24F	2024/25F	2025/26F
1	('000s)					
2	**Short Term Interest**	98	90	90	90	90
3	**Marketable Bonds**	60,916	58,966	57,581	58,445	60,035
4	**MUSH**	20,940	20,134	19,317	18,486	17,682
5	**Long-Term Bond Income**	**81,856**	**79,100**	**76,898**	**76,931**	**77,716**
6	**Marketable Unrealized Gains/(Loss)**	(1,684)	(650)	160	170	182
7	**Marketable Realized Gains/(Loss)**	1,996	1,090	(215)	(227)	(241)
8	**Total Marketable Gain/Loss**	**312**	**440**	**(56)**	**(58)**	**(59)**
9	Income	4,418	5,255	7,195	7,804	8,471
10	Gain/Loss		0	0	0	0
11	**Private Debt**	**4,418**	**5,255**	**7,195**	**7,804**	**8,471**
12	**Total Fixed Income**	**86,684**	**84,884**	**84,127**	**84,767**	**86,218**
13	**Canadian Equities**	3,254	3,567	3,722	4,078	4,467
14	**Global Equities**	2,904	3,389	3,884	4,231	4,610
15	**Global Low Vol**	1,638	1,900	2,185	2,394	2,624
16	**Equity Dividends**	**7,796**	**8,855**	**9,791**	**10,702**	**11,701**
17	**Canadian Equities**	6,872	4,714	4,716	4,786	4,915
18	**Global Equities**	4,571	4,436	4,882	5,344	5,845
19	**Global Low Vol**	2,036	2,561	3,078	3,503	3,915
20	**Equity Realized Gain/Loss**	**13,478**	**11,710**	**12,676**	**13,633**	**14,675**
21	**Total Equities**	**21,274**	**20,566**	**22,467**	**24,335**	**26,376**
22	**Real Estate (Pooled Fund)**	4,708	7,126	7,805	8,623	9,375
23	**Real Estate (CityPlace)**	1,128	1,117	1,107	1,093	1,093
24	**Infrastructure**	5,085	5,371	5,820	6,367	6,872
25	**Venture Capital**	0	0	0	0	0
26	**Total Alternatives**	**10,921**	**13,614**	**14,732**	**16,083**	**17,340**
27	**Management Fees**	(4,595)	(4,976)	(5,422)	(5,777)	(6,064)
28	**Pension Expense**	(10,992)	(11,263)	(11,538)	(11,817)	(11,817)
29	**Bond Amortization**	(2,742)	(3,101)	(3,333)	(4,938)	(6,733)
30	**Investment Write-Down**	0	0	0	0	0
31	**Total Other**	**(18,329)**	**(19,340)**	**(20,293)**	**(22,532)**	**(24,614)**
32	**Basic LOB Total**	**100,549**	**99,724**	**101,032**	**102,654**	**105,319**

Figure INV- 38 This Year vs Last Year Basic Line of Business Investment Income

Line No.	Category	2021/22P	2022/23F	2023/24F	2024/25F	2025/26F
1	*('000s)*					
2	**Short Term Interest**	(5)	574	496	503	509
3	**Marketable Bonds**	20,514	3,984	8,901	11,542	13,052
4	**MUSH**	(20,940)	(806)	(1,064)	(1,302)	(1,476)
5	**Long-Term Bond Income**	**(426)**	**3,178**	**7,837**	**10,240**	**11,576**
6	**Marketable Unrealized Gains/(Loss)**	(121,341)	6,974	(27)	(26)	(32)
7	**Marketable Realized Gains/(Loss)**	(5,971)	(11,343)	(89)	(58)	(58)
8	**Total Marketable Gain/Loss**	(127,312)	(4,369)	(116)	(84)	(90)
9	**Income**	382	1,364	327	(992)	(1,251)
10	**Gain/Loss**	0	0	(1,348)	0	(757)
11	**Private Debt**	**382**	**1,364**	**(1,021)**	**(992)**	**(2,008)**
12	**Total Fixed Income**	**3,662**	**2,679**	**2,446**	**2,531**	**3,421**
13	**Canadian Equities**	2,004	(889)	(985)	(1,197)	(1,252)
14	**US Equities/Global Equities**	674	(1,126)	(1,261)	(1,298)	(1,366)
15	**Global Low Vol**	(1,638)	(731)	(872)	(931)	(979)
16	**Equity Dividends**	**1,040**	**(2,746)**	**(3,119)**	**(3,425)**	**(3,596)**
17	**Canadian Equities**	(929)	21,070	2,226	(1,137)	(788)
18	**US Equities/Global Equities**	236	5,388	1,696	(1,598)	(1,216)
19	**Global Low Vol**	(465)	5,759	(403)	(1,379)	(1,279)
20	**Equity Realized Gain/Loss**	**(1,157)**	**32,217**	**3,519**	**(4,114)**	**(3,282)**
21	**Total Equities**	**(117)**	**29,472**	**400**	**(7,540)**	**(6,878)**
22	**Real Estate (Pooled Fund)**	10,634	3,861	(720)	(898)	(1,875)
23	**Real Estate (CityPlace)**	(980)	(767)	(748)	(726)	(719)
24	**Infrastructure**	(3,013)	2,008	(898)	(1,740)	(1,680)
25	**Venture Capital**	0	0	0	0	0
26	**Total Alternatives**	**6,641**	**5,102**	**(2,366)**	**(3,364)**	**(4,274)**
27	**Management Fees**	(207)	623	974	1,200	1,218
28	**Pension Expense**	(447)	27	27	28	28
29	**Bond Amortization**	(4,220)	403	250	1,627	3,285
30	**Investment Write-Down**	(22,023)	0	0	0	0
31	**Total Other**	**(26,897)**	**1,052**	**1,252**	**2,854**	**4,531**
32	**Basic LOB Total**	**(147,733)**	**36,373**	**6,482**	**1,618**	**3,365**

INV.12.1 Explanation of Major Differences between 2023 GRA and 2022 GRA Forecasted Years (2022/23 to 2025/26)

Long Term Bond Income

- Long term interest income was $6.5M higher on average over the five-year projection period compared to the forecast from the previous year, driven primarily by marketable bonds and slightly dragged down by MUSH. This was caused by increasing long-term provincial interest rates since the 2022 GRA as well as a decrease in the assumed amount of MUSH bonds that MPI will purchase over the forecasted period (2022 GRA: $40 million per year, 2023 GRA: $20 million per year)

Marketable Bonds Losses

- As MPI used a naïve forecast in both the 2022 and 2023 GRAs, there is a $121 million unrealized loss on marketable bonds as a result of increase in interest rates.

Canadian, Global Equities & Low Volatility Global Equities

- Equity dividends were higher by $1M compared to the forecast of the previous year for 2021/22 and lower by $2.7M in 2022/23. Equity dividends are based upon a forecast of dividend yields from Bloomberg. Dividend yields declined significantly from March 2022 to March 2023, which impacted forecasted dividend income.
- Realized gains are forecasted to be on average $5.4M higher throughout the forecast due largely to an accumulation of unrealized equity gains, which become realized due to normal turnover throughout the forecast period. The unrealized gains are largely associated with increases in equity share prices from March 2021 to March 2022. Realized gains in 2022/23 were $32.2M higher than projected in 2022 due to a $100M transfer from RSR to Basic Claims in May 2022 which was funded by the sale of equities and some fixed income assets and resulted in the realization of gains.

INV.12.2 Explanation of Major Differences in 2021/22 Actuals vs. Forecast

In the 2022 GRA, total Basic investment income for 2021/22 was forecasted to be $100.5 million. Actual investment income for 2021/22 was $147.7 million lower than forecast at -$47.2 million. This difference can be primarily attributed to higher-than-expected capital loss for marketable bonds (due to rising interest rates) and write downs. These unexpected losses are partially offset by higher-than-expected gains from the pooled real estate fund and higher than expected realized gains in equities. Losses due to rising interest rates were also offset by decreases in the present value of the claims liability.

See the previous figure for the detailed breakdown – highlights are provided below.

- Dividends from equities were $1.0 million higher than forecasted.
- Realized gains on equities were $1.2 million lower than forecasted.
- Total capital gains/losses for marketable bonds were $127.3 million lower than forecasted due to rising interest rates. Rising interest rates reduced the Basic claims liabilities by $132.8 million.
- Interest income was $0.5 million lower than forecasted.
- Gains from the pooled real estate fund were $10.6 million higher than forecasted.
- Net rental income from Cityplace was $0.9 million lower than forecasted.
- Infrastructure investment income was $3.0 million lower than forecasted.
- Bond amortization was $4.2 million higher than forecasted.
- The write off of impaired securities were $22 million higher than forecasted.

INV.13 Changes To the Investment Income Model

No major changes to the current investment income model have been made. It is expected that once the 2022 ALM study is finalized and the new asset mix for each portfolio is approved by the BoD, the necessary changes will be made to the financial model. At present these changes are not expected to be made until the 2024 GRA.

INV.14 Interest Rate Forecasts and CPI Forecast Detail

This section shows detail on the interest rate forecasts and the CPI forecast. For the naïve interest rate forecast used in the 2023 rate application, see *Figure INV-3* for the 10-year GoC bond yield, the marketable bond yield, MUSH yield, and claims discount rate.

INV.14.1 Interest Rate Forecast

The naïve interest rate forecast is based on the March 31, 2022 GoC 10-year bond yield, which was 2.41%; this interest rate is used throughout the entire five-year forecast for the 2023 GRA. Additionally, the 90-Day T-Bill yield on March 31, 2022 was 0.60%. This yield was used over the forecast period as well.

INV.14.2 Canadian and Manitoba CPI Forecast

The Canadian CPI forecast is used in the calculation of real estate and infrastructure returns. The Manitoba CPI forecast is used in the calculation of projected indexation rates for Personal Injury Protection Plan (PIPP) benefits.

INV.14.2.1 Canadian CPI Forecast

Figure INV- 39 Canadian CPI Forecast

Line No.	Year	Qtr	Scotia	CIBC	RBC	TD	BMO NB	Global	Average
1	**2022**	**Q1**	4.5%	4.9%	5.3%	4.7%	5.3%	5.1%	5.0%
2		**Q2**	4.3%	3.7%	5.2%	4.1%	5.1%	5.4%	4.6%
3		**Q3**	4.3%	2.7%	4.1%	3.2%	4.5%	4.4%	3.9%
4		**Q4**	3.9%	2.0%	3.1%	2.3%	4.1%	3.8%	3.2%
5	**2023**	**Q1**	3.7%	1.7%	2.4%	2.1%		2.8%	2.5%
6		**Q2**	3.4%	1.9%	2.2%	2.1%		1.6%	2.2%
7		**Q3**	3.0%	2.0%	2.3%	2.2%		1.8%	2.3%
8		**Q4**	2.7%			2.2%		1.9%	2.3%
9	**Annual**								
10	**2022**		4.3%	3.3%	4.4%	3.6%		3.2%	3.8%
11	**2023**		3.2%	1.9%	2.3%	2.2%		2.1%	2.3%
12	**2024**							2.0%	2.0%
13	**2025**							2.0%	2.0%
14	**2026**							2.0%	2.0%
15	Bloomberg								
16	Global Insight, "Canadian Forecast and Analysis", April 2022								

Assumption: Canadian CPI is forecasted to be 3.8% in 2022/23, 2.3% in 2023/24, and 2.0% thereafter.

Figure INV- 40 Manitoba CPI Forecast

Line No.	Source	2022	2023	2024	2025	2026
1	**Global Insight**	2.5%	1.9%	2.2%	2.0%	2.0%
2	**RBC Royal Bank**	4.7%	2.2%			
3	**BMO Capital Market Economics**	5.4%	3.2%	2.4%	2.0%	
4	**Overall Average**	4.2%	2.4%	2.3%	2.0%	2.0%
5	Sources:					
6	Global Insight, "Canadian Provincial Forecast and Analysis", January 2022					
7	RBC Economics, "Provincial Outlook", March 2022					
8	BMO Financial Group, "Provincial Economic Outlook", April 2022					

Assumption: Manitoba CPI is forecasted to be 4.2% in 2022/23, 2.4% in 2023/24, 2.3% in 2024/25 and 2.0% thereafter.

INV.15 Accounting by Asset Class

This section summarizes the accounting treatment for each asset class, as per the Annual Review of Accounting Policies – Classification of Financial Instruments.

Basic Claims

100% of Basic claims will be allocated to fixed income. As the sole purpose of the portfolio is to back outstanding claims liabilities, these assets (excluding MUSH) will be designated as FVTPL in order to hedge movements in the interest rate sensitive claims liabilities and therefore reduce accounting mismatch and interest rate risk.

MUSH bonds will continue to be classified as Held to Maturity (HTM), as MPI intends to hold these securities to maturity. They will roll off the portfolio as the various issues mature over time.

Rate Stabilization Reserve

Fixed income within the RSR portfolio is not principally bought to recognize short term trading gains and does not address accounting mismatch. However, these securities are not necessarily intended to be held to maturity and therefore new assets assigned to the portfolio will be classified as Available for Sale.

Extension

Fixed income within Extension is not principally bought to recognize short term trading gains and does not predominately address accounting mismatch. The Extension portfolio backs both claims and surplus; because the underlying claims are short term in nature (1 year duration), and not particularly interest rate sensitive, and because surplus currently represents approximately 80% of the value, the Extension portfolio is considered essentially surplus. These securities are not necessarily intended to be HTM and therefore new assets assigned to the portfolio will be classified as AFS.

Employee Future Benefits

40% of EFB will be allocated to fixed income. The EFB portfolio backs pension and other future employee obligations. While the EFB liability is sensitive to changing interest rates, these re-measurement gains/losses are recognized in Other Comprehensive Income and therefore the fixed income backing EFB will be classified as AFS.

Applicable to all Portfolios with allocations to growth assets

Equities do not meet the criteria to be classified as FVTPL or HTM and therefore will be classified as AFS within all portfolios.

Infrastructure and Real Estate are not principally bought to recognize short term trading gains and they do not address accounting mismatch. These alternative assets will be designated as FVTPL on the basis that they are managed, and their performance is evaluated on a fair value basis, as appraisal gains are a significant component of their total return.

There will be no changes to the investment portfolio as a result of IFRS 17. Upon adoption of IFRS 9 on April 1, 2023 all investments will be reclassified as fair value through profit and loss (FVTPL).

INV.16 Asset Liability Management Program

INV.16.1 Background on ALM Program

MPI uses duration and dollar matching, referred to as the ALM program, in order to manage the interest rate risk associated with its assets and liabilities. In June 2021, moment matching was introduced to manage interest rate risk associated with Basic Claims liabilities. Moment Matching is an immunization method that integrates actuarial discount rates in the computation of the present value and interest rate sensitivity of the liabilities. Interest rate risk for Basic Claims is managed by matching the first and second moments of the marketable bond portfolio (including government bonds, corporate bonds, floating rate notes and short-term investments) to the first and second moments of the Basic Claims liabilities of MPI (excluding the liabilities matched to the MUSH bond portfolio) with the present value of the liabilities calculated using a market-based yield curve.

Section *INV.8.4* of its IPS (*Appendix 1 – Investment Policy Statement*) states the following:

> *"Interest rate risk for Basic Claims is managed by matching the duration of the marketable bond portfolio (including government bonds and corporate bonds) and floating rate notes to the actuarially determined duration of the Corporation's Basic claims liabilities. The duration of the government bond portfolio will be adjusted as necessary to ensure that the duration of the marketable bond portfolio matches the duration of the Corporation's Basic claims liabilities. See the Operational Asset Liability Management Policy for additional information on managing interest rate risk."*

Reducing interest rate risk has been a focus of MPI since 2014.

- In 2014, the duration bandwidth was changed from +/- 2.0 years to +/- 1.0 year. This reduction was an intermediate step designed to reduce the interest rate, forecasting, and rate-setting risks of MPI until the ALM Study was completed.

- In 2015, an ALM Study was completed with assistance from Aon, and the fixed income portfolio duration was fully matched (within +/- 0.25 years) to the corporate claims liability duration.

- In late 2017, the most recent ALM Study was completed with assistance from Mercer, which recommended the separation of the commingled investment portfolio into 5 unique portfolios that back the liabilities and surplus of MPI.

- In 2018, the duration of the claims liabilities was matched to the duration of the marketable bond portfolio (i.e., excluding MUSH bonds) instead of being matched to the duration of the total fixed income portfolio (i.e., including MUSH bonds). This change is due to the change in the calculation methodology for the claims discount rate, which is now based upon the dollar weighted yield of the fixed income portfolio rather than the duration weighted yield of the fixed income portfolio. The net result is that the duration of the marketable bond portfolio was decreased by approximately 2 years.

- On March 1, 2019, a unique portfolio for the Basic claims assets was implemented that includes only fixed income assets. The change to a 100% fixed income portfolio for Basic claims reduced interest rate risk for the Basic line of business. This is discussed further in section *INV.16.2.2*.

- On May 31, 2021 a refinement to the current dollar and duration matching strategy was implemented in order to better protect the corporation from both parallel and non-parallel changes in interest rates. This was accomplished by establishing a new portfolio, called the "completion portfolio", to be managed by Addenda Capital. Going forward Addenda will be responsible for ensuring that the dollar value, duration and convexity of the total Basic Claims asset portfolio matches the dollar value, duration and convexity of the Basic Claims liabilities on a daily basis. Addenda will monitor the duration and convexity of the Provincial bonds, non-marketable bonds and corporate bonds and will adjust the duration of the completion portfolio as required in order to ensure that that the overall duration and convexity are matched to the claims liabilities. This strategy is called moment matching and is expected to reduce the interest rate risk of MPI by 40% - 50% with minimal impact on the yield of the portfolio.

INV.16.2 Interest Rate Risk Definitions

Interest rate risk, for the purpose of this application, is the net impact of changes in interest rates on claims liabilities and the gain or loss for marketable bonds. Interest rate risk is shown on a Basic basis in sections *INV.16.2.1* and *INV.16.2.2*.

Interest rate forecasting risk, for the purpose of this application, is the uncertainty related to setting premium rates based on forecasted interest rates rather than future actual interest rates and the impact of the difference between them.

INV.16.2.1 Basic Interest Rate Risk with Naïve Forecast

Figure INV- 41 Basic Investment and Claims Net Interest Rate Impact with Naïve Forecast

Line No.		2017/18 Actual	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Actual	2022/23 Forecast	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
1	*(in Millions of Dollars)*										
2	Marketable Bond Yield	3.04%	2.88%	2.69%	2.50%	2.52%	3.44%	3.43%	3.42%	3.41%	3.40%
3	YoY Change	0.13%	-0.16%	-0.19%	-0.19%	0.01%	0.92%	-0.01%	-0.01%	-0.01%	-0.01%
4	Claims Discount Rate	3.47%	3.26%	3.09%	2.88%	3.54%	3.55%	3.53%	3.51%	3.50%	3.47%
5	YoY Change	0.08%	-0.21%	-0.17%	-0.21%	0.66%	0.01%	-0.02%	-0.02%	-0.01%	-0.03%
6	Duration Gap (Years)*	0.1	(0.1)	0.9	(0.2)	0.1	-	-	-	-	-
7	Investments										
8	Investment Income	116.3	208.5	59.6	89.5	(47.2)	136.1	107.5	104.3	108.7	109.6
9	(1) Marketable Bond Gain/(Loss)	4.6	14.2	5.5	0.7	(127.0)	(3.9)	(0.2)	(0.1)	(0.1)	(0.1)
10	Investment Income excluding Marketable Bond G/L	111.7	194.3	54.1	88.9	79.8	140.0	107.7	104.4	108.8	109.6
11	Claims										
12	Net Claims Incurred	783.0	892.3	761.5	653.8	838.6	885.5	927.8	970.7	1,016.6	1,071.8
13	(2) Claims Interest Rate Impact	(15.8)	40.9	(8.9)	44.2	(132.8)	(2.5)	4.8	4.5	2.9	6.2
14	Claims Excluding Interest Rate Impact	798.8	851.4	770.4	609.6	971.3	888.1	923.0	966.2	1,013.7	1,065.6
15	Net Interest Rate Impact										
16	(1) Marketable Bond Gain/Loss	4.6	14.2	5.5	0.7	(127.0)	(4.0)	(0.2)	(0.1)	(0.2)	(0.1)
17	(2) Claims Interest Rate Impact	(15.8)	40.9	(8.9)	44.2	(132.8)	(2.5)	4.8	4.5	2.9	6.2
18	Net Impact of Changes in Interest Rates [(1) - (2)]	20.4	(26.7)	14.4	(43.5)	5.8	(1.5)	(4.9)	(4.6)	(3.0)	(6.3)

The net impact of changes in interest rates from 2022/23 to 2026/27 is on average ($4.1 million) per year based on the naïve interest rate forecast. This is in comparison to the prior 2021/22 to 2025/26 average net impact of changes in interest rate of ($11.1 million). The decline of the negative net impact is primarily due to the increasing MUSH yield. As MUSH bonds are reported at their historical book value and book yield, they do not reflect the current high interest rate environment. Therefore, newly purchased MUSH bonds increase the weighted average yield of the MUSH bond portfolio. This impact cannot be hedged. MUSH yield increases from 4.28% at the beginning of the forecast period to 4.37% by the end of the forecast period as older lower yielding MUSH bonds mature. This factor positively impacts the claims discount rate and the present value of the claims liabilities with no offsetting impact from the fixed income portfolio.

