California Public Employees' Retirement System

Parallel Valuation and Certification Report
Legislators' Retirement System Valuation

as of June 30, 2022

December 2023

110 West Berry Street
Suite 1300
Fort Wayne, IN 46802

December 29, 2023

Board of Administration
California Public Employees' Retirement System (CalPERS)
P.O. Box 942701
Sacramento, CA 94229-2701

Members of the Board:

As provided in Contract 2021-9096, we have reviewed valuations prepared by the CalPERS professional actuarial staff in order to certify that such work satisfies applicable standards of the actuarial profession. In the following pages, we report the results of our review of the June 30, 2022, actuarial valuation prepared for the Legislators' Retirement System (LRS).

We reviewed the assumptions, methods and procedures used by CalPERS staff to perform the LRS valuation, and we confirm that they conform to applicable Actuarial Standards of Practice (ASOPs).

In addition, we completed a parallel actuarial valuation for LRS using the same assumptions and census, asset and benefit provision data that were used by CalPERS staff to prepare their June 30, 2022, valuation of the plan. We compared key results of our parallel valuations to those in the valuation report published by CalPERS.

Each actuarial organization has its own valuation model and applies actuarial assumptions and methods in its preferred way. There is rarely a single "right" answer when it comes to actuarial calculations. For a pension actuarial valuation, we consider one actuary's calculations to reasonably match another actuary's calculations when the present values (liabilities), normal cost contributions, and total employer contributions computed by the two actuaries are within 5% of each other.

For LRS, our computations of the contribution rates matched those prepared by CalPERS staff within 5%, which was the target tolerance level specified by CalPERS. Our analysis also included a comparison of present value of future benefits, accrued liabilities and normal costs, which also matched within the required 5% threshold. We view the differences between our calculations as immaterial.

Although not required by our contract, we also compared key valuation results for each individual participant (active members, transferred and terminated members, and retired members and beneficiaries) in LRS. This enhanced reconciliation process provides a deeper review of the calculations and may highlight differences in the handling of individual participants in the valuation process whose effects may offset each other when results are aggregated at the level of the entire plan.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions, applicable law, or regulations. An analysis of the potential range of such future differences is beyond the scope of this study.

This report was prepared for the Board and professional staff of CalPERS for their use in evaluating the preparation of actuarial valuations by the System. Use of this report for any other purpose or by other parties may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for other purposes. Because of the risk of misinterpretation of actuarial results, Buck recommends requesting its advance review of any statement, document, or filing to be based on information contained in this report. Buck will accept no liability for any such statement, document or filing made without its prior review.

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of each plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

The undersigned are Fellows of the Society of Actuaries, Members of the American Academy of Actuaries and Enrolled Actuaries. We each meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

Buck Global, LLC (Buck)

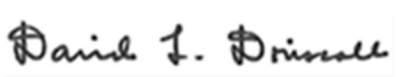

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Table of Contents

Section

Schedules

Section I - Introduction

Under the California Constitution, the Board of Administration has plenary authority and fiduciary responsibility to provide for actuarial services. The CalPERS Chief Actuary advises the Board and directs the activities of the CalPERS professional actuarial staff. The Board also retains the services of an outside actuarial firm to review the work of the CalPERS professional actuarial staff and to certify that such work satisfies actuarial professional standards.

Buck was contracted to provide parallel valuation and certification services to the Board.

This report summarizes our review of the Legislators' Retirement System's actuarial valuation results as of June 30, 2022, under Task #3 of our contract.

We first reviewed the actuarial assumptions and methods used for the June 30, 2022, LRS valuation. Our review reflects the Actuarial Standards of Practice (ASOPs) applicable to the selection of economic assumptions (ASOP 27) and the selection of demographic assumptions (ASOP 35). The results of our review are discussed in Section II.

Next, we completed a parallel actuarial valuation for LRS in order to compare our key valuation results with those published in the valuation report prepared for the plan. CalPERS requested that we reconcile any differences of more than 5% between the two sets of valuation results. Section III contains a summary of our parallel valuation methodology. The results of our analysis are summarized in Section IV.

We also reviewed the report with regard to the sufficiency of information communicated under applicable ASOPs. The results of this review are summarized in Section V.

Lastly, we reviewed the general contents of the valuation report for LRS and have formulated some recommendations for changes in the report. These are presented in Section VI.

We did not audit or review the final valuation data provided to us by CalPERS for this parallel valuation, as review of the data is explicitly excluded from the scope of this assignment. Generally speaking, our review has indicated that the actuarial process followed by CalPERS is thorough, complete, and complies with applicable Actuarial Standards of Practice.

