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February 6, 2024

Mr. Jim Guidry  
Director  
Benefit Services Bureau  
Wisconsin Department of Employee Trust Funds  
Madison, WI 53707

**RE: IBNR Experience Studies for the Duty Disability Program**

Dear Jim,

Thank you for asking Milliman to assist Wisconsin Department of Employee Trust Funds (ETF) in performing experience studies on incurred but not reported (IBNR) claims for the Duty Disability program. We used the results of these studies to develop new assumptions for estimating IBNR claim liabilities for the Duty Disability program, which we plan to use in our actuarial valuation of the program as of December 31, 2023. This letter contains the results of our experience studies, the new valuation assumptions, and a comparison of estimated IBNR claim liabilities between the prior and new assumptions. Appendix A of this letter contains a summary of the new valuation assumptions.

*IBNR Experience Studies*

We performed IBNR experience studies for the Duty Disability program by analyzing historical claim experience from January 1, 2013 through December 31, 2022, as of December 31, 2022. In particular, we analyzed the cumulative number of claims incurred over time from 2013 through 2022, using claim data from successive years during the experience period. Based on this analysis, we noticed that some Duty Disability claims are only reported several years after the qualifying date of benefits. The following table shows the cumulative number of Duty Disability claims incurred each year between 2013 and 2022 by valuation date:

Table 1 Cumulative Duty Disability Claims Incurred Between 2013 and 2022 By Valuation Date Disabled Members										
Valuation Date	Duty Disability Claim Incurral Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
12/31/2016	21	19	16	3						
12/31/2017	22	23	18	13	7					
12/31/2018	26	24	20	21	15	2				
12/31/2019	26	26	22	24	18	10	4			
12/31/2020	26	26	23	25	21	17	7	3		
12/31/2021	26	26	23	25	22	20	15	6	4	
12/31/2022	26	26	25	25	22	22	15	13	11	1

Each column of this table represents the number of claims incurred in the year specified at the top of the column, tabulated as of the valuation date shown at the left end of each row. So, for incurral year 2018, there were only two claims disabled that year that were included in the 12/31/2018 valuation, but that number increased to 10 for the 12/31/2019 valuation, 17 for the 12/31/2020 valuation, etc.

Duty Disability claims incurred between 2013 and 2017 appear to be complete as of December 31, 2022, because the cumulative number of claims seems to be no longer increasing at the most recent valuation date and seems to have reached an ultimate level (e.g., 26 claims for incurral year 2013). For more recent incurral years, there still appear to be incurred but not reported claims as of 12/31/2022.

#### Valuation Assumptions

We calculated Duty Disability claim incidence rates by dividing the number of known claims as of December 31, 2022 (final row in Table 1) by the covered payroll for that year, as shown below:

Table 2 Cumulative Duty Disability Claims Incurred Between 2013 and 2022 By Valuation Date			
Year	Reported Claims as of December 31, 2022	Covered Payroll (CP)	Incidence Rate per \$1,000,000 of CP
2013	26	\$1,299,551,475	2.00%
2014	26	\$1,332,780,095	1.95%
2015	25	\$1,358,934,175	1.84%
2016	25	\$1,389,907,027	1.80%
2017	22	\$1,421,147,406	1.55%
2018	22	\$1,461,189,324	1.51%
2019	15	\$1,516,325,749	0.99%
2020	13	\$1,632,443,485	0.80%
2021	11	\$1,630,737,716	0.67%
2022	1	\$1,732,299,232	0.06%

Based on Duty Disability claim experience from 2013 through 2017, which is considered complete, we have estimated average annual incidence rates for the Duty Disability program in the range of 1.73% to 1.82% per \$1,000,000 of CP. The low end of this range (1.73%) represents average incidence rates from the 3-year period from 2015 through 2017, whereas the high end (1.82%) represents average incidence rates

from the 5-year period from 2013 through 2017. Incidence rates appear to be trending down from 2013 through 2017, which justifies using a range rather than a point estimate for Duty Disability incidence rates.

