

Executive Team

Dominic D. Brown, CPA, CFE
Chief Executive Officer

Daryn Miller, CFA
Chief Investment Officer

Jennifer Zahry, JD
Chief Legal Officer

Matthew Henry, CFE
Chief Operations Officer



Board of Retirement

Juan Gonzalez, Chair
Tyler Whitezell, Vice-Chair
Jeanine Adams
David Couch
Phil Franey
Joseph D. Hughes
Jordan Kaufman
Rick Kratt
Traco Matthews
Dustin Contreras, Alternate
Chase Nunneley, Alternate
Robb Seibly, Alternate

March 3, 2022

Members, Board of Retirement
Employee Bargaining Units
Requesting News Media
Other Interested Parties

Subject: Meeting of the Kern County Employees' Retirement Association Finance Committee

Ladies and Gentlemen:

A meeting of the Kern County Employees' Retirement Association Finance Committee will be held on Tuesday, March 8, 2022 at 1:30 p.m. via teleconference pursuant to Assembly Bill 361, signed into law on September 16, 2021 as urgency legislation, Resolution 2022-02 adopted by the KCERA Board of Retirement at its Regular Meeting held February 9, 2022 and Governor Newsom's March 4, 2020 proclaimed State of Emergency, which remains in effect. (Cal. Gov. Code section 54953, as amended by Assembly Bill 361).

If you wish to listen to the teleconference meeting, please dial one of the following numbers and enter ID# 896 7771 2317:

- (669) 900-9128
- U.S. Toll-free: (888) 788-0099 or (877) 853-5247

Items of business will be limited to the matters shown on the attached agenda. If you have any questions or require additional service, please contact KCERA at (661) 381-7700 or send an email to administration@kcera.org.

Sincerely,

Dominic D. Brown
Chief Executive Officer

Attachment

AGENDA:

All agenda item supporting documentation is available for public review on KCERA's website at www.kcera.org following the posting of the agenda. Any supporting documentation that relates to an agenda item for an open session of any regular meeting that is distributed after the agenda is posted and prior to the meeting will also be available for review at the same location.

**AMERICANS WITH DISABILITIES ACT
(Government Code §54953.2)**

Disabled individuals who need special assistance to listen to and/or participate in the teleconference meeting of the Board of Retirement may request assistance by calling (661) 381-7700 or sending an email to administration@kcera.org. Every effort will be made to reasonably accommodate individuals with disabilities by making meeting materials and access available in alternative formats. Requests for assistance should be made at least two (2) days in advance of a meeting whenever possible.

ROLL CALL

1. [Discussion and appropriate action on recommendation for Actuarial Services](#)
Provider presented by Chief Executive Officer Dominic Brown and Chief Operations Officer Matthew Henry – RECOMMEND THE BOARD OF RETIREMENT APPROVE SEGAL AS ACTUARIAL SERVICES PROVIDER; AUTHORIZE CHIEF EXECUTIVE OFFICER TO SIGN, SUBJECT TO LEGAL ADVICE AND REVIEW

PUBLIC COMMENTS

2. The public is provided the opportunity to comment on agenda items at the time those agenda items are discussed by the Committee. This portion of the meeting is reserved for persons to address the Committee on any matter not on this agenda but under the jurisdiction of the Committee. Committee members may respond briefly to statements made or questions posed. They may ask a question for clarification and, through the Chair, make a referral to staff for factual information or request staff to report back to the Committee at a later meeting. Speakers are limited to two minutes. Please state your name for the record prior to making a presentation.

REFERRALS TO STAFF, ANNOUNCEMENTS OR REPORTS

3. On their own initiative, Committee members may make a brief announcement, refer matters to staff, subject to KCERA's rules and procedures, or make a brief report on their own activities.
4. Adjournment



KERN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

Memorandum from the
Office of the Chief Executive Officer
Dominic D. Brown

Date: March 8, 2022
To: Trustees, Finance Committee
From: Dominic D. Brown, Chief Executive Officer *Dominic D. Brown*
Subject: **Actuarial Services Proposal Review**

On January 27, 2022, KCERA issued a Request for Proposal (RFP) for the services of an actuarial firm to serve as Actuary for KCERA. The Actuary will prepare an annual valuation, as well as several other required reports and services listed in the RFP.

KCERA received the attached two proposals, both of which were reviewed by members of the Evaluation Committee. The Evaluation Committee members were selected by the Chief Executive Officer and utilized the evaluation and selection procedures outlined in the RFP. The selection process calls for the Evaluation Committee to make a recommendation to the Finance Committee, which would then make a recommendation to the Board of Retirement.

The Evaluation Committee received two qualified proposals for consideration and would like to thank the firms for their proposals. After consideration of the proposals and other operating factors the Committee has selected Segal as the recommended Actuary.

Therefore, it is recommended that the Finance Committee approve the Evaluation Committee's selected actuary and recommend them to the Board of Retirement at their meeting on March 9, 2022.



Kern County Employees' Retirement Association

Proposal to Provide Actuarial Services

**Produced by Cheiron
February 25, 2022**

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B. Proposal Cover Letter

February 25, 2022

Mr. Matthew Henry, Chief Operations Officer
Kern County Employees' Retirement Association
11125 River Run Boulevard
Bakersfield, CA 93311

Re: Request for Proposal (RFP) for Actuarial Services

Dear Mr. Henry:

Cheiron is pleased to present its qualifications to provide actuarial services to the Kern County Employees' Retirement Association, hereinafter referred to as "KCERA."

We have read the Request for Proposal (RFP) for actuarial services and fully understand its intent. We confirm that Cheiron has the experienced staffing and resources to provide the services and deliverables requested in this RFP and are willing to provide the requested services subject to the terms and conditions set forth in the RFP and agree to be bound by all of the requirements of the RFP.

Cheiron is an independent, employee-owned, pension and healthcare actuarial consulting firm advising public pension plans, Taft-Hartley pension funds, nonprofit organizations, and corporations. We would like to highlight the following:

- **Extensive Public Sector (and 1937 Act County) Experience:** Our consultants have decades of experience addressing the unique needs of the nation's public pension and welfare plans, in particular, the 1937 Act systems. Our pension and health care consulting practice is dedicated almost exclusively to consulting with public and multiemployer plans.

We are currently the consulting actuary for six of the twenty SACRS systems, and our consultants have performed actuarial audits for twelve other SACRS systems; and members of the proposed team have performed an audit of KCERA. Both of the proposed co-leads are members of the California Actuarial Advisory Panel; Graham Schmidt is the SACRS representative and Anne Harper was appointed by Governor Gavin Newsom.

We are also the consulting actuary for numerous other large systems in California, including the cities of San Diego, San Francisco and San Jose, and have provided auditing services to the three largest systems in California: CalPERS, CalSTRS, and the University of California Retirement System. Outside of California, our consultants have worked with nearly half the country's statewide retirement systems, and we also work with numerous large county and city pension plans.

- **Innovative:** Our interactive modeling skills, which are part of our regular valuation services, set us apart from other actuarial firms. Our models are flexible, easy to understand, and can analyze the impact of changes in benefits, rates of return, discount rates, contribution levels, life expectancies, and dozens of other variables. Our models also project future costs, liabilities, assets, and funded ratios.

Most importantly we are able to use these models during Board meetings to demonstrate the impact on these measures on different policies being considered by the Board. All of our consultants are trained to program our proprietary models to meet individual client needs. Our models enable us to help sponsors better understand and manage the risks of their benefit programs.

We also prepare our presentations with a great deal of thought to anticipate questions from Trustees and staff so we can answer them immediately at Board meetings, and our clients do not have to wait for our response. This allows us to fulfill our mission of empowering sponsors to better understand and manage the risks of their benefit programs.

Our clients also value our ability to explain complicated actuarial and financial concepts in clear and understandable terms. As an example of how we combine these strengths, we invite you to review this presentation one of our co-leads provided to a group of SACRS trustees at the Public Pension Investment Management Symposium: [SACRS Symposium](#).

We also pride ourselves in our development in new paradigms for presenting information to Boards and other stakeholders. In this era of Zoom meetings, we quickly recognized that the standard practice of online slide presentations presented challenges for audience engagement, so we developed new, interactive tools for presenting. To provide an example of this new technology, we put together an online [presentation](#) intended to supplement the RFP questionnaire included as Exhibit C.

- **Independent and Objective:** Unlike nearly all large and midsize consulting firms, we are completely independent from brokers, investment firms, healthcare providers and administrators in that we do not accept assignments or commissions from brokers, investment or insurance companies. Through our ardent dedication to objectivity in advising Board members, we have earned a strong reputation for unbiased consulting that best serves our clients and their employees/retirees.
- **Highly Qualified:** Our talented actuaries back our commitment to quality. More than 40 percent of all our employees are Fellows of the Society of Actuaries or FSAs, the highest professional designation. We have a higher percentage of FSAs with public sector expertise than most other firms.

Our actuaries are very active in leadership positions in professional organizations such as the American Academy of Actuaries and the Public Plan Steering Committee of the Conference of Consulting Actuaries. They also serve on the Pension Committee of the Actuarial Standards Board, the rule-making body for the actuarial profession. Because of our expertise, we've been asked to testify before Congress on pension issues.

Mr. Matthew Henry

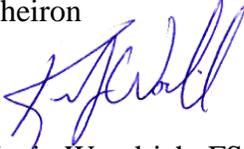
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We are confident we can do a superior job providing a unique experience for KCERA and look forward to answering any questions you may have. By my signature below, I state that I am authorized to bind Cheiron, Inc. contractually. Please see Appendix F for a copy of a resolution adopted by the Cheiron Board of Directors indicating this authority.

Sincerely,

Cheiron



Keyin Woodrich, FSA, FCA, MAAA, EA
Principal Consulting Actuary

February 25, 2022

C. Proposal

1) Ability to Perform Scope of Services

The Respondent should demonstrate in this section an ability to meet the requirements set forth in Section II, Scope of Services, and should address in detail how it intends to complete each task. The detailed description should be organized to reflect the sequence in which the work will be performed and address the strategies that the Respondent will use to achieve the proper level of detail. The Respondent should also specify the extent of involvement required of KCERA staff, outlining the amount of time, skills and knowledge needed in order for the Respondent to meet the deliverables. Finally, the Respondent must complete the questionnaire attached as Exhibit C, providing detailed information about the firm and its employees.

1) Actuarial Policy. Annually review the KCERA's policies governing its funding methods and objectives and provide written recommendations to the Board on appropriate changes, additions, or deletions to the policies.

KCERA's Actuarial Policy documents the Board's goals with respect to the funding of the plan and outlines the policies established to meet those goals. Cheiron uses its interactive model, *P-scan* (discussed in detail below), to illustrate how these policies are working and are expected to work to meet the documented goals in a variety of scenarios. Each year, we review these projections and assess whether there are any changes merited to better meet the objectives. Based on a brief review of the current Actuarial Policy, there are three situations that are likely to need a review sometime in the future.

1. Full Funding – Once the plan reaches 100% funding, there are some changes in the amortization policy that are automatically triggered. Based on recent experience, we've found that some refinement to these changes may be preferred by Boards and plan sponsors. As the plan and specific pools approach 100% funding, we would use our P-scan model to illustrate the current policies and some alternatives for the Board to consider.
2. Amortization Stabilization – As the plan reaches the end of payments on large amortization layers, contribution rates can become volatile. Some temporary modification or alignment of amortization layers may be needed to create a smooth pattern for contribution rates. For KCERA, the largest amortization layer appears to be scheduled to be paid off during FYE 2035, creating a significant drop in contribution rates at that time. There is no immediate need to address this issue, but the Board may want to consider some modifications within the next 5-10 years.
3. Rate Pooling – Multiple employer plans balance equity between employers, the advantages of pooling risk, and complexity in establishing different contribution rates for each employer in the plan. The Actuarial Policy describes the principles behind this balance, but it may be worth revisiting portions of this balance from time to time to ensure that it remains optimal.

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2) Annual Actuarial Report

- a) **Actuaries shall prepare an actuarial valuation study for the periods ending June 30, 2022, 2023, and 2024 which complies with section 2(c) herein and which reviews the funded status of the KCERA and recommends employer contribution rates to be effective the subsequent fiscal year.**

Cheiron's general approach to providing formal pension valuation services is as follows.

- **Initial Planning Meeting.** We meet with staff before the valuation cycle begins in a joint meeting or conference call to go over an agenda containing priority items and suggested deadlines for each step of the valuation process. We collaborate with staff on any potential enhancements or improvements. Typically, the agenda includes:
 - Identification of key people on your staff and at Cheiron who are involved in the valuation process. Responsibilities and contact information will be shared.
 - Determination as to whether changes in the plan or funding policy have occurred since the prior valuation.
 - Review of notes made at the end of the prior actuarial valuation regarding specific items to be addressed for the next valuation.
 - Discussion of timelines and data needed to meet timelines.
 - Confirmation of deliverable dates for Actuarial Valuation Report, the GASB reports, SRBR Tier 3 and 415 Limit Calculations, and any other project or deliverable anticipated for the year.
- **Data Request.** We prepare an annual data request to be sure we receive all necessary elements to perform the valuations and other projects. This request includes individual census data for all members, asset and reserve information, and any plan changes since the prior valuation. To ensure that the individual census data is secure, we use Cheiron's Secure Portal for all data transfers. Alternatively, if KCERA has its own portal, we can use that as well.
- **Data Collection and Data Check.** As a first step, we perform an independent check of the census data obtained from staff to ensure that we have the same total payroll and headcounts by employer and membership group. In addition, at this early juncture, we complete a broad reasonableness check on the data based on the prior year's totals. All data is reconciled to the prior year's data and any potential data issues are flagged. Flagged items are reviewed internally, and any unresolved issues are sent to KCERA for resolution. A final data reconciliation is performed after answers to the data questions are received from KCERA. The data collection and data check process is coordinated by the project manager and handled by the actuarial analysts assigned to the valuation. Any unusual data issues are discussed with the principal and support actuaries who will coordinate with KCERA to resolve any issues so that the valuation can move forward.

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- **Review Actuarial Assumptions and Methods.** Typically, we would perform a high-level review of the assumptions used in the previous actuarial valuation report and based on the most recent experience study to ascertain if they are reasonable and in compliance with the applicable Actuarial Standards of Practice in order to use them in the June 30, 2022 actuarial valuation. However, we were the auditing actuaries for the June 30, 2019 actuarial valuation and also performed a review of the July 1, 2016 through June 30, 2019 experience study. During that audit, we confirmed that the assumptions and methods were reasonable, but had considerations for analysis in the next experience study.

Consequently, we do not anticipate a need to review the actuarial assumptions and methods until the next experience study, unless there have been changes in conditions or policies – such as a significant change in the investment strategy or capital market assumptions – that would warrant a review of specific assumptions.

- **Perform Analysis.** Once the data has been reconciled, we run our valuation systems, incorporate asset information, and analyze results. The steps involved in this process are as follows:
 - Cheiron uses ProVal for our valuation processing. The prior ProVal programming is reviewed and separate runs are programmed to isolate the changes in the liability measures due to plan experience (same programming as the prior year), changes in plan provisions, and changes in actuarial assumptions or methods.
 - Sample lives are selected to review the details of our programming. Some of these sample lives will be the same as were used in the review of the transition valuation, and some will be new sample lives. Sample lives are selected such that all benefit structures are reviewed.
 - Once we are satisfied that the programming is correct, we run the full data through the valuation. If changes have occurred in either the plan or actuarial assumptions, we will do additional software runs to measure the effects of these changes.
 - Next, we perform a gain/loss analysis by source. This analysis identifies the sources of the difference between expected and actual valuation results. For example, it identifies differences between actual and expected salary increases, retirements, terminations, disabilities, and deaths. We also perform a detailed gain/loss by each individual to isolate the largest sources of discrepancies from our assumptions and to identify any remaining data issues. The gain/loss analysis is important not only to communicate the results of the valuation but could also identify a problem in the valuation which might require correction before finalizing the valuation results. It serves as an additional check on the reasonability of the valuation results.

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- Once the liabilities are finalized, we calculate the Actuarial Value of Assets (AVA) based on the Plan's asset smoothing method and the Market Value of Assets (MVA). We first calculate investment gains and losses on the Market Value of Assets and use those results to determine the AVA. We calculate the actual rate of return on both the AVA and MVA.
- Liability results from ProVal are exported to *Excel* where we calculate the Unfunded Actuarial Liability (UAL), funded status both on a market value and actuarial value basis, the UAL payment for any new actuarial gains or losses, assumption or plan changes, and employer and employee contribution rates.
- Employer contribution rates are calculated for the twenty-seven different cost groups depending on the group (General, Safety, Courts), employer or District category and/or benefit tier. Average member contribution rates would also be determined for the same cost groups.
- Funded status, unfunded actuarial liability amortization payments, contribution rates and other statistics are compared to the prior year and checked carefully for accuracy and reasonableness.
- We also build our *P-Scan Model* to project future valuation results. This modeling is an integral part of our assessment of the risks to the retirement system; how the valuation methods and assumptions mitigate those risks; and how well the contribution policy achieves KCERA's objectives. It is Cheiron's standard practice to include various projections in our actuarial valuation report both in the executive summary and risk section.
- **Report Preliminary Results.** Once we get into our valuation work, the co-lead consultants will keep KCERA fully informed of the progress. The first important communication will indicate the draft results of the valuation, including funded status and contribution rates. The discussion of preliminary results allows the consultant to explore Staff's objectives and concerns considering these results to ensure that our communications and alternative scenarios available in *P-Scan* help facilitate the appropriate policy discussions for the Board. The initial communication will likely be done by a conference call with Staff and the lead actuaries. Many of our clients also choose to have a preliminary results presentation made to the Board, so they can provide direction on assumptions and methods to be used in the final valuation. We invite you to review this link as an example of a recent preliminary results presentation made to a County Board:

[Sample Preliminary Results Presentation](#)

Following this process, the report and results will be peer reviewed by a senior

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consulting actuary who is independent of the valuation team and then finalized.

- **Board Presentation.** We believe that the presentation of results to KCERA is the most important communication we provide. The written report itself is also very important, but in practice we find very few Board members read the report from cover to cover, instead using it as a reference. Our typical presentation focuses on our *P-Scan* analysis. We start with a historical review of past results to put the current valuation's results into the context of the long-term trends of the system. We present the current year's results and conclude with an interactive presentation of projections under a variety of economic scenarios. We believe these projections are a critical part of communicating the potential risks in the future to the Board so they are fully informed and can make whatever policy decisions are appropriate. Each *P-Scan* is customized so that it reflects the current operation of the plan and can have a variety of policy options programmed to facilitate any Board discussion of alternatives.
- **Final Reports.** The final reports are sent to the CEO and Trustees. The report follows a standard model used by Cheiron, which includes a board summary with charts that show comparisons to prior valuations, as well as projection charts produced from *P-Scan* and a risk assessment consistent with ASOP 51. The report is customized to include any exhibits, charts, or information that is specific and necessary to KCERA.

In addition to our standard written report, we have also begun providing fully interactive, online valuation reports for certain clients. These reports contain all the information included in the valuation report but allow for users to drill down into the results and receive additional information and education on sections of interest. These reports can also be hosted on the client's own website upon request (ex: [Online Valuation Report](#)).

The table below summarizes the estimated amount of time spent on the actuarial valuation by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	75
Project Managers	65
Principal and Support Actuaries	50
Total	190

- b) **During 2023, Actuaries shall conduct an actuarial study which complies with the provisions of Government Code section 31611, including the annual valuation study and an experience investigation and evaluation which covers the mortality, service and compensation experience of the members and their beneficiaries (non-economic assumptions), and a valuation of the assets and liabilities of the retirement fund. In addition to performing an experience investigation of non-**

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economic experience, Actuaries shall also review and analyze economic assumptions and shall prepare a final report containing findings and recommendations and certifying the methods and procedures which produced the recommended economic and non-economic assumptions. In addition, KCERA requires performance of a valuation study on an annual basis. The valuation studies include separate valuation of the Supplemental Retiree Benefit Reserve (SRBR), established pursuant to CERL Section 31618.

Triennial Experience Study

Cheiron will complete an experience study of KCERA for the July 1, 2019 through June 30, 2022 period in 2023.

Our study will include:

- Investigation and analysis of each demographic assumption including retirement, death, disability, mortality, and turnover – comparing actual experience to assumed experience.
- Analysis of economic assumptions including investment returns, salary scale, and inflation.
- To the extent available, we will include prior study results graphically to look for long-term changes in trends.
- We will comment on the actual experience compared to the actuarial assumptions and make recommendations where the assumptions should be changed to reflect changing experience.

We prepare a written report for the experience study that includes both tables and graphs showing the actual experience compared to the current and any proposed assumptions. We also estimate the impact of any proposed assumption changes on each of the rate groups in the System.

In our experience analysis, we first look at historic gains and losses in the two broad areas of economic and demographic experience. Consistent gains or consistent losses during the period will indicate if the assumptions taken together may not be reasonable.

From here, we drill down to the specific economic assumptions by first looking at historical experience and future expectations for some of the factors that drive your economic experience including:

- Price inflation,
- Wage inflation, and
- Investment returns for applicable asset classes.

With an understanding of these drivers, we will review your economic experience including:

- Payroll growth, and

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- Investment return.

The assumption that normally has the most impact on valuation results is the investment return assumption. Our analysis of the assumption involves the following:

- Review of historical returns of the system to provide context,
- Review of survey information that shows investment return assumptions adopted by other large public sector retirement systems to provide additional context, and
- A forward-looking view of investment returns using capital market assumptions developed by the system's investment consultant and applying the System's own asset allocation policy.

Using the forward-looking capital market assumptions, we develop a suggested range for the investment return assumption. The selection of the appropriate investment return assumption within this range depends on, among other factors, the degree of risk tolerance acceptable to the Board. We will also comment on the expected impact of the SRBR on the net investment returns, though this will not necessarily affect the discount rate adopted by the Board.

The fundamental risk faced by a pension plan is the inability to pay all benefits when due without experiencing unsustainable contributions. To analyze risk tolerance, the Board needs to address the questions of what level of contributions are deemed unsustainable and what probability of reaching those levels is considered acceptable. Lower investment return assumptions result in higher initial recommended contribution rates, but with an increased probability that rates will decrease rather than increase with future experience.

Next, we analyze the historical demographic experience of the System compared to the current assumptions including:

- Mortality rates (pre-retirement, post-retirement and disability retirement),
- Retirement rates,
- Termination rates,
- Rates of electing a refund of contributions,
- Disability incidence rates, and
- Merit and longevity pay increases

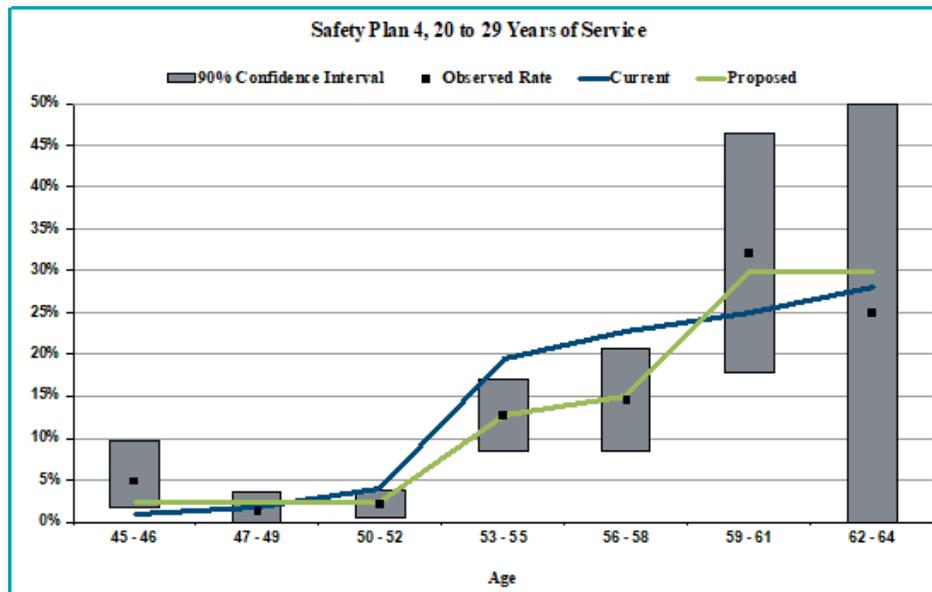
For these demographic assumptions, we examine the experience of the System and compare the 90% confidence interval around the observed experience to the current assumption. Generally, if the current assumption is not within the 90% confidence interval, we recommend a change to the assumption. Because the current assumption reflects prior experience, we often recommend a change moving part way to the new experience.

In the following sample chart, the black squares represent the actual experience observed and the gray bars represent the 90% confidence interval around that experience. The blue and green lines represent the current and proposed assumptions

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respectively. Where there is sufficient experience, the confidence interval is relatively narrow, and where there is little experience, the confidence interval can be very wide. The range of the confidence interval allows Board members and other users of the report to understand where the data provides a strong indication of what the assumption should be and where significant judgment or estimation must be used because there is less certainty based on the data.



In the table below, the exposures and experience by age group is shown as well as the ratio of actual retirements to expected retirements (A/E Ratio) for the current and proposed assumptions in total. For assumptions like mortality, disability, and termination, we normally include data from previous studies if the Plan's experience during the current period is insufficient to develop assumptions at each age or year of service.

Safety Plan 4, 20 to 29 Years of Service						
Age	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Proposed	Current	Proposed
45 - 46	62	3	1	2	484%	194%
47 - 49	143	2	2	4	80%	56%
50 - 52	188	4	8	5	53%	85%
53 - 55	165	21	32	21	65%	99%
56 - 58	82	12	19	12	64%	98%
59 - 61	28	9	7	8	129%	107%
62 - 64	8	2	2	2	89%	83%
Total	676	53	71	54	75%	98%
R-squared			86%	93%		

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The analysis will also include a review of the current methods used to determine contribution rates, including the actuarial cost method and the amortization method. We will compare alternatives to make sure the current methods remain appropriate.

The deliverable for this task is a report and presentation; both will include graphic and tabular results for easy trend recognition. An example of a presentation recently provided to a County Board for an experience study is shown here: [Experience Study Presentation](#)

The table below summarizes the estimated amount of time spent on the experience study by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	80
Project Managers	60
Principal and Support Actuaries	45
Total	185

Supplemental Retiree Benefit Reserve (SRBR) Valuation

- **Perform Analysis.** Since we have the processed data from the actuarial valuation, this project does not require any additional data handling. We run our valuation systems, incorporate asset information and analyze results. The steps involved in this process are as follows:
 - Using our valuation system, ProVal, we program Tiers 1 – 4 of the SRBR benefits and the \$5,000 death benefit for all KCERA's current plan members and calculate the present value of future benefits.
 - After KCERA provides us with the detailed SRBR reserves, including the 0.5% COLA Reserve which is excluded in determining the available SRBR Reserve for benefits, we calculate the SRBR funded ratio before and after recognizing any deferred investment gains or losses.

The table below summarizes the estimated amount of time spent on the SRBR valuation by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	10
Project Managers	7
Principal and Support Actuaries	5
Total	22

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- c) **Each actuarial valuation study performed during the term of this Agreement shall also include:**
- i. **An analysis and recommendation of the funding available for benefits under the KCERA Supplemental Retiree Benefit Reserve ("SRBR") program pursuant to Government Code section 31610-31610, inclusive;**

We understand the supplemental benefits provided by the SRBR are not guaranteed benefits and are determined by the Board of Retirement. Additional benefits may be adopted if the present value of benefits for the SRBR benefits is more than 120% funded in the last two consecutive valuations. However, the KCERA SRBR policy outlines certain conditions that should be considered before adopting additional or increased SRBR benefits. Based on the SRBR policy, we would also analyze the impact of any deferred investment gains or losses in the Actuarial Value of Assets that have not yet been recognized and any recent or potential changes in the actuarial assumptions. Only after a thorough analysis of these conditions and the funded status would we consider making any recommendation to increase benefits.