Section II - Review of Actuarial Assumptions and Methods

We have reviewed the actuarial assumptions and methods used in the LRS valuation. The key valuation assumptions include the following:

Assumption	Detail	Basis and Rationale	Commentary
Expected rate of return on investments, net of investment and administrative expenses	4.50%	Primarily based on capital market assumptions provided by external investment consultants and CalPERS investment staff.	We have reviewed the assumed long-term annual rate of return on plan assets using our own economic modeling tool and determined that it is reasonable.
Discount Rate	4.50%	Set equal to the expected rate of return on investments, net of investment expenses	Reasonable, as stated above.
Price Inflation	2.30%	Documented in 2021 experience study report	We have reviewed the assumed price inflation using our own economic modeling tool and determined that it is reasonable.
Individual Salary Increases and Overall Payroll Growth	2.80%	Documented in 2021 experience study report	We agree with the documented basis and rationale for the assumption.
Demographic Assumptions: Mortality and retirement	The mortality assumption is comprised of customized base rates projected from 2017 using 80% of Scale MP-2020. The retirement assumption varies by age, service, and retirement provision.	Documented in 2021 experience study report	We agree with the documented basis and rationale for the assumptions.
Demographic Assumptions: Withdrawal, disability, and other:	Assumptions may vary by gender, age, or service.	Assumptions have been in place for many years and have not produced significant experience gains or losses for the plan.	Given the nature of the active population, we do not believe refinement of these assumptions would materially change the valuation results.

Section II - Review of Actuarial Assumptions and Methods (continued)

Actuarial Standard of Practice (ASOP) 27 discusses the selection of economic assumptions for the measurement of pension liabilities. Similarly, ASOP 35 discusses the selection of demographic assumptions for the measurement of pension liabilities. In our opinion, the assumptions used in the LRS valuation are reasonable and the methodology used to select these assumptions is appropriate and consistent with the guidance provided in ASOP 27 and ASOP 35.

Concept	Method Employed	Commentary
Actuarial Cost Method	The LRS valuation uses the entry age actuarial cost method, in which projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date.	Described as a "Model Practice" in the Conference of Consulting Actuaries' 2014 report titled "Actuarial Funding Policies and Practices for Public Pension Plans", commonly referred to as the "White Paper." The guidance offered in the White Paper is not binding but provides a sense of the actuarial profession's beliefs about the relative merits of different approaches to funding public retirement systems.
Asset Valuation Method	Market value of assets plus accounts receivable.	This is an acceptable method.
Amortization of Unfunded Actuarial Accrued Liability (UAL)	Layered: UAL bases are amortized over fixed periods (varying by source of the base and the amortization policy in effect when established), calculated as a percentage of payroll (for bases established prior to June 30, 2019) or as a level dollar amount (for bases established on or after June 30, 2019); a ramp-up and/or ramp-down feature is incorporated in the amortization of certain bases.	Under the current policy, the amortization periods for all sources of UAL bases are within the Model Practice criteria in the White Paper with the possible exception of benefit changes. The current policy is set at 20 years, which is a longer period than recommended by the White Paper. Level-dollar amortization, as in effect under the current policy, is described as an "Acceptable Practice" in the White Paper.

Section III – Parallel Actuarial Valuation Methodology

The steps followed in our parallel actuarial valuation are described below.

We requested a copy of the final June 30, 2022, valuation report for LRS, and completed the following steps:

1. We requested:
   a) The complete decrement tables used by CalPERS to prepare the valuation
   b) The final participant data used in generating the valuation report
   c) The key actuarial results presented in each valuation report (normal cost, actuarial accrued liability, present value of benefits, present value future salary, etc.) both in the aggregate and *on a per participant basis*.
2. Using the information provided in the valuation report and in 1(a) and 1(b) above, we produced a valuation for the plan using ProVal®, a commercially available valuation system used worldwide by actuaries and investment professionals. We generated the key actuarial results for comparison to results published in the actuarial valuation report.
3. In the reconciliation process, using the data provided in 1(c) above and the output from ProVal®, we compared the key results both on an aggregate basis and an individual basis. Reconciling results for individual participants as well as by plan may uncover multiple discrepancies that could offset each other, producing aggregate results that fall within the 5% tolerance level. Valuation results that differ by less than 5% in total may camouflage systematic errors with respect to particular types of participants. Comparing results by participant helps us to identify the reasons for differences in aggregate result that exceed the 5% tolerance and to identify hidden material discrepancies for results that are within the tolerance as well. As part of this enhanced reconciliation process, we provide in Schedule C a frequency distribution of the percentage difference in key actuarial results by participant.
4. We have communicated preliminary results to CalPERS via email and telephone discussions.
5. In the following section, we provide the following:
   - Results of the actuarial review
   - A description of our parallel actuarial valuation findings, with differences attributable to either “Differences in valuation system” or “Areas for Refinement”

Section IV - Parallel Actuarial Valuation Findings

In our parallel valuation and review, we compared present values of future pay, present values of future benefits, actuarial accrued liabilities, and total normal costs. We then used these key valuation results to compute and compare the total employer contribution rates. We are pleased to report that our calculation of the employer contribution rates differed by less than 5% from the corresponding results reported by CalPERS.

