



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

**ACTUARIAL VALUATION
LIMITED SCOPE REVIEW REPORT
FOR
SOUTH DAKOTA RETIREMENT SYSTEM**

Prepared November 10, 2021





Cavanaugh Macdonald

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Board of Trustees
South Dakota Retirement System
Post Office Box 1098
Pierre, SD 57501-1098

Dear Board of Trustees:

We have performed a limited scope review of the June 30, 2021, actuarial valuation for the South Dakota Retirement System (“SDRS”). This review is limited to an examination of the internal staff actuary’s actuarial assumptions, funding methods, and procedures for reasonableness, internal consistency, and consistency with the previous year’s actuarial valuation and a review of the internal staff actuary’s valuation report for compliance with actuarial standards. The limited scope review does not include any actuarial calculations.

A full replication audit of the valuation report is performed every five years and limited scope reviews are done in the intervening years. The replication audit was completed for the June 30, 2019 valuation so this year a limited scope review has been performed. This review is intended to meet the Board of Trustees’ requirements for an independent review of the reasonableness of the results of the annual Actuarial Valuation performed by the SDRS internal actuary, but it is not intended to be a validation of the internal actuary’s valuation calculations or numerical results.

Our analysis of the actuarial assumptions and methods was based largely on the most recent experience study covering the time period from July 1, 2011 through June 30, 2016 and implemented effective with the June 30, 2017 actuarial valuation. We would like to thank Doug Fiddler, the SDRS Senior Actuary, for his cooperation and assistance in providing the required information to us in a timely manner.



We find the actuarial assumptions, methods and procedures in the June 30, 2021 actuarial valuation to be reasonable and developed in accordance with applicable Actuarial Standards of Practice. They are consistent with those used in the prior valuation. The valuation report also complies with applicable Actuarial Standards Board.

If you need anything else, please do not hesitate to give us a call. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Sincerely,

A handwritten signature in blue ink, appearing to be 'LL', enclosed in a thin black rectangular box.

Larry Langer, ASA, FCA, MAAA, EA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Patrice Beckham' in a cursive script.

Patrice A. Beckham, FSA, FCA, MAAA, EA
Principal and Consulting Actuary



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1. EXECUTIVE SUMMARY

As an independent auditing actuary, Cavanaugh Macdonald Consulting, LLC (CMC) has been tasked to provide a general overview and review of the actuarial assumptions and methods used in the June 30, 2021 valuation performed by the South Dakota Retirement System's Senior Actuary, Mr. Doug Fiddler. In addition, we reviewed the valuation report to ensure it complies with applicable Actuarial Standards of Practice.

It is our belief that an audit or actuarial review should not focus on finding differences between actuarial processes and procedures utilized by two different actuaries, but rather to ensure that actuarial standards are being followed and to find improvements to the process and procedures and communication of results utilized by the System's Senior Actuary.

Pursuant to the RFP issued by the SDRS, a full replication audit was performed for the June 30, 2019 actuarial valuation. Therefore, only a limited scope review is required for the next four valuations performed by the staff actuary beginning with the June 30, 2020 valuation. In particular, our review this year is limited to an examination of the internal staff actuary's actuarial assumptions, funding methods, and procedures for reasonableness, internal consistency, and consistency with the previous year's actuarial valuation and a review of the internal staff actuary's valuation report for compliance with actuarial standards. The limited scope review does not include any actuarial calculations.

The following recommendations from prior audits have been discussed and it was agreed the SDRS Senior Staff Actuary would consider them during the next experience review:

- Use of aggregate entry age for funding and individual entry age for accounting (GASB)
- Determination of liabilities for account balance related benefits
- Determination of liabilities for Variable Retirement Account benefits

The impact of these recommendations would be immaterial.

We find the actuarial assumptions, methods and procedures used in the June 30, 2021 actuarial valuation to be reasonable and developed in accordance with applicable Actuarial Standards of Practice. They are consistent with those used in the prior valuation. The valuation report also complies with applicable Actuarial Standards of Practice as promulgated by the Actuarial Standards Board.



2. ACTUARIAL ASSUMPTIONS

BACKGROUND

The actuarial assumptions form the basis of any actuarial valuation or cost study. Since it is not possible to know in advance how each member’s career will evolve in terms of salary growth, future service and cause of termination, the actuary must develop assumptions in an attempt to estimate future patterns. These assumptions enable the actuary to value the amount of benefits earned and to reasonably estimate when and how long these benefits will be paid. Similarly, the actuary must make an assumption about future investment earnings of the trust fund. In developing the assumptions, the actuary examines the past experience and considers future expectations to make the best estimate of the anticipated experience under the plan.

