



Gabriel Roeder Smith & Company
Consultants & Actuaries

277 Coon Rapids Blvd.
Suite 212
Coon Rapids, MN 55433

800.521.0498 phone
763.432.5842 fax
www.gabrielroeder.com

August 10, 2016

Mr. Dave Bergstrom
Executive Director
Minnesota State Retirement System
60 Empire Drive, Suite 300
Saint Paul, Minnesota 55103

Re: Proposed Assumption Changes – MSRS CERF

Dear Dave:

Enclosed is a supplemental actuarial valuation showing the estimated impact of changing the actuarial assumptions of the Correctional Employees Retirement Fund of the Minnesota State Retirement System (MSRS CERF). Unless noted otherwise and to the best of our knowledge and belief, the calculations were completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR).

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

This report should not be relied on for any purpose other than the purpose described in the primary communication. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

The valuation was based upon information furnished by MSRS, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries.

The signing actuaries are independent of the plan sponsor.

Please call if you have any questions regarding the calculations enclosed.

Sincerely,

Bonita J. Wurst, ASA, EA, FCA, MAAA

Brian B. Murphy, FSA, EA, FCA, MAAA

BJW/BBM:ah
Enclosures

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND

EXECUTIVE SUMMARY

Requested By: Mr. Dave Bergstrom, Executive Director
Date: August 10, 2016
Submitted By: Bonita J. Wurst, ASA, EA, FCA, MAAA, and
Brian B. Murphy, FSA, EA, FCA, MAAA
Gabriel, Roeder, Smith & Company

This report contains an actuarial valuation of proposed changes in actuarial assumptions for the Correctional Employees Retirement Fund. Please see our report, *Minnesota Correctional Employees Retirement Fund 4-Year Experience Study*, dated July 26, 2016, for a full description of the proposed changes.

Bonita J. Wurst and Brian B. Murphy are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The date of the valuation was June 30, 2015. This means that the results of the supplemental valuations indicate what the June 30, 2015 valuation would have shown if the proposed assumptions had been in effect on that date. Supplemental valuations do **not** predict the result of future actuarial valuations. Rather, supplemental valuations give an indication of the probable long-term cost of the **assumption change only** without comment on the complete end result of the future valuations.

Unless noted otherwise, actuarial assumptions and methods were consistent with those used in the regular actuarial valuation of the MSRS CERF on the valuation date as prescribed by Minnesota Statutes Section 356.215, the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR) and the Board of Directors for the June 30, 2015 MSRS CERF Valuation.

Results in this report are shown on an Actuarial Value of Assets (AVA) basis. We have not reflected any changes in the statutory amortization date of June 30, 2038.

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
CALCULATION AS OF JUNE 30, 2015

A brief summary of the data, as of June 30, 2015, used in this valuation is presented below.

Active Members			
Number	Projected Annual Earnings	Average in Years	
		Age	Service
4,449	\$235,436,000	41.4	8.7

Retired Members		Deferred Vested Members		Non-Vested Members	
Number	Average Annual Benefits	Number	Average Annual Benefits*	Number	Average Member Contributions*
2,769	\$20,520	1,276	\$11,864	531	\$5,395

** Reflects 30% Combined Service Annuity load.*

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 1 – CHANGE MORTALITY ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

The Society of Actuaries (SOA) released updated mortality tables late in 2014 which reflect the improvement in longevity of the studied group of private pension plan participants, and which also reflects projected future improvements for current and future generations of participants. The new mortality table is called the RP-2014 table. The mortality improvement scale is called the MP-2014 improvement scale. In 2015, the SOA released an updated mortality improvement scale called MP-2015. The mortality improvement scale is applied to the RP-2014 table to show the improvements in mortality that are expected to occur.

The SOA has developed base experience tables and collar-specific experience versions of the RP-2014 tables. The Blue Collar tables have higher mortality rates than the base tables and the base tables have higher mortality rates than the White Collar tables.

PRESENT MORTALITY ASSUMPTIONS: The current mortality assumptions are as follows:

- Healthy pre-retirement: RP-2000 employee generational mortality table, projected with mortality improvement scale AA, white collar adjustment, no age adjustments.
- Healthy post-retirement: RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set forward one year for males and set back one year for females.
- Disabled: RP-2000 disabled mortality table.

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 1 – CHANGE MORTALITY ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

PROPOSED MORTALITY ASSUMPTIONS: Change the mortality assumptions as follows:

Healthy pre-retirement

Male Active Members: RP-2014 Male Employee Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015.

Female Active Members RP-2014 Female Employee Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015.

Healthy post-retirement

Healthy Male Retirees¹: RP-2014 Male Healthy Annuitant Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015. Male rates are set forward two years.

Healthy Female Retirees²: RP-2014 Female Healthy Annuitant Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015. Female rates are set forward one year.