INV.16.2.2 Reduction in Basic Interest Rate Risk

Interest rate risk has been significantly reduced by creating a unique asset allocation for Basic claims. To illustrate, for each year from 2022/23 to 2024/25, the GoC 10-year bond rate was increased by 100 bps on the last day of the fiscal year. *Figure INV-42* shows the net impact on the Basic line of business in the 2022 GRA compared to the 2023 GRA.

Forecasted interest rate risk decreased from the 2022 GRA to the 2023 GRA. On average the net impact was $7.0M in the 2022 GRA and -$4.1M in the 2023 GRA (2022/23 to 2024/25).

Figure INV- 42 +100 Bps GoC 10 Year Bond Comparison 2022 GRA to 2021 GRA

Line No.	Description	2022/23	2023/24	2024/25
1	**2022 GRA**			
2	**Marketable Bond G/L**	(157.6)	(166.6)	(176.9)
3	**Claims Interest Rate Impact**	(163.8)	(173.4)	(184.9)
4	**Net Impact**	**6.1**	**6.8**	**8.1**
5	**2023 GRA**			
6	**Marketable Bond G/L**	(160.7)	(158.8)	(164.4)
7	**Claims Interest Rate Impact**	(154.4)	(154.5)	(162.6)
8	**Net Impact**	**(6.3)**	**(4.2)**	**(1.8)**

INV.16.3 Discount Rate Used for the Calculation of the Interest Rate Impact on Claims Incurred

Minimum Filing Request H.6 asked for the following:

"Please provide the discount rate used for the calculation of the interest rate impact on claims incurred, and include the calculations used in the calculation of the discount rate."

The interest rate impact on claims incurred is the difference between net claims incurred using the current discount rate and evaluating the net claims incurred using the discount rate from last year for each fiscal year. The claims discount rate can be found in *Figure INV-3*.

For example, to calculate the interest rate impact on net claims incurred for 2022/23

Interest Rate Impact 2022/23 = (Net Claims Incurred @ 2022/23 Claims Discount Rate) - (Net Claims Incurred @ 2021/22 Claims Discount Rate)

INV.16.4 Historical Fixed Income Duration and Claims Duration

The figure below shows the quarterly fixed income duration and the quarterly claim liability duration communicated to the bond manager each month to maintain a duration matching strategy in compliance with the ALM program. Additionally, March 31, 2022 fixed income and claims liability durations are provided.

Figure INV- 43 Fixed Income Duration and Claims Duration

Line No.	Date	Fixed Income Duration	Claims Duration*	Difference (Fixed Income Duration - Claims Duration)
1	**Feb-20**	10.48	10.68	-0.2
2	**May-20**	10.57	10.35	0.2
3	**Aug-20**	10.41	10.57	-0.2
4	**Nov-20**	10.50	10.58	-0.1
5	**Feb-21**	10.69	10.66	0.0
6	**Mar-21**	10.38	10.35	0.0
7	**Jun-21**	10.42	10.18	0.2
8	**Sep-21**	10.37	10.13	0.2
9	**Dec-21**	10.66	10.17	0.5
10	**Mar-22**	9.58	9.50	0.1
11	* Claims Duration is one month lagged			

INV.17 Investment Policy Statement - Changes

The IPS is reviewed on an annual basis (at a minimum). The policy was last updated in May 2021 (see *Appendix 1 – Investment Policy Statement*).

No changes have been made to the IPS since May 2021. It is expected that changes to the IPS will be made once the 2022 ALM study is finalized and the final asset allocations for each portfolio are approved by the BoD.

INV.18 Investment Income Summary by Portfolio

The investment income and asset allocation for Basic Claims, RSR, and EFB for 2022/23 to 2026/27 is covered in this section.

In the RSR portfolio all asset classes are within the approved minimum and maximum weights, but the corporate operational cash target of $100 million is included in this portfolio, which prevents the fixed income asset classes from reaching their target weights. Private debt is within the minimum weight of 15% throughout the five-year forecast period.

Within the EFB portfolio all asset classes are within the approved minimum and maximum weights. (See *Figure INV-49*).

Figure INV- 44 Basic Claims Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	77,741	79,172	80,557	81,873	83,780
3	Dividend and Other Income During Period	-	-	-	-	-
4	Gains During Period - Profit & Loss	(0)	(0)	(0)	(0)	(0)
5	Investment Fees Paid	(1,430)	(1,457)	(1,492)	(1,505)	(1,512)
6	Amortization/Accretion During Period	(2,701)	(3,092)	(3,286)	(3,416)	(3,350)
7	Pension Expense	-	-	-	-	-
8	**Investment Income**	**73,609**	**74,624**	**75,778**	**76,952**	**78,918**

Figure INV- 45 Basic Claims Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	-	-	-	-	-
2	Provincial Bonds	1,126,634	1,183,000	1,256,866	1,320,489	1,398,330
3	Corporate Bonds	520,912	541,422	567,792	590,814	618,551
4	MUSH	440,475	413,036	386,568	360,135	337,390
5	**Total Assets**	**2,088,022**	**2,137,459**	**2,211,226**	**2,271,438**	**2,354,271**
6	Percentage Allocation					
7	Cash/Short Term Investments	0%	0%	0%	0%	0%
8	Provincial Bonds	54%	55%	57%	58%	59%
9	Corporate Bonds	25%	25%	26%	26%	26%
10	MUSH	21%	19%	17%	16%	14%
11	**Total**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure INV- 46 RSR Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	2,189	2,934	3,822	4,479	3,805
3	Dividend and Other Income During Period	7,371	7,920	7,319	8,174	7,079
4	Gains During Period - Profit & Loss	40,002	10,969	5,907	7,007	6,309
5	Investment Fees Paid	(1,264)	(1,230)	(1,243)	(1,411)	(1,182)
6	Amortization/Accretion During Period	69	72	36	26	7
7	**Investment Income**	**48,366**	**20,665**	**15,841**	**18,275**	**16,018**

Figure INV- 47 RSR Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	97,438	98,508	100,000	100,000	100,000
2	Provincial Bonds	45,518	74,429	79,778	70,667	82,732
3	Corporate Bonds	34,040	37,214	39,889	35,333	41,366
4	MUSH	-	-	-	-	-
5	Private Debt	90,643	74,429	79,778	70,667	82,732
6	**Total Fixed Income**	**267,639**	**284,580**	**299,445**	**276,667**	**306,830**
7	Canadian Equities	40,848	44,657	47,867	42,400	49,639
8	Global Equities	44,252	48,379	51,856	45,933	53,776
9	Global LV Equities	34,040	37,214	39,889	35,333	41,366
10	Real Estate Investments	39,797	42,817	45,337	40,626	46,504
11	Infrastructure & Venture Capital	17,020	18,607	19,945	17,667	20,683
12	**Total Growth Assets**	**175,958**	**191,675**	**204,892**	**181,960**	**211,968**
13	**Total Assets**	**443,597**	**476,254**	**504,337**	**458,626**	**518,797**
14	Percentage Allocation					
15	Cash/Short Term Investments	22.0%	20.7%	19.8%	21.8%	19.3%
16	Provincial Bonds	10.3%	15.6%	15.8%	15.4%	15.9%
17	Corporate Bonds	7.7%	7.8%	7.9%	7.7%	8.0%
18	MUSH	0.0%	0.0%	0.0%	0.0%	0.0%
19	Private Debt	20.4%	15.6%	15.8%	15.4%	15.9%
20	**Total Fixed Income**	**60.3%**	**59.8%**	**59.4%**	**60.3%**	**59.1%**
21	Canadian Equities	9.2%	9.4%	9.5%	9.2%	9.6%
22	Global Equities	10.0%	10.2%	10.3%	10.0%	10.4%
23	Global LV Equities	7.7%	7.8%	7.9%	7.7%	8.0%
24	Real Estate Investments	9.0%	9.0%	9.0%	8.9%	9.0%
25	Infrastructure & Venture Capital	3.8%	3.9%	4.0%	3.9%	4.0%
26	**Total Growth Assets**	**39.7%**	**40.2%**	**40.6%**	**39.7%**	**40.9%**
27	**Total**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figure INV- 48 Employee Future Benefits Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	4,027	4,298	4,525	4,730	4,926
3	Dividend and Other Income During Period	9,648	10,204	10,796	11,469	12,124
4	Gains During Period - Profit & Loss	22,527	19,666	19,893	20,205	21,067
5	Investment Fees Paid	(2,218)	(2,354)	(2,463)	(2,580)	(2,722)
6	Amortization/Accretion During Period	(88)	(85)	(81)	(78)	(74)
7	Pension Expense	(15,020)	(15,386)	(15,758)	(15,758)	(15,758)
8	**Investment Income**	**18,876**	**16,343**	**16,912**	**17,988**	**19,564**

Figure INV- 49 Employee Future Benefit Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	-	-	-	-	-
2	Provincial Bonds	-	-	-	-	-
3	Corporate Bonds	93,433	96,364	99,304	102,394	105,617
4	MUSH	-	-	-	-	-
5	Private Debt	85,676	89,482	93,457	97,608	101,944
6	**Total Fixed Income**	**179,109**	**185,846**	**192,761**	**200,002**	**207,561**
7	Canadian Equities	73,115	77,999	83,210	88,768	94,697
8	Global Equities	113,452	121,019	129,092	137,704	146,890
9	Global LV Equities	42,255	44,816	47,532	50,414	53,469
10	Real Estate Investments	100,199	106,712	113,755	120,580	127,815
11	Infrastructure & Venture Capital	64,592	68,468	72,083	76,120	80,382
12	**Total Growth Assets**	**393,613**	**419,013**	**445,671**	**473,584**	**503,254**
13	**Total Assets**	**572,722**	**604,859**	**638,432**	**673,587**	**710,815**
14	Percentage Allocation					
15	Cash/Short Term Investments	0.0%	0.0%	0.0%	0.0%	0.0%
16	Provincial Bonds	0.0%	0.0%	0.0%	0.0%	0.0%
17	Corporate Bonds	16.3%	15.9%	15.6%	15.2%	14.9%
18	MUSH	0.0%	0.0%	0.0%	0.0%	0.0%
19	Private Debt	15.0%	14.8%	14.6%	14.5%	14.3%
20	**Total Fixed Income**	**31.3%**	**30.7%**	**30.2%**	**29.7%**	**29.2%**
21	Canadian Equities	12.8%	12.9%	13.0%	13.2%	13.3%
22	Global Equities	19.8%	20.0%	20.2%	20.4%	20.7%
23	Global LV Equities	7.4%	7.4%	7.4%	7.5%	7.5%
24	Real Estate Investments	17.5%	17.6%	17.8%	17.9%	18.0%
25	Infrastructure & Venture Capital	11.3%	11.3%	11.3%	11.3%	11.3%
26	**Total Growth Assets**	**68.7%**	**69.3%**	**69.8%**	**70.3%**	**70.8%**
27	**Total**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

INVESTMENTS

2023 GENERAL RATE APPLICATION

July 12, 2022

MANITOBA
PUBLIC INSURANCE

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Attachment E: Mercer Report Review of MPIs Returns vs Peers

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INV.1 Executive Summary

With over $3.5 billion in investment assets, the Investment Income forecast is a major component of the financial forecast of Manitoba Public Insurance (MPI). At the 2021/22 fiscal year-end (FYE), the investment loss allocated to the universal compulsory automobile insurance line of business (Basic) was $47.2 million. In 2022/23, investment income is forecasted to be $136.1 million. This chapter explains how MPI forecasts the investment income of Basic for FYEs 2022/23 to 2026/27.

INV.1.1 Current Year Investment Themes - Summary

Economic Recovery from Pandemic and Increasing Inflation

Similar to 2020, throughout 2021, the COVID-19 pandemic continued to play a major role in the economy. In the spring of 2021, the COVID-19 vaccine became widely available to most Canadians and the combination of high uptake (over 80% of eligible Canadians were vaccinated by September) and the efficacy of the vaccines resulted in a loosening restrictions in spring and summer of 2021. Markets responded with the S&P/TSX index increasing 11.2% (29.0% annualized) in the five-month span from March 31, 2021 to August 31, 2021.

Increases in cases caused by the highly contagious Delta variant negatively impacted equity markets in September 2021 (the S&P/TSX declined by 2.2%), but the concern was short lived, and the markets rallied in October (5% gain by the S&P/TSX) and continued the upward trend throughout the rest of 2021.

In January of 2022, the Omicron-variant wave led to further lockdowns and restrictions worldwide, including in some Canadian provinces. While this had a negative impact on the markets (-0.13% S&P/ TSX return total for January and February), more importantly, it caused worldwide supply shortages. The Russian invasion of Ukraine put further stress on the supply chains and propelled the

Consumer Price Index (CPI) to a reading of 6.7%, the highest year-over-year (YoY) increase in 30 years.

Within Basic Claims, corporate bonds returned -5.1% while provincial bonds returned -5.6%, mid-duration private debt fund within the Rate Stabilization Reserve (RSR) returned 2.5% while long-duration private debt fund within the Employee Future Benefits (EFB) portfolio returned -5.3%. In 2021/22, the MPI Canadian equity portfolio returned 26.3%, the global equity portfolio returned 8.7%, the infrastructure portfolio grew by 3.4%, while the pooled real estate fund returned 16.8%.

Asset Liability Management Study & Strategy

MPI is close to completing its asset-liability management (ALM) study and filed the reports received from Mercer in accordance with PUB Directive 11.19 from the 2022 General Rate Application (GRA). As Mercer completed its analysis; the next step is for MPI to select the asset mix for each portfolio.

MPI will adopt International Financial Reporting Standards (IFRS) 9 and 17 MPI on April 1, 2023 with a comparative year for IFRS 17 starting on April 1, 2022. MPI asked Mercer to comment on the impacts of implementing IFRS 9 and 17 on its investment strategy in the next ALM study. This issue was addressed in Section 2 of its Phase One Report.

MPI anticipates that there will be no impact to the Basic claims investment portfolio from adopting IFRS 9, other than the fact that MUSH bonds will be reported at market value. Currently the Claims Discount Rate (CDR) is based upon the yield of the underlying assets; under IFRS 17 the CDR will be based on characteristics of the liabilities. As a result of adopting IFRS 17 a market-based yield curve will be used for discounting claims liability cash flows rather than a single discount rate (see INV.2.4).

MPI implemented its then new ALM strategy in June 2021 with the assistance of Addenda Capital in order to better protect MPI from both parallel and non-parallel changes in interest rates. The strategy is a hybrid methodology comprised of cash flow matching and moment matching to manage the interest rate risk associated with the Basic Claims liabilities.

The strategy is working well, with a year-to-date net impact of interest rates of $4.2 million on a corporate-basis ($8.2 million for Basic Claims) at March 31, 2022.

Interest Rate Forecasting

The Board of Directors (BoD) and Management of MPI continue to believe that a naïve interest rate forecast is the best estimate of future interest rates. The forecast for each category of fixed income assets uses the yield on the Government of Canada (GoC) 10-year bond as the base, to which a "spread" is added in order to arrive at the absolute yield for the fixed income asset. The naïve forecast holds the GoC 10-year bond yield as of March 31, 2022 constant for the entire five-year forecast. The actual yield on the GoC 10-year bond on March 31, 2022 was 2.41%; this rate forms the basis for all interest rate forecasts in this application. All fixed income asset types are also assumed to maintain a constant "spread" above the yield of the GoC 10-year bond.

IFRS 17 Discount Rate Methodology

MPI elected use of the Top-Down approach rather than the Bottom-Up approach. For additional information please see our IFRS position papers included as *Appendices to the Pro Forma Section* of the GRA filing.

MPI outsourced to Addenda Capital the development of the discount curves to be used with its adoption of IFRS 17. For over 15 years Addenda generated yield curves for their own use.

INV.1.2 Investment Income Forecast - Summary

MPI forecasts ten asset classes in the financial model. These asset classes include: cash, provincial bonds, corporate bonds, MUSH bonds, Canadian equities, global equities, low volatility global equities, real estate (Cityplace and a pooled fund), infrastructure, and private debt. The forecast also includes the impact of investment fees and pension expenses. This document details the accounting treatment, capital and income return, turnover, and funding assumptions under each asset class. Finally, this document provides a comparison of the investment income forecast of the present year (2023 GRA) to the prior year (2022 GRA). The tables below show figures for the Basic line of business, which includes 100% of the Basic Claims investment portfolio, 100% of the RSR investment portfolio and the allocation assigned to Basic of the EFB investment portfolio (based on the payroll ratio of 74.8% in 2021/22 and over the forecast period).

- **Figure INV-1** provides an investment income summary for the Basic line of business over a 10-year period (four years historical, current projected year-end and five years forecasted). See section *INV.18* for a summary of investment income and asset allocation for the Basic Claims, RSR, and EFB portfolios over the five-year forecast period.
- **Figure INV-2** provides the asset values and percentage of the total combined Basic line of business portfolio for each asset class over the same 10-year period.
- **Figure INV-3** shows the naïve interest rate forecast for the present year based on the GoC 10-year bond rate as of March 31, 2022, compared to the naïve interest rate forecast used in the 2022 GRA.
- **Figure INV-4** provides a summary of the major assumptions used in the 2022 and 2023 GRAs, and the corresponding section in this document where the current assumptions are supported.

Figure INV- 1 Summary of Basic Line of Business Investment Income

Asset Class	Reference Section #	2017/18 Actual	2018/19 Actual	*2019/20 Actual	2020/21 Actual	2021/22 Actual	2022/23 Budget	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
(C$000s, except where noted)											
Interest Income During Period											
Cash/Short Term Investments	INV.3	565	2,192	3,641	454	93	664	586	593	599	599
Provincial Bonds	INV.4	34,147	32,514	80,710	84,694	81,430	38,169	39,967	42,124	43,818	45,230
Corporate Bonds	INV.4	-	3,702	-	-	-	24,780	26,514	27,863	29,269	30,300
MUSH	INV.5	25,349	24,950	-	-	-	19,328	18,254	17,184	16,205	15,142
Private Debt	INV.9	-	-	1,254	2,998	4,800	6,619	7,522	6,812	7,220	6,888
Total		**60,060**	**63,358**	**85,604**	**88,146**	**86,323**	**89,561**	**92,843**	**94,576**	**97,111**	**98,159**
Dividend and other Income											
Canadian Equities	INV.6	7,774	8,781	3,097	3,080	5,258	2,678	2,737	2,881	3,215	3,090
US/Global Equities	INV.7	2,619	2,996	797	1,019	3,578	2,263	2,622	2,933	3,244	3,185
Global Low Volatility	INV.7	-	-	2,182	-	-	1,169	1,312	1,464	1,645	1,539
Investment Properties (CityPlace)	INV.8	2,972	3,094	1,390	(765)	148	350	359	367	374	382
Infrastructure	INV.9	1,731	11,533	2,620	1,621	1,961	1,510	1,002	940	1,056	1,066
Total		**15,096**	**26,404**	**10,086**	**4,955**	**10,945**	**7,970**	**8,033**	**8,584**	**9,534**	**9,262**
Gains During Period - Profit & Loss											
Marketable Bonds Unrealized Gains/(Loss)	INV.4	8,079	8,718	(16,827)	(10,645)	(123,025)	6,325	133	144	149	146
Marketable Bonds Realized Gains/(Loss)	INV.4	(3,490)	5,459	22,346	11,296	(3,975)	(10,254)	(304)	(285)	(299)	(211)
Canadian Equities Realized Gains	INV.6	20,060	48,239	(39,207)	1,028	5,943	25,784	6,942	3,648	4,127	3,621
US/Global Equities Realized Gains	INV.7	4,928	56,550	572	1,561	4,807	9,824	6,577	3,746	4,629	4,294
Global Low Volatility	INV.7	-	-	3,652	6,452	1,571	8,320	2,675	2,124	2,636	2,509
Real Estate	INV.8	25,058	17,443	6,516	(878)	15,342	10,987	7,085	7,725	7,499	7,532
Infrastructure	INV.9	5,376	1,635	7,679	1,945	111	5,869	3,921	3,687	4,137	4,178
Total		**60,011**	**138,046**	**(15,269)**	**10,756**	**(99,226)**	**56,854**	**27,029**	**20,789**	**22,879**	**22,070**
Other											
Investment Fees Paid	INV.10	(3,641)	(3,576)	(4,038)	(4,111)	(4,802)	(4,353)	(4,448)	(4,578)	(4,846)	(4,730)
Amortization of Bond Premium/Discount	INV.10	(3,069)	(3,553)	(6,083)	(8,994)	(6,962)	(2,698)	(3,083)	(3,311)	(3,448)	(3,399)
Pension Expense	INV.10	(11,619)	(12,170)	(10,686)	(11,249)	(11,439)	(11,237)	(11,511)	(11,789)	(11,789)	(11,789)
Venture Capital Income	INV.10	412	-	-	-	-	-	-	-	-	-
Investment Write-Down		(930)	-	-	10,022	(22,023)	-	-	-	-	-
Total		**(18,847)**	**(19,298)**	**(20,807)**	**(14,329)**	**(45,226)**	**(18,288)**	**(19,042)**	**(19,678)**	**(20,083)**	**(19,918)**
Total Basic LOB Investment Income		**116,320**	**208,510**	**59,614**	**89,528**	**(47,184)**	**136,097**	**108,862**	**104,271**	**109,441**	**109,572**

*Includes pro-rata securitiy write-downs.