- ii. **Calculation of the KCERA's funding progress based on a generally accepted actuarial methodology agreed upon by Actuaries and the Board;**
and
iii. **Analysis of actuarial gains and losses during the year and the effects of such on employer(s) and employee contribution rates.**

As described under the Annual Actuarial Report section 2. a) above, we calculate KCERA's funded progress both based on the Market Value of Assets and Actuarial Value of Assets. We also perform a comprehensive gain/loss analysis. This analysis identifies on a total plan basis the factors that contributed to the difference between expected and actual valuation results. For example, it identifies differences between actual and expected investment returns, salary increases, retirements, terminations, disabilities, and deaths. In our reports, we also provide a detailed contribution rate reconciliation to disclose the sources for changes in contribution rates.

All of the items in 3) i.-iii. above are included in previous time estimates.

3) Actuaries shall annually provide the following services:

- a) **Provide special actuarial calculations and/or reports required by auditors in (GASB 67 and 68, as applicable). Actuaries will also provide letters and representations required for the KCERA Annual Comprehensive Financial Report (ACFR) consistent with the requirements set forth by the Government Finance Officers Association (GFOA) for the "Certificate of Achievement for Excellence in Financial Reporting."**

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We provide the Government Accounting Standards Board (GASB) 67/68 report as a stand-alone document, so as to provide the information needed for the financial statements in a timely fashion. We understand that the current actuary provides separate reports for GASB 67 and GASB 68, which we can also do if this is the preferred deliverable. We will work with Staff to obtain the preliminary asset schedules and employer-related payroll and contribution amounts as soon as they are available. At the same time, we will roll-forward the Total Pension Liability results from the prior valuation, and then produce a draft of the GASB 67/68 schedules and report using this preliminary information.

Our report includes all schedules necessary to complete the actuarial portions of the Plan's GASB 67 disclosures, as well as the schedules necessary for the participating employers to complete their own financial statements.

Once the final asset information is available, we will finalize and distribute the reports.

The table below summarizes the estimated amount of time spent on the GASB 67 and 68 reports by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	25
Project Managers	35
Principal and Support Actuaries	25
Total	85

We will provide the actuarial certification letter, KCERA and employer valuation results, relevant data exhibits, along with the standard ACFR exhibits including but not limited to the Schedule of Funded Liabilities by Type, Schedule of Funding Progress and the Analysis of Financial Experience. We will continue to provide assistance to Staff and KCERA's auditor to respond to questions related to the report and the associated financial statements.

b) A written report and recommendation on the annual cost-of-living adjustment to retirement and death allowances, as provided in Government Code section 31870 or such other plan provisions which are operative in Kern County by action of the Board or Board of Supervisors;

We understand that KCERA's cost-of-living adjustment factor is based on the ratio of the annual average CPI of the Los Angeles-Long Beach-Anaheim Area in the previous two years, rounded to the nearest 0.5%, not to exceed 2.0% pursuant to Section 31870.

The maximum COLA is increased by an additional 0.5% pursuant to Paragraph 15 of

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the Ventura Settlement and is provided through the Supplemental Retiree Benefit Reserve (SRBR). Any actual CPI increase greater than 2.5% is “banked” and can be used in future years when the CPI is less than 2.5%.

We will begin our calculations as soon as the CPI is published (in mid-January) and provide a letter detailing the COLA results, as well as supporting schedules including the relevant banks based on retirement date, in a format agreeable to KCERA.

The table below summarizes the estimated amount of time spent on the Cost-of-Living Adjustment report by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	4
Project Managers	3
Principal and Support Actuaries	1
Total	8

c) Calculations required to determine whether additional Tier 3 SRBR benefits are due existing retirees and beneficiaries; and

For all current retirees, beneficiaries and disabled members, we determine the annual inflation each year, capped at 4.0%, from retirement date to the current valuation date. Then we calculate the additional benefits necessary to reach the purchasing power protection threshold and the resulting increase in actuarial liability.

The table below summarizes the estimated amount of time spent on the additional Tier 3 SRBR benefits due to existing retirees and beneficiaries by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	15
Project Managers	10
Principal and Support Actuaries	7
Total	32

d) Annual calculations of IRC section 415 limits for those retirees and active members nearing retirement identified by the KCERA.

We understand your benefit system, CPAS, identifies active members nearing retirement and retirees whose benefits are either over the limit or within a certain threshold of the limit. The data for these individuals is then sent to Cheiron to perform a detailed 415 limit calculation for each flagged individual.

In addition to the new calculations described above, we will perform updates to individual retirees whose benefits were over the limit in previous years to determine if their benefits continue to exceed the IRC Section 415 limitations.

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Cheiron is unique in that our Research Actuary, Jim Holland, is retired from the IRS and was involved in drafting the final regulations under IRC Section 415. His assistance is extremely valuable for complex 415 limit calculations.

The table below summarizes the estimated amount of time spent on recurring and new 415 limit calculations by staff level.

Personnel Class	Estimated Hours
Actuarial Analysts	0
Project Managers	40
Principal and Support Actuaries	20
Total	60

4) In addition, the Actuary will provide actuarial services described herein below on an “as needed” and timely basis at the request of the Board or the KCERA Executive Director:

a) Calculation of the present value of any active member’s community property interest in future pension benefits;

In determining the present value of a member’s community property interest in future pension benefit, actuaries perform calculations pursuant to the terms of the Domestic Relations Order (DRO) and based on the Plan’s actuarial equivalence.

These calculations will be billed as non-retainer based on hourly rates.

It is our understanding that Article 8.4 of the County Employees’ Retirement Law of 1937, which provides for the division of community property interests, has not been adopted in Kern County. This means that a separate account cannot be created for the former spouse which would give the former spouse control over when and how the community property retirement benefits are received. As a result, we understand KCERA can only pay community property benefits to a former spouse when the member retires and begins receiving benefits.

b) Calculation of the optional retirement allowances permitted under Government Code sections 31760-31764, inclusive;

Cheiron provides actuarial conversion factors for our '37 Act clients to calculate optional forms of retirement allowances under Government Code sections 31761, 31762, and 31763. KCERA staff would be able to apply these factors (based on the member’s and designated beneficiary’s ages) to the unmodified benefit to calculate the optional retirement allowance. These factors are updated when there are changes in the actuarial assumptions they are based on, such as mortality assumptions and the discount rate.

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Cheiron generally calculates the retirement benefit when members choose "Option 4" under CERL section 31764 since these are more complex and often involve multiple beneficiaries.

The table of actuarial conversion factors and individual Option 4 calculations will be billed as non-retainer based on hourly rates.

c) Annual review and update on temporary annuity factors pursuant to Government Code section 31810;

The temporary annuity factors are designed to level out retirement income for members retiring prior to age 62 who are entitled to Social Security benefits at age 62. The KCERA benefit is greater prior to age 62 and then will decrease after age 62.

Cheiron will provide actuarial factors, based on the member's age at retirement, that are applied to an individual's estimated Social Security benefit. Prior to 62, the adjusted Social Security benefit is added the member's unmodified benefit. When the member reaches age 62, the KCERA benefit is reduced by the estimated Social Security benefit.

Like the actuarial conversion factors in b) above, the temporary annuity factors will be updated when there is a change in an actuarial assumption in which the factors are based on.

The development of the temporary annuity factors will be billed as non-retainer based on hourly rates.

d) Calculations of the present value of continued benefits payable to minor children of deceased active members;

Time charges for these calculations vary and will be billed as non-retainer.

e) Calculations of the actuarial equivalent of disability retirement benefits in connection with actions by the Board against third parties causing or contributing to a member's injury which results in liability to the KCERA;

Time charges for these calculations vary and will be billed as non-retainer based on hourly rate.

f) Respond to questions by the KCERA's auditors and provide such documents as deemed necessary to complete an annual audit;

Time charges related to providing documents and letters to KCERA's auditors will be billed as non-retainer based on hourly rates.

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g) Telephone consulting to the KCERA staff on an actuarial matter relating to the administration of the existing retirement system;

Routine telephone calls and emails are included in our retainer fees. However, if discussions are extensive or require additional research and/or calculations, time charges related to this item may be billed as non-retainer based on hourly rates.

h) Calculations on benefit enhancements available through the adoption of optional sections of the CERL, as requested by plan sponsors and authorized by the Chief Executive Officer;

Time charges related to this item will be billed as non-retainer based on hourly rates.

i) Assist in developing the design, structure, and provide benefit calculations for the KCERA's "SRBR" program;

Time charges related to this item will be billed as non-retainer based on hourly rates.

j) Calculations related to the unfunded liability owed by plan sponsor(s) under the Declining Employer Payroll Policy and/or Termination Policy; and

We are very familiar with KCERA's Declining Employer Payroll Policy as we independently performed calculations related to the unfunded liability owed by Berrenda Mesa Water District and Inyokern Community Services District when we audited Segal's June 30, 2019 actuarial valuations. Thus, we already have the framework set-up for doing these calculations.

Time charges to update these calculations and annual letters will be billed as non-retainer based on hourly rates.

k) Such other actuarial services as may from time to time be requested by the Board or Chief Executive Officer.

Time charges for this item will be billed as non-retainer based on hourly rates.

5) Actuaries will provide testing of the plan for tax qualification under the federal tax code, as requested, and subject to review by KCERA's legal counsel.

Time charges for this item will be billed as non-retainer based on hourly rates.

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2) Quality Assurance

The Respondent must identify and discuss how it controls cost, quality, timeliness and confidentiality of its services.

Cheiron is committed to ensuring compliance with and satisfaction of all services in a timely, cost efficient, and confidential manner. In demonstration of this commitment, we point to the staff commitment we are prepared to make, the financial success we have enjoyed, and the long list of satisfied clients who can testify to our willingness and ability to fulfill such a commitment. The key for our firm is that we employ effective internal quality control procedures that minimize the frequency and impact of any mistakes. Details of our processes to ensure this quality can be found below.

Cheiron has a multi-tiered quality review process in place with many checks and balances that will ensure the actuarial services are completed smoothly and accurately within the reporting deadlines in the RFP. A full description of our quality control process is included in our response to Question 36 of Exhibit C. One feature we wish to highlight is that in addition to the normal peer review process we have implemented a supplementary internal audit team that we believe is unique among our competitors.

These quality control procedures are not just Cheiron's company policy. These methods are the way our consultants have always worked because they believe it is the right way to do business. They believe that the best way to consistently produce high-quality work is to build into their routines ways to identify and catch errors as they are being made. This philosophy confirms their individual work ethics.

With respect to confidentiality, all the data processing, calculations, modeling, and forecasting that we perform can be done efficiently on encrypted personal computers, often by the same consultants that work with and communicate the results. This allows for a more streamlined consulting approach and in the end better service to our clients.

Access to client information is provided on a client team basis and authorized by the consultants for each engagement as specified in our internal policies. All users are assigned individual user IDs for systems including their active directory ID as well as their cloud storage ID. Access to cloud storage is controlled through the project management system which automatically updates a user's access to individual client data as client teams are changed. Software installation is not restricted; however, all computers employ full disk encryption as well as managed enterprise endpoint security solution for protecting against and detecting any malicious activity. Only system programmers have access to development code. All Cheiron professional staff have access to the generic version of the tools and models that we use in our day-to-day consulting.

Automated scripts compare data access rights to authorizations under the project management system and flag and correct exceptions. A policy is in place outlining appropriate access levels and the ability to grant and revoke such access.

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Most client files are stored in the cloud with appropriate backup procedures in place through our third-party provider. Sensitive claims information, in particular, is stored on the health data server which is regularly backed up following internal procedures. A working disaster recovery and business continuity plan is in place.

Cheiron does not use external data processing staff. All the data work involved in our actuarial work is performed by actuarial staff familiar with the purposes and needs of the work. This provides our clients with the assurance that data is handled properly and confidentially, while allowing a more thorough review that the data is used correctly for each project.

Regarding timeliness and cost control, at the beginning of every project, Cheiron develops a reasonable timeline and identifies the responsible parties, consultant or client, for the completion of each phase of the project. Each phase is monitored internally for timeliness and for meeting budgetary goals. Our clients, however, are an integral part of the planning process in that they are included in project meetings and are made aware of any issues or concerns that arise. Including the client in this manner reduces potential conflicts and problems that could delay a project or cause unnecessary work on behalf of the consultants which translates into unexpected fees. We believe clear and continual communication is paramount to the adherence of budgets and scheduling constraints.

3) Fee Proposal

The Respondent is to submit a fixed fee proposal for all services outlined in the Scope of Services.

Please refer to Appendix G - Exhibit B: Actuarial Fee Schedule.

4) Assumptions

The Respondent must identify and discuss all assumptions it has made in preparing its cost proposals. Further, the Respondent must state that there are no other assumptions related to meeting the requirements of the RFP other than those enumerated in this section of the proposal. Any other assumptions elsewhere in the Respondent's proposal will not be recognized by KCERA.

The following assumptions were made in determining the fees for actuarial consulting services:

- **Cheiron includes the ASOP 51 risk disclosures in our regular Annual Actuarial Valuations. There is no need for a separate report or any additional fees.**
- The Annual Valuations retainer fees also includes attendance at two Board or other meetings per year.
- The Triennial Experience Study retainer fee includes two Board or other meetings.
- We do not charge for expenses or travel time for the Board meetings included in the retainer fees.

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- For additionally requested Board meetings, we bill for reasonable travel expenses, but do not bill for travel time.
- Attendance at meetings is subject to COVID-19 mandates, precautions, and appropriate procedures.
- The quality of the data will require minimal additional interaction before it can be used in preparing the actuarial valuations.

There are no other assumptions related to meeting the requirements of the RFP.

5) Exceptions

The Respondent must affirm that it has read and understands the RFP and the terms and conditions included in the RFP. The Respondent must state any and all exceptions it takes with the requirements set forth in the RFP and/or with any terms and conditions contained in the RFP relating to the ensuing contract. Only the exceptions identified in this section of the proposal will be considered by KCERA; any other exceptions embedded elsewhere in the proposal will not be recognized by KCERA.

We have read and understand the RFP and the terms and conditions included in the RFP. However, to the extent it would be recognized, we respectfully request the following modifications be considered as follows (insertions in **red**) to the indicated paragraph in Exhibit B – Sample Agreement:

11. Indemnification. Actuaries agree to indemnify, defend, and save harmless the KCERA, its officers, agents and employees, and each of them, from that portion of any and all actions, claims, costs, demands, liabilities, losses, damages and expenses, including reasonable attorney's fees **awarded by a tribunal with competent jurisdiction**, for injuries to persons, or damage to property, proximately caused by the negligence of Actuaries or Actuaries' officers, agents or employees.

Actuaries further agree that they shall provide services under this Agreement in a skillful and competent manner in accordance with the acceptable standards of professional and enrolled actuaries. Actuaries agree to indemnify, defend and hold harmless the KCERA, its officers, agents and employees, and each of them, from that portion of any and all actions, claims, costs, demands, liabilities, losses, damages and expenses (including reasonable attorney's fees **awarded by a tribunal with competent jurisdiction**) arising out of any negligent errors or omissions by Actuaries in the provision of services under this Agreement.

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6) References

The Respondent should include a list of at least three (3) clients for whom the Respondent has provided consulting services that are the same or similar to those services requested in this RFP. Any California "1937 Act" county pension fund for which the Respondent has provided these products and services should be included. Information provided should include the name, address, and telephone number of the client and the name, title, e-mail address, and phone/fax numbers of a person who may be contacted for further information.

Client:	San Joaquin County Employees Retirement Association
Contact:	Johanna Shick, Chief Executive Officer 6 South El Dorado Street, Suite 400 Stockton, CA 95202 (209) 468-2163 / johannas@sjcera.org

Client:	Marin County Employees Retirement Association
Contact:	Jeff Wickman, Retirement Administrator 1 McInnis Parkway, Suite 100 San Rafael, CA 94903 (415) 473-3733 / jwickman@marincounty.org

Client:	Merced County Employees Retirement Association
Contact:	Kristen Santos, Retirement Plan Administrator 3199 M Street Merced, CA 95348 (209) 726-2724 / Kristen.Santos@countyofmerced.com

Client:	Stanislaus County Employees Retirement Association
Contact:	Rick Santos, Executive Director 832 12 th Street, #600 Modesto, CA 95354 (209) 525-4691 / santosr@stancera.org

Client:	Santa Barbara County Employees Retirement System
Contact:	Greg Levin, Chief Executive Officer 130 Robin Hill Road, Suite 100 Goleta, CA 93117 (805) 568-2585 / glevin@sbcers.org

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References (cont'd.)

Client:	Tulare County Employees Retirement Association
Contact:	Leanne Malison, Retirement Administrator 136 N. Akers Street Visalia, CA 93291 (559) 713-2900 / lmalison@tularecounty.ca.gov

Client:	Denver Employees Retirement Plan
Contact:	Heather Darlington, Executive Director 777 Pearl Street Denver, CO 80203 (720) 723-2734 / hdarlington@derp.org

Client:	San Luis Obispo Pension Trust
Contact:	Carl Nelson, Executive Director and Chief Investment Officer 1000 Mill Street San Luis Obispo, CA 93408 (805) 781-5465 / CNelson@co.slo.ca.us

7) **Financial Statements**

The Respondent must provide a copy of the firm's most recent financial statements.

Please see Appendix C to this proposal for a copy of Cheiron's most recent financial statements. Cheiron is a private company and therefore deems the financial information to be **CONFIDENTIAL** and not for public distribution.

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EXHIBIT C – QUESTIONNAIRE

Organization and Ownership

1. Provide the following information:

- a) **Date of Response**
- b) **Name of Firm**
- c) **Primary Contact Person**
- d) **Title**
- e) **Address**
- f) **Telephone Number**
- g) **Facsimile Number**
- h) **E-mail Address**

Offeror: Cheiron, Inc. (responding February 25, 2022)

Contacts: Anne Harper, FSA
Principal Consulting Actuary
201 Lomas Santa Fe Dr., Suite 400
Solana Beach, CA 94612
(877) 243-4766, x1107 (Tel)
(703) 893-2006 (Fax)
aharper@cheiron.us

Graham A. Schmidt, ASA
Consulting Actuary
3685 Mount Diablo Blvd., Suite 250
Lafayette, CA 94549
(877) 243-4766, x1137 (Tel)
(703) 893-2006 (Fax)
gschmidt@cheiron.us

2. Describe the background and ownership of the firm. Describe any material changes in organization structure or ownership that have occurred in the past five years.

- a) **Year firm was formed and began providing actuarial consulting services to institutional clients.**

Cheiron was incorporated in the State of Delaware in September 2002 and began providing actuarial consulting services to institutional clients in November 2002.

- b) **The ownership structure. Indicate all entities that have an ownership stake in the firm (name and percentage).**

Cheiron has no parent organization and is wholly owned by its employees.

- c) **Affiliated companies or joint ventures.**

Cheiron presently has no affiliated companies nor is engaged in any joint ventures. We do work with a few women- and minority-owned firms as subcontractors with certain public sector clients. We have a wholly owned subsidiary that was formed to provide actuarial support to investment consulting firms, but that entity is dormant.

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d) Recent or planned changes to the ownership or organization structure.

Cheiron has not had any recent nor do we have any planned changes to ownership or organizational structure. While we don't have current plans for additional or pending mergers or acquisitions, as a rapidly growing consulting firm whose growth is attributable to our unique style of communicating and educating our retirement and health system clients about financial risk over year-by-year reporting, we anticipate the potential of continued significant growth.

e) Transition plans for retirement of key executives.

Cheiron's management team includes a number of senior consultants who have been working together for over 30 years. In the event a key executive of the company can no longer effectively work in their existing capacity, any one of these senior consultants is capable of taking on additional responsibilities.

In terms of Cheiron employees dedicated to this assignment, we employ a team approach to servicing our clients, including two experienced actuaries serving in a co-leadership capacity. Cheiron is committed to provide that the appropriate person is available in any given situation to properly advise KCERA with regard to any expected topics of discussion. Likewise, KCERA professionals are free to contact any member of Cheiron's professional staff in order to best service the needs of the KCERA.

On all significant client assignments, we dedicate at least two of our senior consultants to guarantee responsiveness and avoid conflicts with other client work. This allows for multifaceted viewpoints, internal second opinion work quality, and the ability to expand each consultant's influence among our clients.

We do not anticipate losing any key consultants that have been assigned to KCERA. However, you have a team with four credentialed actuarial consultants, all of whom have significant experience consulting for '37 Act plans.

f) Importance of actuarial consulting services to your parent company's (if applicable) or your firm's overall business strategy.

One hundred percent of Cheiron's business is through actuarial consulting services in the areas of pension and health consulting. Our client base is predominantly governmental and jointly trustee pension funds and health and welfare funds and includes plans of all sizes, from less than a hundred participants to tens of thousands of participants. Cheiron is purely an actuarial consulting firm; all our revenues come from the time we spend working with our clients. We do not accept any type of brokerage commissions or soft dollar payments, nor do we provide services outside our area of expertise. We focus exclusively on providing quality consulting in our core areas of expertise.

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g) Percentage of parent company's (if applicable) or your firm's revenues from actuarial consulting services.

As stated in the previous response, one hundred percent of Cheiron's revenues are generated from actuarial consulting services.

3. Provide as Appendix A one organization chart that diagrams the ownership of your firm and any interrelationships between the parent-subsidiary, affiliate, and joint venture entities.

Please see Appendix A for organization chart.

4. Provide as Appendix B another organization chart that depicts the structure of the actuarial consulting group and that identifies this group's key people and the people that will be involved in providing direct services to KCERA.

Please see Appendix B for organization chart.

5. List the locations of each of the firm's offices from which actuarial consulting services are provided. For each office, provide the function(s) performed and the number of professionals in that office. Indicate which office would be primarily responsible for servicing the KCERA account.

Office Locations	No. of Staff	Function Performed
Washington, DC (Headquarters) 8300 Greensboro Drive, Suite 800 McLean, VA 22102	40	Full actuarial services
Chicago, IL 200 West Monroe Street, Suite 1800 Chicago, IL 60606	16	Full actuarial services
Charlotte, NC 9115 Harris Corners Parkway, Suite 380 Charlotte, NC 28269	11	Full actuarial services
Oakland, CA 3685 Mount Diablo Boulevard, Suite 250 Lafayette, CA 94549	4	Full actuarial services
Philadelphia, PA 701 East Gate Drive, Suite 330 Mount Laurel, NJ 08054	12	Full actuarial services
Portland, OR 101 SW Main Street, Suite 1602 Portland, OR 97204	10	Full actuarial services

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Office Locations	No. of Staff	Function Performed
San Diego, CA 201 Lomas Santa Fe Dr., Suite 400 Solana Beach, CA 92075	9	Full actuarial services

While we expect that the majority of work will be performed by consultants whose home offices are in the San Francisco and San Diego areas, Cheiron's staff nationwide always stays connected to each other on a daily basis through our internal web-based network. Our use of this network and the tools we utilize throughout Cheiron has made the company seamless regarding staff location and access to resources. All Cheiron locations provide full actuarial consulting services.

- 6. Provide as Appendix C the latest two years' audited financial reports for your firm. Provide any additional information necessary to demonstrate financial stability, including total revenue, net income/(loss), assets, liabilities, and net worth for each year.**

Please see Appendix C to this proposal for a copy of Cheiron's most recent financial statements. Cheiron is a private company and therefore deems the financial information to be **CONFIDENTIAL** and not for public distribution.

- 7. Describe the firm's objectives with respect to future growth. What products/services will be emphasized or de-emphasized in the future? What are the firm's expectations for its products, and how does it plan to manage the future growth of these products? Discuss how the firm plans to make sure that future growth does not compromise the quality of your existing actuarial consulting services. Include in your answer how you plan to manage growth in your client/actuarial consultant ratio.**

Cheiron expects to continue to grow by adding clients primarily in the public and multiemployer plan sectors. Our primary business focus is in the pension and health and welfare consulting for large public sector and multiemployer retirement systems, where we utilize our technical expertise to identify, measure, and monitor financial risks. We do not have plans to expand this list of expertise at this time.

We anticipate hiring additional staff as demand for our services grows. Every Cheiron consultant has had several years of consulting experience. Our founding consultants successfully transitioned from a professional practice at a former employer. They have chosen Cheiron because of proactive communication style and commitment to quality work in rejecting the current trend to require limitation of liability claims in contracts. We have been consistently successful in finding strong talent to add to our professional staff. Over the years, we have come into contact with many highly qualified members of our profession and will continue to use these contacts to recruit staff of like minds and highest ability. This will be in both our client's best interests as well as our own.

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As long as we have the capacity to perform work for clients (with sufficient margin to accommodate spikes in workload), as well as the ability to attract such people to our firm, we will not limit, with one exception, the number of accounts serviced by Cheiron. The sole exception would be if a potential new account has needs that are not best served by our particular skill set, for example, defined contribution recordkeeping.

Regarding workload, each consultant is responsible for a set list of clients that collectively will not result in time demands that exceeds that consultant's capacity. We monitor this constantly, and when it appears that the capacity level will be reached, we will in advance seek other options (e.g., new hires and consider changing internal workloads of other consultants). In part, this is the philosophy of having co-lead consultants on every account and under no circumstance will a client's team leadership be changed without agreement by the client. In the end, it's all about quality client servicing, and that requires retaining our people and keeping consultants satisfied. So, it's in our best interests as well to not extend our staff. We do not have a specific limit on the number of accounts per consultant as in some cases one account can be more time-consuming than five others.

8. Discuss in general the firm's competitive advantage over other firms in the actuarial consulting industry. Why should KCERA hire your firm?

Cheiron's lead consultants all have national reputations in communicating the details of the actuarial process in a unique and specifically engaging way, allowing our clients the ability to grasp and understand their retirement systems.

Our rapid growth and growing national reputation is founded on the ability of our consultants, using technology as a valued tool, in educating and illustrating to our clients the implications and risks of their retirement systems. We have changed the way our clients view their responsibilities and react to emerging trends by creating new ways to demonstrate financial implications of retirement systems to provide a deeper understanding among Board members who don't deal with the terms we use every day.

If you compare the valuation reports for our '37 Act Systems with those of your current actuary you will notice a big difference in how we are more focused on where the system is going in the future than on the numbers produced as of a single date [see for example pages 11-13: [Sample Valuation Report](#)]. Our ASOP 51 Risk Disclosures are included in our annual actuarial valuation report as shown on pages 14-23. Because we include these disclosures in our standard valuation report, there is no need or cost for a stand-alone ASOP 51 report. However, if it is your preference to receive a separate ASOP 51 report, we certainly will accommodate your request.

Our P-Scan Interactive Model (Deterministic Projections)

P-Scan is our proprietary software that provides long-term pension plan forecasting of assets and liabilities based on any user selected economic scenario. In addition, we can enhance our standard product to include any other projections required, for example, GASB figures and

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model changes in benefits, assumptions, funding methods, and contributions. *P-Scan* can also perform multiple stochastically based forecasts, enabling all our projections to incorporate probabilistic answers.

The *P-Scan* modeling can demonstrate the effectiveness of the funding methods and assumptions in meeting explicit or implicit funding policies of the system. The modeling can also easily demonstrate the long-term implications in changing such policies or responding to current or projected economic conditions as well as demonstrate the implications of legislative changes.

The following screenshot from *P-Scan* is intended to illustrate its capabilities and how using this tool in our consulting is different from what our competitors provide. If selected for a finalist presentation, we will be happy to demonstrate the interactive capabilities of this tool. We also invite you to review a sample online version of the tool [here](#).