Disabled

Disabled Male Retirees: RP-2014 Male Disabled Mortality Table, adjusted for mortality improvements using projection scale MP-2015.

Disabled Female Retirees: RP-2014 Female Disabled Mortality Table, adjusted for mortality improvements using projection scale MP-2015.

The RP-2014 tables as published by the Society of Actuaries (SOA) are based on rates for 2006. The SOA applied eight years of projection scale MP-2014 to produce the rates published as the “RP-2014” table, to be used for calendar year 2014. Recently, the SOA published an update to the MP-2014 projection scale, called MP-2015, which generally reflects lower improvements to life expectancy than MP-2014. All the proposed tables referred to in the above exhibit are based on the appropriate RP-2014 table as published by the Society of Actuaries (i.e., healthy retiree, disabled retiree or employee), projected backwards to 2006 using Scale MP-2014 and projected forward from 2006 using Scale MP-2015. Mortality rates at certain ages have been adjusted to prevent decreasing mortality rates.

¹ Report originally stated that rates are set forward one year; corrected February 8, 2017.

² Report originally indicated that rates are not set forward; corrected February 8, 2017.

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 1 – CHANGE MORTALITY ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Update Mortality	Change from Baseline
<i>Expected 2.5% benefit increase date:</i>	<i>N/A</i>	<i>N/A</i>	
Normal Cost Rate, % of Pay	16.4%	17.0%	0.6%
Amortization of Unfunded Accrued Liability, % of Pay	10.7%	11.6%	0.9%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	27.4%	28.9%	1.5%
Actuarial Accrued Liability, 000s	\$1,239,258	\$1,269,901	\$30,643
Funded Ratio, AVA Basis	70.9%	69.2%	(1.7)%

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 2 – CHANGE OTHER DEMOGRAPHIC ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

Our report, the *Minnesota Correctional Employees Retirement Fund 4-Year Experience Study*, dated July 26, 2016, contained several recommended changes to demographic assumptions, including changes to retirement and disability rates and also the assumed form of payment elections.

PRESENT DEMOGRAPHIC ASSUMPTIONS: See the *Correctional Employees Retirement Fund Actuarial Valuation Report as of July 1, 2015*, dated December 14, 2015, for a complete description of the present demographic assumptions.

PROPOSED DEMOGRAPHIC ASSUMPTIONS: Change demographic assumptions as follows (please see our experience study report noted above for a full description of the proposed assumptions):

- | | |
|------------------|---|
| Retirement: | ▪ Slight adjustments to assumed unreduced retirements. |
| Termination: | ▪ Adjust assumed percentage of members terminating prior to retirement. Rates assume lower numbers of terminations during the first three years of employment and more terminations thereafter. |
| Marriage | ▪ Change assumed percentage of members who are married from 85% to 75% for both males and females. |
| Age of Survivor | ▪ Change assumed age difference from three years to two years (with males older than females). |
| Disability: | ▪ Adopt lower rates of disability incidence for ages 40 to 54 and remove assumed disability incidence beyond age 54. |
| Form of Payment: | ▪ Minor changes to form of payment assumptions. |

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 2 – CHANGE OTHER DEMOGRAPHIC ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Update Mortality + Update Demographics	Change from Baseline
<i>Expected 2.5% benefit increase date:</i>	<i>N/A</i>	<i>N/A</i>	
Normal Cost Rate, % of Pay	16.4%	16.3%	(0.1)%
Amortization of Unfunded Accrued Liability, % of Pay	10.7%	11.4%	0.7%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	27.4%	28.0%	0.6%
Actuarial Accrued Liability, 000s	\$1,239,258	\$1,265,687	\$26,429
Funded Ratio, AVA Basis	70.9%	69.4%	(1.5)%

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 3 – CHANGE MERIT AND SENIORITY INCREASE ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

Pay increases granted to active members typically consist of two pieces:

- An across-the-board, economic type of increase granted to most or all members of the group. This increase is typically tied to inflation or cost-of-living changes, and
- An increase as a result of merit and seniority. This increase is typically related to performance of an individual and includes promotions and increased years of experience.

The assumption for across-the-board increases is the payroll growth assumption.

Our report, the *Minnesota Correctional Employees Retirement Fund 4-Year Experience Study*, dated July 26, 2016, contained recommended changes to merit and seniority increase assumptions.

PRESENT SALARY INCREASE ASSUMPTIONS: See the *Correctional Employees Retirement Fund Actuarial Valuation Report as of July 1, 2015*, dated December 14, 2015, for a complete description of the present salary scale assumption.