Figure INV- 2 Investment Portfolio Asset Values for the Basic Line of Business

Line No.	Reference Section #	2017/18 Actual*	2018/19 Actual*	2019/20 Actual*	2020/21 Actual	2021/22 Actual**	2022/23 Budget	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
1	*Ending Asset Values (C$ 000,000's)*										
2	Cash/Short Term Investments	76	166	187	139	153	97	99	100	100	100
3	Provincial Bonds	984	1,111	1,199	1,230	1,036	1,172	1,257	1,337	1,391	1,481
4	Corporate Bonds	99	99	478	617	576	625	651	682	703	739
5	MUSH	527	491	520	494	468	440	413	387	360	337
6	Private Debt	0	0	79	115	137	155	141	150	144	159
7	Canadian Equities	226	267	56	110	118	96	103	110	109	120
8	US/Global Equities	124	133	107	146	139	129	139	148	149	164
9	Global LV Equities	0	0	54	82	78	66	71	75	73	81
10	Real Estate Investments	259	286	97	86	129	115	123	130	131	142
11	Infrastructure & Venture Capital	87	96	77	73	74	65	70	74	75	81
12	**Total Assets**	**2,381**	**2,649**	**2,853**	**3,092**	**2,909**	**2,960**	**3,066**	**3,193**	**3,234**	**3,405**
13	Ending Rebalanced Allocations (%)										
14	Cash/Short Term Investments	3.2%	6.3%	6.5%	4.5%	5.3%	3.3%	3.2%	3.1%	3.1%	2.9%
15	Provincial Bonds	41.3%	42.0%	42.0%	39.7%	35.6%	39.6%	41.0%	41.9%	43.0%	43.5%
16	Corporate Bonds	4.2%	3.7%	16.7%	19.9%	19.8%	21.1%	21.2%	21.4%	21.7%	21.7%
17	MUSH	22.1%	18.5%	18.2%	16.0%	16.1%	14.9%	13.5%	12.1%	11.1%	9.9%
18	Private Debt	0.0%	0.0%	2.8%	3.7%	4.7%	5.2%	4.6%	4.7%	4.4%	4.7%
19	Canadian Equities	9.5%	10.1%	2.0%	3.6%	4.1%	3.2%	3.4%	3.4%	3.4%	3.5%
20	US/Global Equities	5.2%	5.0%	3.7%	4.7%	4.8%	4.4%	4.5%	4.6%	4.6%	4.8%
21	Global LV Equities	0.0%	0.0%	1.9%	2.7%	2.7%	2.2%	2.3%	2.4%	2.3%	2.4%
22	Real Estate Investments	10.9%	10.8%	3.4%	2.8%	4.4%	3.9%	4.0%	4.1%	4.0%	4.2%
23	Infrastructure & Venture Capital	3.6%	3.6%	2.7%	2.4%	2.5%	2.2%	2.3%	2.3%	2.3%	2.4%
24	**Total Assets**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

25 * Actual (2014/15 - 2018/19) based on long-term basic line of business allocation applied to the entire portfolio
26 * 2019/20 and thereafter basic line of business has a segregated allocation and based on Basic Claims, RSR and pro-rata EFB asset values.
27 ** Investment balances reflect March 31, 2022 actuals.

Figure INV- 3 Interest Rate Forecast

Line No.	Calendar Year/ *Quarter*	Fiscal Year/ Quarter	91-Day T.Bill Rate 2023 GRA	GoC 10 Yr Rate 2023 GRA	Mrk. Bond Yield 2023 GRA	MUSH Yield 2023 GRA	Claims Discount Rate 2023 GRA	91-Day T.Bill Rate 2022 GRA	GoC 10 Yr Rate 2022 GRA	Mrk. Bond Yield 2022 GRA	MUSH Yield 2022 GRA	Claims Discount Rate 2022 GRA	91-Day T.Bill Rate Difference	GoC 10 Yr Rate Difference	Mrk. Bond Yield Difference	MUSH Yield Difference	Claims Discount Rate Difference
1	**22:01**	**2022/23 Q1**	0.60%	2.41%	2.70%	4.28%	3.51%	0.09%	1.56%	2.46%	4.32%	2.81%	0.51%	0.85%	0.24%	-0.04%	0.71%
2	**22:02**	**2022/23 Q2**	0.60%	2.41%	2.70%	4.28%	3.56%	0.09%	1.56%	2.46%	4.31%	2.80%	0.51%	0.85%	0.24%	-0.02%	0.76%
3	**22:03**	**2022/23 Q3**	0.60%	2.41%	2.70%	4.28%	3.55%	0.09%	1.56%	2.46%	4.30%	2.79%	0.51%	0.85%	0.24%	-0.01%	0.77%
4	**22:04**	**2022/23 Q4**	0.60%	2.41%	2.70%	4.28%	3.55%	0.09%	1.56%	2.46%	4.28%	2.78%	0.51%	0.85%	0.24%	0.00%	0.78%
5	**23:01**	**2023/24 Q1**	0.60%	2.41%	2.70%	4.28%	3.54%	0.09%	1.56%	2.46%	4.27%	2.76%	0.51%	0.85%	0.24%	0.01%	0.78%
6	**23:02**	**2023/24 Q2**	0.60%	2.41%	2.70%	4.28%	3.54%	0.09%	1.56%	2.46%	4.26%	2.75%	0.51%	0.85%	0.24%	0.03%	0.79%
7	**23:03**	**2023/24 Q3**	0.60%	2.41%	2.70%	4.28%	3.53%	0.09%	1.56%	2.46%	4.24%	2.74%	0.51%	0.85%	0.24%	0.04%	0.79%
8	**23:04**	**2023/24 Q4**	0.60%	2.41%	2.70%	4.28%	3.53%	0.09%	1.56%	2.46%	4.23%	2.73%	0.51%	0.85%	0.24%	0.05%	0.80%
9	**24:01**	**2024/25 Q1**	0.60%	2.41%	2.70%	4.29%	3.52%	0.09%	1.56%	2.46%	4.22%	2.72%	0.51%	0.85%	0.24%	0.08%	0.80%
10	**24:02**	**2024/25 Q2**	0.60%	2.41%	2.70%	4.30%	3.52%	0.09%	1.56%	2.46%	4.20%	2.71%	0.51%	0.85%	0.24%	0.10%	0.81%
11	**24:03**	**2024/25 Q3**	0.60%	2.41%	2.70%	4.31%	3.51%	0.09%	1.56%	2.46%	4.19%	2.70%	0.51%	0.85%	0.24%	0.12%	0.81%
12	**24:04**	**2024/25 Q4**	0.60%	2.41%	2.70%	4.32%	3.51%	0.09%	1.56%	2.46%	4.17%	2.69%	0.51%	0.85%	0.24%	0.14%	0.82%
13	**25:01**	**2025/26 Q1**	0.60%	2.41%	2.70%	4.30%	3.50%	0.09%	1.56%	2.46%	4.16%	2.68%	0.51%	0.85%	0.24%	0.14%	0.82%
14	**25:02**	**2025/26 Q2**	0.60%	2.41%	2.70%	4.28%	3.50%	0.09%	1.56%	2.46%	4.15%	2.67%	0.51%	0.85%	0.24%	0.14%	0.83%
15	**25:03**	**2025/26 Q3**	0.60%	2.41%	2.70%	4.27%	3.50%	0.09%	1.56%	2.46%	4.13%	2.66%	0.51%	0.85%	0.24%	0.13%	0.84%
16	**25:04**	**2025/26 Q4**	0.60%	2.41%	2.70%	4.25%	3.50%	0.09%	1.56%	2.46%	4.12%	2.65%	0.51%	0.85%	0.24%	0.13%	0.85%
17	* 2023 GRA is based on the March 2022 Naïve Interest Rate Forecast																

Figure INV- 4 Major Asset Class Summary

Line No.		2022 GRA	2023 GRA
1	**Provincial Bonds**		
2	**Turnover**	20%	20%
3	**Marketable Bonds**	Dynamic Table	Dynamic Table
4	**Overall Duration Gap**	0.0 years	0.0 years
5	**Corporate Bonds**		
6	**Turnover**	46% Basic Claims, 49% RSR, 22% EFB	37% Basic Claims, 65% RSR, 38% EFB
7	**Marketable Bonds**	Dynamic Table	Dynamic Table
8	**Overall Duration Gap**	0.0 years	0.0 years
9	**MUSH**		
10	**MUSH Spread on New Purchases**	Quarterly MUSH purchases forecasted	Quarterly MUSH purchases forecasted
11	**New MUSH Purchases**	$10M Quarterly ($40M Annually)	$5M Quarterly ($20M Annually)
12	**Private Debt**		
13	**Private Debt Spread**	0.85% Long Duration & 1.10% Mid Duration	0.99% Long Duration & 1.35% Mid Duration
14	**Private Debt Purchases**	Initial funding complete, Additional funding continues in 2021/22	Fully funded
15	**Canadian Equities**		
16	**Total Return**	6.6%	6.6%
17	**Dividend Yield**	2.8% 2021/22, 3.0% 2022/23, 2.8% 2023/24 and thereafter	2.9% 2022/23, 2.9% 2023/24, 2.9% 2024/25 and thereafter
18	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
19	**Turnover Ratio (Annual)**	15% for 2021/22 and thereafter	13% for 2022/23 and thereafter
20	**Global Equities**		
21	**Total Return**	6.6%	6.6%
22	**Dividend Yield**	1.9% 2021/22, 2.0% 2022/23 and 2.2% thereafter	2.1% 2022/23, 2.2% 2023/24 and 2.2% thereafter
23	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
24	**Turnover Ratio (Annual)**	14% for 2021/22 and thereafter	12% for 2022/23 and thereafter
25	**Global Low Volatility Equities**		
26	**Total Return**	6.0%	6.0%
27	**Dividend Yield**	1.9% 2021/22, 2.0% 2022/23 and 2.2% thereafter	2.1% 2022/23, 2.2% 2023/24 and 2.2% thereafter
28	**Capital Return**	Total Return - Dividend Yield = Capital Return	Total Return - Dividend Yield = Capital Return
29	**Turnover Ratio (Annual)**	50% for 2021/22 and thereafter	50% for 2022/23 and thereafter
30	**Real Estate Pooled Fund**		
31	**Return**	CPI + 4%: 5.9% in 2021/22, 6.0% in 2022/23,	CPI + 4%: 7.8% in 2022/23, 6.3% in 2024/25,
32	**Funding**	5.9% in 2023/24 and 6.0% thereafter	and 6.0% thereafter
33		$0 funding over the five year forecast	$0 funding over the five year forecast
34	**Investment Properties (Cityplace)**		
35	**Investment Property Income**	Based on manager's projections	Based on manager's projections
36	**Infrastructure**		
37	**Return**	CPI + 5%: 6.9% in 2021/22, 7.0% in 2022/23,	CPI + 5%: 8.8% in 2022/23, 7.3% in 2023/24,
38	**Funding**	6.9% in 2023/24 and 7.0% thereafter	and 7.0% thereafter

INV.2 Current Year Investment Themes

This section summarizes the investment themes of the current year, which include:

1. Economic Recovery from Pandemic and Increasing Inflation;
2. ALM:
   a) Update on ALM Study;
   b) Update on Current ALM Strategy

INV.2.1 Economic Recovery from Pandemic and Increasing Inflation

As in 2020, the COVID-19 Pandemic continued to play a big role in the economy throughout 2021. Spring of 2021 is when the COVID-19 vaccine became widely available to most Canadians and the combination of high uptake (over 80% of eligible Canadians were vaccinated by September) and the vaccines effectiveness led to loosening restrictions in spring and summer of 2021. The markets responded with the S&P/TSX index increasing 11.2% (29.0% annualized) in the five-month span from March 31, 2021 to August 31, 2021.

Increases in cases caused by the highly contagious Delta variant negatively impacted equity markets in September (the S&P/TSX declined by 2.2%) but the concern was short lived, and the markets rallied in October (5% gain by the S&P/TSX) and continued the upward trend throughout the rest of the calendar year.

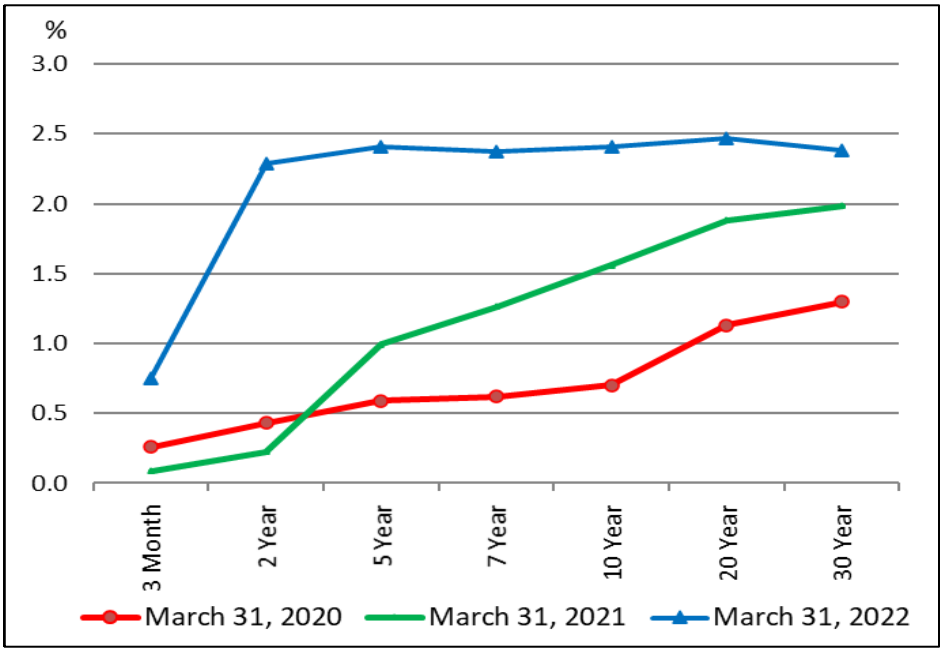
In January of 2022 the Omicron wave led to further lockdowns and restrictions worldwide, including in some Canadian provinces. While this had a negative impact on the markets (-0.13% S&P/ TSX return total for January and February), more importantly, it caused worldwide supply shortages. The Russian invasion of Ukraine put further stress on supply chains and propelled Canadian CPI to the highest YoY reading (6.7%) in 30 years.

As per the chart below, government bond yields declined until mid Aug 2021, with the GoC 10-year bond reaching 1.14% on August 20, 2021 and then rose throughout the year, peaking at 2.55% on March 25, 2022. The yield started the fiscal year at 1.56% and ended at 2.41% on March 31, 2022. As a result of rising bond yields, Provincial bonds within the Basic Claims portfolio declined by 5.6% to March 31, 2022. Since peaking on March 18, the yield on the GoC 10-year bond has remained in a range of 2.40% to 3.1%.

Figure INV- 5 10 Year Government Bond Yields

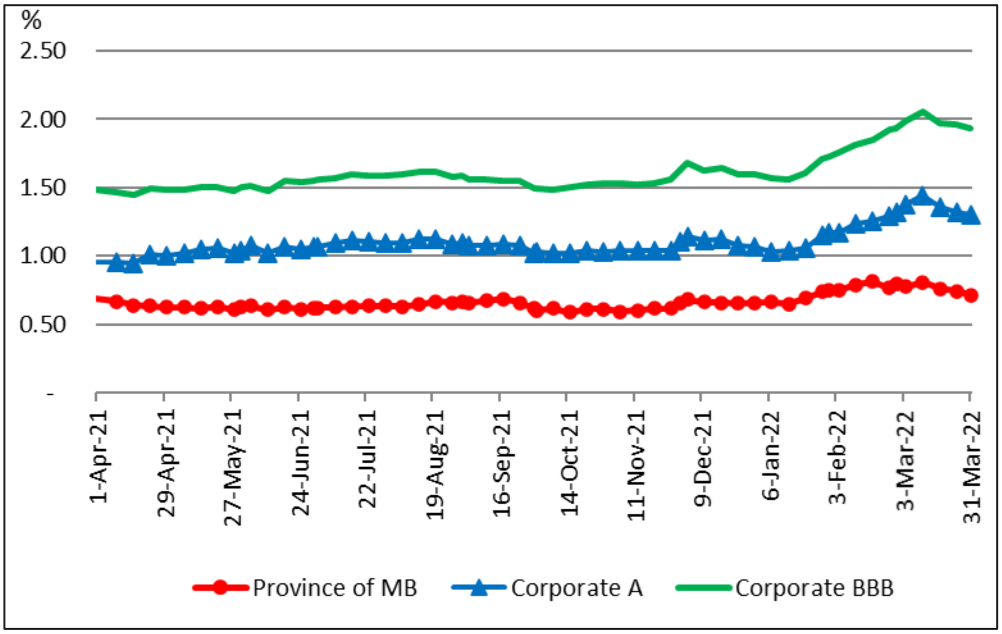
As shown below, the yield curve for government bonds steepened in the short-end of the curve and flattened in the long-end as two year yields increased by 2.06% while three-month yields increased by only 0.66%. The long term 30-year yields increased by only 0.40% from March 2021.

Figure INV- 6 Canadian Government Yield Curve



As shown below, corporate bond spreads increased by about 50 basis points during the year. The spread was steady most of the year, but high inflation and central bank rate hikes increased the spread in March 2022.

Figure INV- 7 Spread Over GoC 10 Year Bond Yield



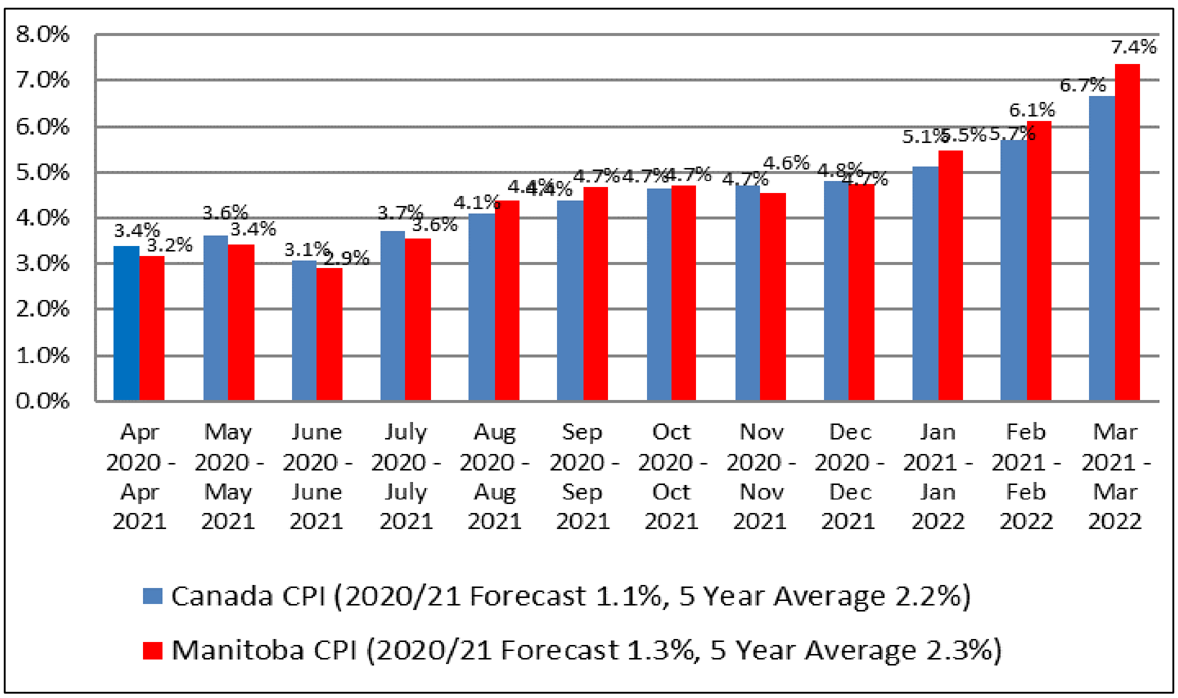
Canadian average annual CPI increased from 2.2% at March 31, 2021 to 6.7% at March 31, 2022 (as shown in the chart below). March 2021 was the last month where inflation was close to the long-term target of the Bank of Canada of 2.0%. Inflation jumped sharply in April 2021 (from 2.2% to 3.4%) followed by gradual increases for most of the 2021 calendar year (ending at 4.8%). The initial jump in April 2021 was caused by base-year effects resulting from a steep decline in prices in April 2020 (caused by COVID-19 lockdowns worldwide). The increases for the remainder of the 2021 calendar year were largely due to unfavorable weather conditions during the growing season and supply chain disruptions that put upward pressure on prices. Supply chain disruptions also led to higher prices for durable goods, including passenger vehicles and household appliances, while higher construction costs and the increased frequency and severity of weather events contributed to rising home and mortgage insurance costs.

Inflation continued to rise in early 2022 with big jumps in February (1.0% m/m) and March (1.4% m/m), in part due to the unexpected conflict in Ukraine, which resulted in substantial supply constraints and had an impact on energy, commodity and agricultural markets. Part of the increase was also as a result of sustained price pressure in the Canadian housing market.

Since March 2021 inflation has continued to increase (6.8% In April 2022) and is expected to climb over 7% in May. Part of the expected May increase is due to Statistics Canada updating the basket weights for CPI and introducing used vehicles into the CPI calculation. Additionally, big jumps in energy prices will also contribute to the increase.

One area that may pull down CPI for the next year is housing. The combination of historically low interest rates and a lessening house supply led to surging real estate prices across Canada in 2021, especially in the largest markets like Toronto and Vancouver. By the end of 2021 the Canadian MLS home price index was up a record 26.6%, or nearly $170,000 YoY. Rising interest rates have started to lead to falling home prices (especially in the GTA and Vancouver markets) which may continue to decline up to 10%.