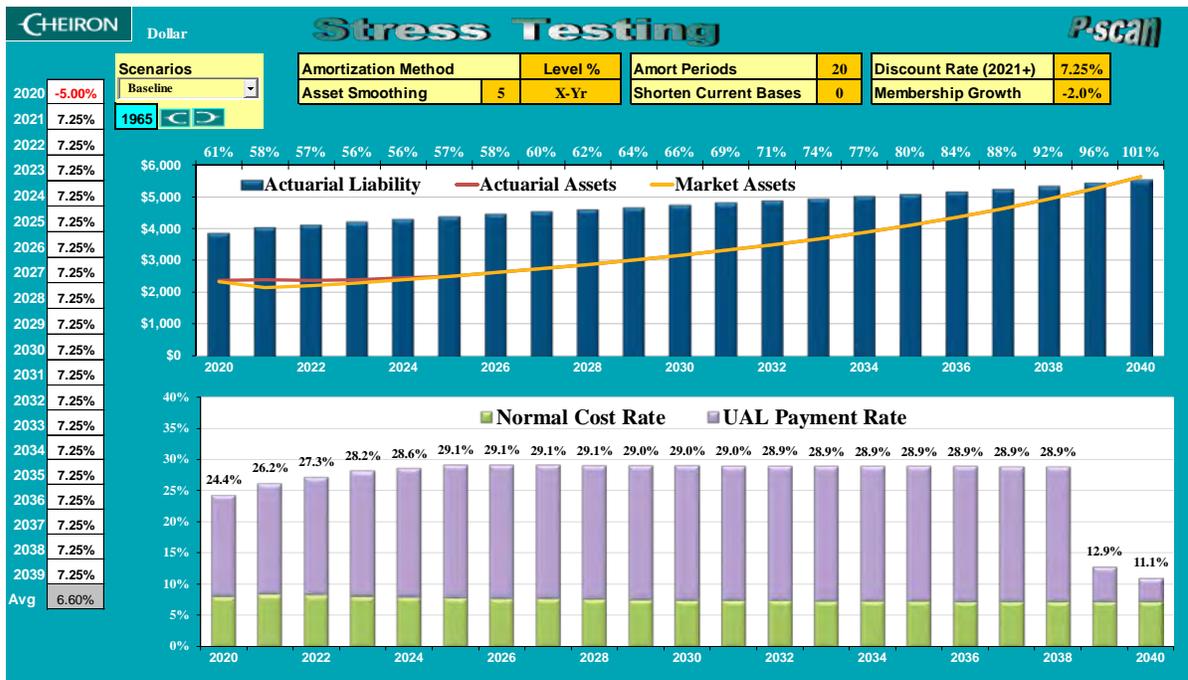
The boxes across the top represent variables tailored for the retirement system or benefit plan and programmed into the model that we update based on suggestions from members of the KCERA or Staff during the presentation. In this example, the variables available include the amortization methodology, the discount rate, asset smoothing method, and changes in expected membership growth.

The top graph shows the projected actuarial liability (the dark blue bars) and the actuarial and market value of assets (red and yellow lines). The numbers at the top of the bars represent the projected funded status. The bottom graph shows the projected contribution rates split between the Normal Cost rate and the amortization payment for the Unfunded Actuarial Liability (UAL).

On the left side of the screen, the actual investment return is shown for each year of the projection. These returns can be changed to develop different economic scenarios. This scenario is the baseline projection using the assumed rate of return of 7.25% and a -5.0% actual return on assets for FYE 2020.

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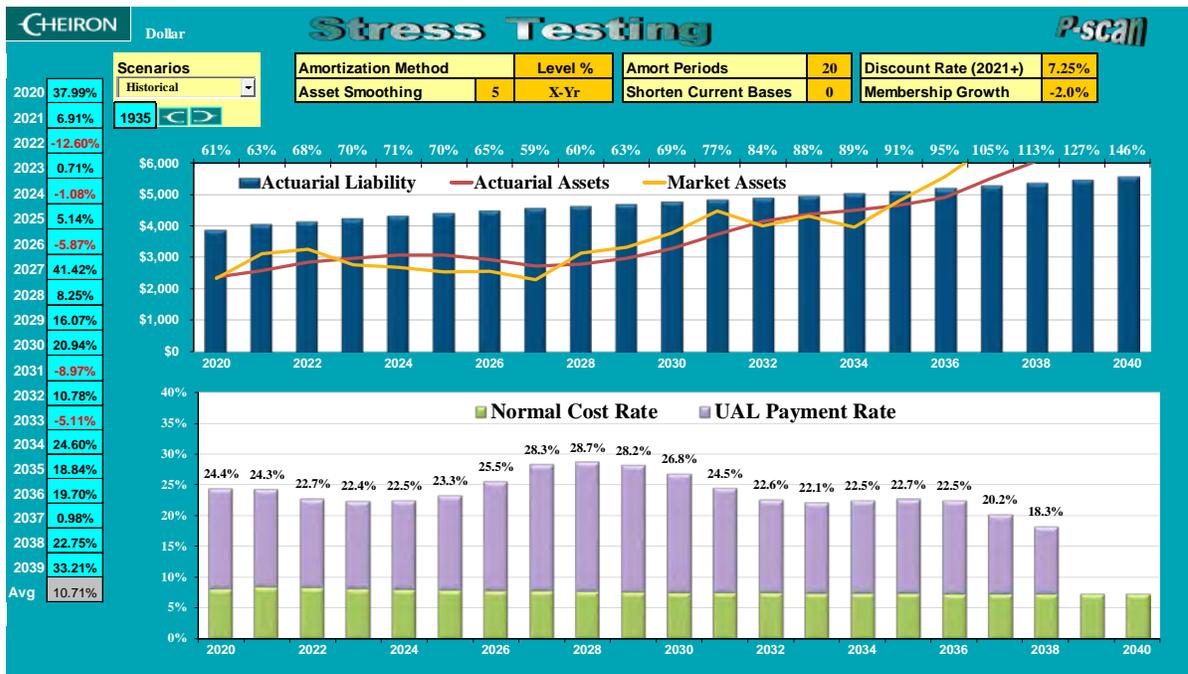
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We believe that communicating the potential risks in a system is fundamental to our work. This includes demonstrating the sensitivity to investment returns. The screenshot that follows shows the same Stress Test but using historical investment returns beginning in 1935. In other words, the investment return shown for FYE 2020 is actually the historical investment return for 1935 for a portfolio invested 70% in equities and 30% in bonds. This graphically demonstrates the sensitivity of both funded status and contribution benchmarks to varying return scenarios.

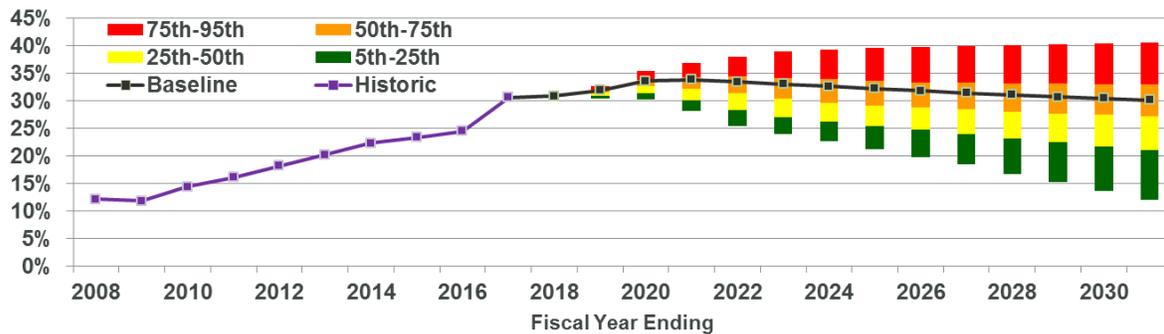
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Our R-Scan Interactive Model (Stochastic Projections)

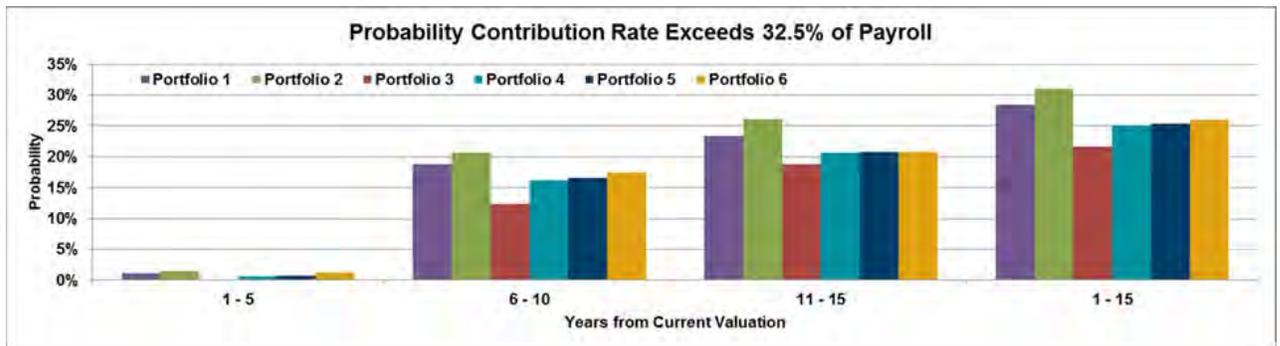
For clients that are interested in seeing a full range of potential contribution rates based on varying investment returns, we also present stochastic projections such as those shown in the chart below. These projections are developed using our *R-Scan* model that adds stochastic returns to the *P-Scan* model. The purple line shows the historical contribution rates and the range from the bottom of the green bars to the top of the red bars represents the 5th to 95th percentile of projected contribution rates based on varying investment returns. That is, we expect the actual contribution rates in the future to fall within this range 90 percent of the time.



These projections are particularly valuable when the level of contribution is not defined by the valuation process because they can demonstrate the potential for insolvency in the future under the current contribution constraints. As you go out into the future there is always some potential for adverse experience. Our projections allow for responding today to minimize that potential.

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In addition to exploring the range of potential future outcomes, *R-Scan* can also be used to assess the likelihood of exceeding certain affordability parameters. In the example below, the retirement system determined that a contribution rate in excess of 32.5% of pay was something they would prefer to avoid. The graph shows the probability of exceeding that rate over different time periods for six different investment portfolios.



This type of analysis will be customized to the particular measures that are important to KCERA.

The strength of our approach to actuarial services for public sector clients is to empower our clients to understand and better manage their benefit programs and their resulting financial risks through innovative technological applications and unsurpassed professional expertise. We focus on developing technical innovations to illustrate complex actuarial items in easier to understand applications. This is done through interactive modeling, mainly *P-Scan* which illustrates the long-term funding of the system, identifies risks and offers solutions to mitigate risks.

- 9. Over the past five years, has your organization or any officer or principal been involved in any business litigation or other legal proceedings related to any actuarial consulting activities? If so, provide a brief explanation and indicate the current status. Has the firm or any officer or employee of the firm 1) been sued by KCERA or 2) entered into a settlement agreement with KCERA to resolve a claim or dispute? If yes, provide details.**

No litigation or other legal proceedings related to any actuarial consulting activities or actuarial auditing services has been initiated in the last five years. In addition, Cheiron is not subject to any pending litigation.

Neither Cheiron or any officer or employee of the firm has been sued by KCERA nor has entered into a settlement agreement with KCERA to resolve any claim or dispute.

- 10. Has your firm or any actuary you employ, within the last ten years, been censured or fined by any regulatory body? If so, please indicate the dates and describe the situation.**

Neither Cheiron or any actuary it employs, within the last ten years, been censured or fined

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by any regulatory body.

11. Is the firm affiliated with any other firm(s) offering non-actuarial services that could represent conflicts of interest? If yes, briefly describe your firm's policies and procedures for doing business with these affiliates while safeguarding against conflicts of interest.

Cheiron is not affiliated with any other firm(s) offering non-actuarial services that could represent conflicts of interest.

12. List and describe any professional relationship your firm or any of your actuarial consulting group staff have with any member of the KCERA Retirement Board, KCERA staff, or a KCERA plan sponsor (e.g., County of Kern).

Neither Cheiron or any of its actuarial consulting staff presently has a professional relationship with any member of the KCERA Retirement Board, KCERA staff, or a KCERA plan sponsor. In 2021, Graham Schmidt and Anne Harper were consultants on Cheiron's actuarial audit of the June 30, 2019 actuarial valuation report to KCERA.

13. Has anyone in your firm provided any gifts, travel expenses, entertainment, or meals to any member of the KCERA Retirement Board or KCERA staff in the last twelve months? If yes, describe the expense and the purpose.

Neither Cheiron nor any of its staff has provided any gifts, travel expenses, entertainment, or meals to any member of the KCERA Retirement Board or KCERA staff in the last twelve months.

Actuarial Services Staffing

14. How many actuaries does your firm employ?

Cheiron employs 71 credentialed actuaries.

15. Describe in general the background of the professionals in the firm's actuarial consulting services group:

a) Are they brought in from outside of the firm or promoted to their positions from within the organization?

Actuarial staff is developed both through internal promotions and new hires. Promotions are based solely on an employee's demonstrated ability to provide efficient and quality actuarial services to our clients and the proven ability to communicate our work to our clients. All actuaries are strongly urged to reach the highest level of professional accreditation (FSA).

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Among the senior consultants that are hired, Cheiron's core business of public sector and multiemployer work is a strong focus and criteria for hiring. We pride ourselves in the collaborative environment within the firm and look to bring in other consultants that have the experience and expertise to add to our internal discussions and thought processes.

b) For those recruited from the outside, what prior experience and educational credentials are generally sought?

Over the years, we have come into contact with many highly qualified members of our profession, and we use these contacts to recruit staff of like minds and highest ability. We have been continually adding staff, in particular FSA- and ASA-credentialed actuaries, in times during which other firms have been contracting. We also recruit new actuarial analysts at the college level, including a recent focus on Historically Black Colleges and Universities (HBCU).

Our interview process is a rigorous one which typically includes a full day of interviews with Cheiron employees at all levels to ensure both we and the candidates have a strong understanding of our culture and their skill set respectively. This process has been highly effective in our successful growth.

c) What percentage are currently Fellows of the Society of Actuaries? Enrolled actuaries?

Of the 71 credentialed actuaries, 42 (59%) are Fellows of the Society of Actuaries (FSA), and 50 (70%) are Enrolled Actuaries (EA) under ERISA.

d) What ongoing educational programs are economically supported and/or required? If economic support is offered, state the extent of this.

All of our actuaries routinely attend and often present at industry meetings and seminars to stay up to date on regulations and new developments in our industry. Also, continuing education is a requirement to maintain our "Enrolled Actuary" status. Cheiron will subsidize fulfillment requirements for Associateship in the Society of Actuaries, including the preliminary education component exams, the Validation by Educational Experience (VEE), the Fundamentals of Actuarial Practice (FAP) Modules, the Associateship Professionalism Course (APC), as well as the exam requirements for admission as Fellow of the Society of Actuaries. Additionally, Cheiron provides study time for the aforementioned exams. We are members of the American Academy of Actuaries and the Society of Actuaries and regularly receive informational bulletins from these organizations.

Cheiron is also a member of the National Association of State Retirement Administrators (NASRA), which permits us to access NASRA's website regarding research on public sector plans and to attend NASRA conferences.

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Internal training of our actuarial staff is generally provided by members of our consulting staff. By passing on the information that they have learned, the consulting staff can hone their skills and knowledge while passing on this valuable training to those who will be Cheiron's future consultants. Cheiron holds an annual two-day educational meeting for all of our consultants covering a wide range of professional and technical topics.

16. For the key executives and professionals in the actuarial consulting group, including the Primary ACTUARY and all Secondary Actuaries that would be assigned to KCERA, provide a table that identifies the following information:

- a) Name
- b) Title
- c) Responsibilities within the firm. If a person has multiple responsibilities, indicate the percentage of time spent on each function in a footnote to the table
- d) Years of relevant experience
- e) Years with the firm
- f) Degrees and professional designations
- g) Institution awarding each degree and designation
- h) Publications authored

Name:	Anne Harper
Title:	Principal Consulting Actuary
Responsibilities:	Actuarial consulting services (95%)/ Internal Workflow Group responsibilities (5%)
Years of relevant experience:	27
Years with the firm:	14
Degrees and professional designations:	FSA, EA, MAAA, BA
Institution awarding each degree and designation:	FSA - Society of Actuaries MAAA - American Academy of Actuaries EA - Joint Board for the Enrollment of Actuaries BA - University of Michigan
Publications authored:	Hallmark, Bill, Harper, Anne, and Schmidt, Graham. "Mature Pension Plans are Sensitive - Manage with Care." SACRS Magazine, Winter 2019.

Name:	Graham Schmidt
Title:	Consulting Actuary
Responsibilities:	Actuarial consulting services (85%); Chair of Cheiron Technology Committee (5%); Public Sector Steering Committee (5%); Board of Directors (5%)
Years of relevant experience:	22
Years with the firm:	9

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Name:	Graham Schmidt
Degrees and professional designations:	ASA, FCA, EA, MAAA, BS
Institution awarding each degree and designation:	ASA - Society of Actuaries FCA - Conference of Consulting Actuaries EA - Joint Board for the Enrollment of Actuaries MAAA - American Academy of Actuaries BS - Johns Hopkins University BA – Johns Hopkins University
Publications authored:	<ul style="list-style-type: none"> • Hallmark, Bill, Harper, Anne, and Schmidt, Graham. “Mature Pension Plans are Sensitive - Manage with Care.” <i>SACRS Magazine</i>, Winter 2019. • Bolton, Bob, Lowman Tom, and Schmidt, Graham (Technical Assistant). “Design and Actuarial Aspects of Deferred Retirement Option Programs.” <i>Society of Actuaries</i>, March 2003.

Name:	William Hallmark
Title:	Consulting Actuary
Responsibilities:	Actuarial consulting services (95%); Public Sector Steering Committee (5%)
Years of relevant experience:	36
Years with the firm:	12
Degrees and professional designations:	ASA, FCA, MAAA, EA, BS
Institution awarding each degree and designation:	ASA – Society of Actuaries FCA – Conference of Consulting Actuaries MAAA – American Academy of Actuaries EA – Joint Board for the Enrollment of Actuaries BS – University of Oregon
Publications authored:	<p>Hallmark, Bill, and Gene Kalwarski. “A Better Answer to the Actuarial Discount Rate Debate.” <i>Benefits Magazine</i>, Vol. 48, No. 11. November 2011: 34-39.</p> <p>Hallmark, Bill, Harper, Anne, and Schmidt, Graham. “Mature Pension Plans are Sensitive - Manage with Care.” <i>SACRS Magazine</i>, Winter 2019.</p> <p>Hallmark, Bill and David Kelly, “How Much Investment Risk Can a Government Sponsored Pension Plan Afford?” SOA Public Pension Finance Symposium, May 2009. http://www.soa.org/files/pdf/2009-chicago-ppf-paper-hallmark.pdf</p>

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Name:	William Hallmark
	<p>Hallmark, Bill and Beverly Orth, "New Retirement Plan Designs for the 21st Century" SOA Symposium: Re-Envisioning Retirement in the 21st Century, May 2006. Reprinted for the 2008 Retirement 20/20 Conference: Defining the Characteristics of the 21st Century Retirement System, November 2008.</p> <p>http://www.soa.org/library/monographs/retirement-systems/retirement2020/2008/november/mono-2008-m-rs08-01-hallmark.pdf. Also reprinted in the Pension Forum, December 2008. http://www.soa.org/library/newsletters/the-pension-forum/2008/pfn-2008-iss01.pdf</p>

Name:	Jacqueline King
Title:	Consulting Actuary
Responsibilities:	Actuarial consulting services (95%); Quality Control Committee (5%)
Years of relevant experience:	17
Years with the firm:	11
Degrees and professional designations:	FSA, EA, MAAA, BS
Institution awarding each degree and designation:	FSA – Society of Actuaries MAAA – American Academy of Actuaries EA – Joint Board for the Enrollment of Actuaries BS – Purdue University
Publications authored:	N/A

17. How long has the current group of key executives and professionals in your actuarial consulting group been together?

The key Cheiron consultants have worked together for nearly 40 years, including 20 years in the Washington, DC office of a major international actuarial firm. Cheiron was formed after its founders took exception to the efforts in our industry to unilaterally impose liability limitations on clients without engaging in an open dialogue on the issue in advance. We believe there are other and better ways of dealing with this issue of risk. Our disagreement led to Cheiron's consultants leaving their former employer and creating a new consulting firm, which continues to offer consulting services, and without liability limitations.

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18. For the Primary ACTUARY and all Secondary Actuaries that will directly provide services to KCERA, provide biographies and label these as *Appendix D*.

- **Anne Harper, FSA, MAAA, EA**, Principal Consulting Actuary, is the proposed co-lead actuary for this engagement.
- **Graham Schmidt, ASA, FCA, MAAA, EA**, Consulting Actuary, is the proposed co-lead actuary for this engagement.
- **Jacqueline King, FSA, MAAA, EA**, Consulting Actuary, is proposed as a project manager for this engagement.
- **Bill Hallmark, ASA, FCA, MAAA, EA**, Consulting Actuary, is proposed as a special resource for this engagement.

Please see Appendix D for biographies of the proposed Cheiron team.

19. For the Primary ACTUARY and all Secondary Actuaries, state the length of time these individuals have all worked together as a team.

The co-leads (Primary) and Secondary Actuaries have been working together as a team for nine years.

21. For the Primary ACTUARY and all Secondary Actuaries, list their actuarial consulting assignments for the past five years. Include for each assignment the date of the final actuarial report, whether the Actuary served as the primary or secondary Actuary, and the client's name and size (number of pension plan members and annuitants).

Anne Harper	Date of Report	Role	Client Size
Santa Barbara County Employees' Retirement System	2021	Primary	10,921
City and County of San Francisco Employees' Retirement System	2021	Primary	75,624
Denver Employees Retirement Plans	2021	Primary	25,723
San Luis Obispo Pension Trust	2021	Primary	6,616
San Joaquin County Employees' Retirement System	2021	Secondary	14,876
Merced County Employees' Retirement Association	2021	Secondary	5,664
San Diego Transit Retirement Plans	2021	Primary	1,595
Palm Springs Convention and Visitor's Bureau Pension Plan	2021	Primary	44
City of San José Police and Fire Department Retirement Plan	2021	Secondary	4,523
Alameda-Contra Costa Transit District Employees' Retirement Plan	2021	Secondary	4,502
Sacramento Regional Transit District Employees' Retirement Plan	2021	Secondary	2,134

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Anne Harper	Date of Report	Role	Client Size
Santa Clara Valley Transportation Authority (VTA) Amalgamated Transit Union, Local 265 Pension Plan	2021	Secondary	3,285

Graham Schmidt*	Date of Report	Role	Client Size
Marin County Employees' Retirement Association	2021	Primary	7,037
San Joaquin County Employees' Retirement System	2021	Primary	14,876
Santa Barbara County Employees' Retirement System	2021	Secondary	10,921
Tulare County Employees' Retirement Association	2021	Primary	10,251
Stanislaus County Employees' Retirement Association	2021	Primary	9,904
Merced County Employees' Retirement Association	2021	Primary	5,664
Denver Employees Retirement Plans	2021	Secondary	25,723
Oakland Police and Fire Retirement System	2021	Primary	798
Sacramento Regional Transit District Employees Retirement Plan	2021	Primary	2,134
Santa Clara Valley Transportation Authority (VTA) Amalgamated Transit Union, Local 265 Pension Plan	2021	Primary	3,285
Golden Gate Transit District Employees' Retirement Plan	2021	Primary	6833
Alameda-Contra Costa Transit District Employees' Retirement Plan	2021	Primary	4,502

**Only public plan consulting roles, excludes Retiree Medical Trust plans.*

Jacqueline King*	Date of Report	Role	Client Size
Merced County Employees' Retirement Association	2021	Secondary	5,664
City of San Jose Federated City Employees Retirement Plan	2021	Secondary	9,949
City of San Jose Police and Fire Department Plan	2021	Secondary	4,523
Jackson County (MO) Revised Pension Plan	2021	Primary	3,816
Kansas City Employees Retirement System	2021	Primary	6,215
Kansas City Firefighters Pension System	2021	Primary	1,941
San Diego City Employees' Retirement System	2021	Secondary	20,725

**Only public plan consulting roles are listed, excludes Taft-Hartley plans; excludes Retiree Medical Trust Plans.*

Bill Hallmark	Date of Report	Role	Client Size
City and County of San Francisco Employees Retirement System	2021	Primary	75,624
City of San Jose Federated City Employees Retirement Plan	2021	Primary	9,949
City of San Jose Police and Fire Department Retirement Plan	2021	Primary	4,523
Tri-County Metropolitan Transportation District of Oregon	2021	Primary	3,857
Marin County Employees Retirement Association	2021	Primary	7,037

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22. For the Primary ACTUARY and all Secondary Actuaries that will directly provide services to KCERA, state the role each would play in providing the required KCERA services.

- Anne Harper – Co-lead Actuary
- Graham Schmidt – Co-lead Actuary
- Jacqueline King – Project Manager
- Bill Hallmark – Special Resource

Cheiron has a tradition of assigning co-lead actuaries to assignments such as this, where there a substantial number of technical issues and opportunities for consulting in the required work. This provides benefits to our clients in terms of availability, experience and subject matter knowledge.

23. State for the Primary ACTUARY and each Secondary Actuary the total number of clients currently assigned to these individuals.

- Anne Harper – 12 clients
- Graham Schmidt – 16 clients
- Jacqueline King – 10 clients
- Bill Hallmark – 5 clients

24. For the Primary ACTUARY and all Secondary Actuaries, state whether any of these individuals are affiliated with any other business entity or activity that could pose a potential conflict of interest with their KCERA assignments. If so, provide details on the entity or activity.

None of the team proposed to serve KCERA are affiliated with any business entity or activity which could pose a potential conflict of interest with their KCERA assignments.

25. Describe your compensation and incentive program for actuaries in your firm. How are actuaries evaluated and rewarded? What incentives are provided to attract and retain superior individuals? Identify the percentage of compensation which is:

- a. Base salary
- b. Performance bonus
- c. Equity incentives
- d. Other
- e. Do you offer direct ownership, phantom stock, profit sharing, and/or performance bonus?
- f. Who is eligible to participate?
- g. On what basis are these incentives determined—is compensation tied to success factors such as client base growth, performance, or other factors? Please list and indicate the weight of each in determining total compensation.
- h. How does your compensation structure/levels compare with other firms in the industry?

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All Cheiron employees are evaluated annually based on quality of work, productivity, contributions to the firm (e.g., IP development), new business secured, and advancement in technical and professional skills. Our salary compensation is based on industry norms which are well known and obtainable from the many recruiters in our industry. We have a generous and multi-faceted year-end bonus program which rewards our employees on quality of work, productivity, special contributions and new business successes.

Current shareholders annually have the opportunity to nominate candidates from among our consulting staff for ownership. Candidates must meet certain standards, including criteria related to experience and actuarial credentials, individual quality and character, reputation among peers and clients, and contributions and visions for the firm.

26. Discuss the causes and impact of any executive and professional staff turnover (departures or hiring/promotions) in the actuarial consulting group that has occurred in the last five years. Provide a table listing all the professionals that have departed from that group over the past five years. For each individual, provide the following information:

- a. Date of departure**
- b. Name**
- c. Title**
- d. Responsibilities**
- e. Years with the firm**
- f. Reason for leaving the firm**
- g. Name of replacement**

	Actuary #1	Actuary #2	Actuary #3
a. Date of departure	2019	2019	2020
b. Name	Actuary #1	Actuary #2	Actuary #3
c. Title	Consulting Actuary	Consulting Actuary	Principal Consulting Actuary
d. Responsibilities	Actuarial Consulting	Actuarial Consulting	Actuarial Consulting
e. Years with the firm	11	10	10
f. Reason for leaving the firm	Moved to a non-consulting position	Retired	Accepted an opportunity to become an equity partner
g. Name of replacement	N/A	N/A	N/A

As a company growing at a steady clip with a unique style of consulting and communicating with our clients, we are dedicated to retaining highly qualified staff who share Cheiron's vision. Our turnover rate over the past five years is well below the industry average. Because of our continued expansion, we are adding actuaries every year, especially those with FSA

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and ASA credentials.

27. Does the firm have a transition plan to deal with the possible sudden departure of key professionals within the group? Describe the plan.

We always assign at least two senior consultants to each of our accounts. This way there is always a fully informed, credentialed co-lead person available. This is done specifically to meet the needs of our clients in coordination of trustee meetings to ensure there is always one of our senior consultants available.

It is Cheiron's philosophy to fill consultant roles internally by promoting our most qualified, experienced, and highly credentialed project managers. Our larger complex clients are staffed with these senior level project managers. If one of the co-lead consultants departs suddenly, the natural progression is for the project manager to advance to a consultant role. This plan is ideal in that it provides continuity to the client team and specific client knowledge is retained. In addition, Cheiron has staffed Bill Hallmark as additional resource, who in a sudden departure of any key professional, would be able to supplement the client team to ensure that the transition is seamless.

