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

Re: Experience Studies for Duty Disability Program

Dear Jim:

This letter contains documentation of the experience studies performed by Milliman in 2020 for the Duty Disability program. In 2019, an audit of the valuation methods and assumptions for the program was performed by Segal. The outcome from this audit included a recommendation to update certain assumptions that are used to calculate program liabilities. Therefore, we have performed experience studies and have developed new assumptions for computing the December 31, 2019 liabilities for the Duty Disability program.

Summary and Impact of Recommended Duty Disability Valuation Assumptions

- We recommend updating Duty Disability claim termination rate assumptions to use mortality rates from the 2015-2017 WRS Experience Study, adjusted for recent program experience. For disabled members, we recommend using base rates that represent an average of the mortality rates for disabled lives and healthy retirees from the WRS Experience Study, adjusted by a factor of 40%. For survivors, we recommend using base rates that are equal to the mortality rates for healthy retirees from the WRS Experience Study, adjusted by a factor of 80%. The final claim termination rates are provided in Appendix A of this letter.
- We recommend updating estimated offset assumptions for Social Security benefits, WRS benefits, Workers' Compensation benefits, and employment earnings based on Duty Disability offset experience as of December 31, 2019. The recommended estimated offset assumptions are included in Appendix B.

- We do not recommend including a provision for future mortality improvement in the new claim termination rate assumptions, based on the results of our experience studies. We will continue to study this issue in our experience analysis.
- The net impact of using these new assumptions is a modest increase in the estimated liability for open claims. Table 1 compares the open claim liability at December 31, 2019 before and after the recommended changes.

Prior Assumptions	\$411,450,427
New Assumptions	\$412,357,049
Difference (\$)	\$906,622
Difference (%)	0.2%

The remainder of this letter provides further detail on each of the changes to the valuation assumptions.

Claim Termination Rates – Disabled Members

Claim termination rates (i.e., mortality rates for disabled members and survivors) are a key driver of estimated plan liabilities. The claim termination rates used to compute December 31, 2018 liabilities are based on the 2012-2014 WRS Experience Study, adjusted for Duty Disability program experience. A new experience study was performed by GRS, the actuary for the WRS retirement program, using WRS experience from 2015 through 2017. The results from this study include new mortality tables. We recommend using these tables for developing base rates and adjusting the base rates for Duty Disability experience, for calculating December 31, 2019 liabilities.

We performed a claim termination rate study for disabled members using claim data from January 1, 2014 through June 30, 2019. The results from this study include actual-to-expected (A/E) claim termination ratios that show how actual terminations in those years compare to expected claim terminations. The expected terminations in our study are equal to the average mortality rates for disabled lives and healthy retirees from the 2015-2017 WRS Experience Study. Note that A/E ratios greater than 100% indicate that claims closed at a higher rate than the expected termination rates, and A/E ratios less than 100% indicate that claims closed at a lower rate than the expected termination rates. Table 2 below shows the results of this study.

Table 2 Duty Disability A/E Claim Termination Ratios Expected Basis: Average of Mortality Rates for Disabled Lives and Healthy Retirees Study Period: 1/1/2014 through 6/30/2019	
Attained Age	A/E Ratio
Under 40	0%
40-44	959%
45-49	0%
50-54	76%
55-59	60%
60-64	115%
65-69	80%
70-74	77%
75-79	69%
80-84	80%
85 and Over	130%
Total	83%

The overall A/E ratio is 83%, meaning that claim terminations for the block as a whole were lower than expected. The A/E ratios are volatile by attained age due to the small size of the block and low number of claim terminations in each of the attained age segments.

We used the overall A/E ratio shown above as a starting point for developing claim termination rate adjustment factors for disabled members. We applied an 80% adjustment factor to the base rates (i.e., the average mortality rates from disabled members and healthy retirees), and performed liability runoff studies to determine if these rates produce reasonable margin in the estimated liability for disabled members. The runoff studies are similar to the studies performed as part of our annual valuation, except that in this case the liabilities are calculated using the new claim termination rates. We used Duty Disability claim experience from 2015 through 2019 in the runoff studies. The results are provided in Table 3 below.