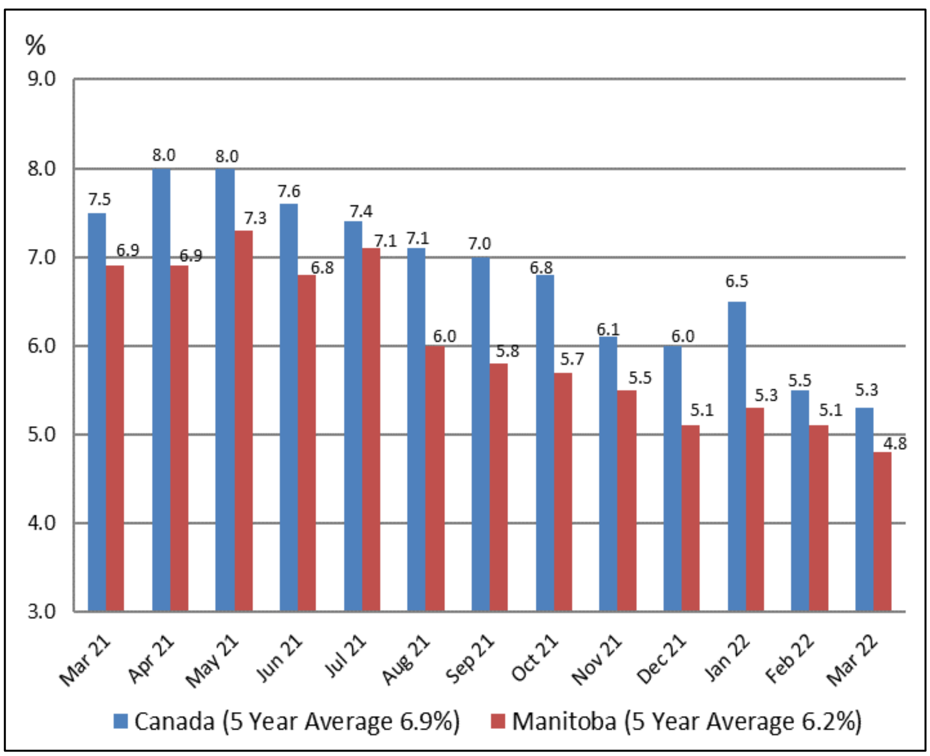
Figure INV- 8 Consumer Price Index



The Russian invasion of Ukraine has had a drastic impact on commodity prices, most notably oil. West Texas intermediate (WTI) futures reached a high of $123.70 USD in early March after ending 2021 at $75.21 USD (a 64% increase). Russia is the second largest oil producer in the world and accounts for roughly 10% of the global market. Since the start of the war sanctions imposed on Russia by other major economies have reduced Russian oil sales and as a result reduced global supplies, leading to price increases.

The Canadian unemployment rate fell from a peak of 8.0% in April 2021 to 5.3% in March 2022, which is 1.7% below the five-year average, as businesses fully reopened and fiscal and monetary stimulus encouraged spending. Employment returned to pre-pandemic level in September 2021. The unemployment rate in March 2022 (5.3%) was the lowest on record since comparable data became available in 1976.

Figure INV- 9 Unemployment Rate



Impact on Fixed Income Portfolio

In 2022/23 all bond yields increased. The table below depicts the yield of corporate bonds rated “A” and “BBB” as well as the yield Provincial and Federal bonds.

Figure INV- 10 Bond Yield Changes

Line No.	Bond Type	Yield at 3/31/2021	Yield at 3/31/2022	Change
1	**Corporate BBB**	2.59%	4.07%	1.48%
2	**Corporate A**	2.13%	3.62%	1.49%
3	**Provincial**	2.06%	3.05%	0.99%
4	**GCAN 10 year**	1.56%	2.41%	0.85%
5	Source: FTSE Russell – Debt Market Indices Report & Bloomberg			

As shown in *Figure INV-10* above, from March 31, 2021 to March 31, 2022 corporate bond yields increase by 148 bps for BBB rated bonds and by 149 bps for A rated bonds. In addition, the yield on the GoC 10-year bond increased by 85 bps.

The yield on the Basic Claims corporate bond portfolio increased by 109 bps over the year, resulting in a return of -5.1%. Over the same period the yield on the Basic Claims Provincial bond portfolio increased by 94 bps, resulting in a return of -5.6%. Over the 12 months ended at March 31, 2022 the yield on the mid-duration private debt fund within the RSR portfolio increased by 108 bps, while the yield on the long-duration private debt fund within the EFB portfolio increased by 55 bps, producing returns of -2.5% and -5.3%, respectively. Since bond prices move inversely with interest rates, rising interest rates produce capital losses on bond investments.

Impact on Equity Portfolio

Equity markets continued to have strong performance, especially in Canada, in early 2021 as the availability and the effectiveness of the vaccine allowed for loosening of restrictions in most of the developed nations across the world, including Canada. The S&P/TSX index had only two months in the year with negative returns (September and January) and both coincided with increased concerns over COVID-19 cases due to new highly contagious variants (Delta and Omicron). Global markets, particularly in the

United States, saw a sharp drop in the first quarter of 2022 as the fast-rising inflation, and breakout of war in Ukraine led to a sell off. The MSCI world index was up 17.4% from March 31, 2021 - December 31, 2021, then declined -7.4% in the first two months of 2022. In 2021/22, the MPI Canadian equity portfolio returned 26.3% and its global equity portfolio returned 8.7%. Both portfolios outperformed their benchmarks (7.9% for Canadian equity and 1.2% for Global equity).

Over the 12 months ended at March 31, 2022, the MPI infrastructure portfolio increased by 3.4% while the pooled real estate fund returned 16.8% over the same period.

Impact on Forecasts

The forecast of bond yields is based upon two components: the GOC 10-year bond yield and spreads. The forecast of the GOC 10-year bond yield is based upon the actual yield at March 31, 2022, which was 85 bps higher than the yield at March 31, 2021 (2.41% vs. 1.56%). The forecasted spreads for marketable bonds are based upon actual spreads at March 31, 2022 which are 79 bps higher than the spreads in the 2022 GRA (172 bps vs. 93 bps). *See Figure INV-3* for details. Income generated by the fixed income portfolio is based upon the actual weighted average coupon rate of the portfolio at March 31, 2022 and is only impacted by changes in market yields to the extent that there is turnover within the portfolio and bonds are purchased at current yields.

INV.2.2 Asset-Liability Management

Update on ALM Study

MPI issued a request for proposals (RFP) for a consultant to assist with completing an asset-liability management study on November 17, 2021 (see *Attachment A for the RFP*); responses were received on December 7. After reviewing the responses Mercer was selected and work began on the study in late December.

MPI sent detailed data to Mercer regarding its claims liabilities and current investment portfolio, sensitivity of Basic/Special Risk Extension (SRE)/Extension/EFB liabilities to changes in interest rates & inflation, Investment Policy Statement, Asset-Liability Management policy, returns for MPI & other institutional investors and information related to its pension plan (from December 21 to January 20).

Phase One - Mercer report covered the following topics: (*Attachment B*)

- IFRS 9 & 17 – Impact on Investment Strategy
- Merits of Adding New Fixed Income Asset Classes
- Merits of Adding Non-Fixed Income Asset Classes for Long Tail Basic Liabilities
- Interest Rate Risk Management Policy – Review
- Capital Markets Assumptions
- MPI Forecasting Methodology

Phase Two – Mercer completed the following reports: (Attachment C- H)

- Phase Two Report
- New Asset Classes for Consideration
- Comparison of MPI returns vs. Other Institutional Investors
- Discussion Paper on Levered Bonds, Real Return Bonds & Mortgages
- Asset Mix Optimization: Efficient Frontier Analysis for Basic Insurance Component
- Asset Mix Optimization: Efficient Frontier Analysis for RSR, EXT, SRE and EFB Portfolios

New asset classes being considered for the Basic Claims portfolio include:

- Real Return Bonds
- Commercial Mortgages
- Real Estate
- 3x Levered Long Provincial Bonds
- 3x Levered Real return Bonds
- Canadian & Global Equities

MPI is currently reviewing the optimizations for the basic & non-basic portfolios and considering the merits of the recommended asset classes and evaluating the various asset mixes. We are currently gathering information regarding levered bond strategies as we view the inclusion or exclusion of leverage as a key decision. No decisions have been made at this point.

Update on Current ALM Strategy

A new AL strategy was implemented in June 2021 with the assistance of Addenda Capital in order to better protect MPI from both parallel and non-parallel changes in interest rates. The new strategy is a hybrid methodology comprised of cash flow matching and moment matching to manage the interest rate risk associated with the Basic Claims liabilities. A portion of the Basic Claims liabilities have been carved out by Addenda to match the cash flows from the MUSH bond portfolio; a duration-based comparison is used to monitor this portion of the strategy. The remaining liabilities are matched to the marketable bond portfolio through a moment matching approach.

Addenda Capital is responsible for ensuring that the duration of the MUSH bond portfolio matches the duration of the associated claims liabilities on a daily basis. Addenda also monitors the first and second moments (similar in concept to duration and convexity) of the Provincial bonds and corporate bonds and will adjust the first and second moments of the completion portfolio as required in order to ensure that the total marketable bond portfolio has a similar sensitivity to interest rate changes as the Basic claims liabilities.

The strategy is working well, with a year-to-date net impact of interest rates of $4.2 million on a corporate basis ($8.2 million for Basic Claims) at March 31, 2022.

The asset allocation targets remain unchanged.

Figure INV- 11 Asset Allocation Targets

Line No.	Target Weights	Basic Claims	RSR	Employee Future Benefits
1	**Fixed Income**			
2	**Provincial Bonds**	60.0%	20.0%	0.0%
3	**Corporate Bonds**	20.0%	10.0%	20.0%
4	**MUSH**	20.0%	0.0%	0.0%
5	**Private Debt**	0.0%	20.0%	20.0%
6	**Total Fixed Income**	**100.0%**	**50.0%**	**40.0%**
7	**Public Equities**			
8	**Canadian Equities**	0.0%	12.0%	10.0%
9	**Global Equities**	0.0%	13.0%	18.0%
10	**Global Low Volatility**	0.0%	10.0%	7.0%
11	**Total Equities**	**0.0%**	**35.0%**	**35.0%**
12	**Alternatives**			
13	**Canadian Real Estate**	0.0%	10.0%	15.0%
14	**Infrastructure**	0.0%	5.0%	10.0%
15	**Total Alternatives**	**0.0%**	**15.0%**	**25.0%**

INV.2.3 Naïve Interest Rate Forecast

Interest rate forecasting risk continues to be a significant concern for MPI. Inaccurate forecasts have in the recent past had material negative impacts on the financial results of the Basic line of business. Interest rate forecasting risk, for the purpose of this GRA, is the uncertainty related to setting premium rates based on forecasted interest rates rather than based on future actual interest rates, and the impact of the difference between those interest rates.

PUB Order 159/18 Directive 11.21 states:

> *"The Naïve interest rate forecast shall be used for rate-setting and the target capital analysis purposes."*

MPI is required to base its GRA on best estimates, and for the 2023 GRA, its BoD and management continue to believe that the naïve forecast is the best estimate.

INV.2.4 IFRS 17 Discount Rate Methodology

The discount rate methodology under IFRS 17 will be a change from current practice. Under IFRS 17, the claims discount rate is independent of assets and cannot reflect asset-specific characteristics. There will no longer be a direct linkage between the insurance liabilities and the backing assets. Accordingly, the insurance liabilities will only have an indirect relationship; that is, only to the extent that underlying financial variables are common. The claims discount rate must reflect the characteristics of the insurance liabilities (regardless of the characteristics of the assets which back them). For example, with non-fixed income instruments, excess spreads are generally viewed to be entirely attributable to the assets and therefore would not affect the claims discount rate.

The standard outlines two approaches, Top-Down or Bottom-Up, but puts minimal constraints on the application of the approaches other than making use of market information where available. The Canadian Institute of Actuaries (CIA) has released reference yield curves (i.e., liquid/illiquid curves) for both observable and unobservable periods. The IFRS 17 discount rate should be compliant with the standard and calibrated considering the CIA references and, where appropriate, leverage methods or inputs released by the CIA.

Top-Down vs. Bottom-Up approach and differences between the methodologies:

The standard does not stipulate the application of a specific methodology, but instead, requires that the discount rate used in the calculation of the insurance contract liability must be based on the characteristics of the insurance liability, incorporating characteristics such as currency, duration and liquidity. The curve is required to be consistent with financial instruments with similar cash flows and liquidity characteristics.

This curve can be determined in one of two ways:

1. A "Bottom-Up" approach which calculates the rate based on adding a liquidity premium to a risk-free rate, or

2. A "Top-Down" approach which uses a reference portfolio and removes items that are not aligned with the characteristics of the insurance liability (such as credit risk) from the yield curve, but is not required to adjust the yield curve for differences in liquidity characteristics of the insurance contracts and the reference portfolio

MPI has selected the Top-Down approach as:

Based on the attributes listed in the comparison table above, many of the cons are the same between the two approaches (e.g., subjectivity in parameters and extrapolation beyond the observable period). While Bottom-Up is expected to be more common in industry, Top-Down is more consistent with the current approach.

Two typically key relevant factors limiting the application of the Top-Down approach within the Canadian P&C industry are operational complexity (i.e., determining and monitoring asset portfolios) and materiality (i.e., limited impact of discounting on short term P&C liabilities). Companies often do not wish to develop new complicated procedures with limited impact to their financials. However, MPI does not align with many Canadian P&C insurers given the following characteristics of its business and capabilities:

- Relatively long duration of policy liabilities, which are more sensitive to interest rate changes
- its robust existing ALM process, which can be leveraged
- Cost efficient and highly experienced resources from a third-party capital management firm (i.e., ADDENDA Capital) for the calibration and justification of key inputs (i.e., credit risk adjustments, etc.)

The major cons considered by other companies are thus irrelevant in the case of MPI. MPI has determined it will apply the Top-Down approach to minimize the impact of the move from the current approach as well as to facilitate the ALM exercises as much as possible. MPI will be taking prescriptive guidelines from the CIA as reference to derive the key inputs.

As we have chosen the Top-Down Approach – we will need the following inputs:

- Confirmation of adoption of the Top-Down approach
- Selection of the reference portfolio
- Selection of the credit risk adjustment
- Execution plan that considers processes, information technology and data requirements

INV.3 Cash/Short Term

The actual 2021/22 FYE cash balance represented 5.3% of the Basic line of business, which includes 100% of the Basic Claims portfolio, 100% of the RSR portfolio and the allocation of the EFB portfolio assigned to Basic. Cash has a target weight of 0%, and a projected weight of 3.3% to 2.9% throughout the forecast. The projected weight reflects a maximum of $100 million cash balance which is held for operational purposes; the forecast assumes zero cash within the investment portfolios.

INV.3.1 Summary Table

Figure INV- 12 Short Term Summary

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**Ending Market Value**	97,438	98,508	100,000	100,000	100,000
3	**Total Investment Income**	664	586	593	599	599
4	**Forecasted Yield**	0.60%	0.60%	0.60%	0.60%	0.60%
5	**% of the Portfolio**	3.3%	3.2%	3.1%	3.1%	2.9%

INV.3.2 Definition and Accounting Treatment

Definition: Cash and Short-Term holdings are defined as cash and fixed income investments having a maturity of less than one year at the time of purchase. Cash and short-term securities are managed by the Department of Finance.

Accounting: Cash is reported at face value on the financial statements. Interest income flows through the Profit and Loss statement.

INV.3.3 Return Assumption

The five year forecasted cash returns are based on the GoC three-month Treasury-bill yield from Bloomberg as of March 31, 2022.

INV.4 Marketable Bonds

Marketable bonds made up 55.4% of the Basic line of business as of 2021/22 FYE, which consisted of 35.6% provincial bonds and 19.8% corporate bonds (as per *Figure INV-2*). The Government bond portfolio was renamed Provincial bonds at the end of Q4 2018/19 as very few GoC bonds are actually held within this portfolio and the portfolio primarily consists of Provincial bonds.

The target weights for Provincial bonds are 60% for Basic claims, 20% for RSR and 0% for EFB. For corporate bonds, the target weights are 20% for Basic claims, 10% for RSR and 20% for EFB.

INV.4.1 Basic Summary Tables

Figure INV- 13 Total Marketable Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Interest	62,950	66,482	69,987	73,087	75,530
3	Unrealized Gains/(Losses)	6,325	133	144	149	146
4	Realized Gains/(Losses)	(10,254)	(304)	(285)	(299)	(211)
5	Total Investment Income	**59,021**	**66,310**	**69,846**	**72,937**	**75,465**
6	Market Value	1,797,004	1,908,158	2,018,616	2,093,906	2,219,993
7	% of Portfolio	60.7%	62.2%	63.2%	64.7%	65.2%
8	GoC 10 Year Rate end of year forecast	2.41%	2.41%	2.41%	2.41%	2.41%
9	Marketable Bond Yield	4.85%	4.85%	4.85%	4.85%	4.85%
10	(GoC 10 Yr Bond Rate + Spread)					

Figure INV- 14 Provincial Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Interest*	38,169	39,967	42,124	43,818	45,230
3	Unrealized Gains/(Losses)	2,052	180	189	196	193
4	Realized Gains/(Losses)	(3,404)	(255)	(214)	(218)	(206)
5	**Total Investment Income**	**36,817**	**39,893**	**42,099**	**43,797**	**45,217**
6	Market Value	1,172,152	1,257,429	1,336,644	1,391,155	1,481,062
7	% of Portfolio	39.6%	41.0%	41.9%	43.0%	43.5%
8	GoC 10 Year Rate end of year forecast	2.41%	2.41%	2.41%	2.41%	2.41%
9	Government/Provincial Bond Yield	3.12%	3.10%	3.09%	3.08%	3.07%
10	(GoC 10 Yr Bond Rate + Spread)					

Figure INV- 15 Corporate Bond Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Interest*	24,780	26,514	27,863	29,269	30,300
3	Unrealized Gains/(Losses)	4,273	(48)	(45)	(47)	(47)
4	Realized Gains/(Losses)	(6,850)	(49)	(71)	(82)	(4)
5	**Total Investment Income**	**22,203**	**26,417**	**27,747**	**29,140**	**30,249**
6	Market Value	624,852	650,729	681,972	702,750	738,931
7	% of Portfolio	21.1%	21.2%	21.4%	21.7%	21.7%
8	GoC 10 Year Rate end of year forecast	2.41%	2.41%	2.41%	2.41%	2.41%
9	Corporate Bond Yield	4.13%	4.13%	4.13%	4.13%	4.13%
10	(GoC 10 Yr Bond Rate + Spread)					

INV.4.2 Definition and Accounting Treatment

Definition: Marketable bonds include all fixed income securities with a maturity of one year or more at the time of purchase and include Canada, Manitoba, other Provincial, municipal, corporate bonds, floating rate notes, and debentures that are tradable in the fixed income market. The Department of Finance manages a portion of the Provincial bonds and all cash/short-term investments; Addenda Capital manages all corporate bonds and some government bonds (in the completion portfolio which is used to implement the moment matching ALM strategy); private debt is managed by Sun Life.

Accounting: Unrealized and realized gains/losses, amortization, and interest income flow through the Profit and Loss statement because marketable bonds within the Basic claims portfolio are classified as FVTPL. Note: newly purchased corporate bonds within the EFB and RSR portfolios will be classified as Available for Sale (AFS).

INV.4.3 Interest and Capital Return Assumptions

Income from the marketable bond portfolio is separated into two components: interest income and capital return (both realized and unrealized gains/losses).

INV.4.3.1 Interest Income

Marketable bond interest income is calculated on a quarterly basis using the weighted average coupon rate for bonds currently within the portfolio, the yield for newly purchased bonds, and the forecasted bond turnover rate. In each quarter, the weighted average coupon yield of the previous quarter is adjusted by: (1) the marketable bond turnover rate; and (2) the forecasted marketable bond yield in order to calculate the new weighted average coupon yield for the entire marketable bond portfolio for that quarter. These components are discussed in further detail below. The interest income calculation is the same for both provincial and corporate bonds. With that said, it is important to note that spreads have minimal impact on interest income, other than through the coupon yields of newly purchased bonds.

INV.4.3.2 Weighted Average Coupon for Existing Bonds

The weighted average coupon is used to calculate the interest from the marketable bond portfolio (Provincial bonds and corporate bonds). To illustrate the concept of the weighted average coupon, a theoretical $1 billion dollar bond held at par value with a weighted average coupon of 5.0% will generate $50 million dollars in interest within one year.

The weighted average coupon for provincial bonds as of March 31, 2022 was 3.86% in Basic and 2.88% in RSR. Whereas the weighted average coupon for corporate bonds was 4.03% in Basic, 3.26% in RSR and 4.45% in EFB. These coupon rates were used as the initial coupon rate in the model in Q1 2022/23. Coupon rate differentials are attributable to the compositional and duration differences of the underlying marketable bonds within Basic, RSR, and EFB portfolios. Provincial and corporate bond yields are lower within the RSR portfolio due to shorter duration bonds held within the portfolio. Provincial coupon rates were provided by Bloomberg for Basic and the PC Bond Index for RSR as of March 31, 2022. Whereas corporate coupon rates were provided by the corporate bond manager for the Basic, RSR, and EFB portfolios as of March 31, 2022.