There are two general types of actuarial assumptions:

- Economic assumptions – these include the valuation interest rate (expected return on plan assets), assumed rates of salary increase, price inflation, wage inflation, and increases in total payroll. The selection of economic assumptions should conform to ASOP No. 27 “*Selection of Economic Assumptions for Measuring Pension Obligations*”.
- Demographic assumptions – these include the assumed rates of retirement, mortality, termination, and disability. The selection of demographic assumptions should conform to ASOP No. 35 “*Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*”.

The discussion on the actuarial assumptions on the following pages is based on the data and recommendations in the 2016 Experience Study report.

Actuarial Assumptions

Discount rate/investment return:	6.50%, net of investment expenses.
Inflation:	2.25%
Wage inflation:	3.00%
Salary merit/seniority:	Service based, decreasing from 3.4% to 0.0% over 25 years.
Retirement:	Age 55 to 80 for non-Public Safety Age 45 to 65 for Public Safety. Rates are generally lower for reduced retirement.
Disability:	Rates for non-Judicial members shown through age 65 and vary by class and employment type. None for Judicial members.



2. ACTUARIAL ASSUMPTIONS

Mortality:	
Healthy	97% of RP-2014 Mortality Table, white collar table for females, total dataset table for males, adjusted to 2006 and projected generationally with MP-2016.
Disabled	RP-2014 Disabled Mortality Table, adjusted to 2006 and projected generationally with MP-2016.
Termination:	Five-year select and ultimate for non-Judicial members. Rates for non-Judicial members shown through age 55 and vary by employment type. None for Judicial members.
Marital Status:	80% of non-retired members assumed to be married with male members three years older than spouses and female members two years younger than spouses
Future Social Security Increases:	Future Social Security COLA adjustments assumed to be 2.25% per year; future social security taxable wage base increases assumed to be 3% per year
Interest on member contributions:	2.50%
Administrative Expenses:	2% of projected annual member and employer contributions
Election of Portable Retirement Option Benefits:	Percentage of election based on credited service at termination
Terminated Vested Member Benefit Commencement:	Three years prior to Normal Retirement Age except age 58 for Class A Members with 20 or more years of Credited Service at termination.
COLA:	2.25% (baseline assumption)



2. ACTUARIAL ASSUMPTIONS

Actuarial Assumptions - Review

No significant changes in actuarial assumptions, other than the COLA assumption, have been made since the June 30, 2017, actuarial valuation. Actuarial assumptions used in the valuation are based on an experience study covering the time period from July 1, 2011 through June 30, 2016. In general, we believe there are no inherent conflicts in the assumptions now in use with the requirements imposed by applicable Actuarial Standards of Practice. The next experience study will be performed prior to the June 30, 2022 valuation.

With respect to the most critical assumptions used in this valuation, we have the following comments:

Discount rate/investment return: ASOP No. 27 requires the selection of a reasonable assumption that may include consideration of a margin for “adverse deviation”.

We note the assumed rate of 6.50% is below the median return of 7.00% used by most public-sector pension plans and lower than the 20-year historical plan experience of 7.91% shown in Table 5.3 on page 24 of the 2021 Actuarial Report. However, we have reviewed the development of the assumption in the November 3, 2016 presentation to the Board entitled “Experience Analysis: Economic Assumptions” and we find it to be complete and supportive of the use of the current set of economic assumptions. We believe the current assumption of 6.50% is reasonable.

Inflation: We believe the inflation assumption of 2.25% is reasonable and in line with the levels of inflation assumed by other public-sector pension plans and expected based on several independent sources. Inflation reported over the last few months has been much higher than historical long-term averages. Whether this higher inflation will be transitory or more permanent is unclear at this time but it should be closely monitored. We believe that an inflation assumption of 2.25% is still reasonable but if current inflationary pressure remains in place, a higher inflation assumption may be appropriate particularly given the impact of this assumption on the COLA assumption.