We then estimated the percentage of unreported claims in 2018 through 2022 by assuming an ultimate incidence rate of 1.73% (Low Estimate) to 1.82% (High Estimate) per \$1,000,000 CP in those years, as follows:

<b>Table 3a</b>					
<b>Percentage of Reported and Unreported Claims from 2018 through 2022</b>					
<b>Low Estimate</b>					
	2018	2019	2020	2021	2022
A. Incidence Rates as of December 31, 2022	1.51%	0.99%	0.80%	0.67%	0.06%
B. Assumed Ultimate Incidence Rate	1.73%	1.73%	1.73%	1.73%	1.73%
C. Percentage Reported (A / B)	87.20%	57.29%	46.12%	39.07%	3.34%
D. Percentage Unreported (100% - C)	12.80%	42.71%	53.88%	60.93%	96.66%

<b>Table 3b</b>					
<b>Percentage of Reported and Unreported Claims from 2018 through 2022</b>					
<b>High Estimate</b>					
	2018	2019	2020	2021	2022
A. Incidence Rates as of December 31, 2022	1.51%	0.99%	0.80%	0.67%	0.06%
B. Assumed Ultimate Incidence Rate	1.82%	1.82%	1.82%	1.82%	1.82%
C. Percentage Reported (A / B)	82.59%	54.27%	43.69%	37.00%	3.17%
D. Percentage Unreported (100% - C)	17.41%	45.73%	56.31%	63.00%	96.83%

The final rows in Tables 3a and 3b show the percentage of unreported claims as of December 31, 2022 based on the Low and High ultimate incidence rates, respectively. We used these ratios to develop new valuation assumptions for computing IBNR claim liabilities, which we intend to adopt for the December 31, 2023 valuation. The new assumptions take into consideration the long reporting lags observed in our experience study and use a 5-year lookback period for estimating IBNR claims. These assumptions are provided in Table 4 below:

<b>Table 4</b>		
<b>Duty Disability IBNR Valuation Assumptions</b>		
Lookback Period	Low IBNR Factors	High IBNR Factors
First Year	96.66%	96.83%
Second Year	60.93%	63.00%
Third Year	53.88%	56.31%
Fourth Year	42.71%	45.73%
Fifth Year	12.80%	17.41%

To estimate IBNR claim liabilities for the Duty Disability program, we will apply the IBNR Factors in Table 4 to the expected incurred claims in each of the lookback years, then we will sum the results across all years. The expected incurred claims will be determined from the payroll in each year and an assumed claim rate based on average experience from a five-year lookback period set back five years (e.g., experience from 2013 through 2017 would be used to determine the claim rate as of December 31, 2022).

Examples of the liability calculation based on a December 31, 2022 valuation date are provided below, for the Low IBNR Factors (Table 5A) and High IBNR Factors (Table 5b):

<b>Table 5a</b>				
<b>Estimated Liability for IBNR Claims</b>				
<b>Low IBNR Factors</b>				
<b>As of December 31, 2022</b>				
Year	Expected Incurred Claims	IBNR Factor	Preliminary IBNR Liability Estimate	Interest Adjusted IBNR Liability Estimate
2022	\$15,955,987	96.66%	\$15,422,525	\$15,938,268
2021	\$15,020,517	60.93%	\$9,152,440	\$10,101,683
2020	\$15,036,229	53.88%	\$8,101,228	\$9,549,464
2019	\$13,966,683	42.71%	\$5,964,759	\$7,509,177
2018	\$13,458,828	12.80%	\$1,722,674	\$2,316,187
<b>Total</b>	<b>\$73,438,244</b>	<b>NA</b>	<b>\$40,363,627</b>	<b>\$45,414,779</b>