INV.4.3.3 Turnover

The weighted average coupon of the marketable bond portfolio (Provincial bonds and corporate bonds) for each successive quarter is calculated by adjusting the weighted average coupon of the previous quarter for the impact of turnover (i.e., buying and selling of bonds) in the current quarter. If new bonds are purchased at a lower (higher) yield than the weighted average coupon in the model, then the weighted average coupon of the marketable bond will decrease (increase).

Turnover indicates how often marketable bond holdings are sold in the portfolio. Turnover can be reported in two ways: the percentage of the portfolio holdings sold in one year (turnover ratio) or the number of years to turn over the entire portfolio (which is the inverse of the turnover ratio).

Since August 31, 2019 corporate bond management has since been outsourced to Addenda Capital. Turnover within the Provincial bond portfolio managed by the Province of Manitoba is projected to be 20% in the Basic claims portfolio (see *Figure INV-16*) and 0% in the RSR and EFB portfolios based on the minimal trading that has occurred within those portfolios. Corporate bond turnover was provided by Addenda Capital and is expected to be 37% for the corporate bonds within the Basic claims portfolio, 65% for the pooled fund within the RSR portfolio and 38% for the long-duration pooled fund within the EFB portfolio. *Figure INV-17* shows the sensitivity of marketable bond turnover on Basic investment income.

Figure INV- 16 Provincial Bond Turnover

Line No.	Date*	Beginning	End Period	Average	Minimum Buys/Sells	Ratio	Years to Turnover the Portfolio
1	*(C$000s, except where noted)*						
2	**Mar 2022**	1,311,148	1,150,787	1,230,967	340,362	28%	3.62
3	**Mar 2021**	1,242,782	1,311,148	1,276,965	268,312	21%	4.76
4	**Mar 2020**	1,304,588	1,242,782	1,273,685	255,447	20%	4.99
5	*Fiscal year-ends						

Figure INV- 17 Marketable Bond Turnover Sensitivity on Basic Investment Income

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	**0.00**	136,765	108,586	106,191	111,786	112,333
3	**0.20**	136,203	107,275	103,942	108,292	109,200
4	**0.35**	135,802	106,410	102,813	106,867	107,643
5	**0.40**	135,657	106,179	102,445	106,555	107,297
6	**0.60**	135,132	105,315	101,504	105,768	105,156
7	**0.80**	134,558	104,668	100,906	105,332	104,801
8	**1.00**	134,041	104,222	100,540	105,092	104,631

Assumption: The turnover ratio for provincial bonds is forecasted to be 0.20 within Basic claims, 0.00 within RSR and EFB; turnover for corporate bonds in Basic Claims is forecasted to be 0.37, within RSR 0.65 and within EFB 0.38 over the five-year forecast period. Income generated due to turnover within the EFB portfolio over the forecast period is applied to the pension liability and not included within the Basic line of business.

INV.4.3.4 Yield to Maturity Calculation

There are two marketable fixed income asset classes which are modeled separately for the Basic claims and the RSR portfolios: 1) Provincial bonds; and 2) Corporate bonds.

Provincial Bond Spread for Basic Claims

The Provincial bond duration spread over the GoC 10-year bond rate as of March 31, 2022 is calculated using the March 31, 2022 FTSE Russel Provincial Bond index (previously the PC Bond Index). Duration spreads were gathered based on three-, five-, 10- and 15-year duration values and then linearly interpolated. The spread of Provincial bonds over GoC 10-year bonds was used as a proxy for the provincial bond portfolio yield.

Given the sensitivity of the claims duration to changes in interest rates, marketable bonds that have duration between 3 years and 16 years are linearly interpolated by the model.

To illustrate how the provincial bond spread is calculated using the naïve interest rate forecast:

- The actual duration of the Provincial bond portfolio was 12.68 years at March 31, 2022. The duration spread over the GoC 10-year bond at 12.68 years is 71 basis points. Therefore, the Provincial bond yield to maturity as at March 31, 2022 is 3.12% (2.41% GoC 10-year bond rate plus 0.71%). In the 2022 GRA, the duration of the Provincial bond portfolio was 10.43 years as of March 31, 2021. The duration spread over the GoC 10-year bond at 10.43 years was 64 basis points. Therefore, the forecasted Provincial bond yield to maturity as at March 31, 2021 was 2.20% (1.56% GoC 10-year bond rate plus 0.64%). The 7 bps increase in spreads over the year largely reflects market concerns related to uncertainty and volatility due to looming fears of recession due to the increasing inflationary environment.

- By Q4 of 2026/27, the duration of the Provincial bond portfolio falls to 9.71 years, causing the duration spread to equal 66 basis points resulting in a Provincial bond yield to maturity of 3.07% (2.41% GoC 10-year bond rate plus 0.66%).

Figure INV- 18 Provincial Bond Yield Spread

Line No.	Duration	Provincial Bond Spread
1	**7.0 years**	51 bps
2	**8.0 years**	57 bps
3	**9.0 years**	62 bps
4	**10.0 years**	68 bps
5	**11.0 years**	73 bps
6	**12.0 years**	77 bps
7	**13.0 years**	81 bps

Provincial Bond Spread for RSR

The duration for Provincial bonds in the RSR portfolio is based on 50% of the FTSE Russel Short-Term Provincial Bond Index (2.71 years) and 50% of the FTSE Russell Mid-Term Provincial Bond Index (6.65 years) for a combined duration of 4.68 years as at March 31, 2022 (4.74 duration in 2022 GRA). A Provincial bond with a duration of 4.68 years is assumed to have a spread over a GoC 10-year bond of 0.37% based on the Provincial bond spread as at March 31, 2022. As a result, the yield to maturity for Provincial bonds in the RSR portfolio with the naïve forecast is 2.78% (2.41% GoC 10-year bond yield plus 0.37% duration spread). In the 2022 GRA, the projected yield for Provincial bonds was 1.29% (1.56% GoC 10-year bond yield plus -0.27% spread). The 64 bps YoY increase in spreads largely reflects the increased liquidity premiums due to the looming fear of recession caused by the increasing inflationary environment.

Corporate Bond Spread for Basic Claims

The duration for corporate bonds in the Basic Claims portfolio was 10.22 years based on information received from the Financial Reporting Department of MPI as at March 31, 2022 (10.43 duration in the 2022 GRA). The weighted average yield on the corporate bond holdings was 4.13%, implying a spread of 172 bps over the GoC 10-

year bond yield of 2.41%. In the 2022 GRA, corporate bonds had a projected yield of 3.17% (1.56% GoC 10-year bond yield plus 1.61% spread). The 11 bps YoY increase in spreads largely reflects an increased liquidity and credit premiums present at the onset of the inflation concerns.

Corporate Bond Spread for RSR

The duration for corporate bonds in the RSR portfolio was 6.40 years based on the corporate bond pooled fund holdings as at March 31, 2022. The weighted average yield on the pooled fund holdings was 3.85%, implying a spread of 144 bps over the GoC 10-year bond yield of 2.41%. In the 2022, GRA corporate bonds in the RSR portfolio had a yield of 2.19% (1.56% GoC 10-year bond yield plus 0.63% spread). The 81 bps YoY increase in spreads largely reflects an increased liquidity and credit premiums present at the onset of inflation concerns.

INV.4.3.5 Capital Return

Rising interest rates and increased spreads result in unrealized losses in the marketable bond portfolio and falling interest rates and decreased spreads result in unrealized gains. The model uses the forecasted GoC 10-year bond rate to calculate the change in interest rates on a quarterly basis (which is zero since we assume that the yield at March 31, 2022 is unchanged). Additionally, spreads are assumed to be static throughout the forecast period. The marketable bond duration, convexity, and change in interest rate are used to calculate the capital return.

INV.4.3.6 Duration

Duration measures the impact of changes in interest rates on the market values of fixed income assets. The higher the duration, the greater the interest rate sensitivity of a bond. The duration of the Basic claims fixed income portfolio as of March 31, 2022 was 11.14 years as per Addenda (10.3 year duration in the 2022 GRA). The duration increased mainly because of the implementation of the moment matching strategy in mid-2021.

As per Section 8.4 of the IPS (*Appendix 1 – Investment Policy Statement*), the marketable bond duration is matched to the Basic claims duration to minimize the interest rate risk to MPI.

Within the model the Provincial bond duration changes so that the total marketable bond portfolio duration (Provincial and corporate bonds) is matched to the claims duration of the previous quarter. This quarter lag between matching the Provincial bond duration and claims liability duration reflects the reality that the claims liability duration must be known before the fixed income duration can be changed to match. Corporate bond duration is assumed to be static at 10.22 years (10.43 duration in the 2022 GRA) for the entire five-year forecast.

Figure INV-19 provides the forecasted marketable and non-marketable bond duration, the claims duration and the duration gap that is calculated by the model at each year end.

Figure INV- 19 Duration Assumption in Model

Line No.	Year Ending	Marketable and Non Marketable Bond Duration	Claims Duration with PfAD (prior quarter)	Duration Gap
1	**Mar 22**	9.3	9.3	-
2	**Mar 23**	9.2	9.2	-
3	**Mar 24**	9.2	9.2	-
4	**Mar 25**	9.1	9.1	-
5	**Mar 26**	9.1	9.1	-

Section *INV.11* on rebalancing discusses the dollar matching of the fixed income portfolio to Basic claims liabilities on an annual basis. Please see *Appendix 2 – Operational ALM Policy* for more detailed information on the Operational ALM Policy of the Investment Committee Working Group. Finally, please see section *INV.16* for a discussion of interest rate risk and further detail on the ALM program.

Assumption: A duration gap target of 0.0 years is assumed for the entire forecast period.

INV.4.3.7 Convexity

Convexity[1] measures the changes in bond prices that are not explained by duration.

- Convexity of the Basic claims Provincial bond portfolio was 1.85 as of March 31, 2022, as calculated by Bloomberg (1.72 in the 2022 GRA).
- Convexity of the Basic claims corporate bond portfolio was 1.51 as of March 31, 2022, as provided by the corporate bond manager (1.63 in the 2022 GRA).
- Convexity for Provincial bonds within RSR was 0.31, based on 50/50 FTSE Russell Short & Mid-Term Provincial Bond Index as at March 31, 2022 (0.32 in the 2022 GRA).
- Convexity for corporate bonds within RSR was 0.80, as provided by the corporate bond manager and based on our actual pooled fund holdings as at March 31, 2022 (0.89 in the 2022 GRA).

[1] Convexity accounts for the non-linearity of changes in bond prices due to changes in interest rates (i.e., the amount of curvature in the price/interest rate graph). It is the second order derivative of the change in bond price.

INV.5 Non-Marketable Bonds (MUSH) And Private Debt

Non-marketable bonds made up 16.1% of the Basic line of business[2] at 2021/22 FYE. Annual purchases of MUSH bonds are forecasted to be $20 million[3]. As a result, MUSH bonds are forecasted to represent 9.9% of the Basic line of business portfolio by the end of 2026/27.

Private debt funding began in July 2019; the initial commitments from MPI have been fully drawn by Sun Life, follow-on commitments were not fully drawn at March 31 (see *INV 2.2* for more information). Private debt comprised 5.2% of the Basic line of business at 2022/23 FYE. Private debt has a target weight of 0% for Basic claims, 20% for RSR and 20% for EFB.

INV.5.1 Summary Table

Figure INV- 20 MUSH Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	***MUSH Book Value***	440,475	413,036	386,568	360,135	337,390
3	**Total Investment Income**	19,328	18,254	17,184	16,205	15,142
4	**End of Period MUSH Yield**	4.30%	4.32%	4.34%	4.39%	4.37%
5	**% of Portfolio**	14.9%	13.5%	12.1%	11.1%	9.9%

[2] The Basic line of business includes 100% of the Basic claims portfolio, 100% of the RSR portfolio and the allocation assigned to Basic of the EFB portfolio based on the payroll ratio.
[3] Additional purchases of MUSH bonds will be limited as only $20 million of new MUSH bonds are expected to be issued annually (mostly by municipalities).

Figure INV- 21 Private Debt Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	*Market Value (Mid-duration)*	90,643	74,429	79,778	70,667	82,732
3	Market Value (Long-duration)	64,096	66,943	69,917	73,023	76,266
4	Total Investment Income	6,619	7,522	6,812	7,220	6,888
5	End of Period Yield (Mid-duration)	5.06%	5.06%	5.06%	5.06%	5.06%
6	End of Period Yield (Long-duration)	4.37%	4.37%	4.37%	4.37%	4.37%
7	% of Portfolio (Mid & Long-duration)	5.2%	4.6%	4.7%	4.4%	4.7%

INV.5.2 Definition and Accounting Treatment

Definition: MUSH bonds are bonds and debentures issued by Manitoba rural municipalities, school divisions, and health care facilities which are not traded in the fixed income market. All MUSH bonds are managed by the Treasury Division of the Province of Manitoba.

Private debt is privately held debt that is not traded publicly in the market. Private debt is investment grade and managed by an external pooled fund manager (Sun Life).

Accounting: MUSH bonds are held at book value on the financial statements as they are classified as Held to Maturity. Interest payments flow through the Profit and Loss statement. Private debt will be classified as Available for Sale. Unrealized gains/losses will flow through Accumulated Other Comprehensive Income (AOCI) until realized and interest income will flow through the Profit and Loss statement.

INV.5.3 Interest Income Assumption

MUSH bonds provide additional yield over a GoC 10-year bond and the yield on the existing portfolio was forecasted for the next five years. There are $20M in annual MUSH purchases forecasted ($5M per quarter) over the five-year forecast horizon (last year $40M in MUSH bond purchases were assumed and approximately $21.2M were actually purchased). These purchases are projected to be comprised primarily of municipal issuances which have attractive yields relative to regular MUSH bonds.

Private debt is forecasted to have a yield of 5.06% (3.29% in the 2022 GRA) for the mid-duration fund and a yield of 4.37% (3.66% in the 2022 GRA) for the long-duration fund (1.35% spread over the FTSE Russell Canada All Corporate Bond Index and 0.99% spread over the FTSE Russell Canada Long Term Overall Bond Index respectively at March 31, 2022). Expected yields for both mid and long-term durations are a function of the credit composition of the underlying assets. The yield earned on private debt does not impact the new money yield used for rate setting purposes as private debt is not held in the Basic claims portfolio.

INV.5.4 MUSH Book Value and Yield Forecasting

MUSH book values and forecasted MUSH yields were calculated over the five-year forecast and entered into the financial model. The ending book values were based on the forecasted principal amortization of the existing MUSH holdings as of Q4 2021/22.

INV.5.5 Private Debt Capital Returns

Private debt has an assumed duration of 6.1 years (6.6 years in the 2022 GRA) within the RSR portfolio and 15.2 years (15.3 years in the 2022 GRA) within the EFB portfolio (based upon actual durations at March 31, 2022). Changes in the forecasted GoC 10-year bond yield are forecasted to not impact private debt capital returns as exposure to the asset class is held within a pooled fund investment vehicle, underlying debt issuances are held-to-maturity, and no turnover of the pooled fund units is assumed to occur over the forecast period.

INV.6 Canadian Equities

In the RSR portfolio, Canadian equities have a 12% target allocation, with a range of 7% to 17%. Whereas, in the EFB portfolio Canadian equities have a 10% target allocation, with a range of 5% to 15%. Canadian equities have a 0% weight in the Basic claims portfolio.

INV.6.1 Summary Table

Figure INV- 22 Canadian Equity Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Dividend Income	2,678	2,737	2,881	3,215	3,090
3	Realized Gains/(Losses) (P&L)	25,784	6,942	3,648	4,127	3,621
4	**Total Investment Income**	**28,462**	**9,680**	**6,529**	**7,343**	**6,711**
5	Forecasted Dividend Yield	2.76%	2.92%	2.88%	2.88%	2.88%
6	Ending Market Value	95,547	103,010	110,117	108,809	120,484
7	% of Portfolio	3.2%	3.4%	3.4%	3.4%	3.5%

INV.6.2 Definition and Accounting Treatment

Definition: The Canadian equity portfolio includes publicly traded common stocks and preferred shares which are listed on a Canadian stock exchange. The Canadian equity portfolio is managed by two active managers under contract with the Province of Manitoba (Foyston, Gordon & Payne and QV Investors).

Accounting: Realized gains/losses and dividend income flow through the Profit and Loss statement. Unrealized gains/losses are located in the Other Comprehensive Income statement.

INV.6.3 Total Return Assumption

As per the forecasting methodology directed by PUB Order 157/12, the annual total return on Canadian equity investments is forecasted to be 6.6% (6.6% in the 2022 GRA) over the five -year forecast period. The 6.6% return is based on the 5th percentile 20-year Canadian equity return using index data starting in 1956 to March 31, 2022.

The model splits total return into dividend yield and capital return:
Total Return = Dividend Yield + Capital Return.

INV.6.4 Dividend Yield

The dividend yield is used to calculate the dividend income in the model. Dividend income for each quarter is calculated using the quarterly market value of the Canadian equity portfolio multiplied by the quarterly dividend yield. All dividends are re-invested back into the Canadian equity portfolio.

The dividend yield for Canadian equities is based upon a forecast obtained from Bloomberg. Bloomberg only forecasts dividend yields three years into the future. The forecasted dividend yield for the S&P/TSX for the next 3 fiscal years is as follows:

- 2022/23: 2.8%
- 2023/24: 2.9%
- 2024/25 and thereafter: 2.9%

Assumption: The Canadian equity dividend yield is forecasted to be 2.8%, 2.9% and 2.9% in 2022/23, 2023/24 and 2024/25 respectively. 2.9% is used for 2025/26 and 2026/27. (2.8%, 3.0% and 2.8% in the 2022 GRA)

INV.6.5 Capital Return

The capital return determines the increase of the Canadian equity portfolio in market value over each period. Increases in market value from the capital return are unrealized gains, which are held in AOCI. Therefore, the capital return component does not impact net income unless there are sales (turnover) of holdings within the portfolio. The capital return for each forecasted year is determined by subtracting the dividend yield from the total rate of return of 6.6%.

INV.6.6 Turnover

The turnover ratio, as programmed in the model, indicates how often equity holdings are sold. When equities are sold, the corresponding unrealized gains in AOCI are then realized and flow through net income. All equity investments are held through pooled funds; no units of the pooled funds are expected to be sold. However, there will be turnover of the holdings within the pooled funds and any gains as a result of this turnover will be distributed at the FYE of the fund. The forecasted turnover rate is based on manager turnover expectations for the holdings within the fund over the forecast period.

Assumption: The forecasted equity turnover ratio is a weighted average based on the turnover expectations of the manager and is projected to be 13% in 2022/23 and thereafter. There will be turnover of the holdings within the pooled funds and any gains realized as a result of this turnover will be distributed at the FYE of the fund.

INV.7 Global Equities and Global Low Volatility

For 2022/23, the target weights for global equities are 0% for Basic Claims, 13% for RSR and 18% for EFB. For low volatility global equities, the target weights are 0% for Basic Claims, 10% for RSR and 7% for EFB.

INV.7.1 Summary Table

Figure INV- 23 Global Equities Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Dividend Income	2,263	2,622	2,933	3,244	3,185
3	Realized Gains/(Losses) (P&L)	9,824	6,577	3,746	4,629	4,294
4	**Total Investment Income**	**12,087**	**9,200**	**6,679**	**7,873**	**7,479**
5	Forecasted Dividend Yield	1.93%	2.05%	2.15%	2.15%	2.15%
6	Ending Market Value	129,128	138,915	148,432	148,952	163,667
7	% of Portfolio	4.4%	4.5%	4.6%	4.6%	4.8%

Figure INV- 24 Global Low Volatility Equities Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	Dividend Income	1,169	1,312	1,464	1,645	1,539
3	Realized Gains/(Losses) (P&L)	8,320	2,675	2,124	2,636	2,509
4	**Total Investment Income**	**9,489**	**3,987**	**3,587**	**4,281**	**4,048**
5	Forecasted Dividend Yield	1.93%	2.05%	2.15%	2.15%	2.15%
6	Ending Market Value	65,652	70,742	75,449	73,049	81,367
7	% of Portfolio	2.2%	2.3%	2.4%	2.3%	2.4%

INV.7.2 Definition and Accounting Treatment

Definition: Global equities are publicly traded stocks, which are listed on a recognized stock exchange in the U.S., Europe, or Asia (developed markets predominately with potential for limited emerging market exposure).

Global low volatility equities are publicly traded stocks in the same markets as global equities. Low volatility stocks have less volatility than other stocks in their parent index.

Accounting: Unrealized and Realized gains/losses and dividends flow through the Profit and Loss statement.

INV.7.3 Total Return Assumption

The total return on the global equity portfolio is forecasted to be 6.6% (6.6% in the 2022 GRA), which matches the Canadian equity total return. The forecasted total return for global low volatility stocks is 6.0%, which is 0.6% lower. This return difference is based on the capital market assumptions provided by Mercer in the 2018 and 2022 ALM studies[4]. In the 2022 GRA, the identical methodology applied (i.e., the forecasted return for global low volatility equities was 6.0%, which is 0.6% lower).

INV.7.4 Dividend Yield

The dividend yield is used to calculate the global equity/ low volatility global equity dividend income in the financial model. Dividend income for each quarter is calculated by using the quarterly market value of the equity portfolio multiplied by the quarterly dividend yield. All dividends are re-invested back into the global equity/ low volatility global equity portfolio.