Table 3 Duty Disability Runoff Study – Disabled Members Claim Termination Rate Basis: 80% of the Average Mortality Rate for Disabled Lives and Healthy Retirees	
Experience Year	Average Annual Margin
2015	0.37%
2016	0.65%
2017	0.64%
2018	0.10%
2019	0.36%
Total	0.43%

The results suggest that an 80% adjustment factor produces modest positive margin in the estimated liability. We then tested other adjustment factors using the same methods. The margins corresponding to these different factors are provided in Table 4 below.

Table 4					
Duty Disability Runoff Study					
Claim Termination Rate Basis: 30% - 70% of the Average Mortality Rate for Disabled Lives and Healthy Retirees					
Experience Year	Average Annual Margin				
	30% Adj. Factor	40% Adj. Factor	50% Adj. Factor	60% Adj. Factor	70% Adj. Factor
2015	1.05%	0.90%	0.75%	0.62%	0.49%
2016	1.37%	1.21%	1.06%	0.92%	0.78%
2017	1.40%	1.23%	1.07%	0.92%	0.77%
2018	0.81%	0.65%	0.51%	0.37%	0.23%
2019	1.18%	1.00%	0.82%	0.66%	0.51%
Total	1.16%	1.00%	0.84%	0.70%	0.56%

Based on these results, we recommend using a 40% adjustment factor for calculating liabilities for disabled members. In our view, this claim termination rate assumption, coupled with the new estimated offset assumptions (described below), produce an estimated liability for disabled members that contains reasonable margin.

Claim Termination Rates – Survivors

There are significantly fewer Duty Disability survivor claims than Duty Disability claims for disabled members. Therefore, we did not perform a claim termination rate study for survivors because the results would not be considered meaningful.

We developed new claim termination rate assumptions for survivors by adjusting the mortality rates for healthy retirees from the 2015-2017 WRS Experience Study, and testing these adjusted rates using the runoff study process. The runoff studies use Duty Disability survivor claim experience from 2015 through 2019. The results shown below correspond to an adjustment factor of 80%, which we feel produces reasonable margin in the estimated liability. Thus, we recommend using an 80% adjustment factor for performing the December 31, 2019 valuation.

Table 5	
Duty Disability Runoff Study – Survivors	
Claim Termination Rate Basis: 80% of the Mortality Rates for Healthy Retirees	
Experience Year	Average Annual Margin
2015	3.54%
2016	4.07%
2017	2.44%
2018	0.22%
2019	0.34%
Total	2.13%

Mortality Improvement

We used the runoff study results for disabled members (Table 4) and survivors (Table 5) to evaluate mortality improvement for Duty Disability claims. Since we do not observe a decreasing trend in margins from 2015 through 2019, there is no evidence of mortality improvement for Duty Disability claims. In other words, if we had observed decreasing margins over time, it would be reasonable to assume that the trend may be due to mortality improvement. For this reason, we do not recommend including a provision for future mortality improvement in the new claim termination rate assumptions. We will continue to study this issue in our experience analysis.

Estimated Offsets - Social Security Disability Income

Benefits paid under the Duty Disability program are reduced by the amount of any Social Security Disability Insurance (SSDI) benefits awarded to disabled members. Although claimants are eligible to receive SSDI benefits after five months of disability, it often takes much longer for claims to be approved for benefits by the Social Security Administration. For this reason, we include an estimated offset assumption in the Duty Disability liability calculations for claims that have not yet been approved for SSDI benefits as of the valuation date.

We tabulated the proportion of Duty Disability claims that had been awarded SSDI benefits by disability duration, using claim experience as of December 31, 2019. The following table shows the percentage of claims approved for SSDI, for disabled members under age 62 who are eligible for Social Security benefits (i.e., excludes members who are ineligible for Social Security benefits).

Claim Duration	% Approved
1-5 Years	14%
6-10 Years	20%
11-15 Years	18%
16-20 Years	18%
21+ Years	3%
Total	13%

In total, 13% of eligible claimants were approved for SSDI benefits as of December 31, 2019.

We also calculated the SSDI benefit amount as a percentage of the Duty Disability benefit amount for claims that received SSDI benefits, which tells us the percentage of the Duty Disability benefit that is offset by SSDI. The results indicate that, on average, SSDI benefits offset approximately 40% of the Duty Disability benefit amount, as shown below.