We do not anticipate losing any consultants assigned to KCERA's actuarial services project, however, you have a team with four credentialed actuarial consultants. If the need arose to replace the lead consultant, any one of the team is fully experienced to work on this assignment and make final presentations to your Board. Specifically, if Anne or Graham becomes unavailable for any reason, the other individual is prepared to serve as the lead Cheiron consultant on this assignment.

Methodology

28. Describe the specific methodology to be used for the required scope of services identified in Section II of this RFP.

Please see Section VI C. 1) **Ability to Perform Scope of Services** on pages 1-15

29. Provide how you will achieve the timeline for completion of the work as identified in Section III of this RFP. Indicate dates by which your firm must have specific input data from KCERA and indicate points in the project when your firm would plan to meet with KCERA staff at our office.

Annual Actuarial Valuations

- a. **Initial Planning Meeting (Immediately after Contract is finalized)** – Joint meeting with KCERA staff and Cheiron team.

Replication of June 30, 2021 Actuarial Valuations. (August 31, 2022)

In the transition year, it is extremely important to set a schedule and strictly adhere to the

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deadlines since it is standard industry practice to perform an independent actuarial valuation of the most recent actuarial valuation (June 30, 2021) to validate the results before starting the June 30, 2022 valuation. However, since Cheiron performed a full replication audit of the June 30, 2019 actuarial valuation, we expect that the process would be smooth and efficient.

2021 Census Data from KCERA (**June 1, 2022**)

2021 Processed Valuation Data from Segal (**June 1, 2022**)

b. Data Request Letter (July 1, 2022)

We will prepare an annual data request letter to be sure we receive all necessary elements to perform the valuations for each plan. This will include requests for individual data for each active employee, for each retiree, disabled retiree, beneficiary, inactive, and terminated vested member. We will also request information on any plan changes that have occurred since the prior valuation, any known cost-of-living adjustments that have been calculated but not yet applied to either benefits or salary, and financial information including reserves.

c. Receive Data from KCERA (September 1, 2022)

d. Initial Processing and Data Questions Sent to KCERA Staff (September 19, 2022)

e. KCERA Staff Responds to Data Questions (October 3, 2022)

f. Finalize Data (October 10, 2022)

g. Receive Financial Information including Reserves (October 31, 2022)

h. Perform Analysis (October 10 – November 18, 2022)

i. Preliminary Results to Staff (November 21, 2022)

j. Draft Report and Presentation to Staff (December 1, 2022)

We will work with the Chief Executive Office and staff to prepare handouts in advance of the Board presentation to provide the opportunity to comment on any of the materials before finalizing.

k. Board Presentation (December 14, 2022)

We understand your preferred timing for the final valuation reports is that they are delivered at the December meeting. We will present the valuation results such as contribution rates, changes in the UAAL and funding progress as well as future contribution rate and funded status projections.

Annual COLA Letter Including COLA bank (January 31, 2023)

We will not require any input from KCERA on this project, except to receive information on

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the existing COLA banks.

Annual SRBR Tier 3 Calculations

- l. Receive Data from KCERA (May 1)**
- m. Preliminary Calculations to KCERA staff (June 15)**
- n. Final Calculations (June 30)**
- o. KCERA Staff Responds to Data Questions (October 3, 2022)**

415 Limit Calculations

- p. Receive Data from KCERA (May 15)**
- q. Preliminary Calculations to KCERA staff (July 15)**
- r. Final Calculations (July 31)**

GASB Disclosures

- s. Receive Financial Information from KCERA staff (October 31, 2022)**
- t. Final GASB 67 Report to KCERA staff (December 1, 2022)**
- u. Receive Contributions and Pensionable Payroll by Employer from KCERA staff (January 9, 2023)**
- v. Final GASB 68 Report to KCERA staff (March 1, 2023)**

Triennial Experience Study

a. Data Request (July 1, 2022)

We will be maintaining a database in order to complete the experience analysis. All data submitted to us via annual data request will be loaded into this database. With this database, we will be able to identify those participants who left the system and for what reason. Initially we will be requesting up to four years of actuarial valuation data to populate our database.

b. Additional Data Request (January 9, 2023)

We will use the same data as requested above for the annual valuations. We will also request additional information in reference to active members depending on how much detail is in the original data. This might entail information pertaining to active member deaths and/or verifying termination of active participants. We may request information

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pertaining to retirees, again depending on the detail of the actual data records.

c. Perform Analysis (January 30 – May 31, 2023)

Once all data has been received, we can begin our analysis. After manipulating the data, we will analyze demographic assumptions and economic assumptions for actual vs. expected results.

d. Present Preliminary Results (June 1, 2023)

After performing our analysis and customizing our experience study models, we will present the preliminary results to the CEO.

e. Draft Report (June 15, 2023)

f. Final Report and Board Presentation (August 31, 2023)

30. Describe your firm's theory and methodology used in recommending an appropriate actuarial cost method for a public pension fund.

The two most prevalent funding methods used in the public sector are the Entry Age Normal Cost Method and the Projected Unit Credit Method. The value of each alternative is discussed below.

Entry Age Normal Cost Method – The primary objective of this method is to spread the cost of projected benefits over a participant's working lifetime as a level percent of payroll. This is the key attraction of the method as it enhances both the budgeting process and negotiation process by defining the cost of benefits in terms of a total payroll package. However, many systems vary in the way the funding policy, whether externally defined by law or internally chosen, addresses paying for unfunded past service obligations.

Projected Unit Credit Method – The other method found among public sector plans defines more directly the cost of benefits earned each year. The advantage of this method is that it tends to result in lower past service obligations, especially with active participant populations that are in a steady state (meaning the average age of the group, and past service of the group remains relatively the same from year-to-year). Historically however, the concern with this method is that it does not necessarily produce a level annual cost as a percent of payroll and particularly if the average age of the population increases so will the costs as a percent of pay. With large systems and among the uniformed services, increasing age is typically not a concern.

Past service obligations are common to both methods. They are a reflection of the liability that has been accrued to date and the assets available to meet that obligation. How this funding shortfall is addressed varies enormously from system to system and is often defined as a balance between intergenerational equity (not having future generations obligated for funding the benefits of the current employees), budgetary constraints—what can be afforded

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and for how long, and political considerations—how various needs are met with public entities' limited resources.

Our Approach – When working with a retirement system we again turn to our *P-Scan* model to explore funding policy as a process to more effectively balance the needs and concerns of the stakeholders identified above. We do this by exploring unique ways of combining traditional funding methods with approaches that can also address predictable budgeting concerns. With our unique modeling capabilities, our focus to funding is not limited to the current year but focused on the long-term solvency of a system and relative cash flow sensitivity implicit in the liabilities. We look for a funding approach that incorporates a measure of the relative risk of insolvency by measurement of the probability of running out of funds in the future.

We note that the Entry Age Normal method has become the standard for the 1937 Act systems, and as we commented in our recent actuarial audit, we believe this methodology is appropriate for KCERA and aligns with guidance issued by the California Actuarial Advisory Panel, and the Government Finance Officers Association.

31. Describe your firm's theory and methodology for development of actuarial assumptions (except for the interest rate assumption, which is addressed separately).

In general, we view every plan as unique with distinctive circumstances. In addition, while past experience is one indicator of future anticipated experience (i.e., experience study results) we are careful to look forward to anticipate future likely changes in trends. Considering these aspects, we then work to identify all the financial and behavioral incentives built into a retirement system that can impact the liability measurements.

Most demographic actuarial assumptions (i.e., turnover, disability and retirement) are best determined by using the plan's own experience, taking care not to unduly reflect short-term experience that might not be indicative of long-term plan experience. For the mortality assumption, it is common to select a standard mortality table that best fits the expected experience of the plan.

For mortality, it is also appropriate to evaluate the level of future improvements in this area that may be expected in future. This is a particularly timely issue, as the Society of Actuaries has recently released several new sets of assumptions for predicting mortality and future improvements. Our consultants have been active in discussing these improvements with our clients – including early implementation of the use of generational mortality assumptions.

The salary increase assumption, particularly the merit component, is also best determined from the plan's own experience, recognizing unusual events that may have occurred during the experience period and any changes in personnel policy that could impact future salary increases.

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In the setting of an underlying inflation assumption we typically rely on either the national or regional urban consumer price index. While there is opportunity to look at the realistic measurement of an alternative basket of goods and services that go towards the make-up of this index, the inflation assumption is typically the foundation for the other economic assumptions. It is the analysis of those other economic assumptions relative to the inflation assumption and the retirement system's specific experience that is more valuable in assessing future obligations.

32. Describe the methodology you use to formulate a pension fund's actuarial interest rate assumption. How may this methodology differ from client to client? Under what circumstances would you recommend KCERA change its interest rate assumption?

The investment assumption can have the greatest impact on the System's cost and should be a reflection of not only future expectations, but also the risk tolerance of the System. Future expectations of investment returns for KCERA's portfolio and the volatility of those expectations are used to establish an initial range for the interest assumption. Factors of financial resources, cash flow, and cost volatility are all components unique to each retirement system that we consider in narrowing the range within which this assumption would be considered appropriate. For some systems this concept of risk tolerance has not been well explored and Cheiron has unique tools that allow us to discuss the types of adverse events the Board would consider as their primary concern and develop a risk profile and asset-liability model allocation that can minimize such events occurring.

Investment return assumptions below 7.5% have become the norm among California public plans, based on an approach that continues to reflect the traditional approach of using the anticipated investment return assumption expected from a diversified portfolio of asset classes as the benchmark for the discount rate used in measurement of plan liabilities. However, when we look at mature plans, we have seen funds with negative cash flows (contributions are less than benefit payouts plus expenses) potentially under higher risk of long-term financial problems based on the current asset allocation that supports this assumption.

The interest rate assumption reflects two different aspects of the valuation process. It is a reflection of the future earnings expectations of the fund assets based on the asset allocation. In these terms, the long-term expectation of asset returns reflect the historic and forward looking risk premiums those investments will provide over a risk-free rate of return. We can build the interest assumption from the risk-free rate of return plus the amount of risk premium based on your target asset allocation.

The other function served by the interest rate assumption is in determining the expected cost of the benefits expected to be provided by the retirement system. These obligations are basically a series of cash flows that are defined by the benefit structure and the behavior of the system participants. The interest assumption is used to discount these future cash flows and should in part reflect the expected cost of the obligation.

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There is much discussion regarding the measurement of liabilities for various purposes, including what we call the current market value of liabilities. This measurement and the context are apart from the funding and financing of the benefits but can be a valuable measurement in understanding the financial risk of an assumption.

What we do is start with the current assumption, introduce the implications of these two functions and discuss and illustrate the long-term implications of the current assumption and changes. With public systems we recommend small incremental changes made over time to limit the cost volatility if it is determined the current assumption no longer best represents the most appropriate rate to reflect these two measurements. We would recommend a change in this assumption if the asset allocation and the obligation no longer support the current assumption.

We also see the assumption as a proxy for risk tolerance and find that many Boards and Sponsors have less tolerance for the volatility of an assumption that reflects the average expected future return over assumptions that have a higher than 50% likelihood of seeing returns in excess of the assumption. Here again we have worked with clients to take the opportunities of favorable investment return experience to buy down the assumption. This approach decreases the potential of higher costs in the future.

Finally, we note that for KCERA the existence of the SRBR is expected to have an impact on the investment returns that can be used to support the basic benefits of the Plan. Although it is not necessary to make a direct adjustment to the assumed earnings rate to anticipate this impact, we will discuss with the Board how the SRBR will be expected to affect the returns and make any appropriate disclosures as necessary.

33. Describe your firm's approach to recommendations regarding the amortization of unfunded liabilities.

Amortization methods are a means of paying down the outstanding obligation for benefits already accrued. Most methodologies are designed to balance the need to provide smooth predictable budgeting of the additional cost with the objective of paying down the outstanding amount. The following considerations are part of the decision process and dependent both on the funded status of the plan and the demographics of the population covered by the plan:

- The amount of the annual payment and ability of the plan sponsor to make the payments,
- Intergenerational equity and the desire to pay the cost of active participant's benefits during their expected future working lifetime,
- Objective of having the pension cost remain relatively constant as a percent of active participant payroll,
- Objectives related to the elimination or reduction of any unfunded liability over a specified period of time, including tolerance of negative amortization,
- Maintenance of flexibility to deal with extraordinary experience,

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- A means of smoothing the funding volatility which is a function of factors including the asset allocation, the net cash flow and cash outlay needs in servicing benefits, the actuarial assumptions and funding method, and
- Other regulatory requirements that may pose limitations on the flexibility in choosing an amortization schedule as well as GASB limitations.

When working with a retirement system we again turn to our *P-Scan* model and special projection screens designed to show how the amortization structure can impact future funded status over time and funding costs both on the assumed return rate and when, in more realistic terms, investment returns are allowed to vary. In this way we help our clients balance the considerations described above to adopt an approach that best balances their objectives for full funding with the volatility of the system and the resources of the sponsor.

34. Describe your approach to measuring funded status and funding progress in order to facilitate the assessment of trends over several valuations of a client.

Funded status and funding progress are measured both based on the actuarial value of assets and the market value of assets. We show our clients historical measures as well as stochastic and deterministic projections into the future under various economic conditions to put the current situation in a long-term perspective.

Funded progress reflects both the objective of the sponsor to fund the system through a funding policy and the impact of experience. It is important to differentiate these two components because a decline in funded status may reflect a change in a sponsor's commitment to fund the system over actuarial experience, or both.

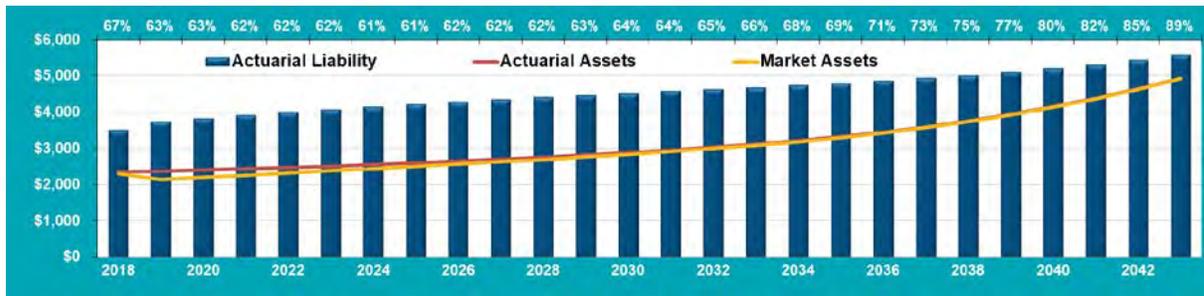
The illustrations below show an example of the impact on a Plan's funded ratio based on their current actuarial funding methods and policy compared to an alternative funding policy. All actuarial assumptions are assumed to be met each and every year of the projections, including the assumed rate of investment return.

Current Funding Policy

The funded ratio declines from 67% to 63% in the first year, then gradual declines over the next six years to 61%, primarily due to unfavorable investment experience during 2018, but also in 2014 and 2015. Under the Plan's current asset smoothing method, the recognition of investment losses is much longer than the traditional five-year recognition used by most public plans. Also, any actuarial gains or losses are amortized over a 30-year period. As a result, it takes sixteen years (in 2034) for the funded ratio to recover to the 2018 level. Even after 25 years of contributing the actuarially determined contributions, the Plan's funded ratio is only 89%.

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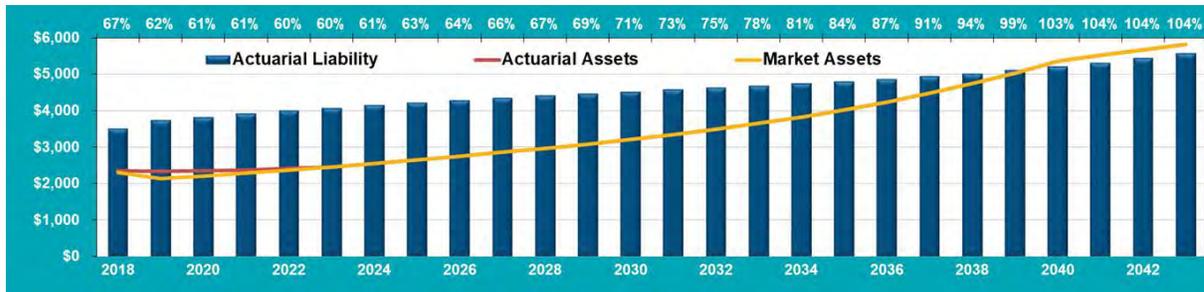
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Alternative Funding Policy

The alternative funding policy used in the projections below includes a more traditional asset smoothing method that recognizes investment gains and losses over a five-year period as well as an amortization period for the UAL that is a much shorter period of 20 years.

The funded ratio declines from 67% to 62% in the first year, then gradual declines over the next four years to 60%. Based on a five-year outlook, the current funding policy appears to be more favorable. However, funding progress after 2023 is significantly quicker if the Plan were to adopt these alternatives. The funded ratio recovers to the 2018 level by 2028, six years sooner than the current funding policy. The Plan is approximately 100% funded by 2039 compared to a funded ratio of only 77% under the current policies.



Distilling the status of a pension plan to a single number can create a distorted picture or hide the potential risks inherent in the plan. Consequently, we encourage a more robust picture of the plan that may include additional measures such as the unfunded liability as a percentage of payroll (proxy for tax revenues) as well as measurements of the liabilities at different investment return assumptions.

Our models are interactive, thus allowing us to demonstrate these different scenarios during a meeting to address any of the Board's concerns in person. They give us the ability to better educate the Board to make them an integral part of the decision-making process. We also believe it can be helpful to compare the funded status of plans with their peers, and we have developed multiple interactive [tools](#) that can be used to review funded status trends over time.

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35. Describe the capabilities of your valuation system(s) and your computer system support.

Cheiron utilizes actuarial valuation software leased from Winklevoss Technologies (WinTech) called ProVal. WinTech provides similar lease arrangements to consulting firms and insurance companies nationwide. ProVal is one of the most widely accepted high-end defined benefit valuation systems available today, easily handling large valuation cases on a PC or LAN. The WinTech Pension Product can value plans using select and ultimate interest rates, multiple funding methods, cash balance benefit formulas, multiple decrements, actuarial gains and losses by source, and open and closed group forecasts. ProVal's full functionality includes built-in reporting, contribution and expense determination, extensive documentation, and a host of other features. Enhancements include the use of generational mortality tables and an expanding suite of funding report capabilities. With WinTech's superior actuarial valuation system as our foundation, Cheiron's exciting innovations, such as *P-Scan*, become a powerfully effective product. Also, from a quality control point of review (risk management), this arrangement is beneficial to our clients and to our firm since many of the basic computations will be performed by industry-trusted software.

36. Describe your quality control processes for actuarial services & reports. How are these services monitored and reviewed?

Cheiron has a multi-tiered quality review process in place with many checks and balances that will ensure that required services are completed smoothly and accurately within deadlines.

Stringent quality control is essential for us to retain your confidence and trust. Cheiron's ability to ensure the quality of its services rests on five pillars:

- 1) The qualifications and experience of the people assigned to the account,
- 2) Our professional commitment and capacity to provide exceptional service,
- 3) Adherence to strict quality control procedures,
- 4) Independent Peer Review Specialists, and
- 5) Independent validation of the valuation utilizing our sophisticated simulation software tools, including *P-Scan*.

To elaborate on the five pillars:

- *Exceptional professional qualifications and deep experience of the professionals dedicated to this account will assure quality work.*

Cheiron has assigned one project team member who has reached the highest level of actuarial professional accreditation, Fellow of the Society of Actuaries (FSA) and two who are Associates of the Society of Actuaries (ASA). All KCERA team members are also Members of the American Academy of Actuaries (MAAA) and are Enrolled Actuaries (EA) under ERISA.

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- ***Commitment and giving our best improves quality control.***

Cheiron is motivated to provide the highest level of commitment to quality. Our firm does not impose liability limitations and therefore, we are fully accountable for our work.

- ***Internal review procedures give discipline to quality control.***

Cheiron's quality review procedures are a multi-tiered process with various checks and balances:

- 1) At the beginning of each project a detailed work plan is developed for each team member that describes who is responsible for each task, and the corresponding deadlines.
- 2) An internal project manager is responsible for making sure that every ongoing task is on schedule, that deliverables are timely, and for checking up on the status of items we are waiting for from our client.
- 3) On top of all this, Cheiron designates a corporate officer as the workflow manager for all activities in the office. That person conducts monthly reviews with all staff to identify any potential assignment where our ability to meet a deadline is at risk.
- 4) For each task there are procedures for designating a "doer" and a "reviewer," with requirements for both to sign off on the ongoing work progress.
- 5) Our experience shows that it's possible that data provided to us by clients contain errors. To address this issue, when we first receive the data we prepare an aggregate summary listing of key membership and payroll totals, and submit that for client verification.
- 6) All reports and written communications are prepared by a qualified actuary or actuarial assistant, and also checked by a peer or more qualified individual. All reports and letters then go through a separate peer review by a senior actuary who is dedicated to reviewing public sector reports, and who is not a member of the client team. The role of this individual is to determine if results are:
 - Reasonable based on summary demographic data and financial data,
 - Based on consistent assumptions and methods in accordance with Actuarial Standards of Practice,
 - Communicated appropriately for the intended audience,
 - Responsive to the assignment, and
 - Reflective of any specific questions, providing desired answers.

- ***Independent Peer Review Specialists***

We recognize that our employees are human, and breakdowns in the traditional peer review process are possible. As a result, in addition to the normal peer review process we have implemented a supplementary internal audit team that we believe is unique among our competitors. Their role is to conduct independent reviews on projects that have an irrevocable financial impact to employers or plan members and to independently replicate

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the valuations of all of our clients on a periodic basis (generally every three years). The internal audit team does not work directly on any of our clients. Cheiron has an Independent Review Policy that requires an additional analysis by members of the audit team, including but not limited, to the following types of actuarial work:

- Studies involving assumption changes or other communications having a financial impact
- Actuarial communications involving change(s) in benefit structure or contribution rates
- Employer disaffiliation valuations
- Non-routine benefit calculations

The valuation replication process of the audit team is similar to an independent actuarial firm conducting a valuation audit. They use the plan provisions and assumptions provided by the client team and independently program a valuation system from scratch. They also include a review of the valuation data, by using the raw client files and independently processing the data. Data processing is an area where mistakes or omissions can be overlooked, but can be a source of material valuation differences.

These audits are performed without the regular consulting team's involvement and entails not only independent review of all reports but also whether our quality control standards were adhered to. We believe this internal full replication audit is unique to Cheiron, but because we always stand behind our work without liability limitations, we believe it is a prudent investment.

- ***Modeling the results provides a macro quality review.***

The final step in our quality control process provides an independent "macro" review of the valuation by placing the analysis into our proprietary *P-Scan* model to measure current valuations against historic results and future projections. This allows us to review with our clients results developed historically and projected into the future. This process helps spot any anomalies or potential mistakes, and also allows for and assists in the quality control process. It is a powerful tool for drawing comfort in the knowledge and accuracy of our results, as well as educating our clients on the potential risks and sensitivities of their benefit systems to external forces.

No matter how many checks and balances are in place, however, it is impossible to be 100% accurate 100% of the time, considering the thousands of calculations made over years in performing valuations. In the event a mistake is made by our firm, our policy is to report it to key client staff immediately and assist in any resulting communications or recalculations that may be needed.

37. Provide as *Appendix E* one recent actuarial report as provided to an existing client.

Please see Appendix E to this proposal for a sample actuarial valuation report. We have also begun providing fully interactive online valuation reports to some of our clients. An example

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of such a report (which can be issued in addition to the standard report) is shown here:

[Sample Actuarial Valuation Report](#)

Relevant Experience

38. Complete the following table, reporting only those client relationships where actuarial services similar to this mandate have been or are being provided.

As of June 30

	2017	2018	2019	2020	2021
Total number of actuarial clients	297	333	353	379	397
Total number of public pension plan actuarial clients*	71	76	83	86	86

* Includes non-valuation public pension plan projects such as actuarial audits, pension studies, and retiree medical trusts.

39. For all current public pension plan clients, state the client's name, the first year of your initial Contract with the plan, and their asset and membership size as of June 30, 2021. Designate by asterisk which of these clients are multi-employer plans.

Client	Date of Hire	Assets	Participants
• Alameda-Contra Costa Transit District Employees Retirement Plan	1/1/2013	\$837,867,000	4,502
• Amalgamated Transit Union Local 900 Pension Plan	1/1/2007	\$5,373,088	145
• Arlington County Retirement System	4/3/2003	\$2,413,300,000	8,299
• Beverly Hills Police Officers Association Supplemental Benefit Trust	2/5/2013	\$12,658,994	205
• Cincinnati Retirement System Pension	8/8/2018	\$1,834,979,000	7,473
• City and County of San Francisco Employees Retirement System*	7/1/2008	\$35,673,800,000	75,624
• City of Alexandria Firefighters and Police Officers Pension Plan	11/30/2010	\$296,948,047	882
• City of Allentown Pension Plans	7/12/2010	\$284,395,284	944
• City of Baltimore Fire and Police Employees	3/30/2012	\$2,750,275,383	10,317
• City of Kansas City, Missouri Employees Retirement System	1/1/2007	\$1,169,271,585	6,215
• City of Kansas City, Missouri Firefighters Pension System	1/1/2007	\$552,265,610	1,941
• City of Norfolk Employees Retirement System	6/1/2005	\$1,084,248,000	5,095
• City of Philadelphia Municipal Retirement System	8/7/2007	\$4,872,977,000	66,321
• City of San Jose Federated City Employees Retirement System	8/12/2010	\$2,884,344,000	9,949

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Client	Date of Hire	Assets	Participants
• City of San Jose Police and Fire Department Retirement Plan	5/5/2011	\$4,726,642,000	4,523
• City of Wilmington Pension System	12/28/2011	\$206,576,675	2,744
• DART Contributory Pension Plan	5/7/2007	\$50,556,919	933
• Delaware Public Employees Retirement System*	6/1/2006	\$9,696,899,100	72,767
• Denver Employees Retirement Plan*	11/7/2018	\$2,441,690,000	25,723
• Employees Retirement System of the City of Baltimore	5/5/2005	\$1,740,450,176	18,292
• Employees Retirement System of the City of St. Louis*	10/1/2010	\$797,777,721	12,487
• Fairfax County Retirement Systems	7/1/2003	\$7,399,044,443	32,797
• Firefighters Retirement Plan of the City of St. Louis	6/25/2014	\$43,948,104	682
• Golden Gate Transit-Amalgamated Retirement Plan	4/1/2013	\$103,122,655	683
• Greater Palm Springs Convention & Visitors Bureau	7/15/2014	\$8,452,037	44
• Hampton Employees Retirement System	8/27/2009	\$141,924,882	1,130
• Jackson County Revised Pension Plan	5/1/2016	\$301,760,724	3,816
• Knoxville Utilities Board Pension Plan	11/15/2011	\$51,235,022	1,360
• Maine Public Employees Retirement System*	3/1/2005	\$15,075,604,606	155,822
• Marin County Employees Retirement Association*	1/1/2013	\$3,361,600,000	7,037
• Maryland National Park and Planning Commission	3/7/2019	\$892,978,117	3,823
• Merced County Employees Retirement Association*	1/1/2013	\$1,163,300,000	5,664
• Metropolitan Relief Association Death Benefit Plan	1/6/2015	\$12,344,910	771
• Metropolitan Washington Council of Governments	4/1/2003	\$67,363,817	193
• Newport News Employees Retirement Fund	6/3/2010	\$957,478,462	12,476
• Oakland Police and Fire Retirement System	9/18/2013	\$384,711,000	798
• Pennsylvania Municipal Retirement System*	10/1/2006	\$2,151,378,000	15,908
• Port Authority of Allegheny County Retirement and Disability Allowance Plan for Employees Represented by Local 85 of the Amalgamated Transit Union	1/1/2007	\$661,231,493	5,173
• Retirement Plan for Pace West Division Employees	1/1/2007	\$19,574,522	442
• Riverside Sheriffs Association	6/8/2015	\$17,900,000	2,924
• Sacramento Regional Transit District	1/1/2013	\$297,384,910	2,134
• San Diego City Employees Retirement System*	6/14/2006	\$10,293,622,000	20,725
• San Diego Transit Corporation Pension Plan	1/1/2013	\$204,471,831	1,595
• San Joaquin County Employees Retirement System*	1/1/2013	\$3,546,712,249	14,876
• San Luis Obispo Pension Trust*	1/1/2021	\$1,566,326,000	6,616
• Santa Barbara County Employees Retirement System*	1/1/2013	\$3,990,899,000	10,921
• Santa Clara Valley Transportation Authority ATU Pension Plan	1/1/2013	\$604,698,941	3,285

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Client	Date of Hire	Assets	Participants
• Stanislaus County Employees Retirement Association*	1/1/2013	\$2,483,700,000	9,904
• State of New Jersey Division of Pensions and Benefits*	8/1/2018	\$76,924,788,947	456,000
• State Teachers Retirement System of Ohio*	5/29/2018	\$74,916,301,830	515,960
• Sussex County Employee Pension Plan	2/1/2016	\$82,759,578	810
• The Police Retirement System of St. Louis	6/1/2012	\$784,752,472	3,203
• Tri-County Metropolitan Transportation District of Oregon			3,857
• Tulare County Employees*	5/6/2015	\$1,976,185,000	10,251
• U.S. Court of Appeals for Veterans Claims	4/1/2003	\$39,893,231	16
• United States Army Nonappropriated Fund Employee Retirement Plan	8/1/2003	\$1,820,908,696	28,808
• Washington Metropolitan Area Transit Authority Retirement Plan	7/1/2009	\$3,721,736,057	1,763
• Washington Metropolitan Area Transit Authority, Local 2 Retirement Plan	7/1/2009	\$148,050,475	425
• Washington Metropolitan Area Transit Authority, Local 922 Retirement Plan	6/1/2004	\$209,442,697	738
• Washington State Council of Fire Fighters Employee Benefit Trust	5/22/2014	\$10,310,000	9,081

* Multi-employer plans

40. Provide the name, title, address, and telephone number for the following client references for whom your firm has provided full service actuarial consulting similar to this mandate, as specified in each question:

a. The client that most recently terminated your firm's full-service actuarial consulting Contract.