The dividend yield for the global equity/ low volatility global equity portfolio is based upon a forecast from Bloomberg. Bloomberg only forecasts 3-years into the future.

For the global equity and low volatility global equity, the MSCI World Index forecasted dividend yield was used for 2022/23 and thereafter.

[4] The return difference in the 2022 capital market assumptions provided by Mercer was 0.5%

Figure INV- 25 Bloomberg Expected Dividend Yield Forecast

Line No.	Index	MSCI World
1	**2022/23**	1.9%
2	**2023/24**	2.1%
3	**2024/25**	2.2%
4	**Thereafter**	2.2%

Assumption: The global equity and low volatility global equity dividend yield is forecasted to be 1.9% for 2022/23, 2.1% for 2023/24 and 2.2% thereafter. (1.90%, 2.04% and 2.16% thereafter in the 2022 GRA).

INV.7.5 Capital Return

The capital return determines the increase of the global equity/ low volatility global equity portfolio in market value over each quarter. Increases in market value from the capital return create unrealized gains, which are held in AOCI. Therefore, the capital return component does not impact net income unless there are sales (turnover) in the portfolio. The capital return for each year is determined by subtracting the dividend yield (section *INV.7.4*) for each forecasted year from the total equity return (6.6% and 6.0%) for global equity and low volatility global equity respectively (section *INV.7.3*).

INV.7.6 Turnover Ratio

The turnover ratio is based on manager turnover expectations and forecasted to be 12% for global equities and 50% for low volatility global equities in 2022/23 and thereafter. Both asset classes will be held within pooled funds; no units of the pooled fund are expected to be sold. However, there will be turnover of the holdings within the pooled funds and any gains as a result of this turnover will be distributed at the FYE of the fund. The forecasted turnover rate is based on manager turnover expectations for the holdings within the fund over the forecast period.

Assumption: The turnover ratio for global equity/ low volatility global equities for 2022/23 and beyond is forecasted to be 12% and 50% respectively.

INV.8 Real Estate

As of 2022/23 FYE, the real estate portfolio had an actual weight of 3.9% within the Basic line of business. There are two main components to the real estate portfolio; first are holdings in a real estate pooled fund managed by TD Asset Management, which had a weight of 3.7%. The second is the investment portion of Cityplace (MPI-owned office and retail complex), which had a weight of 0.2%. Target weights for real estate are 0% for Basic claims, 10% for RSR, and 15% for EFB.

INV.8.1 Real Estate Summary Table

Figure INV- 26 Real Estate Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s, except where noted)*					
2	***Real Estate Pooled Fund***					
3	**Ending Market Value**	109,001	117,047	124,991	125,541	136,986
4	**% of Portfolio**	3.7%	3.8%	3.9%	3.9%	4.0%
5	**Forecasted Return**	7.8%	6.3%	6.0%	6.0%	6.0%
6	**Real Estate Gains (P&L)**	10,987	7,085	7,725	7,499	7,532
7	**Investment Properties (Cityplace)**					
8	**Ending Market Value**	5,757	5,603	5,448	5,293	5,138
9	**% of Portfolio**	0.2%	0.2%	0.2%	0.2%	0.2%
10	**Investment Property Income**	350	359	367	374	382

INV.8.2 Accounting Treatment of the Pooled Fund

Assets in the real estate portfolio are separated into two categories, the Real Estate Pooled Fund and Investment Properties since they have different accounting treatments. Investment Properties (e.g., Cityplace) are discussed in section *INV.8.4*.

Definition: As of March 31, 2022, approximately $181.9M was invested in a diversified Canadian real estate pooled fund (total portfolio), which is managed by TD Asset Management.

Accounting: All unrealized and realized gains/losses flow through the Profit and Loss statement. Realized gains/losses would only arise if fund units were sold.

INV.8.3 Real Estate Pooled Fund Return Assumption

The return on the Real Estate portfolio of MPI is based on the forecast for the Canadian Consumer Price Index (CPI) plus a spread of 4%. This assumption for real estate has been unchanged since the first investment by MPI in the asset class in 2009. Please see *Figure INV-39* for the Canadian CPI forecast. As per *Figure INV-26* the forecasted return was 7.8% to 6.0%. In the 2022 GRA, forecasted pooled fund returns were 5.9% in 2021/22, 6.0% in 2022/23, 5.9% in 2023/24 and 6.0% thereafter.

INV.8.4 Cityplace Accounting Treatment

Definition: Investment Property includes an investment in the parking lots surrounding Cityplace with an appraised value of approximately $21.6M[5].

Accounting: The value of the investment property is measured at amortized cost; as such, changes in the appraised market value are not reflected in investment income or other comprehensive income. Income from investment property is in the form of rental income from the portion of the property rented to commercial tenants. All rental income from Cityplace is net of rental expenses and amortization and flows through the Profit and Loss statement.

INV.8.5 Cityplace Return Assumption

The return forecast is based on projections provided by the property manager fewer capital improvements and associated depreciation.

[5] The parking lots have a book value of $13.7 million. The CityPlace building was reclassified from an investment asset to a corporate asset on March 31, 2021.

INV.9 Infrastructure

The target allocations for infrastructure are 0% for Basic claims, 5% for RSR, and 10% for EFB. Like real estate, infrastructure is privately held and is not a liquid asset class.

INV.9.1 Summary Table

Figure INV- 27 Infrastructure Summary Table

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	***(C$000s, except where noted)***					
2	**Income**	1,510	1,002	940	1,056	1,066
3	**Infrastructure Gains (P&L)**	5,869	3,921	3,687	4,137	4,178
4	**Forecasted Return**	8.8%	7.3%	7.0%	7.0%	7.0%
5	**MV**	65,343	69,829	73,871	74,613	80,818
6	**% of Portfolio**	2.2%	2.3%	2.3%	2.3%	2.4%

INV.9.2 Definition and Accounting Treatment

Definition: Infrastructure is defined as an essential service with high barriers to entry that often operate in a monopolistic and regulated environment. Infrastructure investment contracts are held by the Province of Manitoba.

Accounting: Income and unrealized gains/losses flow through the Profit and Loss statement. Realized gains or losses were not included in the model since sales of infrastructure were not originally forecasted during the five-year forecast period.

INV.9.3 Return Assumption

Infrastructure is expected to provide a total return of 8.8% for 2022/23, 7.3% for 2023/24, and 7.0% thereafter. This forecasted return is based on the Canadian CPI forecast plus a spread of 5%. Please see *Figure INV-34* for the CPI forecast for the current year. In the 2022 GRA, infrastructure was expected to provide a total return of 6.9% for 2021/22, 7.0% for 2022/23, 6.9% for 2023/24 and 7.0% thereafter.

The total infrastructure return is comprised of two components: yield and capital return. Capital return is projected to represent 80% of the total return on infrastructure and yield the remaining 20%, which is based on historical returns and unchanged from the assumption of the previous year.

INV.10 Other Investment Income Impacts

This section discusses the other investment income impacts: investment management fees; pension expense; bond amortization; venture capital; and line of business allocations.

INV.10.1 Investment Management Fees

In order to forecast fees for the Basic line of business, investment management fees were split into four categories by type of manager. The first category includes the fees paid to the Department of Finance. The second category includes the fees paid to the corporate bond manager. The third category includes fees paid to equity managers. The fourth category includes fees paid to all other managers (real estate, private debt, and infrastructure managers).

Figure INV- 28 Investment Manager Fees

Line No.	Description	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	**Fees to the Department of Finance**	1205	1203	1227	1232	1172
3	**Fees to the Corporate Bond Manager**	680	722	751	787	812
4	**Fees to the Equity Managers**	1020	1065	1136	1264	1220
5	**Fees to the Alternative Assets**	1448	1459	1464	1563	1526
6		**4,353**	**4,448**	**4,578**	**4,846**	**4,730**

INV.10.1.1 Department of Finance

100% of the Provincial bond fixed income portfolio was managed by the Department of Finance until May 31, 2021, at which time Addenda Capital started to manage some Provincial bonds as part of the implementation of the moment matching strategy (referred to as the "completion portfolio"). The Department of Finance charges a management fee of 7.5 basis points on the first $2 billion for fixed income, with no fees on assets above that. For all other asset classes, the fee charged by the Department of Finance is 3.0 basis points.

INV.10.1.2 Corporate Bond Manager

The corporate bond portfolio is managed by an external bond manager (Addenda Capital). The investment management fees are based on assets under management. For the first $100 million the fee is 0.20%, on the next $100 million the fee is 0.14%, on the next $200 million the fee is 0.10%; for amounts greater than $400 million (on the excess) the fee is 0.08%. The weighted average investment fee is forecasted to be 0.11%.

INV.10.1.3 Alternative Assets

The investment management fees are based on assets under management for public equities, real estate and private debt.

INV.10.1.4 Canadian Equities

A weighted average fee of 0.33% was used based on March 31, 2022 relative Canadian Equity manager weights and associated management fees charged by Foyston, Gordon & Payne and QV Investors.

INV.10.1.5 Global Equities/Global Low Volatility

Guardian Capital manages global equities, and their forecasted fee is 0.44%. Acadian manages Global Low volatility equity, and their forecasted fee is 0.30%.

INV.10.1.6 Real Estate Pooled Fund

The sliding fee schedule for the real estate pooled fund managed by TD Asset Management was used to forecast investment fees. For the first $10 million the fee is 1.00%, for the next $25 million the fee is 0.80%, for the next $65 million the fee is 0.60%, on the balance over $100 million the fee is 0.50%.

INV.10.1.7 Private Debt Manager

The private debt portfolio is managed by an external manager (SLC Asset Management or Sun Life). The weighted average investment management fee is based on assets under management and is forecasted to be 0.38%. Fees are calculated based upon invested capital. As of March 31, 2022 100% of the total commitment of MPI to the Sun Life long duration fund (within the EFB portfolio) has been drawn. Follow-on commitments to the Sun Life mid-duration fund (within the EXT and SRE portfolio) were fully drawn in early 2022/23.

INV.10.1.8 Infrastructure

The infrastructure portfolio consists of assets held in funds and through direct investment. The weighted average investment fee is forecasted to be 0.41%.

INV.10.2 Pension Expense

The pension expense line, in investment income, is calculated by applying the pension discount rate to the opening pension liability. The pension discount rate has been used in the March 31, 2022 actuarial analysis of the provision for EFB. The pension discount rate was determined by applying the pension liability cash flows to the Canadian Institute of Actuaries Method Accounting Discount Rate Curve published by Fiera Capital; the rate was set at 4.01% (3.34% at March 31, 2021).

For 2019/20 and thereafter, investment assets and the underlying income have been segregated and are calculated independently for each investment portfolio. Investment assets on the Statement of Financial Position and investment income on the Income Statement for the Basic Financial statements will include both Basic claims and RSR portfolio assets and investment income as well as the portion of the EFB portfolio assets and investment income relating to Basic.

The figure below represents the forecasted investment income earned on the employee future benefit investment asset portfolio, net of the pension expense (or interest cost) requirement (which is not additive when compared with Basic line of business). Investment income is accounted for in the “Provision for EFB” within the Statement of Financial Position.

Figure INV- 29 Investment Income on Employee Future Benefits

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	4,027	4,298	4,525	4,730	4,926
3	Dividend and Other Income During Period	9,648	10,204	10,796	11,469	12,124
4	Gains During Period - Profit & Loss	22,527	19,666	19,893	20,205	21,067
5	Investment Fees Paid	(2,218)	(2,354)	(2,463)	(2,580)	(2,722)
6	Amortization/Accretion During Period	(88)	(85)	(81)	(78)	(74)
7	Pension Expense	(15,020)	(15,386)	(15,758)	(15,758)	(15,758)
8	**Investment Income**	**18,876**	**16,343**	**16,912**	**17,988**	**19,564**

INV.10.2.1 Defined Benefit Pension Plan Funding

MPI currently operates its defined benefit pension plan as a payment funding employer within the plan administered by the Civil Service Superannuation Fund (CSSF). Funding of the employer portion (MPI) to the CSSF occurs as benefits are paid. To prepare and ensure adequate funds will be available in the future, a specific investment fund has been established by MPI with a tailored investment approach and funding policy.

The BoD approved Management to engage Government to seek a change of the funding status from payment funding to pre-funding under the Civil Service Superannuation Act (CSSA). MPI is currently working with the relevant stakeholders within Government to seek the appropriate authorizations and if approved, the change would be expected to take place in fiscal 2023/24.

The primary motivation for seeking this change is the reduction of financial statement volatility. As a payment funding employer, MPI carries a pension obligation on its balance sheet and sets aside assets dedicated to backing the pension liability. Prior to 2019 MPI placed a general provision against its general assets equal to the amount of the pension liability. After execution of the 2018 asset liability strategy the corporation now has a specific portfolio designated to meets its pension obligations.

The defined benefit obligation is measured as the present value of the estimated future cash outflows, using a discount rate based on market yields for high quality corporate fixed income securities. Because this market yield, known as the Fiera curve, changes constantly the valuation of the pension liability also changes constantly. As the liability is backed by approximately 30% fixed income securities, 70% of the liability remains unhedged.

Pension valuation changes flow through Other Comprehensive Income and will continue to do so, however the mark to market of the corresponding assets will flow through the statement of profit and loss upon adoption of IFRS 9 in 2023/24, adding additional volatility to the P&L.

Prefunding participants are required to match contributions contributed to the Fund by the employees at prescribed rates, which are recorded as operating expenses. Under the CSSA, corporations have no further pension liabilities.

There are no material impacts to Basic rate setting, however depending on market rates and conditions at time of a potential transition, there may be an accounting gain (or loss) that will impact the total equity position of MPI (and Basic). Because the going concern yield assumption is currently higher than the accounting discount rate, a gain would be anticipated upon implementation of this change. Based upon 2021/22 year-end values this gain is estimated to be approximately $150 million. This amount is subject to change based upon interest rate movements leading up to the settlement transaction and the final actuarial determination of the amount required to settle and transfer to the CSSF.

This funding change and resulting transaction is subject to Government review and approval and as such are not reflected in the financial forecasts in the 2023 GRA.

INV.10.3 Amortization of Bond Premium/Discount

The financial model calculates the amortization of the bond premium/discount for provincial and corporate bonds. The premium or discount is calculated as the difference between the face value of the bond and the actual purchase price. A bond purchased at a higher (lower) price than its face value will have a premium (discount) that is amortized over the remaining time to maturity of the bond. The amortization of this premium (discount) effectively reduces (increases) the interest income received based on the coupon rate of the bond.

INV.10.4 Venture Capital

At March 31, 2022 venture capital represented 0.0% of the total portfolio. Given the limited allocation to venture capital, investment income from venture capital is not forecasted in the model. Please see the summary investment *Figure INV-1* to see the historical investment income from venture capital.

INV.10.5 Allocation of Investment Income to Lines of Business

The allocation of investment income throughout the forecast period has been reviewed and approved by the BoD. The 2022/23 and subsequent forecast period applies investment income based on the direct proportion of investment assets available to each line of business with the exception of EFB which uses the payroll ratio (with 74.8% allocated to Basic Claims). No changes have been made to the allocation methodology since March 1, 2019. The current Investment Income Allocation Policy is provided in *Appendix 8 – Investment Income Allocation Policy*.

INV.10.6 Impaired Securities

As of March 31, 2022, there were $29.2M in impaired securities (corporate total). Corporate bonds, private debt and provincial bonds were written down by $14.5M, $13.9M and $0.8M. From the total write-downs, $28.4M were allocated to the EFB portfolio (corporate bonds and private debt) and $0.8M to the RSR portfolio (provincial bonds). As of March 31, 2022, there were no write-downs within the Basic Claims portfolio. From March 31, 2021 to March 31, 2022, corporate and provincial bonds declined by 4.6% and 5.6% respectively, due to rising interest rates.

INV.10.7 Investment Portfolio Performance in 2021/2022

Transitional benchmarks were developed for each portfolio which more closely reflected the actual asset allocation of the portfolios until Fiscal Year 2020/21. By July

2021, the transitions to the new asset allocation as defined in the 2018 ALM Study were substantially funded, and the calculation of transitional benchmarks was discontinued.

Performance is presented for the Basic Claims, RSR & EFB portfolios over the 12 months ended at March 31, 2022.

The Basic Claims portfolio returned -2.8%, outperforming the IPS benchmark by 2.0% (see *Appendix 9 – Actual vs. Benchmark Returns)*. This was attributed primarily to outperformance of MUSH bonds, which are reported at book value (i.e., with no capital gains or losses). If MUSH bonds were reported at their implied market value (i.e., marked to market using the current yield on newly issued MUSH bonds) the total portfolio return would have decreased to -5.4% and underperformed the benchmark by 0.6%. The transitional benchmark calculations for this portfolio were discontinued after March 2020 as the portfolio was substantially funded at that time. Investment income was -$47.2 million in 2021/22.

The RSR portfolio returned 4.8%, outperforming the IPS benchmark by 1.0%. This was mainly due to large & small-cap Canadian equities, real estate, private debt and low volatility global equites outperforming their benchmarks by 6.8%, 6.3%, 2.2%, 2.0% and 0.2%, respectively. Provincial bonds, global equities and infrastructure underperformed their benchmarks. The transitional benchmark calculations for this portfolio were discontinued after June 2021 as the portfolio was substantially funded. Investment income was $24.9 million in 2021/22.

The EFB portfolio returned 6.2%, outperforming the IPS benchmark by 1.5%. This was largely due to large & small-cap Canadian equites, real estate and private debt outperforming their benchmarks by 8.2%, 6.3%, 5.9% and 0.3%, respectively. Global equities and infrastructure underperformed their benchmarks. Investment income was -$2.4 million in 2021/22 (-$17.7 million after the provision for pension).

Similar to the Basic Claims portfolio, the transitional benchmark calculations for this portfolio were discontinued after March 2020 as the portfolio was substantially funded. By June 2020, the initial allocation to Private Debt was entirely funded.

INV.10.8 MPI Performance Relative to Other Institutional Investors

Minimum Filing Request C.5 stated:

> *"Please provide a 5-year comparison of the Corporation's total annual investment return rates with the corresponding annual return rates of:*
>
> *a) Insurance Corporation of British Columbia, and*
>
> *b) Saskatchewan Auto Fund, and please provide commentary on any significant differences."*

The performance of the consolidated investment portfolio belonging to MPI was compared against the Insurance Corporation of British Columbia (ICBC) and Saskatchewan Government Insurance (SGI), Workers' Compensation Board Manitoba (WCB), Civil Service Superannuation Board (CSSB), and the Manitoba Teachers' Retirement Allowance Fund (TRAF) over the last five years.

During this period SGI, ICBC and MPI changed their FYEs to March 31; SGI changed from December 31 in 2016, ICBC changed from December 31 in 2017 and MPI changed from February 28 in 2020. The FYE of other funds is December 31. As a result, the performance for each fund is reported for their appropriate FYE along with the performance of MPI over the same period. The result is that in each year, the performance of MPI is reported over the 12 months ended at both March 31 and December 31. This ensures that its performance is always calculated over a period that matches the reporting periods of the other funds.

The return for MPI was presented for the consolidated portfolio (i.e., the total of all five new portfolios) for 2021 to be consistent with prior periods.

In 2021, the investment portfolio of MPI underperformed ICBC & SGI by 2.3% and 9.5% respectively. In addition, the investment portfolio of MPI also underperformed TRAF, CSSB & WCB by 13.5%, 7.9% and 6.8% respectively (see *Figure INV-30*). Over the last five years, MPI outperformed ICBC by 0.6% but underperformed TRAF, CSSB, SGI and WCB by 3.3%, 2.4%, 2.3% and 2.0% respectively.

The asset allocation of these funds is very different than the asset allocation of the MPI fund. When the asset allocations of other funds were adjusted to match its asset allocation, MPI outperformed ICBC by 0.1%, but underperformed TRAF by 4.5%, WCB by 1.8%, CSSB by 1.3% and SGI by 0.9% (see *Figure INV-31*) in 2021. Adjusted returns are presented for 2019, 2020 and 2021 only because the data required to calculate adjusted returns was not available for every fund prior to 2019.

Figure INV- 30 Fiscal Year Gross Annual Returns

Line		TRAF	CSSB	WCB	ICBC	SGI	MPI	
No.	Year-end Period	31-Dec	31-Dec	31-Dec	31-Mar	31-Mar	31-Dec	31-Mar
1	**2017**	9.2%	10.8%	8.3%	5.2%	8.3%	6.3%	6.0%
2	**2018**	3.1%	-0.9%	1.5%	1.7%	7.2%	4.9%	4.8%
3	**2019**	12.0%	13.7%	12.4%	5.3%	5.6%	8.8%	6.5%
4	**2020**	6.9%	9.0%	9.0%	1.4%	0.4%	7.9%	1.5%
5	**2021**	16.6%	11.0%	9.9%	11.2%	18.4%	3.1%	8.9%
6	**Annualized Return**							
7	**over the 5 year period:**	9.5%	8.6%	8.2%	4.9%	7.8%	*6.2% / 5.5% / 5.5%	
8	**MPI Value Added**	-3.3%	-2.4%	-2.0%	0.6%	-2.3%		
9	*6.2% : Comparative return to TRAF, CSSB, WCB (returns to Dec 31), 5.5% : Comparative return to ICBC, 5.5% : Comparative return to SGI							

Figure INV- 31 Fiscal Year Gross Annual Returns – Adjusted

Line		TRAF	CSSB	WCB	ICBC	SGI	MPI	
No.	Year-end Period	31-Dec	31-Dec	31-Dec	31-Mar	31-Mar	31-Dec	31-Mar
1	**2019**	9.7%	10.8%	8.6%	5.1%	5.8%	8.8%	6.5%
2	**2020**	7.2%	8.8%	8.1%	2.0%	3.7%	7.9%	1.5%
3	**2021**	7.6%	4.4%	4.9%	8.8%	9.8%	3.1%	8.9%
4	**MPI Value Added**	-4.5%	-1.3%	-1.8%	0.1%	-0.9%		

MPI asked Mercer to review its performance relative to these institutional investors as part of the ALM study. Mercer concluded that MPI should compare the performance of its investment managers to relevant benchmarks set out in its Investment Policy Statement and relevant peer universes for each asset manager. Mercer further concluded that MPI should not "continue with peer comparison at the total fund return level". In other words, MPI should not compare itself to pension plans or even other insurance companies as they may have very different liability profiles, regulatory requirements, risk appetites and performance objectives.