Claim Duration	SSDI Offset Percentage
1-5 Years	42%
6-10 Years	45%
11-15 Years	43%
16-20 Years	42%
21+ Years	36%
Total	43%

Based on the results in Table 6 and Table 7, we recommend updating the estimated SSDI offset assumption by assuming that 10% of members under age 62 who are eligible for Social Security benefits will qualify for SSDI benefits, and that those benefits are equal to 40% of the Duty Disability benefit amount.

Estimated Offsets – Social Security Retirement Benefits

Duty Disability claimants who are eligible for Social Security benefits, and who have not been awarded SSDI benefits, are required to apply for Social Security Retirement (SSR) benefits at age 62. Therefore, we recommend including an estimated SSR offset assumption for eligible claims who had not received SSDI benefits as of the valuation date. The estimated SSR offset begins on the claimant's 62nd birthday, and is equal to 75% of the SSDI benefit amount (because according to the guidelines from the Social Security Administration, SSR benefits that commence at age 62 are reduced by 25%). This assumption is coordinated with the estimated SSDI offset assumptions because we assume that 10% of disabled members will qualify for SSDI benefits, and we assume that the remaining 90% of disabled members who do not qualify for SSDI will collect SSR at age 62.

Estimated Offsets – WRS Disability Benefits

Duty Disability benefits are also reduced by the amount of any WRS disability benefits awarded to disabled members. For this reason, we include an estimated offset assumption for claims that have not been approved for WRS disability benefits as of the valuation date.

We tabulated the proportion of Duty Disability claims that had been awarded WRS disability benefits as of December 31, 2019:

Claim Duration	% Approved
1-5 Years	18%
6-10 Years	22%
11-15 Years	19%
16-20 Years	14%
21+ Years	3%
Total	14%

In total, 14% of Duty Disability claimants were receiving WRS disability benefits as of December 31, 2019.

WRS disability benefit amounts are based on the member's employment category and years of service. In particular, the benefit amount is equal to a "formula multiplier" for the member's employment category, times the member's final average earnings, times the number of years of creditable service under the retirement program. The formula multipliers as shown below:

Employment Category	Pre-2000 Service	Post 1999 Service	Post Act10 Service
General EEs and Teachers	1.77%	1.60%	1.60%
Protectives with SS	2.17%	2.00%	2.00%
Protectives w/o SS	2.67%	2.50%	2.50%
Elected officials	2.17%	2.00%	1.60%

Based on the results from Table 8 and the formula multipliers in Table 9, we recommend updating the estimated WRS disability offset assumption by assuming that 15% of members will qualify for WRS disability benefits, and by assuming a formula multiplier of 2% for all claims (the claim data does not include the employment categories listed in Table 7).

Estimated Offsets – WRS Retirement Benefits

Duty Disability claimants are required to apply for WRS retirement benefits at age 50 if they have terminated WRS employment and are not required to apply for WRS disability benefits. These benefits offset the Duty Disability benefit. Therefore, we include an estimated offset assumption for WRS retirement benefits in the estimated liability for disabled members.

The following table shows the WRS retirement benefit amount as a percentage of the Duty Disability benefit amount, based on claim experience as of December 31, 2019.

Claim Duration	Offset %
1-5 Years	57%
6-10 Years	39%
11-15 Years	35%
16-20 Years	32%
21+ Years	33%
Total	35%

We recommend updating the estimated WRS retirement offset assumption by assuming that WRS retirement benefits will be awarded at age 50 to claimants who do not apply for separation benefits, and by assuming those benefits equal 35% of the Duty Disability benefit amount. We also assume that 10% of Duty Disability claimants apply for separation benefits prior to age 50, based on historical Duty Disability claim experience.

Estimated Offsets – Other

Duty Disability benefits are reduced by the amount of any Workers' Compensation benefits, and they are reduced by employment earnings as follows:

- If the disabled member works for the same employer from which he or she became disabled, the earnings directly offset the Duty Disability benefit.
- If the disabled member works for a different employer from which he or she became disabled:
 - The offset is one-third of employment earnings for the amount of total earnings that is less than 40% of the Duty Disability benefit,
 - The offset is one-half of employment earnings for the amount of total earnings that is between 40% and 80% of the Duty Disability benefit,
 - The offset is two-thirds of employment earnings for the amount of total earnings that is less than greater than 80% of the Duty Disability benefit.