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 3 – CHANGE MERIT AND SENIORITY INCREASE ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015

PROPOSED SALARY INCREASE ASSUMPTIONS: Proposed salary increase assumptions are as follows:

Year	Gross Salary % Increase	
	Current	Proposed
1	5.75%	12.50%
2	5.60%	9.00%
3	5.45%	6.00%
4	5.30%	5.50%
5	5.15%	5.25%
6	5.00%	5.00%
7	4.85%	5.00%
8	4.70%	5.00%
9	4.55%	5.00%
10	4.40%	5.00%
11	4.30%	5.00%
12	4.20%	4.75%
13	4.10%	4.50%
14	4.00%	4.50%
15	3.90%	4.25%
16	3.80%	4.25%
17	3.70%	4.25%
18	3.60%	4.00%
19	3.50%	4.00%
20	3.50%	4.00%
21	3.50%	3.75%
22	3.50%	3.75%
23	3.50%	3.75%
24	3.50%	3.50%
25	3.50%	3.50%
26	3.50%	3.50%
27	3.50%	3.50%
28	3.50%	3.50%
29	3.50%	3.50%
30	3.50%	3.50%
31+	3.50%	3.50%
Total	4.55%	5.15%

**MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEP 3 – CHANGE MERIT AND SENIORITY INCREASE ASSUMPTIONS
CALCULATION AS OF JUNE 30, 2015**

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Update Mortality + Demographics AND Salary Asumptions	Change from Baseline
<i>Expected 2.5% benefit increase date:</i>	<i>N/A</i>	<i>N/A</i>	
Normal Cost Rate, % of Pay	16.4%	16.9%	0.5%
Amortization of Unfunded Accrued Liability, % of Pay	10.7%	11.4%	0.7%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	27.4%	28.6%	1.2%
Actuarial Accrued Liability, 000s	\$1,239,258	\$1,269,205	\$29,947
Funded Ratio, AVA Basis	70.9%	69.2%	(1.7)%

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND
STEPS 1-3 – ALL CHANGES
CALCULATION AS OF JUNE 30, 2015

A step-by-step summary of the changes due to the mortality assumption, other demographic assumptions and the assumed salary increase assumption are summarized below:

	Valuation Baseline	Update Mortality	Update Mortality + Update Demographics	Update Mortality + Demographics AND Salary Assumptions
<i>Expected 2.5% benefit increase date:</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Normal Cost Rate, % of Pay	16.4%	17.0%	16.3%	16.9%
Amortization of Unfunded Accrued Liability, % of Pay	10.7%	11.6%	11.4%	11.4%
Expenses, % of Pay	0.3%	0.3%	0.3%	0.3%
Total Required Contribution, % of Pay	27.4%	28.9%	28.0%	28.6%
Actuarial Accrued Liability, 000s	\$1,239,258	\$1,269,901	\$1,265,687	\$1,269,205
Funded Ratio, AVA Basis	70.9%	69.2%	69.4%	69.2%

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND

CALCULATION AS OF JUNE 30, 2015

Comments

Comment 1 — The calculations are based upon assumptions regarding future events, which may or may not materialize. They are also based upon plan provisions that are outlined in this report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the authors of this report prior to relying on information in the report.

Comment 2 — If you have reason to believe that the information provided in this report is inaccurate, or is in any way incomplete, or if you need further information in order to make an informed decision on the subject matter of this report, please contact the authors of the report prior to making such decision.

Comment 3 — In the event that more than one change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

Comment 4 — The reader of this report should keep in mind that actuarial calculations are mathematical estimates based on current data and assumptions about future events (which may or may not materialize). Please note that actuarial calculations can and do vary from one valuation year to the next, sometimes significantly if the group valued is very small (less than 30 lives). As a result, the cost impact of a benefit change may fluctuate over time, as the demographics of the group changes.

MINNESOTA CORRECTIONAL EMPLOYEES RETIREMENT FUND

CALCULATION AS OF JUNE 30, 2015

Comments (Concluded)

Comment 5 — In the event the MSRS CERF accrued liability funding ratio (determined on a market value of assets basis) reaches or exceeds 90% funded (on a 2.5% post-retirement benefit increase assumption) for two consecutive years, the post-retirement benefit increase will revert to 2.5%. For purposes of the annual valuation and this supplemental valuation, we performed a projection of liabilities and assets to determine an assumed date for the post-retirement benefit increase. Based on these assumptions, the projection indicates that this plan is not expected to attain the accrued liability funding ratio threshold required to pay a 2.5% post-retirement benefit increase and will pay a 2.0% post-retirement benefit increase indefinitely. This assumption is reflected in our calculations. This is only an assumption; actual timing will depend on actual experience.

Comment 6 — We have provided this analysis in the same format as that used when plan or assumption changes are considered by the Board of Directors. For any legislative proposals, it may be necessary to follow up with a more in-depth analysis to comply with the *Standards for Actuarial Work*. We will provide the additional information upon request.