The table in Schedule B summarizes the results for LRS. This schedule indicates that we were able to closely replicate CalPERS' results. We generally categorize differences in results between our valuations and CalPERS valuations in one of two areas:

1. Differences between valuation systems. No two valuation systems will produce identical results due to differing approaches to age and service rounding, adjustments for mid-year timing, consideration of monthly vs. annual payments, and other features. These differences generally will not produce materially different results.
2. Areas for which refinement of calculation would be advisable.

Differences in valuation systems

The table in Schedule B shows that Buck's present value of future benefits and actuarial accrued liability calculations were both within 5% overall and on each status. However, the normal cost as of the valuation date that we calculated was $0 compared to $59,581 for CalPERS, which is a 100% difference. This is due to the treatment of individuals expected to retire on or after the maximum assumed retirement age. In those instances, CalPERS imputes one-half year of service in the year of retirement, which will always generate a nonzero normal cost. For those past maximum assumed retirement age, ProVal assumes retirement at beginning of year, which will produce a normal cost of $0. Both active individuals are past the maximum assumed retirement age, hence the zero normal cost that we show. It should be noted that the employer contribution rate is based on normal cost projected to the 2023-24 fiscal year and is presented as $0 by both CalPERS and Buck since both individuals are expected to have terminated before June 30, 2023.

Areas for refinement

None.

Section V – Additional ASOP Considerations

ASOP 41 (Actuarial Communications) Checklist

Key Information	Included in Report	Not Included in Report	Not Applicable
Identification of Responsible Actuary (ASOP 41, 4.1.1)	✓		
Identification of Actuarial Documents (ASOP 41, 4.1.2)	✓		
Intended users of the actuarial report	✓		
Scope and intended purpose of the engagement or assignment	✓		
Acknowledgement of qualification as specified in the Qualification Standards	✓		
Any cautions about risk and uncertainty	✓		
Any limitations or constraints on the use or applicability of the actuarial findings contained within the actuarial communication including, if appropriate, a statement that the communication should not be relied upon for any other purpose	✓		
Any conflict of interest			✓
Any information on which the actuary relied that has a material impact on the actuarial findings and for which the actuary does not assume responsibility			✓
Information Date of Report	✓		
Subsequent Events	✓		
If appropriate, the documents comprising the actuarial report			✓

Section V – Additional ASOP Considerations (continued)

ASOP 51 Compliance

ASOP 51 Material	Commentary
Identification of Risks to be Assessed (ASOP 51, 3.2)	The ASOP requires the actuary to identify risks that, in the actuary's professional judgement, may reasonably be anticipated to significantly affect the plan's future financial condition. The report appropriately identifies certain risks in the 'Risk Analysis' section of the report.
Assessment of Risk (ASOP 51, 3.3)	The ASOP requires the actuary to assess risks identified by the actuary in accordance with section ASOP 51, Section 3.2, including the potential effects of the identified risks on the plan's future financial condition. This is accomplished via sensitivity tests in the 'Risk Analysis' section of the report.
Plan Maturity Measures (ASOP 51, 3.7)	The ASOP requires that the actuary calculate and disclose plan maturity measures that, in the actuary's professional judgment, are significant to understanding the risks associated with the plan. The report acknowledges the standard and provides justification for the omission of plan maturity measures.
Historical Information (ASOP 51, 3.8)	The ASOP requires that, if reasonably available, the actuary should identify and disclose relevant historical values of the plan's actuarial measurements that, in the actuary's professional judgment, are significant to understanding the risks identified in accordance with section ASOP 51, Section 3.2. The report provides historical information in accordance with the standard.

ASOP 56 Compliance

The Actuarial Standards Board issued ASOP 56, Modeling, in December 2019, which provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. This ASOP is effective for work performed on or after October 1, 2020, and is applicable to the valuation report audited here. Since a valuation model is used for the reports, which fall within the scope of ASOP 56, CalPERS is required to disclose and describe their model.