Client:	City of Falls Church VA
Contact Name:	Cindy Mester, Assistant City Manager City of Falls Church 300 Park Ave., Ste. 102 West Falls Church, VA 22046 (703) 248-5042

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- b. The client with the longest full-service actuarial consulting relationship with your firm.

Client:	Maine Public Employees Retirement System (Cheiron client since 2002; client with previous employer since 1986)
Contact Name:	Sandra Matheson, Former CEO (retired Aug. 2021) Phone: 207-512-0694 Email: sandymatheson@msn.com

- c. A multi-employer public pension plan client for whom your firm has provided full-service actuarial consulting for at least three years.

Client:	San Joaquin County Employees' Retirement Association
Contact Name:	Johanna Shick, Chief Executive Officer 6 El Dorado Street, Suite 700 Stockton, CA 95202 (209) 468-2163

- d. A full-service actuarial consulting client that has been assigned for at least two years to the Primary Actuary proposed for the KCERA account.

Anne Harper

Client:	Santa Barbara County Employees' Retirement System
Contact Name:	Greg Levin, CPA Chief Executive Officer 130 Robin Hill Road, Suite 100 Goleta, CA 93117 (805) 568-2585

Graham Schmidt

Client:	Marin County Employees' Retirement Association
Contact Name:	Jeff Wickman, Retirement Administrator 1 McInnis Parkway, 1st Floor San Rafael, CA 94903 (415) 473-3733

41. List all pension plan clients that have terminated their actuarial service contracts with your firm in the last five years. Include the client firm's name, size (number of pension plan members and annuitants), date of contract termination, and reason(s) for contract termination.

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- 1) Client: City of Phoenix Employees' Retirement System
Membership: 15,553
Reason/Date Lost: Lost in competitive rebid / 2017

- 2) Client: City of Annapolis MD
Membership: 479
Reason/Date Lost: Moved to a lower fee provider / 2017

- 3) Client: City of Falls Church VA
Membership: 667
Reason/Date Lost: Lost in competitive rebid / 2019

42. Within the last five years, has your firm been notified by any actuarial consulting services client that your firm is in default of its contract, or that conditions exist endangering continuation of that contract? If so, state the client firm's name, year the notice was received, reasons for the notice, and resolution or current status of the relationship.

Cheiron has never been notified by any actuarial consulting services client that we were in default of a contract, or that conditions existed that endangered continuation of that contract.

43. Have your firm's actuarial consulting service products been audited by another actuarial firm within the last five years? If so, state the number of such audits and whether any resulted in revisions to your clients' annual valuation results, actuarial assumptions, or actuarial cost methods.

In the last five years, actuarial valuations we have done for 12 of our clients have been audited (including all six of our '37 Act plans), the results of which have all been overwhelmingly favorable. In all these audits, we have never had to revise our valuation results, actuarial assumptions or actuarial cost methods. In addition to these outside audits, Cheiron maintains an internal auditing team to conduct internal audits of our work.

Resources

44. Would your firm propose to use any subcontracts in the provision of the required KCERA services? If so, describe the specific services that would be subcontracted, the name of the subcontractor, the cost to your firm of these services, and how you would control the quality of services provided.

Cheiron does not subcontract any services with outside vendors and does not intend to use subcontractors to perform any of the services contemplated by this arrangement. All services and deliverables will be performed and produced by Cheiron staff.

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45. Does your firm use internal or external legal expertise, or both? If external is used, state its source and nature.

Cheiron uses both internal and external legal expertise. Internally we have a Chief Research Counsel and a Legislative & Regulatory Advisor who provide creative but legally sound solutions to clients' plan funding, design, administrative and compliance requirements. Externally we use law firms specializing in different areas of jurisprudence.

The former assistant director for the employee plans ruling and agreement area of the Internal Revenue Service, Jim Holland, is our Chief Research Actuary. He is available to meet the special needs of our public sector clients at this time when many systems are addressing compliance with plan submissions.

While we have internal legal expertise, Cheiron does not practice law and therefore does not provide legal advice.

46. What investments has the firm made in information technology?

We invest in state-of-the-art actuarial valuation software like ProVal, but also make significant investments in hardware and software to effectively communicate to clients, work collaboratively, secure documents, and innovatively analyze risk. We moved to a cloud-based approach to accessing client files nearly a decade ago, using the Box platform - an industry leader in providing secure cloud storage and collaboration. We have recently enhanced our presentation format, using the interactive format shown in several examples in our response. Our investment in modeling and development of programs to facilitate transactional calculations tailored to our clients' needs and requests are continuous and part of our underlying business model.

We anticipate that in the next five years we will continue to invest in leading edge technology to meet our clients' needs.

47. Do you have plans/arrangements in place for alternative work sites should either your headquarters facility or the facility that will primarily provide services to KCERA become inoperative because of fire, earthquake, etc.? Briefly describe your emergency and disaster recovery plans. Include in your description your disaster recovery plans related to client data files.

Client projects and files are typically distributed among multiple employees and therefore not as susceptible to catastrophic failures from one particular system and/or individual computer. In addition, final work products are transferred to a centralized location, and disk-based file backup is performed periodically to a centralized network storage device with redundant power supplies and a RAID 5 storage configuration for additional safety and security.

Cheiron's contingencies in the event of a natural or man-made disaster or pandemic are as follows. Client data files, sharing of data, as well as backup and archiving operations, are

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handled through secure network attached storage in our Washington, DC location, which can be accessed externally through secure VPN connections. In this manner data can be securely accessed by authorized Cheiron employees anywhere in the world, files are stored and backed up offsite for disaster recovery purposes weekly, and project files are moved to off-line storage on non-volatile media such as CDs and tapes for archival purposes. We regularly use the backup system to restore files as necessary. We also have duplicate hardware in both the Chicago, IL office and McLean, VA offices, allowing us to restore operations in either location.

The last few months have given us first-hand experience with implementing our contingency plans in response to the current global health pandemic. Our cloud-based approach to accessing client files has allowed us to seamlessly transition to a primarily work-from-home based structure, and we have had absolutely no disruptions in our ability to service our clients. The reception from our current clients has been overwhelmingly positive, with many providing unsolicited feedback praising our responsiveness and ability to deliver consulting services in a virtual manner.

48. Please describe the levels of coverage for errors and omissions insurance and any fiduciary or professional liability insurance your firm carries. Is the coverage on a per-client basis, or is the dollar figure applied to the firm as a whole? List the insurance carriers.

Cheiron and its professional staff are covered by professional liability Errors & Omission (E&O) insurance in the amount of \$5,000,000 with a deductible of \$50,000 per claim with Admiral Insurance. Cheiron also carries excess E&O insurance in the amounts of \$5,000,000 with Nautilus Insurance Company and \$10,000,000 with Evanston Insurance Company. Accordingly, Cheiron has E&O insurance coverage in the aggregate amount of \$20,000,000. The insurance coverage applies to the entire firm.

Cheiron also maintains commercial general liability insurance in the total amount of \$2,000,000 with National Fire Insurance Company of Hartford, automobile liability insurance in the amount of \$1,000,000 with Valley Forge Insurance Company and umbrella liability insurance in the amount of \$5,000,000 with Continental Insurance. Cheiron maintains cyber liability insurance coverage with Corvus in the following limit: \$5,000,000 aggregate and per occurrence.

49. How does the firm monitor and measure actuarial client satisfaction?

Cheiron monitors client satisfaction through open lines of communication. We establish relationships with people at various levels of our client's organization. We constantly seek feedback from our clients to address issues while they are small, before becoming significant. Members of Cheiron's Board of Directors, as part of their responsibilities, periodically call or visit all of our major clients to discuss ongoing relationships and explore areas where we can continuously improve our service and service offerings.

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We also address the question of client satisfaction with our flexible co-leadership approach for every client. Our clients have a choice of who to focus their questions and the opportunity to discuss concerns with either one of our co-leads to ensure Cheiron's team is meeting and exceeding our client's expectation. We are always focused on our client's satisfaction and work to maintain an open communication to allow for critical feedback in every step of our assignments.

We also regularly participate in formal consultant evaluation processes performed by our clients. As an example, we encourage you to review the results of the most recent evaluation of the client team assigned to this project from another 1937 Act system (see page 124 of the pdf):

https://www.sjcera.org/new_website/15board-retirement/documents/B20191011.pdf

The consultants that formed Cheiron in 2002 all came from an international consulting firm where they served public sector clients for more than 25 years. Many of the same public sector clients this consulting team served while at their former firm are now Cheiron clients. Cheiron's philosophy towards providing consulting services is first, and always, to meet the requirements of the clients, but second, to tailor our services and our focus to the nature and degree of financial risk our clients face. Cheiron is an employee-owned company. Everyone on your team has a stake in your satisfaction.

50. Describe the resources your firm has that specifically address the needs of public fund clients.

Cheiron's resources to address the needs of public fund clients include the following:

- **Projection Models**

Cheiron was one of the first actuarial consulting firms to use statistical models to stress test pension and health plans. Our *P-Scan* (Pension) and *H-Scan* (Health) models demonstrate the likelihood of plans developing funding crises and enable us to develop solutions and long-term funding designs to reduce the future risks. All of our consultants are hands-on in programming our models in order to specifically tailor them to each client's needs. These models can also be made available online through our Secure Portal for client use. Cheiron also has an internal committee that ensures these models include the latest developments.

- **Client Alerts and Advisories**

Cheiron regularly sends client alerts and advisories to our clients on changes in regulations and laws that impact pension and/or health plans. For example, within two days after GASB issued its preliminary views on pension accounting, we sent an alert to all public fund clients with a summary of its implications. Please see this [link](#) for Cheiron's library of client regulatory alerts and advisories.

February 25, 2022

- **Regulatory Support**

The public sector is under increased scrutiny from federal and regulators such as the Governmental Accounting Standards Board (GASB). Our consultants are often aware of these changes in advance through volunteer work on various actuarial committees and are sometimes called upon to assist regulators with these activities. For example, several of our consultants have recently participated in the GASB Advisory Committees for the Implementation Guides of the revised pension and OPEB statements (GASB 67/68; 74/75).

Also, our Chief Research Actuary, Jim Holland, is the former chief actuary of the Internal Revenue of Services (IRS) and maintains relationships with a number of contacts within regulatory agencies. While working at the IRS, Jim Holland literally “wrote the book” on many IRS regulations and rulings, including the final regulations under IRC Section 415. He often assists clients with any compliance and regulatory issues, including interpretations of statutes and regulations.

- **Participation with Public Plan Organizations**

Cheiron is active in organizations representing public pension plans, and our consultants regularly participate in their discussions, conferences, and research. These organizations include the National Conference on Public Employee Retirement Systems, the National Association of State Retirement Administrations, the National Council on Teacher Retirement, National Institute on Retirement Security, and the International Foundation on Employee Benefit Plans.

In California, Cheiron is also active with SACRS and CALAPRS, with Graham Schmidt serving as the SACRS representative to the California Actuarial Advisory Panel. Graham and Anne Harper have also made numerous presentations at the SACRS and CALAPRS annual conferences and have provided instruction at the SACRS Public Pension Investment Management Program at UC Berkeley, as well as various CALAPRS staff and trustee training sessions, and the Administrators Institute.

- **Experienced Consultants**

Our consultants have many years of experience working with public sector plans. Please review our résumés for an idea of the depth and commitment that the proposed team has made towards this specialized area of consulting. In addition, the individuals below offer particular experiences which benefit our public sector clients:

- Gene Kalwarski, Cheiron’s president and CEO, has spoken on the need for better ways of defining public pension plan risk. He has addressed the Center for Retirement Research at Boston College, the National Conference on Public Employee Retirement Systems, and the International Foundation of Employee Benefit Plans on the topic.
- Ken Kent, Principal Consulting Actuary, served on the American Academy of Actuaries Board of Directors for nine years as a Regular Director, as Vice President for Professionalism, as Vice President for Pensions and as a Special Director when he

February 25, 2022

- served as President of the Conference of Consulting Actuaries for two years. Ken is on the Actuarial Board for Counseling and Discipline and is Chair of the Joint Committee for the Code of Professional Conduct. He has testified before GASB as well as Congressional Subcommittees on pensions.
- Fiona Liston, Principal Consulting Actuary, served on the Pension Committee of the Actuarial Standards Board (ASB) from 2009-2018. The ASB is the committee responsible for developing and publishing the Actuarial Standards of Practice related to pension issues, including those governing public plans.
 - Bill Hallmark, Consulting Actuary, served as Vice President of Pensions for the American Academy of Actuaries (2015 - 2017) after having been chair of the Public Plans Subcommittee for the prior four years and vice-chair of the Pension Practice Council the prior two years. He also served on the Board and Executive Committee of the Academy and continues to serve on the steering committee for the Public Plan Community of the Conference of Consulting Actuaries. Bill was a member of GASB's Pension Accounting and Financial Reporting Implementation Guide Advisory Committee for Statements 67 and 68.
 - Stephen McElhaney, Principal Consulting Actuary, currently serves on the Pension Committee of the Actuarial Standards Board and was a member of GASB's Task Force for Other Postemployment Benefits Accounting and Financial Reporting, the group which assisted with the development of GASB Statements 74 and 75.
 - Graham Schmidt, Consulting Actuary, and Elizabeth Wiley, Consulting Actuary, serve on the Society of Actuaries' Retirement Plans Experience Committee (RPEC), the committee responsible for developing and publishing the mortality studies and tables universally used by actuaries in the U.S.

Fees

51. Describe how fees are determined for your firm's actuarial services.

Fees are determined by preparing time estimates for each aspect of the project (e.g., data processing, programming and running the valuation system, preparing models and reports, presentations, etc.). Each phase of the project has an allocation of hours by each member working on the project (senior consultant, actuary assistant, analyst, and administrative staff). We multiply these estimates by the billing rates per designation.

Our billing rates are based upon our experience within relevant market sectors, our actuarial credentials and our desire to provide economically competitive professional services.

52. How are fees billed (billing periods and prospective versus arrears)?

We generally bill fees using monthly invoices as time charges are incurred, but this can be

**Kern County Employees' Retirement Association
Request for Proposal for Actuarial Services**

February 25, 2022

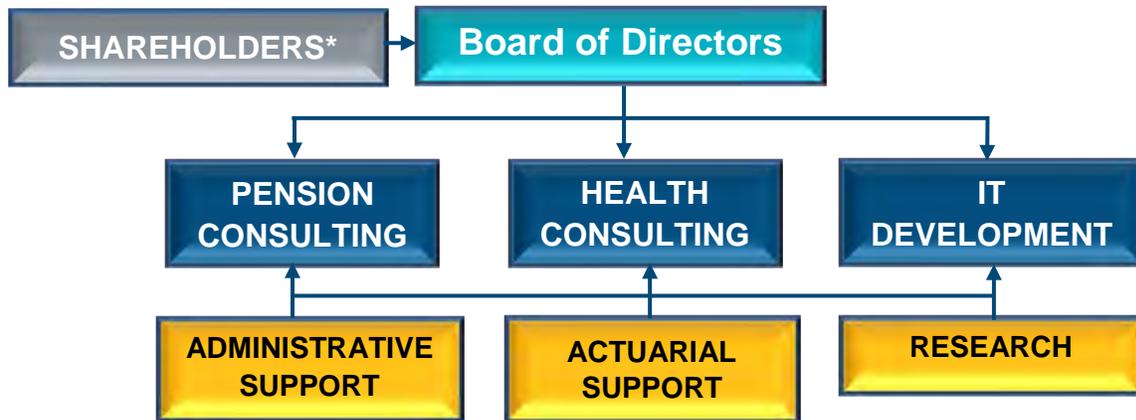
adjusted as necessary to suit the client's needs.

53. The proposed fee should include administrative, third-party, travel, and all other costs.

Our fixed fees include these additional costs.

Appendix A
Organization Chart – Firm Ownership

APPENDIX A - FIRM OWNERSHIP

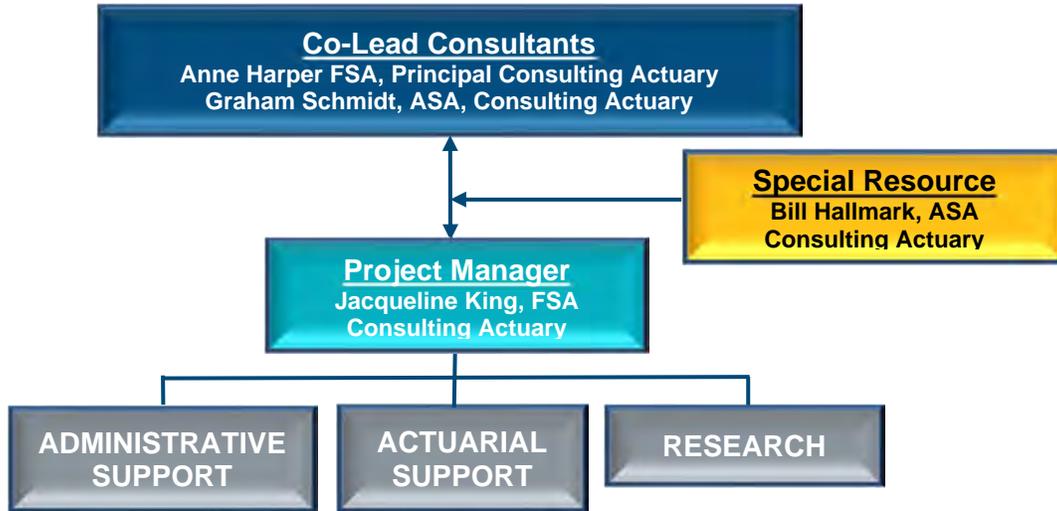


* All shareholders are Cheiron employees.

Appendix B

Organization Chart – Key People

Actuarial Consulting Group



Appendix D
Staff Biographies

Anne Harper, FSA, MAAA, EA
Principal Consulting Actuary

Anne Harper is the proposed co-lead actuary for this engagement. She has 26 years of experience advising large complex public retirement systems, mainly in California. Anne was recently appointed to the California Actuarial Advisory Panel by Governor Gavin Newsom.



Her experience includes developing funding policies, performing actuarial valuations, cost projections, conducting experience studies and sensitivity analyses, producing GASB accounting disclosures, and consulting on complex Internal Revenue Code section 415 issues and GASB 73 disclosures.

Her clients include the City and County of San Francisco Employees' Retirement System, Denver Employees Retirement Plan, City of San José Police and Fire Department Retirement Plan, Santa Barbara County Employees' Retirement System, Merced County Employees' Retirement Association, and the San Joaquin County Employees' Retirement Association.

She also has led many actuarial audits including recent studies for the City of Los Angeles, the California Public Employees' Retirement System, the University of California Retirement Plan and several 1937 Act Counties in California.

Her recent presentations include:

- State Association of County Retirement Systems (SACRS) – COVID Era Funding Strategies and Stress Testing
- CalAPRS Intermediate Course – “So... What’s on the Board’s Agenda?”
- CalAPRS Beginning Course – Pension Funding

She co-authored an article for The State Association of County Retirement Systems Winter 2019 magazine entitled, “Mature Pension Plans are Sensitive—Manage with Care.”

She joined Cheiron in February 2007 and set up the firm’s San Diego office.

She is Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. She graduated with High Distinction in Economics from the University of Michigan.

Graham Schmidt, ASA, FCA, MAAA, EA
Consulting Actuary

Graham Schmidt is the proposed co-lead actuary for this engagement. He is a well-known expert on public pension plans with more than 23 years of experience. Graham is a member of California's Actuarial Advisory Panel.



His experience includes working on audits, accounting and disclosure issues, and risk analyses. He oversees Cheiron's retiree medical benefit trusts practice, developing more than a dozen tax-advantaged union-run trusts that provide pooled lifetime benefits under a fixed contribution. He is also the chairperson of Cheiron's Technology Committee and has lead our efforts in developing the interactive online valuation reports presented in our proposal.

His clients include:

- Santa Barbara County Employees' Retirement System
- Merced County Employees' Retirement Association
- San Joaquin County Employees' Retirement Association
- Marin County Employees' Retirement Association
- Stanislaus County Employees' Retirement Association
- Tulare County Employees' Retirement Association

He also is the lead consultant or co-lead consultant on many of Cheiron's actuarial audits, including studies for the Public Employees Retirement Association of New Mexico PERA, CalSTRS, the San Mateo County Employees' Retirement Association, the City of Los Angeles, and the San Diego County Employee Retirement Association.

He is a member of the Society of Actuaries' Retirement Plans Experience Committee and has volunteered on other public plan committees of the Academy of Actuaries and the Conference of Consulting Actuaries.

He often speaks about public pension issues at various industry and professional conferences, including recent sessions for the International Foundation of Employee Benefit Plans, the Conference of Consulting Actuaries, and the National Council on Teacher Retirement. He co-authored an article for the State Association of County Retirement Systems (SACRS) Winter 2019 magazine entitled, *Mature Pension Plans are Sensitive—Manage with Care*, and presented a webinar on *COVID Era Funding Strategies and Stress Testing* at a SACRS conference. He is a frequent instructor for the California Association of Public Retirement Systems Staff Training and the SACRS Public Plan Investment Management programs.

He joined Cheiron in January 2013 and opened the firm's Bay Area office that year.

He is an Associate of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. He received a B.A. in Mathematics and B.S. in Mathematical Science with Departmental Honors from the Johns Hopkins University.



Jacqueline King, FSA, MAAA, EA
Consulting Actuary

Jacqueline King is the proposed project manager for this engagement. Jacqui joined Cheiron in August 2010 and has 16 years of actuarial consulting experience. Prior to joining Cheiron, Jacqui worked for Towers Watson for six years, where she was an actuarial analyst and project manager for defined benefit pension plans and retiree medical plans.



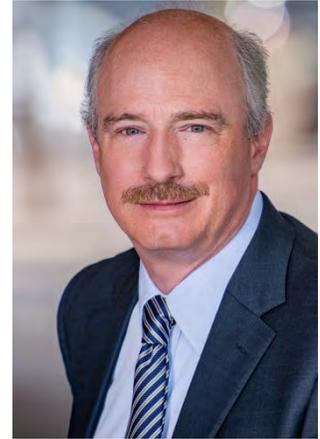
Jacqui currently works on retiree medical trusts, public sector pension plans, multiemployer plans, and single employer plans. Her experience includes preparing and reviewing Funding valuations and projections, GASB disclosures for public plans, government filings, experience studies, plan design studies, analysis of proposed legislations, 415(b) valuations and calculations, individual benefit calculations and benefit statements.

Her current public sector clients serving as co-lead consultant or project manager include San Diego City Employees Retiree Medical Trust, San Diego County Public Safety Retiree Medical Trust, San Diego City Employees' Retirement System (Pension 415(b)), City of Kansas City, Missouri Employees Retirement System (Pension), City of Kansas City, Missouri Firefighters Pension System (Pension), Jackson County Missouri Revised Pension Plan (Pension), City of San Jose Federated City Employees Retirement System (Pension & OPEB), The City of San Jose Police and Fire Department Plan (OPEB), and Merced County Employees' Retirement Association (Pension).

Jacqui is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary under ERISA. She graduated from Purdue University with a Bachelors of Science in Actuarial Science and Statistics, in 2004.

William Hallmark, ASA, FCA, MAAA, EA
Consulting Actuary

William Hallmark is proposed as a special resource for this engagement. He is a nationally respected retirement consultant with more than three decades of experience advising public pension plans.



His experience includes serving as the lead actuary for the Oregon Public Employees Retirement System and San Francisco Employees' Retirement System.

He has also audited the California Public Employees' Retirement System and the California State Teachers' Retirement System, the Teachers' Retirement System of Illinois, the State Employees' Retirement System of Illinois, the Public Employees' Retirement System of Washington, the Public Employees' Retirement Association of New Mexico, the Utah Retirement System, and the Arizona State Retirement System.

He specializes in financial management, designing plans, complying with financial accounting and funding requirements, and retirement valuations. He also developed a framework for analyzing funding strategies for unfunded retiree medical liabilities, designing hybrid plans, and managing risk.

He has led various committees of the American Academy of Actuaries, the Conference of Consulting Actuaries and other professional organizations and speaks frequently at industry conferences.

He joined Cheiron in September 2009 and opened the firm's Portland, Oregon, office.

Bill is an Associate of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. He graduated with a B.S. from the University of Oregon.

Appendix E
Sample Actuarial Valuation Report

Tulare County Employees' Retirement Association

Actuarial Valuation Report as of June 30, 2021

Produced by Cheiron

October 2021

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October 27, 2021

Board of Retirement
Tulare County Employees' Retirement Association
136 N. Akers St.
Visalia, California 93291

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the Tulare County Employees' Retirement Association (TCERA, the System, the Fund, the Plan) as of June 30, 2021. This report contains information on the System's assets, liabilities, and discloses employer contribution levels. Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report.

The purpose of this report is to present the results of the annual actuarial valuation of TCERA. This report was prepared for the TCERA Board of Retirement for the purposes described herein and for use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Sincerely,
Cheiron

Graham A. Schmidt, ASA, FCA, MAAA, EA
Consulting Actuary

Steven M. Hastings, FSA, FCA, MAAA, EA
Consulting Actuary

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

FOREWORD

Cheiron has performed the actuarial valuation of the Tulare County Employees' Retirement Association as of June 30, 2021. The valuation is organized as follows:

- In Section I, the **Executive Summary**, we describe the purpose of an actuarial valuation, summarize the key results found in this valuation, and disclose important trends.
- The **Main Body** of the report presents details on the System's
 - Section II – Disclosures Related to Risk
 - Section III – Assets
 - Section IV – Liabilities
 - Section V – Contributions
 - Section VI – Comprehensive Annual Financial Reporting Information
- In the **Appendices**, we conclude our report with detailed information describing plan membership (Appendix A), actuarial assumptions and methods employed in the valuation (Appendix B), a summary of pertinent plan provisions (Appendix C), a glossary of key actuarial terms (Appendix D), and tables containing member contribution rates (Appendix E).

Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

This report was prepared using census data and financial information as of the valuation date, June 30, 2021. Events following that date are not reflected in this report. Whereas there remains a lot of uncertainty, we continue to monitor developments regarding the COVID-19 pandemic and the impact it may have on TCERA. Actual experience, both demographic and economic, will be reflected in subsequent valuations as experience emerges.