<b>Table 5b</b>				
<b>Estimated Liability for IBNR Claims</b>				
<b>High IBNR Factors</b>				
<b>As of December 31, 2022</b>				
Year	Expected Incurred Claims	IBNR Factor	Preliminary IBNR Liability Estimate	Interest Adjusted IBNR Liability Estimate
2022	\$15,955,987	96.83%	\$15,450,702	\$15,967,387
2021	\$15,020,517	63.00%	\$9,462,385	\$10,443,775
2020	\$15,036,229	56.31%	\$8,467,527	\$9,981,246
2019	\$13,966,683	45.73%	\$6,387,412	\$8,041,264
2018	\$13,458,828	17.41%	\$2,342,565	\$3,149,650
<b>Total</b>	<b>\$73,438,244</b>	<b>NA</b>	<b>\$42,110,592</b>	<b>\$47,583,322</b>

We calculated the expected incurred claims in the second column of Tables 5a and 5b by assuming incurred claims represent 0.92% of payroll in each of those years, where the claim rate of 0.92% represents the average claim rate from 2013 through 2017, as shown below:

<b>Table 6</b>			
<b>Estimated Duty Disability Incurred Claims and Claim Rates</b>			
<b>As of December 31, 2022</b>			
Year	Payroll	Incurred Claims	Claim Rate
2013	\$1,299,551,475	\$12,018,004	0.92%
2014	\$1,332,780,095	\$14,386,233	1.08%
2015	\$1,358,934,175	\$12,147,331	0.89%
2016	\$1,389,907,027	\$11,525,518	0.83%
2017	\$1,421,147,406	\$12,578,216	0.89%
2018	\$1,461,189,324	\$9,211,632	0.63%
2019	\$1,516,325,749	\$7,293,214	0.48%
2020	\$1,632,443,485	\$3,365,706	0.21%
2021	\$1,630,737,716	\$5,031,091	0.31%
2022	\$1,732,299,232	\$203,376	0.01%
<b>2013 - 2017</b>	<b>\$6,802,320,178</b>	<b>\$62,655,303</b>	<b>0.92%</b>

Note that the estimated incurred claims in Table 6 are different than the values in the 12/31/2022 valuation report because we noticed an issue with the incurred claims calculation. This issue was introduced when we made an intentional change in the calculation methods for incurred claims adopted last year, when we switched to using the Qualifying Date rather than the Injury Date for discounting benefit payments. The issue has been resolved, and its impact on valuation results is discussed in the next section of this letter.

The final adjustment in the IBNR liability calculation (last column in Tables 5a and 5b) reflects the shorter discounting period for IBNR claims as of December 31, 2022 versus the dates when these claims were actually incurred, because we calculate incurred claims as the present value of future benefits discounted to the date of disability, and the present value of IBNR claims increases as the valuation date becomes farther away from the date of disability.

Observations

For comparison, the estimated liability for Duty Disability IBNR claims using the prior valuation assumptions was \$29,686,049 as of December 31, 2022, which is approximately \$15.7 million lower than the estimated liability in Table 5a based on the Low IBNR Factors, and approximately \$17.9 million lower than the estimated liability in Table 5b based on the High IBNR Factors. We analyzed the drivers of these discrepancies, and have made the following observations:

- We noticed an issue with the incurred claims calculation that impacts the IBNR claim liability. The issue has been resolved, which resulted in higher incurred claims estimated between 2013 and 2022. Consequently, the average claim rate (which was based on experience from 2015 through 2019) increased from 0.71% of payroll to 0.74% of payroll. This claim rate is used in the formula for computing IBNR claim liabilities, and the impact of updating the claim rate is a \$1.3 million increase in the estimated liability as of December 31, 2022 (see Table 8).
- When we performed the valuation of the Duty Disability program as of December 31, 2022, we calculated IBNR claim liabilities based on a three-year lookback period, which is shorter than the five-year lookback period included in the new assumptions. The impact of this change is an increase in the IBNR claim liability, because the new method includes two more years of estimated IBNR claims. Also, the IBNR percentages are different, as shown below:

<b>Table 7 Duty Disability IBNR Valuation Assumptions</b>			
<b>Lookback Period</b>	<b>Prior Assumptions</b>	<b>New Low IBNR Factors</b>	<b>New High IBNR Factors</b>
First Year	98.41%	96.66%	96.83%
Second Year	58.20%	60.93%	63.00%
Third Year	72.07%	53.88%	56.31%
Fourth Year	NA	42.71%	45.73%
Fifth Year	NA	12.80%	17.41%

- When we performed the December 31, 2022 valuation, we took a slightly different approach for estimating the incurred claims rate (which is used to estimate annual incurred claims based on payroll in a given year, and is different than the incidence rate defined above) by using average experience from a five-year lookback period set back three years, rather than set back five years. Therefore, we used experience from 2015 through 2019 to estimate the claim rate as of December 31, 2022. The impact of this change was an increase in the claim rate from 0.74% (prior method using 3-year setback period and modified incurred claims calculation) to 0.92% (new method using 5-year setback period) of covered payroll. For example, estimated incurred claims in 2022 are equal

to \$12.8 million based on the prior claim rate of 0.74% and \$16.0 million based on the new claim rate of 0.92%.

- The final interest adjustments were applied consistently between the prior and current methods.

We performed a waterfall analysis to evaluate the impact of each of the adjustments described above on the estimated liability as of December 31, 2022. We used the Low IBNR factors for performing this analysis. The results are provided in Table 8 below:

<b>Table 8</b> <b>Impact of New Valuation Methods and New Assumptions on the</b> <b>Estimated Liability for Duty Disability IBNR Claims</b> As of December 31, 2022 Based on Low IBNR Factors	
<b>Assumption Change</b>	<b>Impact on Liability</b>
Updated Incurred Claims Calculation	\$1,285,205
Updated IBNR Factors	\$4,618,162
Extended Lookback Period	\$9,825,364
<b>Total</b>	<b>\$15,728,730</b>

Funding Analysis

We tested the impact of the new valuation assumptions on Duty Disability funding levels. We developed a financial projection using the Baseline assumptions from the December 31, 2022 valuation (i.e., current contribution rates are held level in all years and investment income is 6.8% in all years), except we restated the IBNR reserves and the incurred claim rate based on the new valuation assumptions. The projections are provided on pages 5 and 6 below for the Low and High IBNR scenarios, respectively. The impact of the new valuation assumptions is an increase in IBNR reserves and insurance claims, which decreases the fund ratio from 131% as of December 31, 2022 to 120.9% as of December 31, 2031 in the Low IBNR scenario, and to 120.3% as of December 31, 2031 in the High IBNR scenario.