Wage inflation: We believe the wage inflation assumption is reasonable and within the range of assumptions used by other public-sector pension plans. The wage inflation assumption of 3.00% is 75 basis points higher than the inflation assumption of 2.25%. We commented earlier on the recent spike in price inflation



2. ACTUARIAL ASSUMPTIONS

and the inability to know whether such a trend is temporary or has longer term implications. Higher inflation, combined with labor shortages, may result in higher wage inflation at least in the short term. This assumption will be studied in conjunction with the 2022 experience study and hopefully more will be known at that time.

Salary merit/seniority:

The individual salary increase assumption is separated into wage inflation and merit/seniority increase assumptions. We have already commented on the wage inflation assumption. The merit/seniority salary increase assumption is a service-based assumption, with smaller increases for longer-service employees. In our experience, salary increases are typically closely correlated with service and most public plans use a service-based merit salary assumption. We concur with this methodology, and the merit/seniority rates appear reasonable when compared to those currently used by other public retirement systems.

Retirement:

We concur with separating of the retirement assumptions by occupational categories, and the rates themselves appear to be consistent with those used by other public sector retirement systems. The retirement assumption used in the SDRS valuation reflects lower retirement rates for those who are eligible for reduced retirement benefits which is a pattern commonly observed in other systems. Normal Retirement Age (NRA) is age 65 with three years of service for non-Public Safety members. The highest pre-NRA retirement rate is 30% and rates extend for 15 years after initial unreduced benefit eligibility. For Public Safety, Normal Retirement Age is age 55 with three years of service. The highest pre-NRA retirement rate is 15% with rates extending for 10 years after initial unreduced benefit eligibility.

These assumptions appear to be reasonable based on the findings of the most recent experience study.

Disability:

Since the disability benefit is converted to a Normal Retirement benefit once the member reaches age 65, we agree with the cessation of assumed disability rates at age 65 (first eligibility for unreduced benefit). The assumed disability rates appear to be reasonable, based on those used by other public-sector retirement systems we work with.



2. ACTUARIAL ASSUMPTIONS

Mortality:	<p>In our opinion, the recommended and adopted mortality assumptions for healthy and disabled members are reasonable and meet the requirements of ASOP No. 35 including addressing future mortality improvements by using generational mortality. We note that the Society of Actuaries publishes a new mortality improvement scale each fall.</p> <p>In addition, in February 2019 the Society also published a family of mortality tables specifically developed for public-sector retirement systems. These are called the Pub-2010 Mortality Tables. More detail and discussion on these tables is included at the end of this section. It is likely the new public mortality table will be considered when the next experience study is performed.</p>
Termination:	<p>We agree with the application of assumed termination rates by years of service in the first years of employment and by both service and age for members in later years. The termination rates incorporated in the valuation appear to be in line with those used by other public-sector plans in our experience.</p>
Interest on member contributions:	<p>Interest is credited at a rate less than or equal to the minimum of 90% of the average 91-day US Treasury rate for the preceding calendar year and the assumed rate of investment return. In our opinion, the contribution interest assumption is reasonable and on the conservative side of the reasonable range.</p>
Terminated member commencement:	<p>The reduction for early retirement is 3% per year for Foundation Members and 5% per year for Generational Members, which appears to reflect a degree of subsidization by the plan. We agree members may likely elect a benefit prior to Normal Retirement eligibility given this subsidy. In our opinion, the stated assumptions are reasonable.</p>
COLA:	<p>The COLA is defined in levels based on the SDRS Fair Value Funded Ratio (FVFR):</p> <ol style="list-style-type: none">1) FVFR at least 100% when future COLAs are equal to the baseline COLA assumption:<ul style="list-style-type: none">• % increase in most recent 3rd calendar quarter CPI-W over the prior year (min



2. ACTUARIAL ASSUMPTIONS

- 0.0%, max 3.5%)
- 2) FVFR less than 100% when future COLAs are equal to the baseline COLA assumption:
- Same as above, but restricted maximum COLA is based on a future COLA assumption that results in a FVFR of at least 100%

The baseline assumption is that COLAs will be granted at the assumed inflation rate of 2.25% per year, which is reasonable.

The results of the June 30, 2021 actuarial valuation indicate the full COLA range of 0% to 3.5% is affordable so the liabilities and normal costs in the valuation are determined using the baseline COLA assumption of 2.25%. Note, under the COLA policy, the actual 2022 COLA is 3.50%.