In preparing our report, we relied on information (some oral and some written) supplied by the TCERA staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe, and identify the following as of the valuation date:

- The funded status of the System,
- Past and expected trends in the funding progress of the System,
- Employer and employee contribution rates for Plan Year 2022-2023,
- An assessment and disclosure of key risks, and
- Information required by the GFOA for the Annual Comprehensive Financial Report (ACFR).

In the balance of this Executive Summary, we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key results, (C) an examination of the historical trends, and (D) the projected outlook for the System.

A. Valuation Basis

This valuation determines the employer contributions required for the employers' fiscal years beginning July 1, 2022. The System's funding policy is to collect contributions from the employers and employees equal to the sum of (1) the normal cost under the Entry Age Normal Cost Method and (2) amortization of the Unfunded Actuarial Liability.

The Unfunded Actuarial Liability (UAL) is the excess of the Actuarial Liability over the Actuarial Value of Assets. Based on the funding policy adopted by the Board at its October 28, 2015 meeting, the UAL payment in the current valuation is the amount needed to fund the June 30, 2015 UAL over a closed 19-year period with payments as a level percentage of payroll, assuming payroll increases of 3.00% per year, with subsequent gains and losses being amortized over new 19-year closed periods, also as a level percentage of payroll.

Actuarial experience studies are performed every three years. This valuation was performed using the economic and demographic assumptions adopted by the Board, which are based on the experience study presented by Cheiron on September 23, 2020 and described in detail in a follow-up report delivered to the Board in October 2020. The Board decided to phase in the impact of the June 30, 2020 assumption changes on the employer contribution rate over the next three fiscal years, with two years remaining as of June 30, 2021. There are no assumption changes for this valuation. The discount rate remains 7.00%. A summary of the assumptions and methods used in the current valuation is shown in Appendix B.

At the direction of the Board, the UAL and contribution rates shown in Tables I-1 and I-4 do not reflect any estimated liabilities associated with future transfers to the Supplemental Retiree Benefit Reserve (SRBR). An estimate of this liability has been disclosed in Table IV-4.

This valuation was prepared based on the plan provisions shown in Appendix C. There have been no changes to the plan provisions since the last valuation. This valuation does not include any consideration of external liabilities (or related debt service payments) incurred by the Plan sponsors outside of TCERA, such as those related to pension obligation bonds.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

B. Key Findings of this Valuation

The key results of the June 30, 2021 actuarial valuation are as follows:

- The average actuarially determined employer contribution rate decreased from 15.68% of payroll to 15.65% of payroll, before reflecting the three year phase-in of the June 30, 2020 assumption changes. The employer contribution rate after the phase-in is 15.19%. Information on the contribution rates and changes from last year to this year may be found in Tables I-4 and I-5.
- The largest factor affecting the employer contribution rate was an increase of 0.45% from the continued phase-in of the impact of assumption changes adopted by the Board concurrent with the 2020 valuation; an identical amount will be recognized in the next valuation. The decision to phase-in the impact of the assumption changes will increase the employer contribution rate slightly in future years, but only by approximately 0.1% of payroll for the length of the amortization period.
- There was also a 0.05% decrease due to investment gains for the plan year ending June 30, 2021. On a Market Value of Assets basis, the Plan earned 24.49%, as compared to the prior year's 7.00% assumed return. On a smoothed (Actuarial Value of Assets) basis, the return was 7.13%.
- The UAL is the excess of the System's Actuarial Liability over the Actuarial Value of Assets. The System experienced a decrease in the UAL from \$205.0 million as of June 30, 2020 to \$199.0 million as of June 30, 2021. The \$6.1 million decrease in the UAL was primarily due to investment and demographic gains, which decreased the UAL by \$11.9 million for the plan year ending June 30, 2021 but were partially offset by contributions being less than the actuarial cost. A detailed reconciliation of the components of change in the UAL is shown in Table I-3.
- The remaining balance of the June 30, 2015 UAL is being amortized over 13 years and the remaining balances for each of the subsequent UAL layers are being amortized over periods that extend by one additional year each (e.g., the UAL loss from the plan year ending June 30, 2016 is being amortized over 14 years). Finally, the UAL loss for the plan year ending June 30, 2021 is being amortized as a new 19-year layer.
- The System's funded ratio, the ratio of actuarial assets over Actuarial Liability, increased from 89.1% last year to 89.8% as of June 30, 2021. On a market value basis, the funded ratio increased from 80.3% last year to 95.4% this year. The Actuarial Value of Assets is lower than the market value, meaning that there are deferred investment gains that will be recognized in the Actuarial Value of Assets (and employer contributions) in future years.
- During the 2020-2021 Plan year, the actuarial liabilities of the System increased less than expected. The liability gains were associated primarily with salary increases that were lower than expected, particularly for General non-PEPRA members, as well as more deaths than expected. These gains were partially offset by termination and retirement experience. In total, the liability gains decreased the Actuarial Liability by \$9.8 million.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

- Overall participant membership increased compared to last year, from 10,196 to 10,251. The total active population decreased from 4,605 to 4,484 and total projected payroll increased from \$284,272,002 to \$286,886,367. The number of inactives increased from 2,183 to 2,295, while the number of retirees increased from 3,408 to 3,472.
- In Table IV-4 of this valuation, we have disclosed a liability of \$174.9 million associated with future transfers to the Supplemental Retiree Benefit Reserve (SRBR). This represents an increase of roughly \$100 million compared to last year due primarily to exceptional investment returns and the unrecognized asset gains associated with them. These gains will flow to the Actuarial Value of Assets over 10 years and significantly increase the likelihood of future transfers.

The liability associated with future transfers is based on a simulation of investment returns and represents the accrued portion of the present value of SRBR transfers expected to result from future returns on the Actuarial Value of Assets in excess of the 7.00% assumption. It has not been reflected in the calculation of the employer contribution rate. Future SRBR transfers would result in lower net asset experience, which will be reflected in future amortization layers.

If the liability for future SRBR transfers were to be pre-funded, the employer contribution would be approximately \$14.2 million higher, or about 5.0% of pay. We have also disclosed a liability of \$100.3 million associated with the current SRBR balance, which is equal to the current balance of the SRBR, less the portion assumed to represent future benefit accruals. Note that the disclosure of these liabilities does not imply that the current benefit levels are guaranteed. Our understanding is that the Board has the power to adjust the benefit amounts paid from the SRBR.

On the following pages, we present Tables I-1 and I-2, which summarize the key results of the valuation with respect to TCERA assets, liabilities, Unfunded Actuarial Liability, funded ratios, and membership. The results are presented and compared for both the current and prior plan year.

The leverage ratios are equal to the Market Value of Assets (or Actuarial Liability) divided by payroll and represent a measure of the size of the plan relative to the plan sponsor. For additional discussion, see the discussion of maturity measures in Section II of this report.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

Table I-1			
Summary of Key Valuation Results - Funded Status			
(in thousands)			
Valuation Date	June 30, 2020	June 30, 2021	% Change
Actuarial Liability	\$ 1,875,797	\$ 1,957,985	4.4%
Market Value of Assets	\$ 1,615,418	\$ 1,976,185	22.3%
Market Value of Assets (Excluding SRBR)	1,507,070	1,867,739	23.9%
Actuarial Value of Assets (Excluding SRBR)	1,670,786	1,759,025	5.3%
Unfunded Actuarial Liability (UAL)			
- based on Market Value of Assets	\$ 368,727	\$ 90,246	-75.5%
- based on Actuarial Value of Assets	205,011	198,960	-3.0%
Funding Ratio - Market value basis	80.3%	95.4%	15.0%
Funding Ratio - Actuarial value basis	89.1%	89.8%	0.8%
Expected Payroll	\$ 284,272	\$ 286,886	0.9%
Asset Leverage Ratio (Excluding SRBR)	5.3	6.5	22.8%
Actuarial Liability Leverage Ratio	6.6	6.8	3.4%
Interest on UAL (MVA basis)	\$ 25,811	\$ 6,317	-75.5%
Interest Cost as Percent of Payroll	9.1%	2.2%	-6.9%

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

Table I-2			
Membership Total			
Item	June 30, 2020	June 30, 2021	% Change
Actives	4,605	4,484	-2.6%
Inactives	2,183	2,295	5.1%
Members Receiving Benefits	3,408	3,472	1.9%
Total Members	10,196	10,251	0.5%
Ratio of Retired Members to Active Members	74.0%	77.4%	3.4%
Active Member Projected Payroll for FYE June 30, 2021 and 2022	\$ 284,272,002	\$ 286,886,367	0.9%
Average Pay per Active	\$ 61,731	\$ 63,980	3.6%

The Unfunded Actuarial Liability (UAL) for TCERA decreased by \$6.1 million, from \$205.0 million to \$199.0 million. Table I-3 below presents the specific components of the change in the UAL.

The UAL was expected to decrease by \$4.7 million, due to the scheduled amortization payment being greater than the interest on the UAL. Liability experience gains decreased the UAL by an additional \$9.8 million and asset gains – i.e., the smoothed investment return above last year's assumed rate of 7.00% – decreased the UAL by \$2.1 million. Contributions were less than the actuarial cost, due to the phase-in of the assumption changes and the 12-month delay in the implementation of the contribution rates, increasing the UAL by \$10.5 million. A detailed breakdown of the liability experience can be found in Table IV-2.

Table I-3	
Change in Unfunded Actuarial Liability	
Experience	(in thousands)
Unfunded actuarial liability, 6/30/2020	\$ 205,011
Expected change in unfunded actuarial liability	(4,668)
Decrease due to investment gain	(2,068)
Increase due to contributions less than actuarial cost	10,524
Decrease due to liability gain	(9,840)
Increase due to assumption changes	0
Total change in unfunded actuarial liability	\$ (6,052)
Unfunded actuarial liability, 6/30/2021	\$ 198,960

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

Employer and Employee Contributions

Table I-4 below compares the net employer contribution rate and its components to those from the prior year. The overall net employer contribution rate (prior to the phase-in of the assumption changes) decreased by 0.04% for the June 30, 2021 valuation. The net employer normal cost rate decreased by 0.14% and the UAL rate increased by 0.10%. The average employee rate decreased by 0.02%, from 9.10% to 9.08%.

Additional details on contributions may be found in Section V, including separate rates for the County versus the other employers, which have been included in this report to reflect the Board's decision to allocate the cost impact of the POB contribution to the County only. Future investment experience related to the POB contribution will be shared amongst all TCERA employers.

**Table I-4
Summary of Contributions ***

	FYE 2022	FYE 2023	Change
<u>Contribution Rates</u>			
Net Employer Contribution Rate	15.68%	15.65%	-0.04%
Estimated Employee Contribution Rate	<u>9.10%</u>	<u>9.08%</u>	-0.02%
Total Contribution Rate	24.79%	24.73%	-0.06%
Net Employer Contribution Rate with Phase-in	14.78%	15.19%	
Estimated Net Employer Contributions <i>(in thousands)</i>	\$ 43,234	\$ 44,904	\$ 1,670
<u>Total Contribution Rate</u>			
Estimated Employee Contribution Rate	9.10%	9.08%	-0.02%
Employer Normal Cost Rate	<u>9.21%</u>	<u>9.08%</u>	-0.14%
Total Normal Cost Rate	18.32%	18.16%	-0.16%
UAL Rate			
Interest on Market Value UAL	9.08%	2.20%	-6.88%
Principal on Market Value UAL	<u>-2.61%</u>	<u>4.37%</u>	6.98%
Total UAL Rate	6.47%	6.57%	0.10%
Total Contribution Rate	24.79%	24.73%	-0.06%
Total Contribution Rate with Phase-in	23.88%	24.28%	0.40%

Numbers may not add to totals due to rounding.

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SECTION I – EXECUTIVE SUMMARY

Table I-5 summarizes the changes in the employer contribution rate. As discussed earlier in this section, the largest sources of change were increases due to the phase-in of prior assumption changes and contributions being less than the actuarial cost. The other source of increase was pensionable payroll increasing by less than expected. The increases were partially offset by decreases from investment and demographic gains over the past year. In aggregate, the employer contribution rate increased from 14.78% for FYE 2022 to 15.19% for FYE 2023, after reflecting the three year phase-in of the impact of the assumption changes.

Table I-5 Employer Contribution Reconciliation			
Item	Normal Cost	Amortization	Total
FYE 2022 Net Employer Contribution Rate with Phase-in	9.00%	5.78%	14.78%
Change due to asset gain	0.00%	-0.05%	-0.05%
Change due to contributions less than actuarial cost	0.00%	0.27%	0.27%
Change due to demographic gains and losses	-0.14%	-0.26%	-0.40%
Change due to payroll less than expected	0.00%	0.14%	0.14%
Change due to assumption changes	0.00%	0.00%	0.00%
Phase-in of assumption changes*	0.11%	0.35%	0.45%
Total Change in Employer Rate	-0.03%	0.45%	0.42%
FYE 2023 Net Employer Contribution Rate with Phase-in	8.97%	6.22%	15.19%

**Reflects second year of three year phase-in of assumption changes for employer contribution rate*

Numbers may not add to totals due to rounding.

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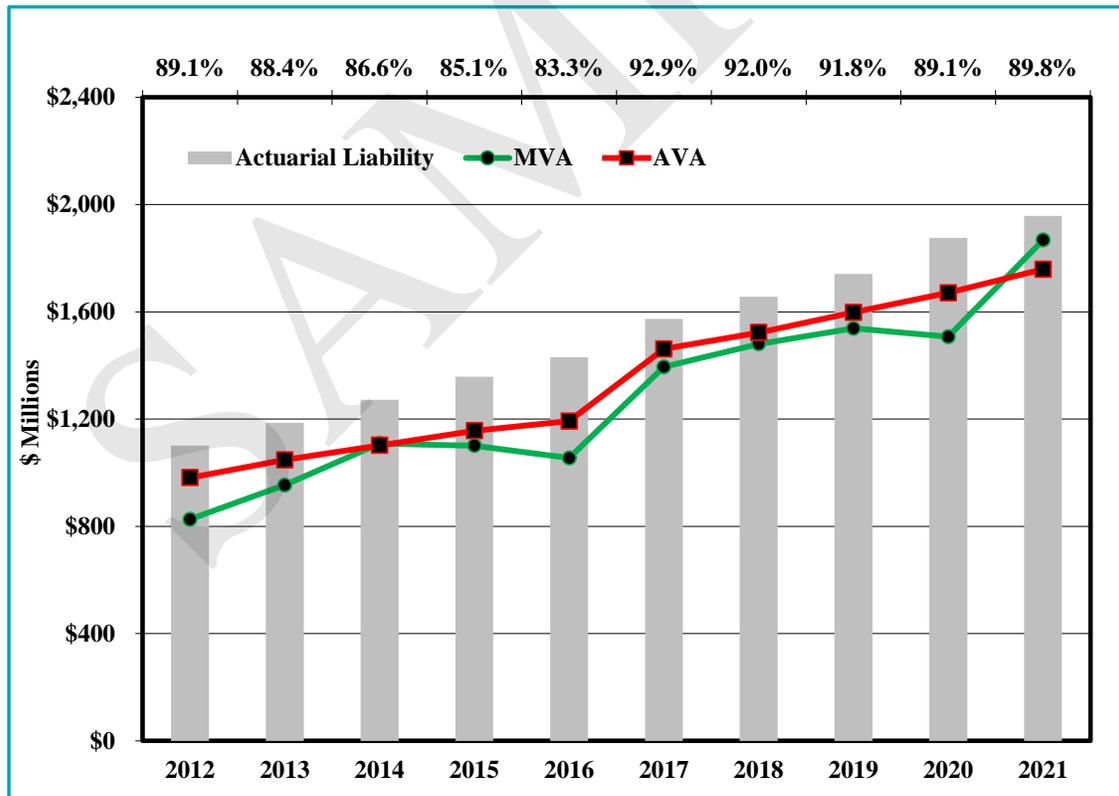
SECTION I – EXECUTIVE SUMMARY

C. Historical Trends

Despite the fact that for most retirement plans the greatest attention is given to the current valuation results and in particular the size of the current Unfunded Actuarial Liability and the employer contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

Assets and Liabilities

The chart below compares the Market Value of Assets (MVA) and Actuarial Value of Assets (AVA) to the actuarial liabilities. The percentage shown in the graph is the ratio of the Actuarial Value of Assets to the Actuarial Liability (the funded ratio). The funded ratio had declined from 89.1% in 2012 to 83.3% in 2016 but increased to 92.9% as of June 30, 2017. The largest factor for the funding ratio decline was asset losses in 2008-2009, and the significant increase in the funded ratio in 2017 was due to the contribution from POB proceeds. For the 2021 plan year, the funding ratio increased slightly to 89.8% after decreasing the three prior years. The increase was primarily a result of demographic experience gains and investment gains compared to the assumed rate of return.



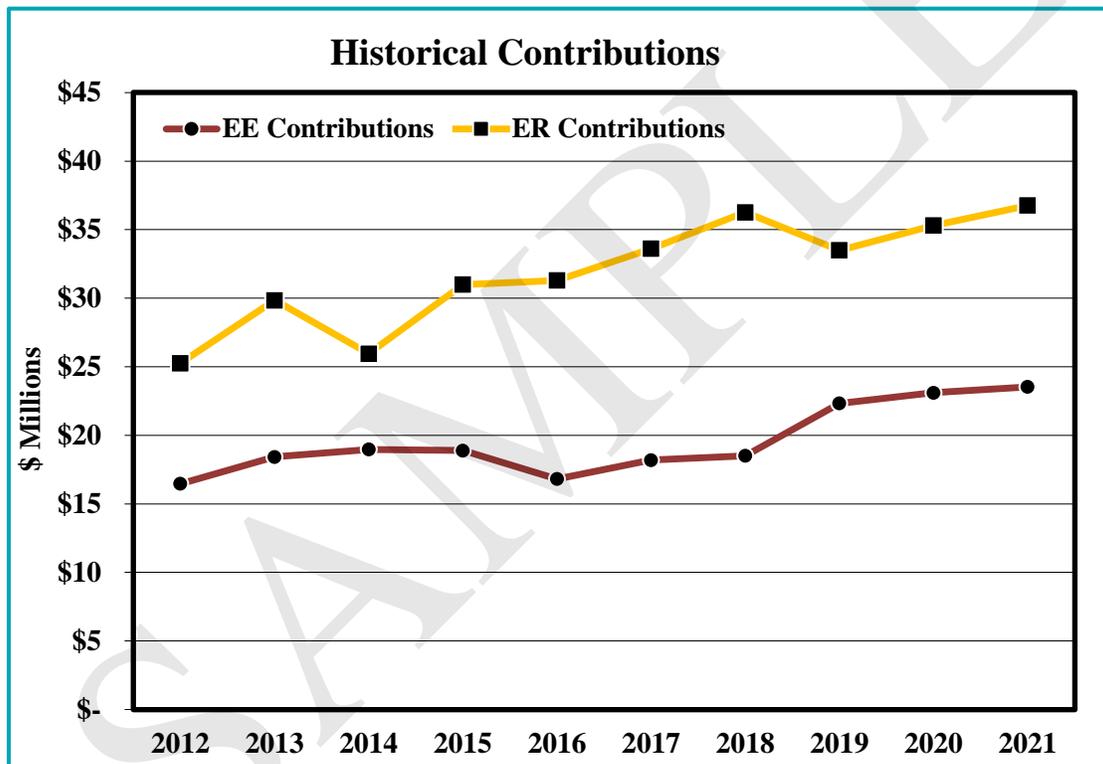
TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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SECTION I – EXECUTIVE SUMMARY

Contribution Trends

In the chart below, we present the historical trends for the TCERA employer and employee contributions. In the first year of the period, the employer and employee contributions were closer together, but the employer contribution rates rose as a result of the 2008-2009 asset losses that were phased in over 10 years. TCERA has also made assumption changes and experienced additional asset losses, further increasing the employer contribution rates.

Note that the employer contributions shown below do not include the contribution from POB proceeds in FY2017-2018 that exceeded the regular actuarially determined amounts.



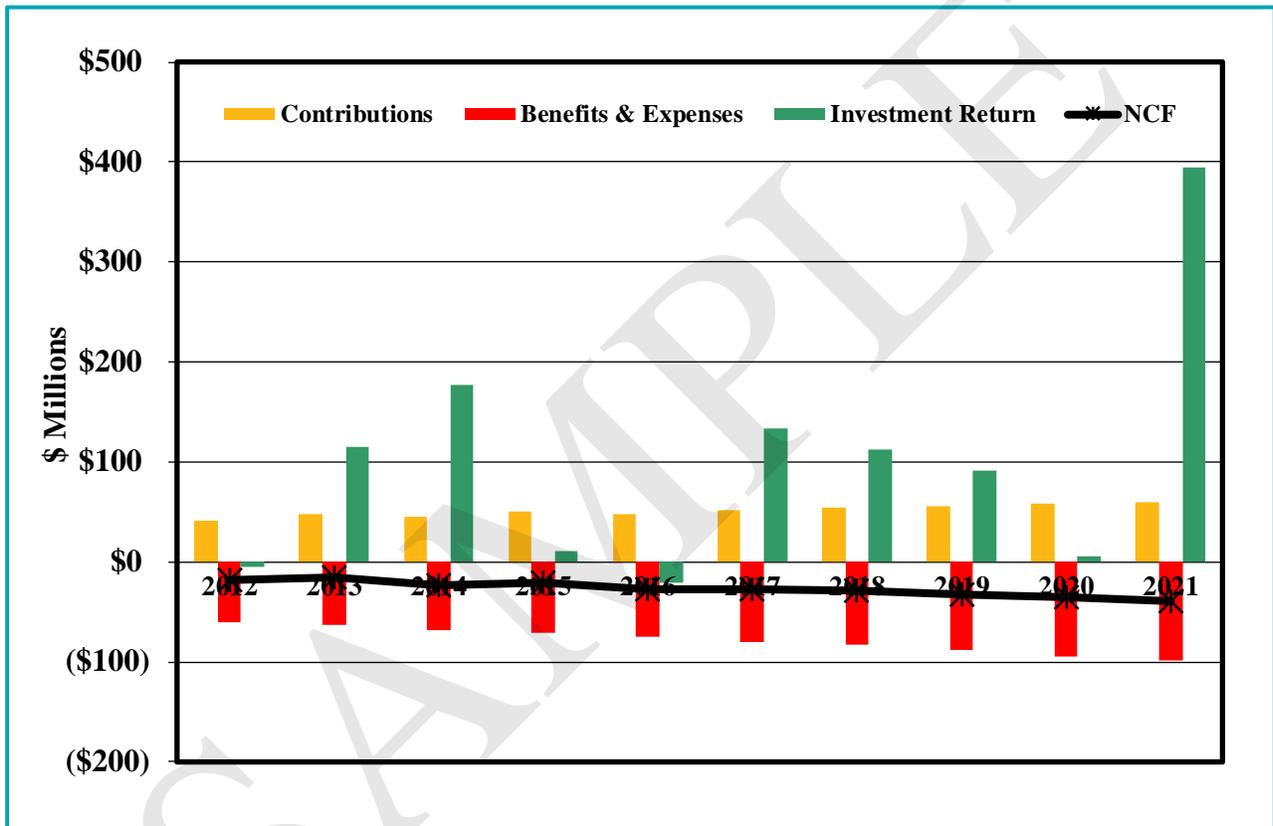
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SECTION I – EXECUTIVE SUMMARY

Cash Flows

The chart below shows the Plan's cash flow (contributions less benefit payments and administrative expenses). This is a critical measure, as it reflects the ability to have funds available to meet benefit payments without having to make difficult investment decisions, especially during volatile markets.

Note that the contributions do not include the excess contributions from POB proceeds.



In the chart above, the contributions, benefit payments plus expenses, and investment returns are shown as bars and the Plan's net cash flow (NCF) is shown as a black line. The NCF, which is equal to contributions less benefit payments and administrative expenses, began close to zero at the beginning of the 10-year period, but has grown consistently more negative over time. For the most recent year, the plan had negative cash flow of approximately 2.6% of assets (market value). A negative cash flow magnifies the losses during a market decline hindering the Plan in its ability to absorb market fluctuations. The implications of a plan in negative cash flow are that the impact of market fluctuations can be more severe: as assets are being depleted to pay benefits in down markets, there is less principal available to be reinvested during favorable return periods.

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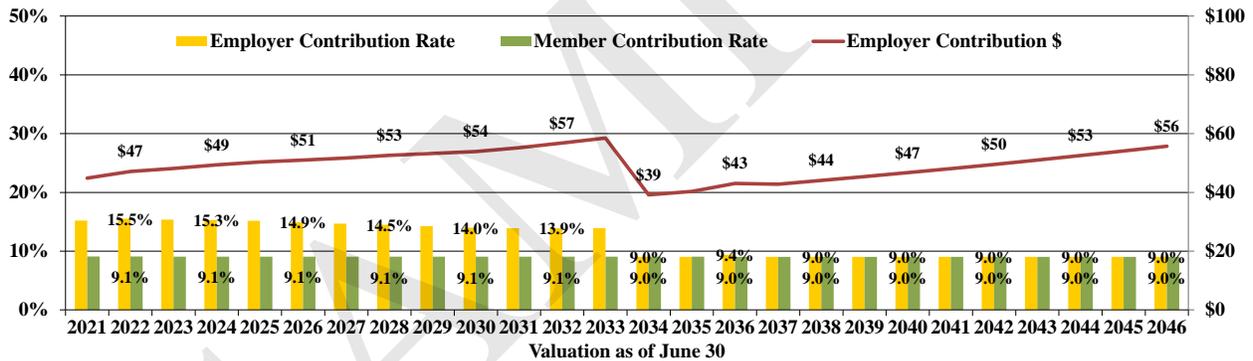
SECTION I – EXECUTIVE SUMMARY

D. Future Expected Financial Trends

The analysis of projected financial trends is an important component of this valuation. In this section, we present our assessment of the implications of the June 30, 2021 valuation results in terms of future projected contribution rates and benefit security (assets over liabilities). All the projections in this section are based on an investment return assumption of 7.00%. We have assumed future increases in total pensionable payroll of 3.00% per year.

The following graph shows the expected employer contribution rate (gold bars) and employee contribution rate (green bars) determined as of the valuation date, and the employer contribution in millions of dollars (red line) for the following fiscal year, based on achieving the investment assumption **each year** for the next 25 years. This scenario is highly unlikely: even if the Plan does achieve the assumed return **on average** over this time period, the returns in each given year will certainly vary.

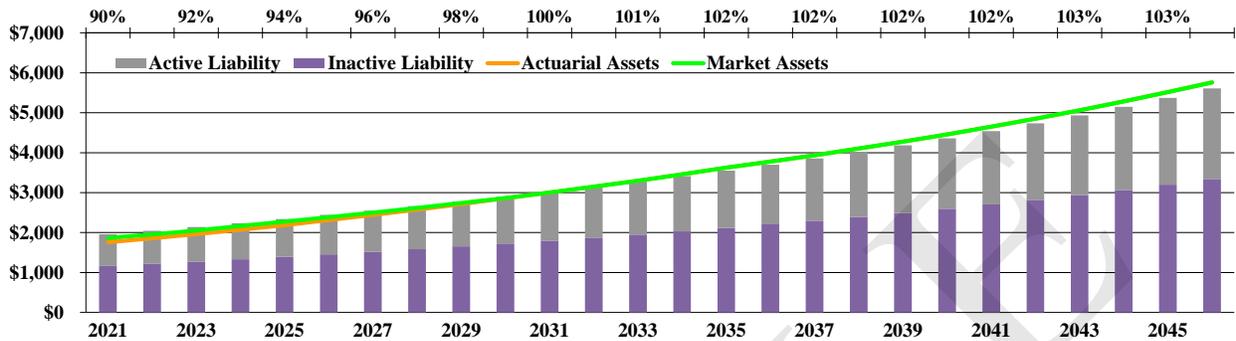
The contribution graph shows that the employer contribution rate is expected to decrease for the next nine years as the current deferred investment gains (approximately \$109 million) are recognized, then drop significantly after 2033 when the UAL layer from 2015 is paid off.