INV.11 Rebalancing

Rebalancing is a major component of the financial model and ensures that the asset classes stay within the tolerance ranges defined in the IPS. This section discusses the rebalancing assumptions in the model for:

- Basic claims portfolio supporting the claims liabilities; and
- RSR and EFB.

INV.11.1 Basic Claims Portfolio supporting Basic Claims Liabilities Rebalancing

The Basic claims portfolio rebalancing rules are as follows:

- The dollar amount of the Basic fixed income portfolio is rebalanced to match the present value of Basic claims liabilities on an annual basis.
- The marketable bond duration is matched to the claims duration of the previous quarter. Duration matching occurs in the first quarter of each fiscal year based on the claim duration at the previous FYE.
- Rebalancing to ensure dollar matching occurs within the financial model only once a year and only if the dollar difference between Basic claims assets and Basic claims liabilities exceeds +/- $20 million. Any transfers would be funded by the RSR portfolio.

Figure INV- 32 Basic Claims Portfolio Asset Allocation

Line No.	Basic Claims Asset Allocation	Minimum	Target	Max
1	**Fixed Income**			
2	**Provincial Bonds**	50.0%	60.0%	70.0%
3	**Corporate Bonds**	10.0%	20.0%	30.0%
4	**MUSH**	0.0%	20.0%	30.0%
5	**Total Fixed Income**		**100.0%**	
6	**Public Equities**			
7	**Canadian Equities**		0.0%	
8	**Global Equities**		0.0%	
9	**Global Low Volatility**		0.0%	
10	**Total Equities**		**0.0%**	
11	**Alternatives**			
12	**Canadian Real Estate**		0.0%	
13	**Infrastructure**		0.0%	
14	**Total Alternatives**		**0.0%**	

Rebalancing

In order to ensure dollar matching is maintained within the model, any surplus (or deficit) between the Basic claims fixed income portfolio and Basic claims liabilities is transferred to (or funded from) the liquid asset classes within the RSR portfolio. The allocation ratios are shown in the figure below.

Figure INV- 33 Allocation Ratio

Line No.	Description	Target Weight	Allocation Ratio
1	**Basic Line of Business Portfolio**		
2	**Provincial Bonds**	60.0%	75.0%
3	**Corporate Bonds**	20.0%	25.0%
4	**Total**	**80.0%**	**100.0%**
5	**RSR Asset Classes**		
6	**Provincial Bonds**	20.0%	30.8%
7	**Corporate Bonds**	10.0%	15.4%
8	**Canadian Equities**	12.0%	18.5%
9	**Global Equities**	13.0%	20.0%
10	**Global Low Volatility**	10.0%	15.4%
11	**Total**	**65.0%**	**100.0%**

To illustrate, using a hypothetical $100 million dollar shortfall in Q1 between the Basic claims fixed income portfolio and the Basic claims liabilities, the model will transfer $30.8M, $15.4M, $18.5M, $20.0M and $15.4M from the Provincial, corporate, Canadian equity, global equity and global low volatility asset classes in the RSR portfolio, respectively. This money will be invested in Provincial and corporate bonds within the Basic claims portfolio in a 75%/25% ratio.

INV.11.2 RSR and EFB Rebalancing Assumptions

The next two figures show the RSR and EFB asset allocations.

Figure INV- 34 RSR Asset Allocation

Line No.	Description	Minimum	Target	Max
1	**Fixed Income**			
2	**Provincial Bonds**	10.0%	20.0%	30.0%
	Corporate Bonds	0.0%	10.0%	20.0%
3	**MUSH Bonds**	0.0%	0.0%	0.0%
4	**Private Debt**	15.0%	20.0%	25.0%
5	**Total Fixed Income**	**40.0%**	**50.0%**	**60.0%**
6	**Public Equities**			
7	**Canadian Equities**	7.0%	12.0%	17.0%
8	**Global Equities**	8.0%	13.0%	18.0%
9	**Global Low Volatility**	5.0%	10.0%	15.0%
10	**Total Equities**	**25.0%**	**35.0%**	**45.0%**
11	**Alternatives**			
12	**Canadian Real Estate**	7.0%	10.0%	20.0%
13	**Infrastructure**	2.0%	5.0%	8.0%
14	**Total Alternatives**	**10.0%**	**15.0%**	**20.0%**

Figure INV- 35 Employee Future Benefits Asset Allocation

Line No.	Description	Minimum	Target	Max
1	**Fixed Income**			
2	**Corporate Bonds**	10.0%	20.0%	30.0%
3	**Private Debt**	10.0%	20.0%	30.0%
4	**Total Fixed Income**	**30.0%**	**40.0%**	**50.0%**
5	**Public Equities**			
6	**Canadian Equities**	5.0%	10.0%	15.0%
7	**Global Equities**	13.0%	18.0%	23.0%
8	**Global Low Volatility**	2.0%	7.0%	12.0%
9	**Total Equities**	**25.0%**	**35.0%**	**45.0%**
10	**Alternatives**			
11	**Canadian Real Estate**	12.0%	15.0%	18.0%
12	**Infrastructure**	7.0%	10.0%	13.0%
13	**Total Alternatives**	**20.0%**	**25.0%**	**30.0%**

The rebalancing rules for the RSR and EFB portfolios are summarized below.

1. **Marketable Bonds (Provincial and Corporate Bonds)**
   If Provincial and corporate bonds remain outside their tolerance ranges for two consecutive quarters, the asset class will be adjusted to the target weight in the following quarter. The total portfolio reallocation requirements will be sourced from or reallocated from the equity portfolio.

2. **Equities**
   For Canadian equities, global equities and global low volatility equities, when the asset class remains outside the maximum or minimum allocation limit for two consecutive quarters, then the asset class will be adjusted to the target weight in the following quarter. Inflows or outflows required for rebalancing will come from marketable bonds.

3. **Illiquid Asset Classes (MUSH, Private Debt, Real Estate, Infrastructure)**
   MUSH, private debt, real estate and infrastructure are illiquid and are not automatically rebalanced in the model (as a result of asset class modeling constraints). However, transfers from Extension to RSR are modeled to rebalance all assets classes (independent of illiquidity) to target. The forecasted MUSH and real estate values do not fall outside of their respective tolerance ranges during the five-year forecast period. Private debt within the RSR portfolio is within the tolerable ranges during the five-year forecast period as this is expected to be fully funded in 2022/23.

INV.12 Comparison of Forecast

This section compares the forecasts of the current and previous years. *Figure INV-36* provides detailed investment income information from the 2023 GRA interest rate forecast scenario. *Figure INV-37* provides information from the 2022 GRA and *Figure INV-38* compares the difference between *Figure INV-36* and *Figure INV-37*.

Figure INV- 36 2023 GRA Investment Income (Basic Line of Business)

Line No.	Category	2021/22P	2022/23F	2023/24F	2024/25F	2025/26F
1	*('000s)*					
2	Short Term Interest	93	664	586	593	599
3	Marketable Bonds	81,430	62,950	66,482	69,987	73,087
4	MUSH	0	19,328	18,254	17,184	16,205
5	Long-Term Bond Income	**81,430**	**82,278**	**84,735**	**87,171**	**89,292**
6	Marketable Unrealized Gains/(Loss)	(123,025)	6,325	133	144	149
7	Marketable Realized Gains/(Loss)	(3,975)	(10,254)	(304)	(285)	(299)
8	Total Marketable Gain/Loss	**(127,000)**	**(3,929)**	**(172)**	**(141)**	**(150)**
9	Income	4,800	6,619	7,522	6,812	7,220
10	Gain/Loss	0	0	(1,348)	0	(757)
11	Private Debt	**4,800**	**6,619**	**6,174**	**6,812**	**6,463**
12	Total Fixed Income	**(40,677)**	**85,632**	**91,323**	**94,435**	**96,204**
13	Canadian Equities	5,258	2,678	2,737	2,881	3,215
14	Global Equities	3,578	2,263	2,622	2,933	3,244
15	Global Low Vol		1,169	1,312	1,464	1,645
16	Equity Dividends	**8,836**	**6,110**	**6,672**	**7,277**	**8,105**
17	Canadian Equities	5,943	25,784	6,942	3,648	4,127
18	Global Equities	4,807	9,824	6,577	3,746	4,629
19	Global Low Vol	1,571	8,320	2,675	2,124	2,636
20	Equity Realized Gain/Loss	**12,321**	**43,928**	**16,195**	**9,518**	**11,393**
21	Total Equities	**21,157**	**50,038**	**22,867**	**16,795**	**19,497**
22	Real Estate (Pooled Fund)	15,342	10,987	7,085	7,725	7,499
23	Real Estate (CityPlace)	148	350	359	367	374
24	Infrastructure	2,072	7,379	4,922	4,627	5,192
25	Venture Capital	0	0	0	0	0
26	Total Alternatives	**17,562**	**18,716**	**12,366**	**12,719**	**13,066**
27	Management Fees	(4,802)	(4,353)	(4,448)	(4,578)	(4,846)
28	Pension Expense	(11,439)	(11,237)	(11,511)	(11,789)	(11,789)
29	Bond Amortization	(6,962)	(2,698)	(3,083)	(3,311)	(3,448)
30	Investment Write-Down	(22,023)	0	0	0	0
31	Total Other	**(45,226)**	**(18,288)**	**(19,042)**	**(19,678)**	**(20,083)**
32	Basic LOB Total	**(47,184)**	**136,097**	**107,515**	**104,271**	**108,684**

Figure INV- 37 2022 GRA Investment Income (Basic Line of Business)

Line No.	Category	2021/22F	2022/23F	2023/24F	2024/25F	2025/26F
1	**('000s)**					
2	**Short Term Interest**	98	90	90	90	90
3	**Marketable Bonds**	60,916	58,966	57,581	58,445	60,035
4	**MUSH**	20,940	20,134	19,317	18,486	17,682
5	**Long-Term Bond Income**	**81,856**	**79,100**	**76,898**	**76,931**	**77,716**
6	**Marketable Unrealized Gains/(Loss)**	(1,684)	(650)	160	170	182
7	**Marketable Realized Gains/(Loss)**	1,996	1,090	(215)	(227)	(241)
8	**Total Marketable Gain/Loss**	**312**	**440**	**(56)**	**(58)**	**(59)**
9	Income	4,418	5,255	7,195	7,804	8,471
10	Gain/Loss		0	0	0	0
11	**Private Debt**	**4,418**	**5,255**	**7,195**	**7,804**	**8,471**
12	**Total Fixed Income**	**86,684**	**84,884**	**84,127**	**84,767**	**86,218**
13	**Canadian Equities**	3,254	3,567	3,722	4,078	4,467
14	**Global Equities**	2,904	3,389	3,884	4,231	4,610
15	**Global Low Vol**	1,638	1,900	2,185	2,394	2,624
16	**Equity Dividends**	**7,796**	**8,855**	**9,791**	**10,702**	**11,701**
17	**Canadian Equities**	6,872	4,714	4,716	4,786	4,915
18	**Global Equities**	4,571	4,436	4,882	5,344	5,845
19	**Global Low Vol**	2,036	2,561	3,078	3,503	3,915
20	**Equity Realized Gain/Loss**	**13,478**	**11,710**	**12,676**	**13,633**	**14,675**
21	**Total Equities**	**21,274**	**20,566**	**22,467**	**24,335**	**26,376**
22	**Real Estate (Pooled Fund)**	4,708	7,126	7,805	8,623	9,375
23	**Real Estate (CityPlace)**	1,128	1,117	1,107	1,093	1,093
24	**Infrastructure**	5,085	5,371	5,820	6,367	6,872
25	**Venture Capital**	0	0	0	0	0
26	**Total Alternatives**	**10,921**	**13,614**	**14,732**	**16,083**	**17,340**
27	**Management Fees**	(4,595)	(4,976)	(5,422)	(5,777)	(6,064)
28	**Pension Expense**	(10,992)	(11,263)	(11,538)	(11,817)	(11,817)
29	**Bond Amortization**	(2,742)	(3,101)	(3,333)	(4,938)	(6,733)
30	**Investment Write-Down**	0	0	0	0	0
31	**Total Other**	**(18,329)**	**(19,340)**	**(20,293)**	**(22,532)**	**(24,614)**
32	**Basic LOB Total**	**100,549**	**99,724**	**101,032**	**102,654**	**105,319**

Figure INV- 38 This Year vs Last Year Basic Line of Business Investment Income

Line No.	Category	2021/22P	2022/23F	2023/24F	2024/25F	2025/26F
1	*('000s)*					
2	**Short Term Interest**	(5)	574	496	503	509
3	**Marketable Bonds**	20,514	3,984	8,901	11,542	13,052
4	**MUSH**	(20,940)	(806)	(1,064)	(1,302)	(1,476)
5	**Long-Term Bond Income**	**(426)**	**3,178**	**7,837**	**10,240**	**11,576**
6	**Marketable Unrealized Gains/(Loss)**	(121,341)	6,974	(27)	(26)	(32)
7	**Marketable Realized Gains/(Loss)**	(5,971)	(11,343)	(89)	(58)	(58)
8	**Total Marketable Gain/Loss**	(127,312)	(4,369)	(116)	(84)	(90)
9	**Income**	382	1,364	327	(992)	(1,251)
10	**Gain/Loss**	0	0	(1,348)	0	(757)
11	**Private Debt**	**382**	**1,364**	**(1,021)**	**(992)**	**(2,008)**
12	**Total Fixed Income**	**3,662**	**2,679**	**2,446**	**2,531**	**3,421**
13	**Canadian Equities**	2,004	(889)	(985)	(1,197)	(1,252)
14	**US Equities/Global Equities**	674	(1,126)	(1,261)	(1,298)	(1,366)
15	**Global Low Vol**	(1,638)	(731)	(872)	(931)	(979)
16	**Equity Dividends**	**1,040**	**(2,746)**	**(3,119)**	**(3,425)**	**(3,596)**
17	**Canadian Equities**	(929)	21,070	2,226	(1,137)	(788)
18	**US Equities/Global Equities**	236	5,388	1,696	(1,598)	(1,216)
19	**Global Low Vol**	(465)	5,759	(403)	(1,379)	(1,279)
20	**Equity Realized Gain/Loss**	**(1,157)**	**32,217**	**3,519**	**(4,114)**	**(3,282)**
21	**Total Equities**	**(117)**	**29,472**	**400**	**(7,540)**	**(6,878)**
22	**Real Estate (Pooled Fund)**	10,634	3,861	(720)	(898)	(1,875)
23	**Real Estate (CityPlace)**	(980)	(767)	(748)	(726)	(719)
24	**Infrastructure**	(3,013)	2,008	(898)	(1,740)	(1,680)
25	**Venture Capital**	0	0	0	0	0
26	**Total Alternatives**	**6,641**	**5,102**	**(2,366)**	**(3,364)**	**(4,274)**
27	**Management Fees**	(207)	623	974	1,200	1,218
28	**Pension Expense**	(447)	27	27	28	28
29	**Bond Amortization**	(4,220)	403	250	1,627	3,285
30	**Investment Write-Down**	(22,023)	0	0	0	0
31	**Total Other**	**(26,897)**	**1,052**	**1,252**	**2,854**	**4,531**
32	**Basic LOB Total**	**(147,733)**	**36,373**	**6,482**	**1,618**	**3,365**

INV.12.1 Explanation of Major Differences between 2023 GRA and 2022 GRA Forecasted Years (2022/23 to 2025/26)

Long Term Bond Income

- Long term interest income was $6.5M higher on average over the five-year projection period compared to the forecast from the previous year, driven primarily by marketable bonds and slightly dragged down by MUSH. This was caused by increasing long-term provincial interest rates since the 2022 GRA as well as a decrease in the assumed amount of MUSH bonds that MPI will purchase over the forecasted period (2022 GRA: $40 million per year, 2023 GRA: $20 million per year)

Marketable Bonds Losses

- As MPI used a naïve forecast in both the 2022 and 2023 GRAs, there is a $121 million unrealized loss on marketable bonds as a result of increase in interest rates.

Canadian, Global Equities & Low Volatility Global Equities

- Equity dividends were higher by $1M compared to the forecast of the previous year for 2021/22 and lower by $2.7M in 2022/23. Equity dividends are based upon a forecast of dividend yields from Bloomberg. Dividend yields declined significantly from March 2022 to March 2023, which impacted forecasted dividend income.
- Realized gains are forecasted to be on average $5.4M higher throughout the forecast due largely to an accumulation of unrealized equity gains, which become realized due to normal turnover throughout the forecast period. The unrealized gains are largely associated with increases in equity share prices from March 2021 to March 2022. Realized gains in 2022/23 were $32.2M higher than projected in 2022 due to a $100M transfer from RSR to Basic Claims in May 2022 which was funded by the sale of equities and some fixed income assets and resulted in the realization of gains.

INV.12.2 Explanation of Major Differences in 2021/22 Actuals vs. Forecast

In the 2022 GRA, total Basic investment income for 2021/22 was forecasted to be $100.5 million. Actual investment income for 2021/22 was $147.7 million lower than forecast at -$47.2 million. This difference can be primarily attributed to higher-than-expected capital loss for marketable bonds (due to rising interest rates) and write downs. These unexpected losses are partially offset by higher-than-expected gains from the pooled real estate fund and higher than expected realized gains in equities. Losses due to rising interest rates were also offset by decreases in the present value of the claims liability.

See the previous figure for the detailed breakdown – highlights are provided below.

- Dividends from equities were $1.0 million higher than forecasted.
- Realized gains on equities were $1.2 million lower than forecasted.
- Total capital gains/losses for marketable bonds were $127.3 million lower than forecasted due to rising interest rates. Rising interest rates reduced the Basic claims liabilities by $132.8 million.
- Interest income was $0.5 million lower than forecasted.
- Gains from the pooled real estate fund were $10.6 million higher than forecasted.
- Net rental income from Cityplace was $0.9 million lower than forecasted.
- Infrastructure investment income was $3.0 million lower than forecasted.
- Bond amortization was $4.2 million higher than forecasted.
- The write off of impaired securities were $22 million higher than forecasted.

INV.13 Changes To the Investment Income Model

No major changes to the current investment income model have been made. It is expected that once the 2022 ALM study is finalized and the new asset mix for each portfolio is approved by the BoD, the necessary changes will be made to the financial model. At present these changes are not expected to be made until the 2024 GRA.

INV.14 Interest Rate Forecasts and CPI Forecast Detail

This section shows detail on the interest rate forecasts and the CPI forecast. For the naïve interest rate forecast used in the 2023 rate application, see *Figure INV-3* for the 10-year GoC bond yield, the marketable bond yield, MUSH yield, and claims discount rate.

INV.14.1 Interest Rate Forecast

The naïve interest rate forecast is based on the March 31, 2022 GoC 10-year bond yield, which was 2.41%; this interest rate is used throughout the entire five-year forecast for the 2023 GRA. Additionally, the 90-Day T-Bill yield on March 31, 2022 was 0.60%. This yield was used over the forecast period as well.

INV.14.2 Canadian and Manitoba CPI Forecast

The Canadian CPI forecast is used in the calculation of real estate and infrastructure returns. The Manitoba CPI forecast is used in the calculation of projected indexation rates for Personal Injury Protection Plan (PIPP) benefits.

INV.14.2.1 Canadian CPI Forecast

Figure INV- 39 Canadian CPI Forecast

Line No.	Year	Qtr	Scotia	CIBC	RBC	TD	BMO NB	Global	Average
1	**2022**	**Q1**	4.5%	4.9%	5.3%	4.7%	5.3%	5.1%	5.0%
2		**Q2**	4.3%	3.7%	5.2%	4.1%	5.1%	5.4%	4.6%
3		**Q3**	4.3%	2.7%	4.1%	3.2%	4.5%	4.4%	3.9%
4		**Q4**	3.9%	2.0%	3.1%	2.3%	4.1%	3.8%	3.2%
5	**2023**	**Q1**	3.7%	1.7%	2.4%	2.1%		2.8%	2.5%
6		**Q2**	3.4%	1.9%	2.2%	2.1%		1.6%	2.2%
7		**Q3**	3.0%	2.0%	2.3%	2.2%		1.8%	2.3%
8		**Q4**	2.7%			2.2%		1.9%	2.3%
9	**Annual**								
10	**2022**		4.3%	3.3%	4.4%	3.6%		3.2%	3.8%
11	**2023**		3.2%	1.9%	2.3%	2.2%		2.1%	2.3%
12	**2024**							2.0%	2.0%
13	**2025**							2.0%	2.0%
14	**2026**							2.0%	2.0%

15 Bloomberg
16 Global Insight, "Canadian Forecast and Analysis", April 2022

Assumption: Canadian CPI is forecasted to be 3.8% in 2022/23, 2.3% in 2023/24, and 2.0% thereafter.