New Public Plan Mortality Tables (Pub-2010 Tables)

The Society of Actuaries (SOA) released a new set of mortality tables in February 2019 which are based solely on public plan data. This set of tables is the first time mortality tables have been produced using public plan data and the first time that specific tables have been developed based on profession. Now there is a mortality table created for use by pension plans covering teachers (other tables are available for public safety and civilian employee groups). These standard tables will hopefully provide a better overall fit for the mortality observed by public plans as compared to corporate plans where differences in the reasons for retirement can impact the mortality observed at younger retirement ages. If that occurs, we would expect to find less frequent and dramatic adjustments to the standard mortality tables in the future.

We share this information on the Pub-2010 Tables for educational purposes only. The membership of the system is large enough to assign a fair amount of credibility to the actual experience in setting the mortality assumption and, the standard table has been adjusted to reflect the actual observed of the SDRS population. It is important to note that the fit of the mortality assumption to the observed data is more important than the date the table was issued or the data upon which it was based. Just because a new mortality table was issued by the SOA does not mean that SDRS or any other public retirement systems should automatically adopt that table. It does make sense to consider the new set of Pub-2010 Tables when the next experience study is performed to determine if the fit of the new table might be better than the current assumption.



2. ACTUARIAL ASSUMPTIONS

Other Considerations for Generational Members

Finally, Generational Members have a different level of benefits and subsidies which could result in different patterns of termination and retirement. As the Generational Members become a larger portion of the active membership, it will be important to establish a separate set of demographic assumptions for this group. While enough actual member experience may not be available in the next experience study in 2022, each assumption should be considered and discussed even if the recommendations are based on professional judgement and future expectations. For example, since Generational Members' retirement eligibility criteria differ from those applicable to Foundation Members, the actuary has used professional judgment to adjust the retirement rates of Generational Members pending the accumulation of sufficient experience among Generational Members to serve as a basis for this assumption.

COVID-19

At this time, the world is still recovering from the Covid-19 pandemic so we believe it is premature to consider changes to the long-term assumptions based on available information. The implications of the pandemic on the various assumptions used in the valuation will undoubtedly be discussed in the 2022 experience study.



3. ACTUARIAL METHODS

SDRS is funded by fixed, statutory Member and Employer Contributions that total 12.404% of covered compensation. As stated in the valuation report, the purpose of the valuation is:

- (1) to determine the 2022 COLA for SDRS,
- (2) to measure the funded status of SDRS as of June 30, 2021,
- (3) to confirm that such fixed, statutory contributions are the Actuarially Determined Contributions (ADC),
- (4) to determine if corrective actions must be recommended, and
- (5) to provide accounting information under GASB 67 and 68.

The annual valuation provides the basis for making such determinations based on the actuarial methods described in the report. On this basis, the 2021 Actuarial Valuation of SDRS determines that the baseline assumption for the COLA of 2.25% results in a Fair Value Funded Ratio greater than 100.0%, determines that the full COLA range of 0% to 3.5% is available and confirms that the statutory rates of contribution are the ADC and that no corrective actions recommendations are required.

Actuarial Methods - Review

No changes to the actuarial methods have been made since the June 30, 2017, actuarial valuation. The Entry Age Normal actuarial cost method, which is used in the SDRS valuation, satisfies the requirements of Actuarial Standard of Practice (ASOP) No. 4 and is an appropriate method to use for the calculation of System's Actuarial Accrued Liability and Normal Costs. Furthermore:

- Normal Cost is calculated as a level percentage of each member's pay over the member's career.
- The majority of public plans use such cost method for funding.
- GASB Statement Nos. 67 and 68 require the use of the individual version of such cost method for financial accounting and disclosure. For the ADC, the aggregate version is used. Refer to section 5 of this report for more detail on the distinction between the individual and aggregate version of the Entry Age Normal cost method.
- Use of the same cost method for funding enhances consistency between funding and accounting valuations.

The Conference of Consulting Actuaries Public Plans Community (CCA PPC) White Paper entitled "Actuarial Funding Policies and Practices for Public Pension Plans" (dated October 2014) categorizes such cost method as the model actuarial cost method.



3. ACTUARIAL METHODS

In our opinion, the actuarial cost method employed for the SDRS valuation is appropriate and will systematically fund the prospective pension benefits on an actuarially sound basis, if all of the actuarial assumptions are realized.