Page A-1 of the report includes a description of the valuation model, satisfying the requirements of ASOP 56.

Section VI – Additional Comments and Recommendations

Recommendations

There are no additional comments.

Schedule A – Comparison of Member Data

The tables below compare the participant data summarized in the CalPERS report to the participant data provided to Buck.

Active Participants	CalPERS	Buck
Number	2	2
Average age	71.3	71.3
Average service	13.3	13.3
Average pay	$ 147,273	$ 147,273

Retirees and Beneficiaries	CalPERS	Buck
Number	189	189
Average age	76.0	76.0
Average annual benefits	$ 37,239	$ 37,239

Vested Terminated Participants	CalPERS	Buck
Number	3	3

Schedule B – Comparison of Key Valuation Results

Liabilities as of June 30, 2022	CalPERS	Buck	% Difference
Present Value of Benefits			
1. Active members	$ 1,779,535	$ 1,787,015	0.4%
2. Inactive members	895,380	914,131	2.1%
3. Members receiving benefits	92,081,995	92,028,893	-0.1%
4. Total	94,756,910	94,730,039	-0.0%
Accrued Actuarial Liability			
1. Active members	$ 1,719,953	$ 1,787,015	3.9%
2. Inactive members	895,380	914,131	2.1%
3. Members receiving benefits	92,081,995	92,028,893	-0.1%
4. Total	94,697,328	94,730,039	0.0%
Normal Cost (Employer + Employee)	59,581	0	100.0%[1]

Contribution as a % of Payroll	CalPERS	Buck	% Difference
Total Normal Cost	0.00%	0.00%	0.0%
Employee Contribution	0.00%	0.00%	0.0%
Employer Normal Cost	0.00%	0.00%	0.0%
Unfunded Actuarial Liability Payment	0.00%	0.00%	0.0%
Required Employer Contribution	0.00%	0.00%	0.0%

[1] See page 5 of this report for an explanation of this difference.

Schedule C – Comparison of Individual Participant Results

Present Value of Future Benefit Differences

(Members Valued: 194)

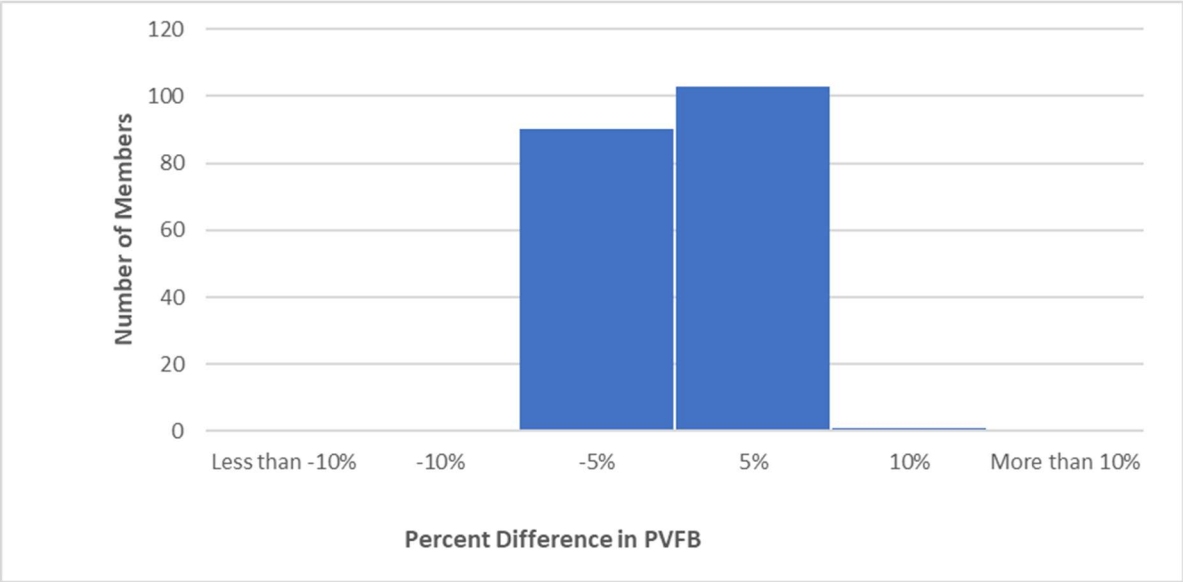

Chart Tabulation Method and Notation: The chart above reflects percent differences between Buck and CalPERS results, rounded to the nearest hundredth of a percent, where -5% reflects Buck results that were within the range from 0.00% to -4.99% compared to CalPERS results, where -10% reflects Buck results within -5.00% to -9.99% of CalPERS results, etc.