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The following graph shows the projection of assets and liabilities assuming that assets will earn the investment assumption each year during the projection period (dollars shown in millions). The percentages at the top of the graph represent the funded ratio or status of the System.



The funded status, based on the Actuarial Value of Assets, is expected to reach 100% by 2031 assuming the actuarial assumptions are achieved, which is 10 years earlier than in last year's report. The Market Value of Assets is currently higher than the actuarial value – due to the deferred gains mentioned above – and the funded status on this basis is currently about 6% higher but is expected to converge to the actuarial value over time if the investment return assumption is met.

However, as with the projection of contribution rates, it is the **actual** return on System assets that will determine the future funded status.

SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may vary significantly. This section of the report is intended to identify the primary risks to the Plan, provide some background information about those risks, and provide an assessment of those risks.

Identification of Risks

The fundamental risks to the pension plan are that the contributions needed to pay the benefits become unaffordable or that the contributions needed to support the Plan may differ significantly from expectations. While there are a number of factors that could lead to either of these events, we believe the primary risks are:

- Investment risk,
- Assumption change risk, and
- Contribution and payroll risk.

Other risks that we have not identified may also turn out to be important.

Investment risk is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the Unfunded Actuarial Liability necessitating higher contributions in the future unless there are other gains that offset these investment losses. The potential volatility of future investment returns is determined by the Plan's asset allocation and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsors or other contribution base.

Assumption change risk is the potential for the environment to change such that future valuation assumptions are different than the current assumptions. For example, declines in interest rates over the last three decades resulted in higher investment returns for fixed income investments, but lower expected future returns necessitating either a change in investment policy, a reduction in discount rate, or some combination of the two. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable.

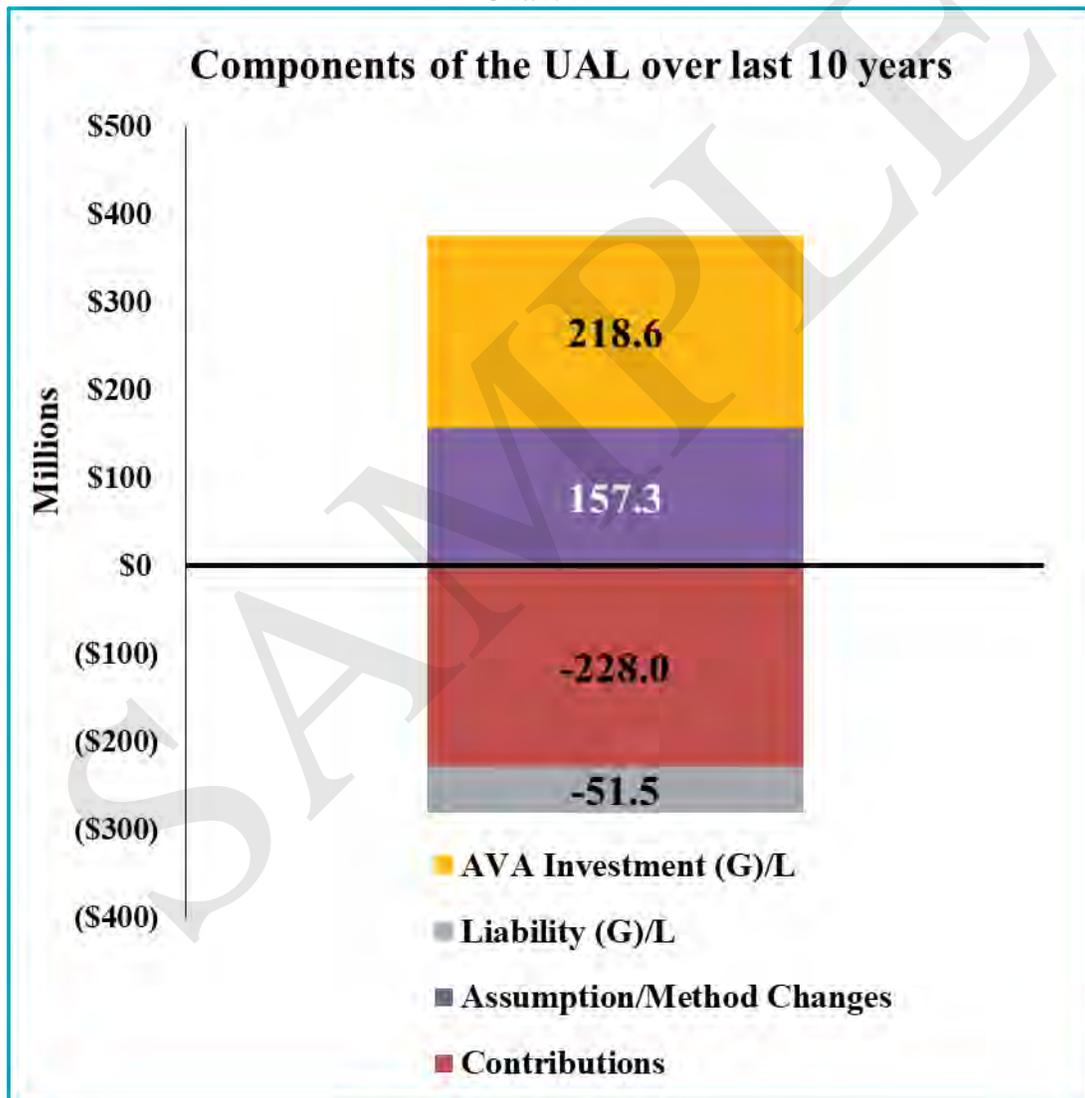
Contribution risk is the potential for actual future contributions to deviate from expected future contributions. There are different sources of contribution risk such as the sponsor choosing to not make contributions in accordance with the funding policy. As another example, the contribution requirement might become a financial strain on the sponsor as a result of material contribution base changes (e.g., covered employees, covered payroll) that affect the amount of contributions the Plan can collect.

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SECTION II – RISK IDENTIFICATION AND ASSESSMENT

The chart below shows the components contributing to the Unfunded Actuarial Liability (UAL) from July 1, 2011 through June 30, 2021. Over the last 10 years, the UAL has increased by approximately \$96 million. The investment losses (gold bar) of \$219 million on the Actuarial Value of Assets (AVA) and assumption/method changes (purple bar) resulting in a total UAL increase of \$157 million are the primary sources in the UAL growth. Contributions in excess of the “tread water” level (red bar) of \$228 million, resulting from a pension obligation bond contribution of approximately \$250 million, have partially offset the UAL growth. Finally, net liability gains (gray bar) of \$51 million also decreased the UAL.

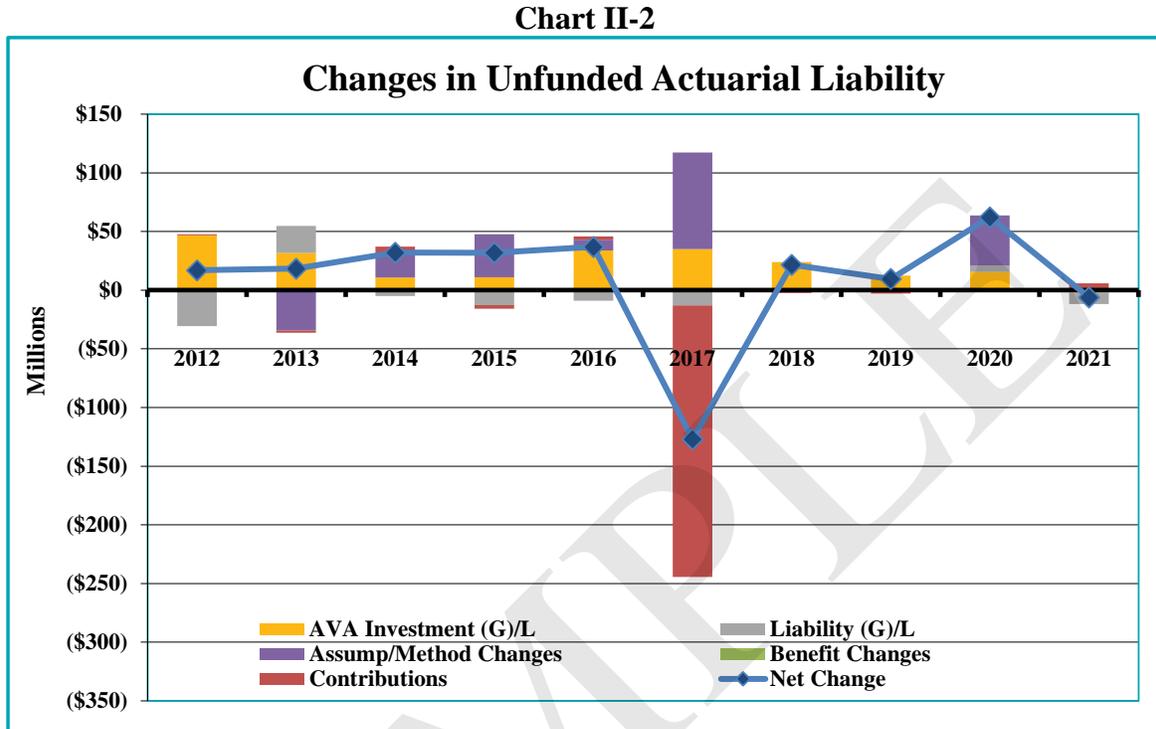
Chart II-1



**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Chart II-2 below details the annual sources of the UAL change (colored bars) for the plan years ending June 30. The net UAL change for each year is represented by the blue diamonds.



On a smoothed basis, the average annual geometric return over the 10-year period is 5.5%, with losses occurring on the AVA every year before this year that have increased the UAL. As of June 30, 2021, there are approximately \$109 million of deferred gains that will be recognized over the next nine years. As a result, even if the Plan earns below the expected return of 7.00% on a market basis, there could still be a gain on the smoothed value of assets.

Over the same time period, the assumed rate of return decreased from 7.90% to 7.00%. It is important to note that these changes simply reflect a downward revision to the estimate of future investment earnings; ultimately costs will be determined by actual investment earnings. Based on Verus' current capital market assumptions (including their inflation assumption of 2.00%) and the Plan's asset allocation, the expected average annual return is 6.88% compared to the Plan's assumption of 7.00%, which is net of investment and administrative expenses. Future expectations of investment returns may continue to decline necessitating further reductions in the discount rate.

The net impact of assumption changes is represented by the purple bars and includes changes to demographic assumptions that decreased the UAL in some years.

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Each year the UAL is expected to increase for benefits earned in the current year (the normal cost), administrative expenses, and interest on the UAL. This expected increase is referred to as the tread water level. If contributions are greater than the tread water level, the UAL is expected to decrease. Conversely, if contributions are less than the tread water level, the UAL is expected to increase. The amortization policy (as well as the contribution-timing lag) can impact whether or not the contributions exceed the tread water level.

The County issued bonds worth approximately \$250 million and included a similar amount as a receivable contribution for the June 30, 2017 valuation. This large contribution went directly toward paying down the principal on the UAL as seen below in Table II-1, which numerically summarizes the changes in the UAL for each year by source over the last 10 years. It should be noted that for bonds to have positive long-term financial impact, pension investments will need to outperform debt service payments over the length of the bonds.

The Board adopted 19-year layered amortization of the UAL at its October 28, 2015 meeting. Under this approach, contributions are typically above the tread water level each year. However, the Board's election to phase in the impact of the most recent assumption changes over three years was the primary cause for the most recent contributions to be \$5.9 million less than the actuarial cost and subsequently increased the UAL by that amount.

Table II-1

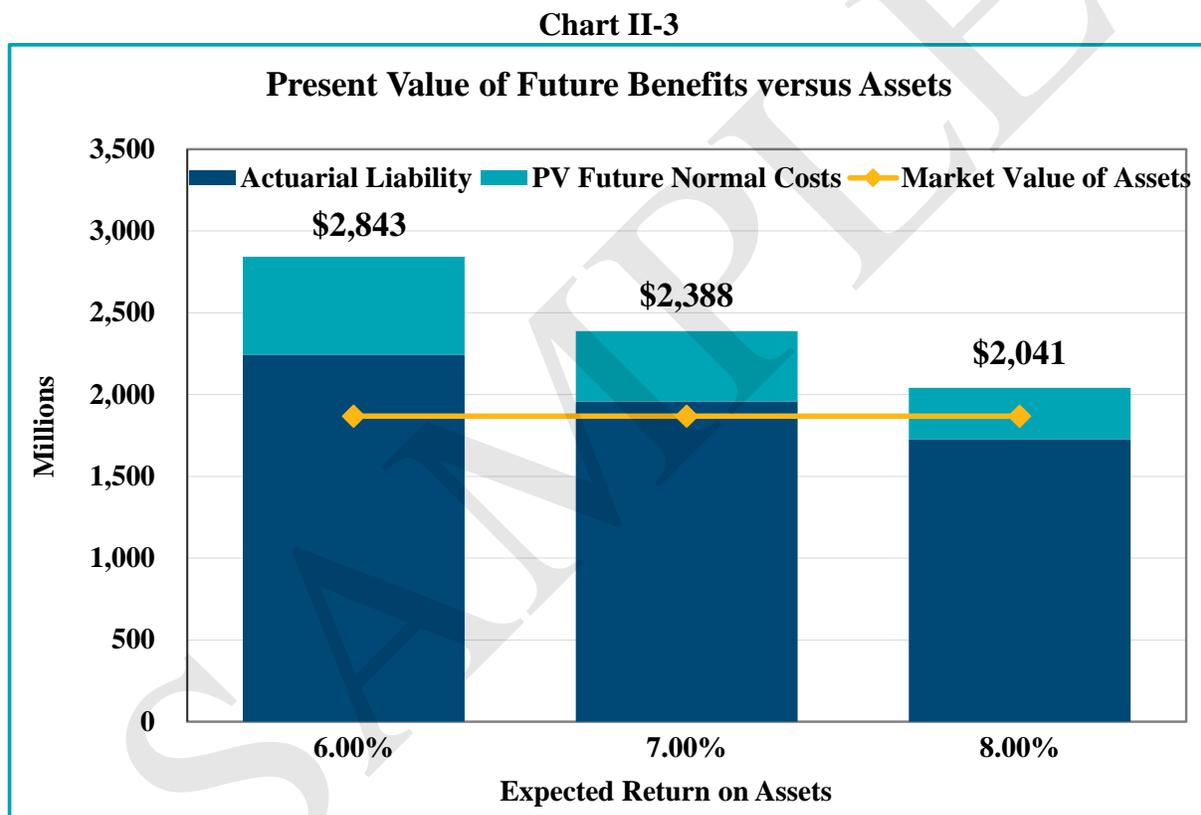
Unfunded Actuarial Liability (UAL) Change by Source					
June 30,	Contributions	Assumption/ Method Changes	Liability Experience	Investment Experience	Total UAL Change
2012	\$ 1,063,430	\$ 0	\$ (30,721,453)	\$ 46,660,090	\$ 17,002,067
2013	(1,843,981)	(34,420,710)	23,026,858	31,624,756	18,386,923
2014	5,138,315	21,095,393	(5,070,085)	10,841,064	32,004,687
2015	(3,043,058)	36,744,870	(12,668,401)	10,912,537	31,945,948
2016	2,775,153	9,170,277	(8,948,443)	33,948,354	36,945,341
2017	(231,452,683)	82,259,297	(12,982,692)	35,033,717	(127,142,361)
2018	(2,307,142)	0	285,647	23,696,427	21,674,932
2019	(2,726,065)	0	(161,312)	12,412,582	9,525,205
2020	(1,439,104)	42,435,148	5,587,388	15,576,636	62,160,068
<u>2021</u>	<u>5,856,076</u>	<u>0</u>	<u>(9,839,957)</u>	<u>(2,067,958)</u>	<u>(6,051,840)</u>
Total	\$ (227,979,060)	\$ 157,284,275	\$ (51,492,450)	\$ 218,638,204	\$ 96,450,970

SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Assessing Costs and Risks

Sensitivity to Investment Returns

The chart below compares assets to the present value of all projected future benefits discounted at the current expected rate of return (7.00%) and at discount rates 100 basis points above and below the expected rate of return. The present value of future benefits is shown as a bar with the portion attributable to past service in dark blue (Actuarial Liability) and the portion attributable to future service in teal (Present Value of Future Normal Costs). The Market Value of Assets is shown by the gold line.



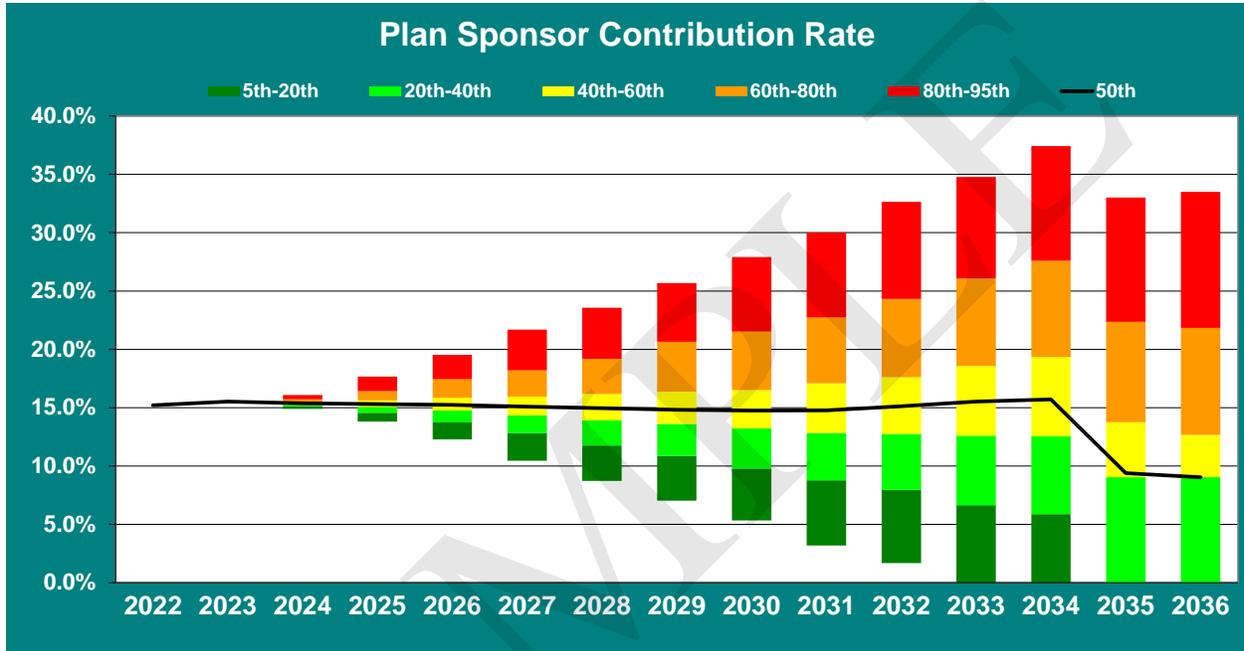
If investments return 7.00% annually, the Plan would need approximately \$2.4 billion in assets today to pay all projected benefits compared to current assets of \$1.9 billion (excluding assets and liabilities related to the Supplemental Retiree Benefit Reserve). If investment returns are only 6.00%, the Plan would need approximately \$2.8 billion in assets today, and if investment returns are 8.00%, the Plan would need approximately \$2.0 billion in assets.

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SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Sensitivity to Investment Returns - Stochastic Projections

Stochastic projections serve to show the range of probable outcomes of various measurements. The graphs below and on the following page show the projected range of the employer contribution rate and of the funded ratio on an Actuarial Value of Assets basis. The range in both scenarios is driven by the volatility of investment returns, assumed to be based on a 12.5% standard deviation of annual returns, as indicated by Verus' current capital market assumptions.



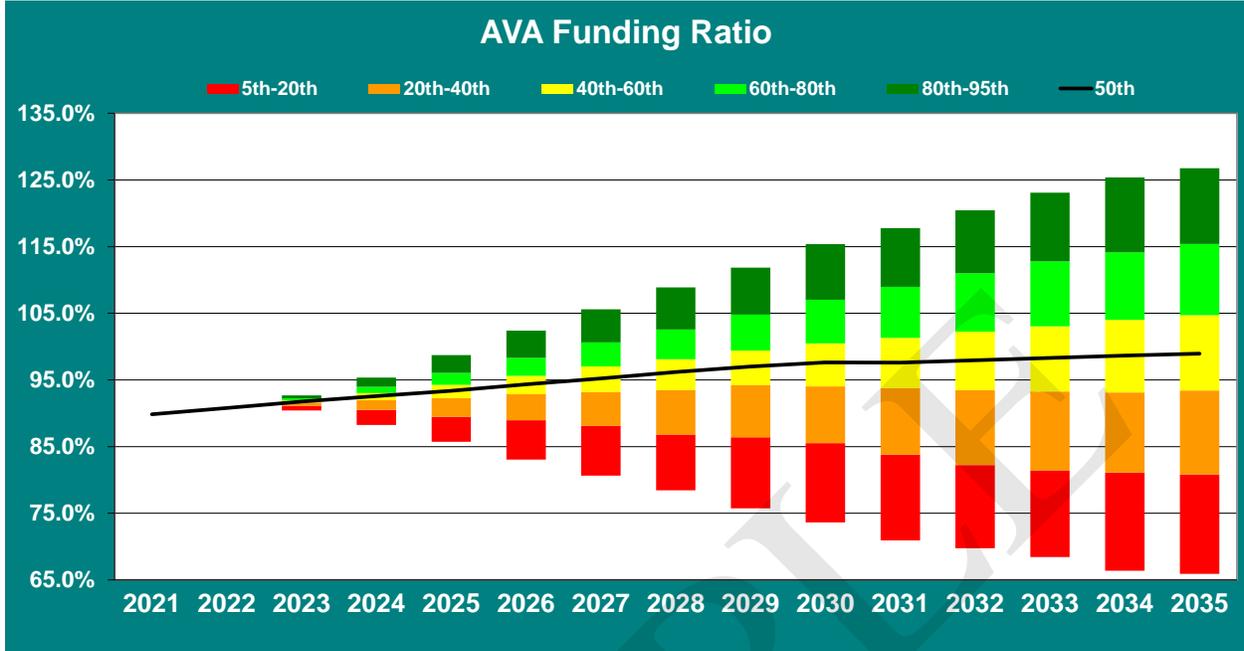
The stochastic projection of employer contributions as a percent of pay shows the probable range of future contribution rates. The baseline contribution rate (black line) is based on the median of the simulations using an average return of 7.00%. It is similar to the *deterministic* projections discussed in subsection D of the Executive Summary of this report, where the returns are expected to be exactly 7.00% each year. However, the median results are somewhat higher than the deterministic projections because of the impact of the SRBR, which may result in fewer assets available to fund the basic benefits in years where the smoothed returns exceed 7.00%.

In the most pessimistic scenario shown, the 95th percentile, the projected employer contribution rate approaches 37% of pay in 2034. Conversely, the most optimistic scenario shown, the 5th percentile, the projected employer contribution rate declines to 0% in 2033.

We note that these projections only allow the employers' contribution to drop below their share of the normal cost if the Plan becomes extremely overfunded (i.e., a funded ratio above 120%), as is required under PEPRA.

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SECTION II – RISK IDENTIFICATION AND ASSESSMENT



The graph above shows the projection of the funded ratio based on the Actuarial Value of Assets. While the median funded ratio (black line) is projected to be approximately 99% at the end of the 15-year period shown here, there is a wide range of potential outcomes. Good investment returns have the likelihood of bringing the funded ratio well over 100%. Due to the current funding policy of the Plan, even in scenarios with unfavorable investment returns, the Plan is projected to remain over 65% funded on an Actuarial Value of Assets basis, as long as the actuarially determined contributions continue to be made.

Contribution Risk

While investment returns are typically the dominant factor in volatility, contribution rates can also be sensitive to future salary increases and the hiring of new members. When member payroll growth stagnates or even declines, the dollar level of contributions made to the Plan also stagnates or declines since contributions are based on payroll levels.

There is also a risk of the contribution rate increasing even higher when payroll decreases since the Plan’s funding policy amortizes the UAL as a level percentage of pay. This means that the UAL payments increase at the assumed payroll growth rate of 3.00%, so that the payment is expected to remain constant as a percentage of payroll. If payroll growth is less than the expected 3.00% or there is a decline in payroll, the UAL payments are spread over a smaller payroll base and the contribution rate as a percentage of pay increases, potentially making the Plan less affordable.

SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Plan Maturity Measures

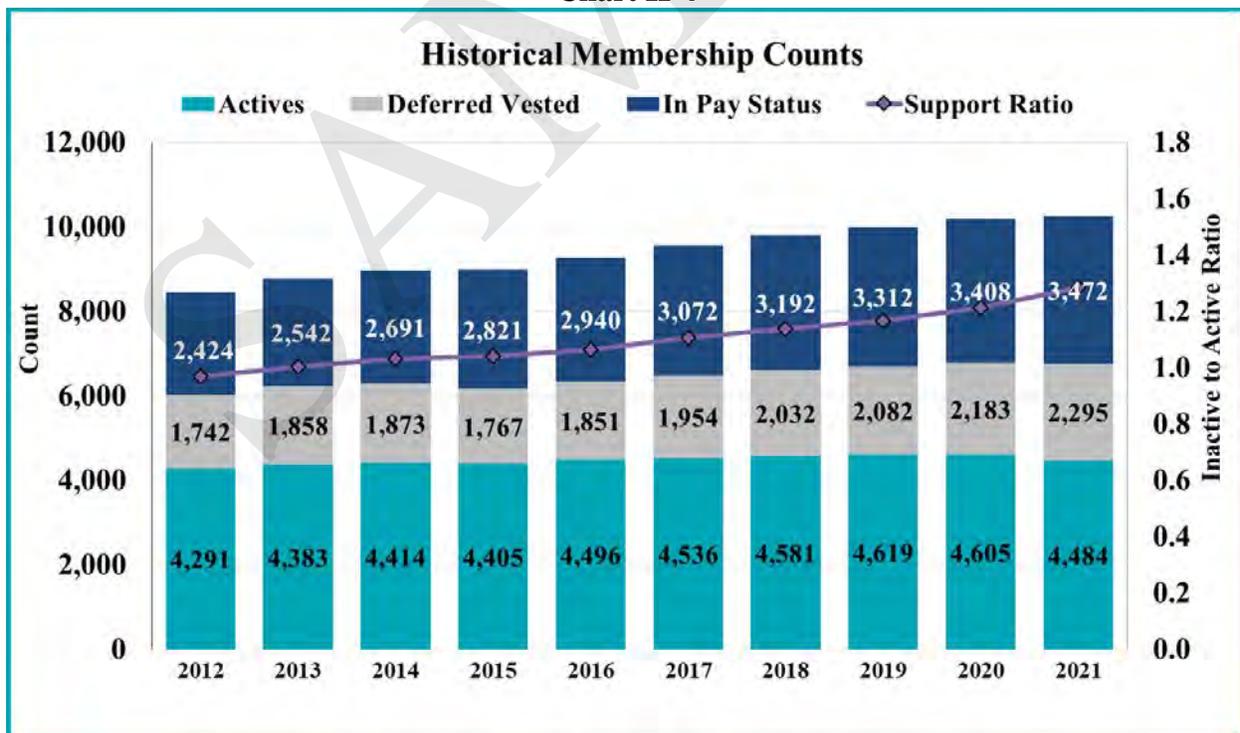
The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of the Plan and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic – the larger the plan is compared to the contribution or revenue base that supports it; the more sensitive the plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for the Plan.

Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of those receiving benefits or those entitled to a deferred benefit to the number of active members. The Support Ratio is expected to increase gradually as a plan matures. The chart below shows the growth in the Support Ratio from 2012 to 2021. The inactive membership level was only about 97% of the active membership level in 2012, so the Support Ratio was approximately 1.0. During the past few years, the growth in retired membership has exceeded the growth in active membership, increasing the Support Ratio to approximately 1.3. That means for 2021, there are approximately 1.3 inactive members per active member.