ASSET VALUATION METHOD

The SDRS actuarial valuation uses the fair market value of assets. We believe this is appropriate given SDRS' Funding Policy objectives to manage SDRS benefits based on the fixed, statutory member and employer contribution rates. Those objectives include a funded ratio, on the market value of assets, that is at least 100%, and actuarially determined benefits that are variable and supported by the fixed, statutory contributions. To this end, the cost of living adjustment (COLA) granted each year is adjusted to maintain a funded ratio of 100%, subject to certain minimum and maximum limits.

Given the Board's Funding Policy, we believe the use of market value for an asset valuation method is reasonable. Because Actuarial Standard of Practice Number 44 only applies to the use of asset valuation methods other than pure market value, it does not apply to the SDRS valuation.

AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY METHOD

Based on the Board's Funding Policy which maintains a funded ratio of 100%, there is no unfunded actuarial accrued liability and an amortization policy is not needed. We would note that if the Fair Value Funded Ratio is less than 100%, corrective action would be required so any unfunded actuarial accrued liability would be temporary.



4. VALUATION REPORT REVIEW

CONTENT OF THE ACTUARIAL REPORTS

The American Academy of Actuaries has issued a number of Actuarial Standards of Practice which deal with measuring pension obligations and communicating the results (ASOP No. 4, 23, 27, 35, 41, 44 and 56). Those standards list specific elements to be included, either directly or by reference to other documents, in pension actuarial communications. Some of the elements would not be pertinent in all communications, but since an actuarial valuation report is the most complete picture of the actuarial status of the plan, all of the elements listed should be covered in the report, even if only briefly.

There is a new actuarial standard of practice that is first applicable for the 2021 valuation, Actuarial Standard of Practice Number 56, *Modeling*. This ASOP provides guidance to actuaries with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models in performing actuarial services. The System's internal actuary has incorporated discussion and disclosure of the modeling tools used in producing the valuation and projection results and how they were selected. Therefore, in our opinion, the requirements of ASOP 56 have been met.

The actuarial valuation report is a well written and comprehensive summary of the key findings of the valuation. It also contains detailed information regarding the assets, liabilities, and funding of the System. It complies with all applicable Actuarial Standards of Practice.

Risk Assessment and Disclosure

ASOP No. 51, which was first required in the 2019 valuation, provides guidance to actuaries with respect to the assessment and disclosure of risk with respect to future actuarial measurements, which may vary significantly from current measurements.

In our opinion, the risk discussion included in the June 30, 2021 actuarial report complies with ASOP No. 51. The identification of risks to be assessed appears reasonable and appropriate. The initial risk assessment indicates investment risk is the most significant risk to SDRS funding and benefit levels. Other less significant risks identified were longevity risk, inflation risk, salary increase risk, other demographic risk and covered payroll risk. For each of these less significant risks, scenarios were generally described where departures from expectations would result in a certain general outcomes. ASOP No. 51 does not require that the assessment of a risk be based on numerical calculations, but the SDRS actuary does a good job of addressing the risks by including some quantitative analysis.

The report included further assessment of investment risk. While many methods of risk assessment are allowed, the choice of scenario testing for investment risk appears reasonable and appropriate for SDRS. The scenario testing appropriately showed the impact on funding results over a five-year period if actual returns were significantly less than or greater than the assumed investment return of 6.5%. The analysis showed that investment risk most significantly impacts a member's level of benefits since recommendations for benefit adjustments are required in certain low return scenarios and ad hoc benefit increases may be recommended in high return



4. VALUATION REPORT REVIEW

scenarios. As such, the report includes one-, two- and three-year projections of the amount of investment return needed (and the likelihood of such return) to meet certain objectives such as avoiding corrective action or providing a full COLA. The assessment of investment risk as a major risk to the System is appropriate and compliant with ASOP No. 51, in our opinion.

ASOP No. 51 also indicates that the actuary should consider disclosing certain plan maturity measures that the actuary believes are significant to understanding risks to the plan and provide commentary to help the reader understand the significance of the measurement in the assessment of risk. For this requirement, the actuary included historical ratios of assets and liabilities to active member payroll, historical percentages of retired and terminated member counts to total member counts, historical percentages of retired and terminated member liability to total member liability and historical cash flow measurements as a percentage of assets.

We believe the information provided in the 2021 valuation report is very comprehensive and does an excellent job of communicating the most significant risks to SDRS.

We believe the content and disclosures included in the SDRS valuation report are in compliance with all current Actuarial Standards of Practice (ASOPs).