Figure INV- 40 Manitoba CPI Forecast

Line No.	Source	2022	2023	2024	2025	2026
1	**Global Insight**	2.5%	1.9%	2.2%	2.0%	2.0%
2	**RBC Royal Bank**	4.7%	2.2%			
3	**BMO Capital Market Economics**	5.4%	3.2%	2.4%	2.0%	
4	**Overall Average**	4.2%	2.4%	2.3%	2.0%	2.0%

5 Sources:
6 Global Insight, "Canadian Provincial Forecast and Analysis", January 2022
7 RBC Economics, "Provincial Outlook", March 2022
8 BMO Financial Group, "Provincial Economic Outlook", April 2022

Assumption: Manitoba CPI is forecasted to be 4.2% in 2022/23, 2.4% in 2023/24, 2.3% in 2024/25 and 2.0% thereafter.

INV.15 Accounting by Asset Class

This section summarizes the accounting treatment for each asset class, as per the Annual Review of Accounting Policies – Classification of Financial Instruments.

Basic Claims

100% of Basic claims will be allocated to fixed income. As the sole purpose of the portfolio is to back outstanding claims liabilities, these assets (excluding MUSH) will be designated as FVTPL in order to hedge movements in the interest rate sensitive claims liabilities and therefore reduce accounting mismatch and interest rate risk.

MUSH bonds will continue to be classified as Held to Maturity (HTM), as MPI intends to hold these securities to maturity. They will roll off the portfolio as the various issues mature over time.

Rate Stabilization Reserve

Fixed income within the RSR portfolio is not principally bought to recognize short term trading gains and does not address accounting mismatch. However, these securities are not necessarily intended to be held to maturity and therefore new assets assigned to the portfolio will be classified as Available for Sale.

Extension

Fixed income within Extension is not principally bought to recognize short term trading gains and does not predominately address accounting mismatch. The Extension portfolio backs both claims and surplus; because the underlying claims are short term in nature (1 year duration), and not particularly interest rate sensitive, and because surplus currently represents approximately 80% of the value, the Extension portfolio is considered essentially surplus. These securities are not necessarily intended to be HTM and therefore new assets assigned to the portfolio will be classified as AFS.

Employee Future Benefits

40% of EFB will be allocated to fixed income. The EFB portfolio backs pension and other future employee obligations. While the EFB liability is sensitive to changing interest rates, these re-measurement gains/losses are recognized in Other Comprehensive Income and therefore the fixed income backing EFB will be classified as AFS.

Applicable to all Portfolios with allocations to growth assets

Equities do not meet the criteria to be classified as FVTPL or HTM and therefore will be classified as AFS within all portfolios.

Infrastructure and Real Estate are not principally bought to recognize short term trading gains and they do not address accounting mismatch. These alternative assets will be designated as FVTPL on the basis that they are managed, and their performance is evaluated on a fair value basis, as appraisal gains are a significant component of their total return.

There will be no changes to the investment portfolio as a result of IFRS 17. Upon adoption of IFRS 9 on April 1, 2023 all investments will be reclassified as fair value through profit and loss (FVTPL).

INV.16 Asset Liability Management Program

INV.16.1 Background on ALM Program

MPI uses duration and dollar matching, referred to as the ALM program, in order to manage the interest rate risk associated with its assets and liabilities. In June 2021, moment matching was introduced to manage interest rate risk associated with Basic Claims liabilities. Moment Matching is an immunization method that integrates actuarial discount rates in the computation of the present value and interest rate sensitivity of the liabilities. Interest rate risk for Basic Claims is managed by matching the first and second moments of the marketable bond portfolio (including government bonds, corporate bonds, floating rate notes and short-term investments) to the first and second moments of the Basic Claims liabilities of MPI (excluding the liabilities matched to the MUSH bond portfolio) with the present value of the liabilities calculated using a market-based yield curve.

Section *INV.8.4* of its IPS (*Appendix 1 – Investment Policy Statement*) states the following:

> *"Interest rate risk for Basic Claims is managed by matching the duration of the marketable bond portfolio (including government bonds and corporate bonds) and floating rate notes to the actuarially determined duration of the Corporation's Basic claims liabilities. The duration of the government bond portfolio will be adjusted as necessary to ensure that the duration of the marketable bond portfolio matches the duration of the Corporation's Basic claims liabilities. See the Operational Asset Liability Management Policy for additional information on managing interest rate risk."*

Reducing interest rate risk has been a focus of MPI since 2014.

- In 2014, the duration bandwidth was changed from +/- 2.0 years to +/- 1.0 year. This reduction was an intermediate step designed to reduce the interest rate, forecasting, and rate-setting risks of MPI until the ALM Study was completed.

- In 2015, an ALM Study was completed with assistance from Aon, and the fixed income portfolio duration was fully matched (within +/- 0.25 years) to the corporate claims liability duration.

- In late 2017, the most recent ALM Study was completed with assistance from Mercer, which recommended the separation of the commingled investment portfolio into 5 unique portfolios that back the liabilities and surplus of MPI.

- In 2018, the duration of the claims liabilities was matched to the duration of the marketable bond portfolio (i.e., excluding MUSH bonds) instead of being matched to the duration of the total fixed income portfolio (i.e., including MUSH bonds). This change is due to the change in the calculation methodology for the claims discount rate, which is now based upon the dollar weighted yield of the fixed income portfolio rather than the duration weighted yield of the fixed income portfolio. The net result is that the duration of the marketable bond portfolio was decreased by approximately 2 years.

- On March 1, 2019, a unique portfolio for the Basic claims assets was implemented that includes only fixed income assets. The change to a 100% fixed income portfolio for Basic claims reduced interest rate risk for the Basic line of business. This is discussed further in section *INV.16.2.2*.

- On May 31, 2021 a refinement to the current dollar and duration matching strategy was implemented in order to better protect the corporation from both parallel and non-parallel changes in interest rates. This was accomplished by establishing a new portfolio, called the "completion portfolio", to be managed by Addenda Capital. Going forward Addenda will be responsible for ensuring that the dollar value, duration and convexity of the total Basic Claims asset portfolio matches the dollar value, duration and convexity of the Basic Claims liabilities on a daily basis. Addenda will monitor the duration and convexity of the Provincial bonds, non-marketable bonds and corporate bonds and will adjust the duration of the completion portfolio as required in order to ensure that that the overall duration and convexity are matched to the claims liabilities. This strategy is called moment matching and is expected to reduce the interest rate risk of MPI by 40% - 50% with minimal impact on the yield of the portfolio.

INV.16.2 Interest Rate Risk Definitions

Interest rate risk, for the purpose of this application, is the net impact of changes in interest rates on claims liabilities and the gain or loss for marketable bonds. Interest rate risk is shown on a Basic basis in sections *INV.16.2.1* and *INV.16.2.2*.

Interest rate forecasting risk, for the purpose of this application, is the uncertainty related to setting premium rates based on forecasted interest rates rather than future actual interest rates and the impact of the difference between them.

INV.16.2.1 Basic Interest Rate Risk with Naïve Forecast

Figure INV- 41 Basic Investment and Claims Net Interest Rate Impact with Naïve Forecast

Line No.		2017/18 Actual	2018/19 Actual	2019/20 Actual	2020/21 Actual	2021/22 Actual	2022/23 Forecast	2023/24 Forecast	2024/25 Forecast	2025/26 Forecast	2026/27 Forecast
1	*(in Millions of Dollars)*										
2	Marketable Bond Yield	3.04%	2.88%	2.69%	2.50%	2.52%	3.44%	3.43%	3.42%	3.41%	3.40%
3	YoY Change	0.13%	-0.16%	-0.19%	-0.19%	0.01%	0.92%	-0.01%	-0.01%	-0.01%	-0.01%
4	Claims Discount Rate	3.47%	3.26%	3.09%	2.88%	3.54%	3.55%	3.53%	3.51%	3.50%	3.47%
5	YoY Change	0.08%	-0.21%	-0.17%	-0.21%	0.66%	0.01%	-0.02%	-0.02%	-0.01%	-0.03%
6	Duration Gap (Years)*	0.1	(0.1)	0.9	(0.2)	0.1	-	-	-	-	-
7	Investments										
8	Investment Income	116.3	208.5	59.6	89.5	(47.2)	136.1	107.5	104.3	108.7	109.6
9	(1) Marketable Bond Gain/(Loss)	4.6	14.2	5.5	0.7	(127.0)	(3.9)	(0.2)	(0.1)	(0.1)	(0.1)
10	Investment Income excluding Marketable Bond G/L	111.7	194.3	54.1	88.9	79.8	140.0	107.7	104.4	108.8	109.6
11	Claims										
12	Net Claims Incurred	783.0	892.3	761.5	653.8	838.6	885.5	927.8	970.7	1,016.6	1,071.8
13	(2) Claims Interest Rate Impact	(15.8)	40.9	(8.9)	44.2	(132.8)	(2.5)	4.8	4.5	2.9	6.2
14	Claims Excluding Interest Rate Impact	798.8	851.4	770.4	609.6	971.3	888.1	923.0	966.2	1,013.7	1,065.6
15	Net Interest Rate Impact										
16	(1) Marketable Bond Gain/Loss	4.6	14.2	5.5	0.7	(127.0)	(4.0)	(0.2)	(0.1)	(0.2)	(0.1)
17	(2) Claims Interest Rate Impact	(15.8)	40.9	(8.9)	44.2	(132.8)	(2.5)	4.8	4.5	2.9	6.2
18	Net Impact of Changes in Interest Rates [(1) - (2)]	20.4	(26.7)	14.4	(43.5)	5.8	(1.5)	(4.9)	(4.6)	(3.0)	(6.3)

The net impact of changes in interest rates from 2022/23 to 2026/27 is on average ($4.1 million) per year based on the naïve interest rate forecast. This is in comparison to the prior 2021/22 to 2025/26 average net impact of changes in interest rate of ($11.1 million). The decline of the negative net impact is primarily due to the increasing MUSH yield. As MUSH bonds are reported at their historical book value and book yield, they do not reflect the current high interest rate environment. Therefore, newly purchased MUSH bonds increase the weighted average yield of the MUSH bond portfolio. This impact cannot be hedged. MUSH yield increases from 4.28% at the beginning of the forecast period to 4.37% by the end of the forecast period as older lower yielding MUSH bonds mature. This factor positively impacts the claims discount rate and the present value of the claims liabilities with no offsetting impact from the fixed income portfolio.

INV.16.2.2 Reduction in Basic Interest Rate Risk

Interest rate risk has been significantly reduced by creating a unique asset allocation for Basic claims. To illustrate, for each year from 2022/23 to 2024/25, the GoC 10-year bond rate was increased by 100 bps on the last day of the fiscal year. *Figure INV-42* shows the net impact on the Basic line of business in the 2022 GRA compared to the 2023 GRA.

Forecasted interest rate risk decreased from the 2022 GRA to the 2023 GRA. On average the net impact was $7.0M in the 2022 GRA and -$4.1M in the 2023 GRA (2022/23 to 2024/25).

Figure INV- 42 +100 Bps GoC 10 Year Bond Comparison 2022 GRA to 2021 GRA

Line No.	Description	2022/23	2023/24	2024/25
1	**2022 GRA**			
2	**Marketable Bond G/L**	(157.6)	(166.6)	(176.9)
3	**Claims Interest Rate Impact**	(163.8)	(173.4)	(184.9)
4	**Net Impact**	**6.1**	**6.8**	**8.1**
5	**2023 GRA**			
6	**Marketable Bond G/L**	(160.7)	(158.8)	(164.4)
7	**Claims Interest Rate Impact**	(154.4)	(154.5)	(162.6)
8	**Net Impact**	**(6.3)**	**(4.2)**	**(1.8)**

INV.16.3 Discount Rate Used for the Calculation of the Interest Rate Impact on Claims Incurred

Minimum Filing Request H.6 asked for the following:

"Please provide the discount rate used for the calculation of the interest rate impact on claims incurred, and include the calculations used in the calculation of the discount rate."

The interest rate impact on claims incurred is the difference between net claims incurred using the current discount rate and evaluating the net claims incurred using the discount rate from last year for each fiscal year. The claims discount rate can be found in *Figure INV-3*.

For example, to calculate the interest rate impact on net claims incurred for 2022/23

Interest Rate Impact 2022/23 = (Net Claims Incurred @ 2022/23 Claims Discount Rate) - (Net Claims Incurred @ 2021/22 Claims Discount Rate)

INV.16.4 Historical Fixed Income Duration and Claims Duration

The figure below shows the quarterly fixed income duration and the quarterly claim liability duration communicated to the bond manager each month to maintain a duration matching strategy in compliance with the ALM program. Additionally, March 31, 2022 fixed income and claims liability durations are provided.

Figure INV- 43 Fixed Income Duration and Claims Duration

Line No.	Date	Fixed Income Duration	Claims Duration*	Difference (Fixed Income Duration - Claims Duration)
1	**Feb-20**	10.48	10.68	-0.2
2	**May-20**	10.57	10.35	0.2
3	**Aug-20**	10.41	10.57	-0.2
4	**Nov-20**	10.50	10.58	-0.1
5	**Feb-21**	10.69	10.66	0.0
6	**Mar-21**	10.38	10.35	0.0
7	**Jun-21**	10.42	10.18	0.2
8	**Sep-21**	10.37	10.13	0.2
9	**Dec-21**	10.66	10.17	0.5
10	**Mar-22**	9.58	9.50	0.1
11	* Claims Duration is one month lagged			

INV.17 Investment Policy Statement - Changes

The IPS is reviewed on an annual basis (at a minimum). The policy was last updated in May 2021 (see *Appendix 1 – Investment Policy Statement*).

No changes have been made to the IPS since May 2021. It is expected that changes to the IPS will be made once the 2022 ALM study is finalized and the final asset allocations for each portfolio are approved by the BoD.

INV.18 Investment Income Summary by Portfolio

The investment income and asset allocation for Basic Claims, RSR, and EFB for 2022/23 to 2026/27 is covered in this section.

In the RSR portfolio all asset classes are within the approved minimum and maximum weights, but the corporate operational cash target of $100 million is included in this portfolio, which prevents the fixed income asset classes from reaching their target weights. Private debt is within the minimum weight of 15% throughout the five-year forecast period.

Within the EFB portfolio all asset classes are within the approved minimum and maximum weights. (See *Figure INV-49*).

Figure INV- 44 Basic Claims Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	77,741	79,172	80,557	81,873	83,780
3	Dividend and Other Income During Period	-	-	-	-	-
4	Gains During Period - Profit & Loss	(0)	(0)	(0)	(0)	(0)
5	Investment Fees Paid	(1,430)	(1,457)	(1,492)	(1,505)	(1,512)
6	Amortization/Accretion During Period	(2,701)	(3,092)	(3,286)	(3,416)	(3,350)
7	Pension Expense	-	-	-	-	-
8	**Investment Income**	**73,609**	**74,624**	**75,778**	**76,952**	**78,918**

Figure INV- 45 Basic Claims Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	-	-	-	-	-
2	Provincial Bonds	1,126,634	1,183,000	1,256,866	1,320,489	1,398,330
3	Corporate Bonds	520,912	541,422	567,792	590,814	618,551
4	MUSH	440,475	413,036	386,568	360,135	337,390
5	**Total Assets**	**2,088,022**	**2,137,459**	**2,211,226**	**2,271,438**	**2,354,271**
6	Percentage Allocation					
7	Cash/Short Term Investments	0%	0%	0%	0%	0%
8	Provincial Bonds	54%	55%	57%	58%	59%
9	Corporate Bonds	25%	25%	26%	26%	26%
10	MUSH	21%	19%	17%	16%	14%
11	**Total**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure INV- 46 RSR Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	2,189	2,934	3,822	4,479	3,805
3	Dividend and Other Income During Period	7,371	7,920	7,319	8,174	7,079
4	Gains During Period - Profit & Loss	40,002	10,969	5,907	7,007	6,309
5	Investment Fees Paid	(1,264)	(1,230)	(1,243)	(1,411)	(1,182)
6	Amortization/Accretion During Period	69	72	36	26	7
7	**Investment Income**	**48,366**	**20,665**	**15,841**	**18,275**	**16,018**

Figure INV- 47 RSR Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	97,438	98,508	100,000	100,000	100,000
2	Provincial Bonds	45,518	74,429	79,778	70,667	82,732
3	Corporate Bonds	34,040	37,214	39,889	35,333	41,366
4	MUSH	-	-	-	-	-
5	Private Debt	90,643	74,429	79,778	70,667	82,732
6	Total Fixed Income	**267,639**	**284,580**	**299,445**	**276,667**	**306,830**
7	Canadian Equities	40,848	44,657	47,867	42,400	49,639
8	Global Equities	44,252	48,379	51,856	45,933	53,776
9	Global LV Equities	34,040	37,214	39,889	35,333	41,366
10	Real Estate Investments	39,797	42,817	45,337	40,626	46,504
11	Infrastructure & Venture Capital	17,020	18,607	19,945	17,667	20,683
12	Total Growth Assets	**175,958**	**191,675**	**204,892**	**181,960**	**211,968**
13	Total Assets	**443,597**	**476,254**	**504,337**	**458,626**	**518,797**
14	Percentage Allocation					
15	Cash/Short Term Investments	22.0%	20.7%	19.8%	21.8%	19.3%
16	Provincial Bonds	10.3%	15.6%	15.8%	15.4%	15.9%
17	Corporate Bonds	7.7%	7.8%	7.9%	7.7%	8.0%
18	MUSH	0.0%	0.0%	0.0%	0.0%	0.0%
19	Private Debt	20.4%	15.6%	15.8%	15.4%	15.9%
20	Total Fixed Income	**60.3%**	**59.8%**	**59.4%**	**60.3%**	**59.1%**
21	Canadian Equities	9.2%	9.4%	9.5%	9.2%	9.6%
22	Global Equities	10.0%	10.2%	10.3%	10.0%	10.4%
23	Global LV Equities	7.7%	7.8%	7.9%	7.7%	8.0%
24	Real Estate Investments	9.0%	9.0%	9.0%	8.9%	9.0%
25	Infrastructure & Venture Capital	3.8%	3.9%	4.0%	3.9%	4.0%
26	Total Growth Assets	**39.7%**	**40.2%**	**40.6%**	**39.7%**	**40.9%**
27	Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figure INV- 48 Employee Future Benefits Investment Income

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	*(C$000s)*					
2	Interest Income During Period	4,027	4,298	4,525	4,730	4,926
3	Dividend and Other Income During Period	9,648	10,204	10,796	11,469	12,124
4	Gains During Period - Profit & Loss	22,527	19,666	19,893	20,205	21,067
5	Investment Fees Paid	(2,218)	(2,354)	(2,463)	(2,580)	(2,722)
6	Amortization/Accretion During Period	(88)	(85)	(81)	(78)	(74)
7	Pension Expense	(15,020)	(15,386)	(15,758)	(15,758)	(15,758)
8	**Investment Income**	**18,876**	**16,343**	**16,912**	**17,988**	**19,564**

Figure INV- 49 Employee Future Benefit Asset Allocation

Line No.	Investment Summary During Period	2022/23	2023/24	2024/25	2025/26	2026/27
1	Cash/Short Term Investments	-	-	-	-	-
2	Provincial Bonds	-	-	-	-	-
3	Corporate Bonds	93,433	96,364	99,304	102,394	105,617
4	MUSH	-	-	-	-	-
5	Private Debt	85,676	89,482	93,457	97,608	101,944
6	**Total Fixed Income**	**179,109**	**185,846**	**192,761**	**200,002**	**207,561**
7	Canadian Equities	73,115	77,999	83,210	88,768	94,697
8	Global Equities	113,452	121,019	129,092	137,704	146,890
9	Global LV Equities	42,255	44,816	47,532	50,414	53,469
10	Real Estate Investments	100,199	106,712	113,755	120,580	127,815
11	Infrastructure & Venture Capital	64,592	68,468	72,083	76,120	80,382
12	**Total Growth Assets**	**393,613**	**419,013**	**445,671**	**473,584**	**503,254**
13	**Total Assets**	**572,722**	**604,859**	**638,432**	**673,587**	**710,815**
14	Percentage Allocation					
15	Cash/Short Term Investments	0.0%	0.0%	0.0%	0.0%	0.0%
16	Provincial Bonds	0.0%	0.0%	0.0%	0.0%	0.0%
17	Corporate Bonds	16.3%	15.9%	15.6%	15.2%	14.9%
18	MUSH	0.0%	0.0%	0.0%	0.0%	0.0%
19	Private Debt	15.0%	14.8%	14.6%	14.5%	14.3%
20	**Total Fixed Income**	**31.3%**	**30.7%**	**30.2%**	**29.7%**	**29.2%**
21	Canadian Equities	12.8%	12.9%	13.0%	13.2%	13.3%
22	Global Equities	19.8%	20.0%	20.2%	20.4%	20.7%
23	Global LV Equities	7.4%	7.4%	7.4%	7.5%	7.5%
24	Real Estate Investments	17.5%	17.6%	17.8%	17.9%	18.0%
25	Infrastructure & Venture Capital	11.3%	11.3%	11.3%	11.3%	11.3%
26	**Total Growth Assets**	**68.7%**	**69.3%**	**69.8%**	**70.3%**	**70.8%**
27	**Total**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**