**Duty Disability Financial Projection as of December 31, 2022**

Low IBNR Factors

Investment Income: 6.8%

Premium Contributions: Current contribution rates

Calendar Year	Actual	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BOY Fund Balance	\$744,537,327	\$754,059,930	\$765,056,203	\$773,601,734	\$779,512,450	\$782,610,190	\$784,753,380	\$785,892,250	\$786,027,770	\$784,984,847
Premium Contributions	\$1,983,711	\$1,067,991	\$1,118,983	\$1,152,552	\$1,187,129	\$1,222,743	\$1,259,425	\$1,297,208	\$1,336,124	\$1,376,208
Miscellaneous Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Investment Income	\$45,637,204	\$51,276,075	\$52,023,822	\$52,604,918	\$53,006,847	\$53,217,493	\$53,363,230	\$53,440,673	\$53,449,888	\$53,378,970
Total Revenues	\$47,620,915	\$52,344,066	\$53,142,805	\$53,757,470	\$54,193,975	\$54,440,236	\$54,622,655	\$54,737,881	\$54,786,012	\$54,755,177
Insurance Claims	\$37,234,267	\$40,410,052	\$43,585,837	\$46,761,621	\$49,937,406	\$51,110,982	\$52,270,807	\$53,364,015	\$54,562,772	\$55,708,834
Administrative Expense	\$864,045	\$937,741	\$1,011,437	\$1,085,133	\$1,158,829	\$1,186,063	\$1,212,978	\$1,238,346	\$1,266,164	\$1,292,759
Total Operating Expenses	\$38,098,312	\$41,347,793	\$44,597,274	\$47,846,755	\$51,096,236	\$52,297,045	\$53,483,785	\$54,602,361	\$55,828,936	\$57,001,593
Net Change in Fund Balance	\$9,522,603	\$10,996,273	\$8,545,531	\$5,910,716	\$3,097,740	\$2,143,190	\$1,138,870	\$135,520	-\$1,042,923	-\$2,246,415
EOY Fund Balance	\$754,059,930	\$765,056,203	\$773,601,734	\$779,512,450	\$782,610,190	\$784,753,380	\$785,892,250	\$786,027,770	\$784,984,847	\$782,738,432
Estimated Liability	\$573,105,964	\$586,563,897	\$598,069,412	\$607,316,081	\$614,345,402	\$621,196,770	\$627,864,497	\$634,445,094	\$640,860,201	\$647,159,812
Surplus / (Deficit)	\$180,953,966	\$178,492,306.2	\$175,532,322	\$172,196,368	\$168,264,788	\$163,556,610	\$158,027,753	\$151,582,676	\$144,124,646	\$135,578,620
Fund % of Incurred Claim Liability	131.6%	130.4%	129.3%	128.4%	127.4%	126.3%	125.2%	123.9%	122.5%	120.9%

\* The estimated liability shown above includes the liability for open claims and claims incurred but not reported as of December 31, 2022, as well as the liability for new claims incurred by active members and survivors in 2023 and beyond.

**Duty Disability Financial Projection as of December 31, 2022**

High IBNR Factors

Investment Income: 6.8%

Premium Contributions: Current contribution rates

Calendar Year	Actual	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BOY Fund Balance	\$744,537,327	\$754,059,930	\$765,011,005	\$773,463,067	\$779,228,758	\$782,126,415	\$784,052,422	\$784,963,474	\$784,859,213	\$783,560,641
Premium Contributions	\$1,983,711	\$1,067,991	\$1,118,983	\$1,152,552	\$1,187,129	\$1,222,743	\$1,259,425	\$1,297,208	\$1,336,124	\$1,376,208
Miscellaneous Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Investment Income	\$45,637,204	\$51,276,075	\$52,020,748	\$52,595,489	\$52,987,556	\$53,184,596	\$53,315,565	\$53,377,516	\$53,370,427	\$53,282,124
Total Revenues	\$47,620,915	\$52,344,066	\$53,139,731	\$53,748,041	\$54,174,684	\$54,407,339	\$54,574,990	\$54,674,724	\$54,706,551	\$54,658,331
Insurance Claims	\$37,234,267	\$40,454,225	\$43,674,183	\$46,894,140	\$50,114,098	\$51,291,090	\$52,446,875	\$53,536,632	\$54,734,963	\$55,876,702
Administrative Expense	\$864,045	\$938,766	\$1,013,487	\$1,088,209	\$1,162,930	\$1,190,243	\$1,217,063	\$1,242,352	\$1,270,160	\$1,296,655
Total Operating Expenses	\$38,098,312	\$41,392,991	\$44,687,670	\$47,982,349	\$51,277,028	\$52,481,332	\$53,663,938	\$54,778,984	\$56,005,123	\$57,173,356
Net Change in Fund Balance	\$9,522,603	\$10,951,075	\$8,452,061	\$5,765,692	\$2,897,657	\$1,926,007	\$911,052	-\$104,260	-\$1,298,572	-\$2,515,025
EOY Fund Balance	\$754,059,930	\$765,011,005	\$773,463,067	\$779,228,758	\$782,126,415	\$784,052,422	\$784,963,474	\$784,859,213	\$783,560,641	\$781,045,616
Estimated Liability	\$575,359,080	\$588,916,189	\$600,473,124	\$609,722,146	\$616,705,331	\$623,503,140	\$630,117,471	\$636,644,710	\$643,003,491	\$649,247,744
Surplus / (Deficit)	\$178,700,850	\$176,094,815.9	\$172,989,942	\$169,506,612	\$165,421,084	\$160,549,282	\$154,846,003	\$148,214,504	\$140,557,150	\$131,797,872
Fund % of Incurred Claim Liability	131.1%	129.9%	128.8%	127.8%	126.8%	125.7%	124.6%	123.3%	121.9%	120.3%