Based on historical claim data, a very small percentage of Duty Disability claims receive Workers Compensation benefits and/or employment earnings. The combined total of these benefits was approximately equal to 3% of total Duty Disability benefits as of December 31, 2019. Therefore, we recommend including an estimated offset assumption for combined Workers' Compensation benefits and employment earnings equal to 3% of the Duty Disability benefit amount.

Limitations of Analysis

The analysis in this letter has been prepared solely for the use of Wisconsin ETF, for the purpose of updating the valuation assumptions for the Duty Disability program. It may not be appropriate for other purposes. It may not be shared with any other party without the prior written consent of Milliman. It is a complex, technical analysis that assumes a high level of knowledge concerning Wisconsin ETF operations. It is not for the use or benefit of any third party for any purpose. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

In preparing this analysis, we have relied on data provided to us by Wisconsin ETF, including historical claim data, historical payment data, and plan design information. To the extent that any of this information is incomplete or inaccurate, the results of our analysis may be materially affected.

This letter contains the results from experience studies for the Duty Disability program based on historical program experience. The estimated liabilities discussed in this letter are based on actuarial assumptions about future experience that were derived, in large part, from the historical

analysis presented here. It is highly likely that future experience will vary from these assumptions, meaning that the actual liabilities may be either higher or lower than those implied by the recommendations in this letter.

I, Paul Correia, am a consulting actuary at Milliman, Inc. and a member of the American Academy of Actuaries. I meet its qualification standards to render the actuarial opinion contained herein.

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Please feel free to contact me at (207) 771 - 1204 or paul.correia@milliman.com if you have any questions on this material. Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Paul Correia".

Paul Correia, FSA, MAAA
Principal and Consulting Actuary

Appendix A

Recommended Claim Termination Rate Assumptions for the Duty Disability Program

Rates are based on the 2015 - 2017 Experience Study performed by the actuary for the Wisconsin Retirement System, adjusted for recent trends in Duty Disability claim termination experience. The rates vary by attained age and gender. Sample rates are provided below for disabled members and survivors.

Duty Disability Annual Claim Termination Rates					
Disabled Members			Survivors		
Age	Male	Female	Age	Male	Female
25	0.017%	0.009%	25	0.026%	0.014%
30	0.025%	0.014%	30	0.033%	0.019%
35	0.037%	0.022%	35	0.058%	0.035%
40	0.049%	0.033%	40	0.077%	0.048%
45	0.072%	0.049%	45	0.098%	0.073%
50	0.125%	0.080%	50	0.130%	0.108%
55	0.200%	0.128%	55	0.303%	0.193%
60	0.330%	0.195%	60	0.435%	0.279%
65	0.528%	0.319%	65	0.664%	0.421%
70	0.891%	0.559%	70	1.083%	0.705%
75	1.630%	1.041%	75	1.830%	1.279%
80	2.999%	2.076%	80	3.362%	2.402%
85	5.056%	3.756%	85	6.283%	4.818%
90	8.761%	6.788%	90	10.914%	8.738%
95	11.668%	9.817%	95	19.093%	15.763%
100	14.067%	12.113%	100	26.492%	22.891%

**Appendix B
Recommended Estimated Offset Assumptions for Duty Disability Program**

Estimated Offset	Assumption
WRS Benefits:	<p>Assume 15% of members qualify for a WRS disability benefit.</p> <p>Assume 10% of members under age 50 who do not qualify for a WRS disability benefit elect to receive a WRS separation benefit.</p> <p>Assume other members commence a WRS retirement benefit at age 50 (requirement of plan).</p>
Social Security:	<p>Assume 10% of members under age 62 and covered by Social Security qualify for Social Security Disability Income benefits. Assume benefits are equal to 40% of the gross benefit amount.</p> <p>Assume all members under age 62 covered by Social Security and not receiving actual or estimated SSDI will receive Social Security Retirement benefits at age 62.</p>
Combined Offset from: <ul style="list-style-type: none"> • Worker’s Compensation • Employer Earnings • Other Earnings 	<p>Assume 3.00% of Duty Disability benefit amount for disabled members who do not receive WC or earnings offsets.</p>