\* The estimated liability shown above includes the liability for open claims and claims incurred but not reported as of December 31, 2022, as well as the liability for new claims incurred by active members and survivors in 2023 and beyond.



## Next Steps

For the December 31, 2023 valuation, we will develop a point estimate liability that falls within the range determined from the Low and High IBNR factors described above. For example, if we observe from recent claim experience that historical incidence rates continue to trend down, then we anticipate using factors that are closer to the Low end of the range of IBNR factors. The factors we use for determining the point estimate liability as of December 31, 2023 will be held constant for three years, and will be reviewed and potentially updated for the December 31, 2026 valuation of the Duty Disability plan.

In the meantime, we are happy to answer any questions you may have on the experience studies or the new valuation assumptions. Please let me know if you have any questions or would like to schedule a call to go through this information together. I can be reached at (207) 771-1204 or paul.correia@milliman.com. Thank you.

## General

This letter has been prepared for Wisconsin ETF for the specific purpose of developing valuation assumptions for estimating Duty Disability claim liabilities. This letter may not be distributed to any other party without the written consent of Milliman. Any distribution of this letter should be in its entirety.

In preparing this letter, we relied on information and data (some oral and some in writing) supplied by ETF, including historical ICI claim data from The Hartford and ETF. While Milliman has not audited this data, we have reviewed it for reasonableness and it is, in our opinion, sufficient and reliable for the purposes of our calculations. If any of this information is inaccurate or incomplete, the results shown could be materially affected and this letter may need to be revised.

This analysis relied on various assumptions and projections about future Duty Disability experience. It is unlikely that future experience will conform exactly to these assumptions and therefore future results will vary from expected results to the extent future experience varies from these assumptions.

We certify that the development and use of models for performing our analysis conform to the standards established in Actuarial Standards of Practice No. 56 of the Actuarial Standards Board.

I, Paul Correia, am a Consulting Actuary at Milliman. I am a member of the American Academy of Actuaries and I meet its Qualification Standards to provide the actuarial opinion contained herein.

Sincerely,



Paul Correia, FSA, MAAA  
Principal and Consulting Actuary

**Appendix A**  
**Duty Disability IBNR Valuation Assumptions**

The table below contains valuation assumptions developed by Milliman for estimating IBNR claim liabilities for the Duty Disability plan. These factors will be applied to estimated incurred claims in each of the years in the lookback period to determine a range for the estimated IBNR claim liability. For the December 31, 2023 valuation, we will develop a point estimate liability that falls within the range determined from the factors below. For example, if we observe from recent claim experience that historical incidence rates continue to trend down, then we anticipate using factors that are closer to the Low end of the range of IBNR factors. The factors we use for determining the point estimate liability as of December 31, 2023 will be held constant for three years, and will be reviewed and potentially updated for the December 31, 2026 valuation of the Duty Disability plan.

<b>Duty Disability IBNR Valuation Assumptions</b>		
Lookback Period	Low IBNR Factors	High IBNR Factors
First Year	97%	97%
Second Year	61%	63%
Third Year	54%	56%
Fourth Year	43%	46%
Fifth Year	13%	17%

The estimated incurred claims in the lookback years will be determined from a claim rate applied to payroll in each of those years. We will use average incurred claims experience from a five-year lookback period set back five years to determine the claim rate as a percent of payroll. The claim rate will be updated annually based on historical claim experience from a five-year period set back five years as of the valuation date.