Chart II-4



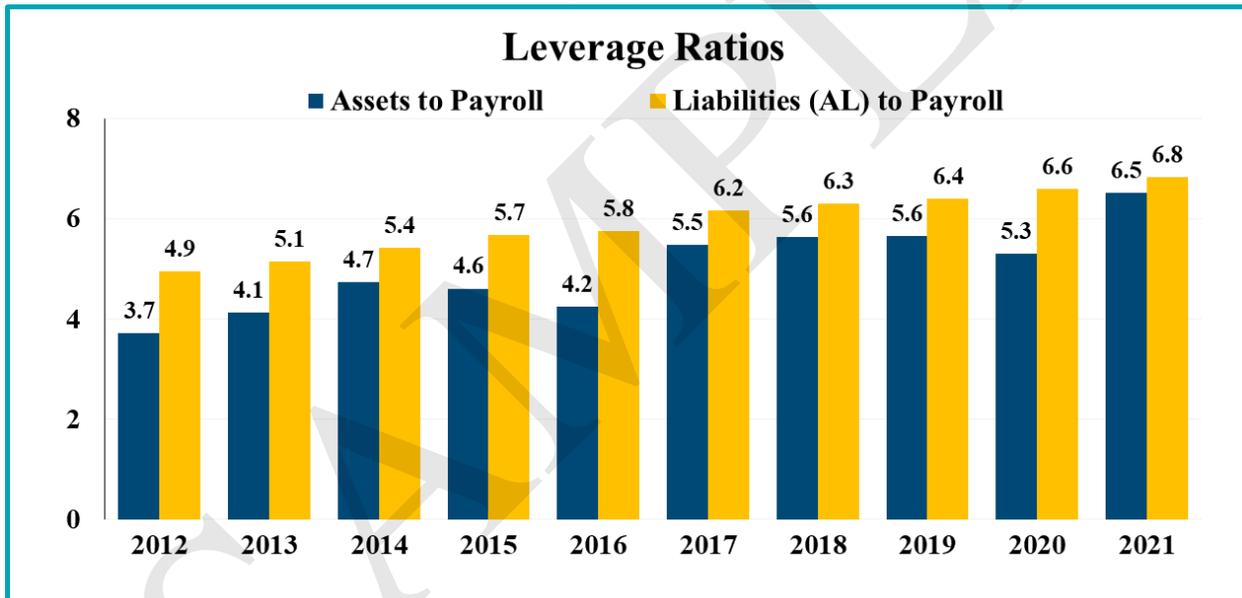
SECTION II – RISK IDENTIFICATION AND ASSESSMENT

Leverage Ratios

Leverage or volatility ratios measure the size of the plan compared to its revenue base more directly. The asset leverage ratio is simply the Market Value of Assets to active member payroll and indicates the sensitivity of the Plan to investment returns. The liability leverage ratio is the plan's Actuarial Liability to active member payroll and indicates the sensitivity of the Plan to assumption changes or demographic experience.

The chart below shows the historical leverage ratios of the Plan. The liability leverage ratio has increased steadily since 2012, driven by changes to more conservative actuarial assumptions and a continued maturing of the Plan. The asset leverage ratios have also increased, but with more volatility, based on variations in investment experience and with a large jump due to the pension obligation bond contribution for 2017 and another jump in 2021 due to exceptional asset returns.

Chart II-5



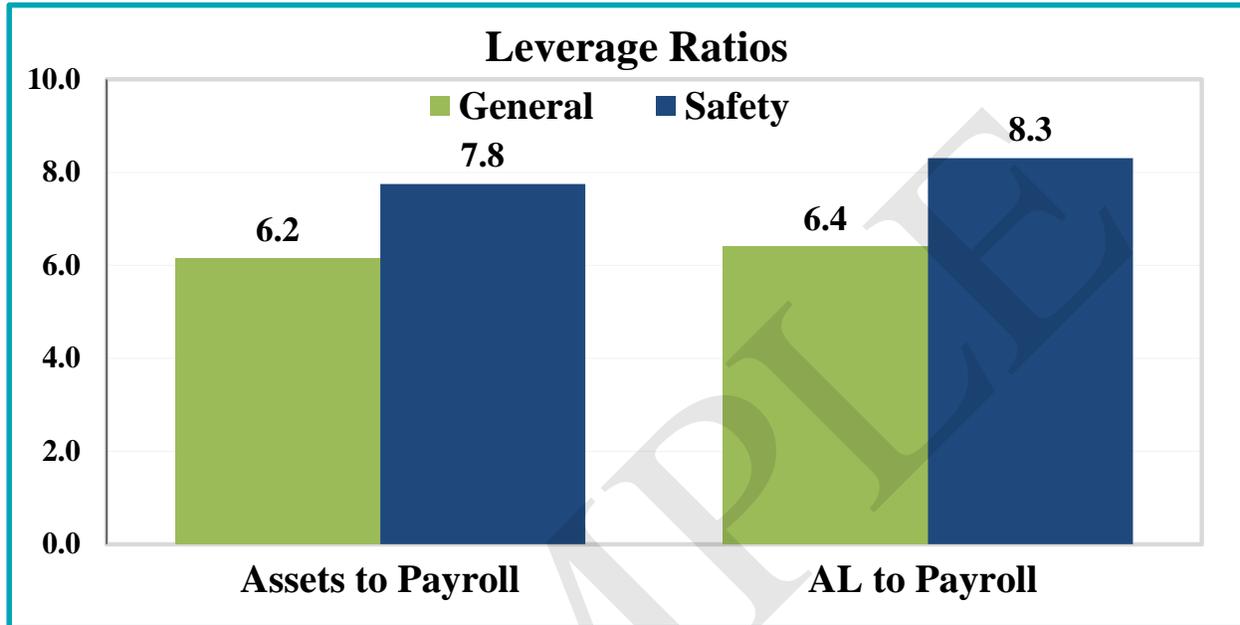
To appreciate the impact of the ratio of assets to payroll on plan cost, consider the situation for a new plan with almost no assets. Even if the assets suffer a bad year of investment returns, the impact on the plan cost is nil, because the asset level is so small.

As the Plan becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the asset leverage ratio would be close to 6.8 times payroll, or the Actuarial Liability (AL) leverage ratio.

SECTION II – RISK IDENTIFICATION AND ASSESSMENT

The following chart shows that the ratio of both assets and liabilities to payroll, and therefore the sensitivity to investment returns, is higher for the Safety members compared to the General members. This is because of the higher benefit amounts and the earlier average retirement ages for Safety.

Chart II-6



The General asset leverage ratio of 6.2 means that if the Plan's assets lose 10% of their value, which is a 17.00% actuarial loss compared to the expected return of 7.00%, the loss would be equivalent to 105% of payroll (17.00% times 6.2). The same investment loss for the Safety group with an asset ratio of 7.8 would be equivalent to approximately 133% of payroll. As illustrated by this example, the contribution rates for the Safety members will generally be more volatile than those of the General members.

More Detailed Assessment

While a more detailed assessment is always valuable to enhance the understanding of the risks identified above, we believe the scenarios illustrated above cover the primary risks facing the Plan at this time. We would be happy to provide the Board with a more in-depth analysis at their request.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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SECTION III – ASSETS

Pension plan assets play a key role in the financial operation of the System and in the decisions the Board may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on System assets including:

- **Disclosure** of System assets as of June 30, 2020 and June 30, 2021;
- Statement of the **changes** in market values during the year;
- Development of the **Actuarial Value of Assets**;
- An allocation of the assets by **reserve balances**; and,
- An assessment of historical **investment performance versus inflation**.

Disclosure

There are two types of asset values disclosed in the valuation, the Market Value of Assets and the Actuarial Value of Assets. The market value represents “snap-shot” or “cash-out” values which provide the principal basis for measuring financial performance from one year to the next. The Actuarial Value of Assets reflects smoothing of annual investment returns.

Table III-1 on the next page discloses and compares each asset value as of June 30, 2020 and June 30, 2021.

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SECTION III – ASSETS

Table III-1 Statement of Assets at Market Value		
	June 30, 2020	June 30, 2021
Cash and Securities Lending Collateral:		
Cash and Short Term Investments	\$ 98,130,000	\$ 67,707,000
Collateral on Loaned Securities	35,338,000	56,729,000
Total Cash and Securities Lending Collateral	\$ 133,468,000	\$ 124,436,000
Receivables:		
Sales of Investments	\$ 10,315,000	\$ 23,884,000
Interest and Dividends	1,847,000	2,273,000
Employee and Employer Contributions	860,000	1,014,000
Other Receivables	12,000	7,000
Total Receivables	\$ 13,034,000	\$ 27,178,000
Investments, at Fair Value:		
Fixed Income	\$ 474,595,000	\$ 561,576,000
Equities	723,450,000	950,148,000
Real Estate	177,779,000	195,568,000
Alternative Investments (Hedge Funds, Private Equity, Private Credit, Futures, Commodities)	151,671,000	230,977,000
Total Investments, at Fair Value	\$ 1,527,495,000	\$ 1,938,269,000
Capital Assets		
Land	\$ 370,000	\$ 370,000
Building, Office Equipment and Furniture Net of Accumulated Depreciation	694,000	699,000
Intangible Assets, Pension Administration System Net of Accumulated Depreciation	607,000	303,000
Total Capital Assets	\$ 1,671,000	\$ 1,372,000
Total Assets	\$ 1,675,668,000	\$ 2,091,255,000
Current Liabilities:		
Purchase of Investments	\$ 19,237,000	\$ 51,172,000
Obligations under Security Lending Program	35,337,000	56,729,000
Refunds Payable	3,392,000	4,099,000
Accounts Payable	2,180,000	2,955,000
Total Current Liabilities	\$ 60,146,000	\$ 114,955,000
Long-Term Liabilities:		
Compensated Absences	\$ 104,000	\$ 115,000
Total Long-Term Liabilities	\$ 104,000	\$ 115,000
Total Liabilities	\$ 60,250,000	\$ 115,070,000
Total Market Value of Assets for Valuation	\$ 1,615,418,000	\$ 1,976,185,000

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION III – ASSETS

Changes in Market Value

The components of asset change are:

- Contributions (employer and employee)
- Benefit payments
- Expenses (investment and administrative)
- Investment income (realized and unrealized)

Table III-2 below and on the following page shows the components of change in the Market Value of Assets during the fiscal years ending June 30, 2020 and June 30, 2021.

Table III-2 Changes in Market Values		
	June 30, 2020	June 30, 2021
Additions:		
Contributions		
Employer	\$ 35,310,000	\$ 36,766,000
Plan Member	23,104,000	23,536,000
Total Contributions	<u>\$ 58,414,000</u>	<u>\$ 60,302,000</u>
Investment Income		
Net Appreciation/(Depreciation) in		
Fair Value of Investments	\$ (5,485,000)	\$ 381,705,000
Interest	5,219,000	3,649,000
Dividends	4,400,000	4,153,000
Real Estate Operating Income	5,155,000	6,015,000
Other Investment Income	4,557,000	8,446,000
Total Investment Activity Income/(Loss)	<u>\$ 13,846,000</u>	<u>\$ 403,968,000</u>
Less Expenses from Investing Activities	<u>9,051,000</u>	<u>9,145,000</u>
Net Investing Activity Income/(Loss)	\$ 4,795,000	\$ 394,823,000
From Securities Lending Activities		
Securities Lending Income	\$ 816,000	\$ 121,000
Less Expenses from Securities Lending Income		
Management Fee	\$ 691,000	\$ 12,000
Borrower Rebate	(5,000)	41,000
Net Securities Lending Income	<u>\$ 130,000</u>	<u>\$ 68,000</u>
Total Net Investment Income/(Loss)	\$ 4,925,000	\$ 394,891,000
Other Income	\$ 188,000	\$ 188,000
Total Additions	\$ 63,527,000	\$ 455,381,000

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION III – ASSETS

**Table III-2
Changes in Market Values (Continued)**

	June 30, 2020	June 30, 2021
Deductions:		
Benefits	\$ 87,671,000	\$ 92,690,000
Refunds of Contributions	3,756,000	3,586,000
Administrative Expenses	<u>2,853,000</u>	<u>2,740,000</u>
Total Deductions	\$ 94,280,000	\$ 99,016,000
Net Increase/(Decrease)	\$ (30,753,000)	\$ 356,365,000
<u>Net Assets Held in Trust for Pension Benefits</u>		
Beginning of Year	\$ 1,646,171,000	\$ 1,615,418,000
Adjustment to Match 2020 Final Assets	<u>\$ 0</u>	<u>\$ 4,402,000</u>
End of Year for Valuation	\$ 1,615,418,000	\$ 1,976,185,000
Approximate Return*	0.14%	24.49%

Numbers may not add to totals due to rounding.

**Net of investment and administrative expenses*

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION III – ASSETS

Actuarial Value of Assets (AVA)

The table below shows the development of the Actuarial Value of Assets. Based on discussions with TCERA staff, the total actual market returns for each period shown are based on preliminary financial information. Please see Appendix B for a description of the asset smoothing method.

Table III-3 Development of Actuarial Value of Assets for June 30, 2021						
Six month Period		Total Actual Market	Expected Market	Investment	Deferred	Deferred
From	To	Return (net)	Return (net)	Gain (Loss)	Factor	Return
1/12	6/12	\$ 46,133,182	\$ 36,032,847	\$ 10,100,335	0.05	\$ 505,017
7/12	12/12	61,934,352	38,223,420	23,710,932	0.10	2,371,093
1/13	6/13	45,446,072	39,915,825	5,530,247	0.15	829,537
7/13	12/13	114,083,453	41,675,731	72,407,722	0.20	14,481,544
1/14	6/14	62,482,815	45,022,478	17,460,337	0.25	4,365,084
7/14	12/14	(17,886,044)	46,676,782	(64,562,826)	0.30	(19,368,848)
1/15	6/15	26,507,383	44,856,580	(18,349,197)	0.35	(6,422,219)
7/15	12/15	(45,631,715)	45,909,756	(91,541,471)	0.40	(36,616,589)
1/16	6/16	24,729,226	43,045,278	(18,316,052)	0.45	(8,242,223)
7/16	12/16	44,835,718	44,015,787	819,931	0.50	409,965
1/17	6/17	84,564,705	42,691,625	41,873,080	0.55	23,030,194
7/17	12/17	79,943,304	45,809,189	34,134,115	0.60	20,480,469
1/18	6/18	11,201,303	48,460,635	(37,259,332)	0.65	(24,218,566)
7/18	12/18	(54,685,836)	56,898,055	(111,583,891)	0.70	(78,108,724)
1/19	6/19	143,284,434	53,981,060	89,303,374	0.75	66,977,531
7/19	12/19	74,015,847	59,050,363	14,965,484	0.80	11,972,387
1/20	6/20	(69,767,060)	60,619,959	(130,387,018)	0.85	(110,828,966)
7/20	12/20	207,466,372	56,098,158	151,368,214	0.90	136,231,393
1/21	6/21	178,848,571	62,147,805	116,700,766	0.95	<u>110,865,728</u>
1. Total deferred return						108,713,808
2. Market Value of Assets (includes SRBR)						1,976,185,000
3. Actuarial Value of Assets for Funding Ratio (2. - 1.) ¹						1,867,471,000
4. Non-valuation reserves and designations:						
a. Supplemental Retiree Benefit Reserve (SRBR)						108,446,000
5. Preliminary Actuarial Value of Assets (3. - 4.) ²						1,759,025,000
6. Corridor Limit						
a. 70% of Market Value of Assets excluding SRBR						1,307,417,300
b. 130% of Market Value of Assets excluding SRBR						2,428,060,700
7. Actuarial Value of Assets after Corridor						1,759,025,000

¹Items will not sum due to a rounding adjustment on the MVA

²Items will not sum due to a rounding adjustment on the SRBR

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION III – ASSETS

Allocation of Reserve Balances

The following table shows the allocation of the assets among the various accounting reserves provided by TCERA staff.

Table III-4 Allocation of Assets by Accounting Reserve Amounts for the Years Ended June 30, 2020 and June 30, 2021		
	FYE 2020	FYE 2021
1. Member Deposit Reserve	\$ 319,562,000	\$ 339,547,000
2. Employer Advance Reserve	859,182,000	908,887,000
3. Retiree Reserve	442,157,000	446,256,000
4. Supplemental Retiree Benefit Reserve	108,348,000	108,446,000
5. Contingency Reserve	49,228,000	60,736,000
6. Market Stabilization Reserve	(163,717,000)	108,714,000
7. TCERA Property, Inc. Retained Earnings	787,000	939,000
8. Other Reserves	(129,000)	2,660,000
Total Reserves	\$ 1,615,418,000	\$ 1,976,185,000

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION III – ASSETS

Asset Returns vs. Inflation

Table III-5 shows the returns on the Market and Actuarial Values of Assets, with the increase in the CPI for comparison, over the last 10 years.

Table III-5 Net Return on Assets vs. Increase in Consumer Price Index			
Year Ended June 30	Net Return at Market Value*	Net Return at Actuarial Value*	Increase in Consumer Price Index**
2012	-1.3%	3.1%	1.7%
2013	11.1%	4.6%	1.8%
2014	16.7%	6.8%	2.1%
2015	0.7%	6.1%	0.1%
2016	-1.9%	4.7%	1.0%
2017	11.3%	4.6%	1.6%
2018	7.4%	5.6%	2.9%
2019	5.6%	6.5%	1.6%
2020	0.1%	6.3%	0.6%
2021	24.5%	7.1%	5.4%
Compound Average	7.1%	5.5%	1.9%

* Net of investment and administrative expenses.
** Based on All Urban Consumers - U.S. City Average, June indices.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION IV – LIABILITIES

In this section, we present detailed information on System liabilities including:

- **Disclosure** of System liabilities at June 30, 2020 and June 30, 2021;
- Statement of **changes** in these liabilities during the year;
- Present value of future **SRBR** benefits based on current benefit levels; and
- Liability and funded status **disclosures** with and without the SRBR.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them. Note that these liabilities are not applicable for settlement purposes, including the purchase of annuities and the payment of lump sums.

- **Present Value of Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fully fund all benefits of the System both earned as of the valuation date and those to be earned in the future by current plan participants, under the current System provisions.
- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the Present Value of Future Benefits and subtracting the present value of future Member Contributions and future Employer Normal Costs under an acceptable actuarial funding method. The method used for this System is called the **Entry Age Normal** (EAN) funding method.
- **Unfunded Actuarial Liability:** The excess of the Actuarial Liability over the Actuarial Value of Assets.

Table IV-1 on the following page discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of Plan assets yields, for each respective type, a **net surplus**, or an **Unfunded Actuarial Liability**.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION IV – LIABILITIES

Table IV-1				
Present Value of Future Benefits and Actuarial Liability				
(in thousands)				
Item	General	Safety	June 30, 2021 Total	June 30, 2020 Total
Present Value of Future Benefits (PVFB)				
Actives	\$ 865,109	\$ 356,487	\$ 1,221,596	\$ 1,190,290
Terminated Vested	88,635	27,697	116,332	109,512
Retirees	650,413	199,773	850,186	814,417
Disabled	55,791	64,177	119,969	118,949
Beneficiaries	49,804	30,074	79,877	75,066
Total PVFB	\$ 1,709,751	\$ 678,208	\$ 2,387,960	\$ 2,308,235
Actuarial Liability				
Total Present Value of Benefits	\$ 1,709,751	\$ 678,208	\$ 2,387,960	\$ 2,308,235
Present Value of Future Normal Costs				
Employer Portion	153,514	69,136	222,650	224,044
Employee Portion	143,807	63,518	207,325	208,394
Actuarial Liability	\$ 1,412,430	\$ 545,555	\$ 1,957,985	\$ 1,875,797
Actuarial Value of Assets	\$ 1,279,691	\$ 479,334	\$ 1,759,025	\$ 1,670,786
Funded Ratio	90.6%	87.9%	89.8%	89.1%
Unfunded Actuarial Liability/(Surplus)	\$ 132,739	\$ 66,220	\$ 198,960	\$ 205,011

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION IV – LIABILITIES

Changes in Liabilities

Each of the liabilities disclosed in the prior tables are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in System assets resulting from:

- Employer contributions different than the actuarial cost
- Investment earnings different than expected
- A change in the method used to measure plan assets

Table IV-2 Development of 2021 Experience Gain/(Loss) (in thousands)	
Item	Cost
1. Unfunded Actuarial Liability at June 30, 2020	\$ 205,011
2. Middle of year actuarial liability payment	(18,386)
3. Interest to end of year on 1 and 2	13,718
4. Impact of assumption changes	<u>0</u>
5. Expected Unfunded Actuarial Liability at June 30, 2021	\$ 200,343
6. Actual Unfunded Liability at June 30, 2021 (AVA basis)	<u>198,960</u>
7. Net Gain/(Loss): (5 - 6)	\$ 1,384
8. Portion of net gain/(loss) due to:	
a. Investment experience gain	\$ 2,068
b. Contributions less than actuarial cost	(10,524)
c. Inactive mortality gain	2,828
d. COLAs less than expected	248
e. Salaries less than expected	7,281
f. Retirements	(1,828)
g. Terminations	(644)
h. Other experience	<u>1,955</u>
i Total gain/(loss)	\$ 1,384

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION IV – LIABILITIES

Table IV-3 shows the present value of future SRBR benefits at current benefit levels and the calculation of the net reserve based on the SRBR balance. The net reserve as of June 30, 2021 is positive, meaning that the current SRBR balance is expected to cover SRBR benefits at current levels.

Table IV-3 Supplemental Retiree Benefit Reserve as of June 30, 2021		
	June 30, 2020	June 30, 2021
Level One		
1. Current Retirees	\$ 60,262,708	\$ 61,061,811
2. Inactive Members	2,051,922	1,960,719
3. Active members	38,425,932	37,820,474
4. Subtotal	<u>\$ 100,740,562</u>	<u>\$ 100,843,004</u>
Level Two		
5. Supplemental COLA for those who have lost at least 15% of Purchasing Power	\$ 718,407	\$ 667,759
Level Three		
6. Supplemental Spousal Death Benefit	\$ 4,846,221	\$ 5,459,914
7. Total SRBR Combined Liability: (4) + (5) + (6)	\$ 106,305,190	\$ 106,970,677
8. Supplemental Retiree Benefit Reserve: (SRBR)	<u>108,348,000</u>	<u>108,446,000</u>
9. Net Reserve: (8) - (7)	\$ 2,042,810	\$ 1,475,323

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION IV – LIABILITIES

The top portion of Table IV-4 shows System assets, liabilities, and funded ratios excluding the SRBR. In the bottom half, the liabilities are adjusted to include the portion associated with the current SRBR balance that has been accrued based on service to date (\$100.3 million) as well as the accrued portion of the present value of future transfers to the SRBR (\$174.9 million). In addition, the SRBR balance of \$108.4 million as of June 30, 2021 is added to the asset values.

The Board has not elected to pre-fund the estimated liability associated with future SRBR transfers. Such transfers will be recognized as asset losses in the valuation as they occur. We note that the estimated liability associated with future transfers has increased significantly since the prior valuation (from \$72.8 million to \$174.9 million), as a result of the increase in deferred investment gains, which raise the likelihood of the smoothed return exceeding the investment return assumption in the future.

These liability disclosures do not imply that the current benefit levels are guaranteed. Our understanding is that the Board has the power to adjust the benefit amounts paid from the SRBR.

Table IV-4 Disclosure of SRBR Liabilities (in thousands)	
Valuation Date	June 30, 2021
<u>Without SRBR</u>	
Actuarial Liability (Excluding SRBR)	\$ 1,957,985
Actuarial Value of Assets (Excluding SRBR)	1,759,025
Market Value of Assets (Excluding SRBR)	1,867,739
Funded Ratio - Actuarial Value Basis	89.8%
Funded Ratio - Market Value Basis	95.4%
<u>With SRBR</u>	
Actuarial Liability (Excluding SRBR)	\$ 1,957,985
Liability Associated with Current SRBR Balance	100,270
Liability from Future Transfers	<u>174,882</u>
Total Liability with SRBR	\$ 2,233,137
Actuarial Value of Assets (Including SRBR)	\$ 1,867,471
Market Value of Assets (Including SRBR)	1,976,185
Funded Ratio - Actuarial Value Basis	83.6%
Funded Ratio - Market Value Basis	88.5%

Numbers may not add to totals due to rounding.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the actuarial funding method used to determine the normal cost and the Unfunded Actuarial Liability is the **Entry Age Normal (EAN)** cost method. There are two primary components to the total contribution: the **normal cost rate** (employee and employer), and the **Unfunded Actuarial Liability rate** (UAL rate).

The normal cost rate is determined in the following steps. First, an individual normal cost rate is determined by taking the value of each member's projected future benefits as of the member's entry age into the System. This value is then divided by the value of the member's expected future salary, also at entry age, producing a normal cost rate that should remain relatively constant over a member's career. The total normal cost is computed by adding the expected dollar amount of each active member's normal cost for the current year – known as the Individual Entry Age Method. The total normal cost rate is the total normal cost divided by expected salary. Finally, the total normal cost rate is reduced by the member contribution rate to produce the employer normal cost rate.

The Unfunded Actuarial Liability is the difference between the Actuarial Liability and the Actuarial Value of Assets. At its October 28, 2015 meeting, the Board adopted 19-year layered amortization of the UAL. The UAL as of June 30, 2015 is being amortized over a closed 19-year period as a level percentage of payroll (with 13 years remaining), assuming payroll increases of 3.00% per year. Subsequent changes in the UAL due to experience gains and losses, assumption changes, or plan changes will be amortized over new closed 19-year periods.

The tables on the following pages present the calculation of the contribution rates for the System for the current and prior valuations.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

The employer contribution rates for FYE 2023 are shown in the table below, split by tier (1-4), membership class (General or Safety), and for the General class, employer (County or non-County). As directed by the TCERA Board at its April 12, 2018 meeting, we have allocated the cost impact of the contribution from POB proceeds to the County only, based on their share of pensionable payroll for the fiscal year ending June 30, 2018 (excluding TCAG). We were notified by Staff that all Safety members are employed by the County, so there is only one set of Safety rates. Based on information provided by Staff, we recommend that the General (Non-County) employer contribution rates be used for the Strathmore Public Utility District (SPUD).

Table V-1(a) Development of the Net Employer Contribution Rate as of June 30, 2021 for FYE 2023				
	Tier 1	Tier 2 & 3	Tier 4	Total
General (County)				
1. Total Normal Cost Rate	18.50%	16.87%	15.59%	16.29%
2. Member Contribution Rate	<u>2.48%</u>	<u>8.56%</u>	<u>7.80%</u>	<u>8.20%</u>
3. Employer Normal Cost Rate (1-2)	16.03%	8.31%	7.80%	8.09%
3a. Employer Normal Cost Rate with Phase-in	15.65%	8.24%	7.62%	7.97%
4. UAL Amortization	5.23%	5.23%	5.23%	5.23%
4a. UAL Amortization with Phase-in	4.98%	4.98%	4.98%	4.98%
5. Net Employer Contribution Rate (3+4)	21.26%	13.54%	13.03%	13.32%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	20.63%	13.22%	12.60%	12.95%
General (Non-County)				
1. Total Normal Cost Rate	18.50%	16.87%	15.59%	16.29%
2. Member Contribution Rate	<u>2.48%</u>	<u>8.56%</u>	<u>7.80%</u>	<u>8.20%</u>
3. Employer Normal Cost Rate (1-2)	16.03%	8.31%	7.80%	8.09%
3a. Employer Normal Cost Rate with Phase-in	15.65%	8.24%	7.62%	7.97%
4. UAL Amortization	12.55%	12.55%	12.55%	12.55%
4a. UAL Amortization with Phase-in	12.30%	12.30%	12.30%	12.30%
5. Net Employer Contribution Rate (3+4)	28.58%	20.86%	20.35%	20.64%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	27.95%	20.54%	19.92%	20.27%
Safety (County)				
1. Total Normal Cost Rate	N/A	23.37%	26.02%	24.41%
2. Member Contribution Rate	<u>N/A</u>	<u>11.42%</u>	<u>13.01%</u>	<u>12.04%</u>
3. Employer Normal Cost Rate (1-2)	N/A	11.95%	13.01%	12.37%
3a. Employer Normal Cost Rate with Phase-in	N/A	11.99%	12.77%	12.30%
4. UAL Amortization	N/A	9.13%	9.13%	9.13%
4a. UAL Amortization with Phase-in	N/A	8.47%	8.47%	8.47%
5. Net Employer Contribution Rate (3+4)	N/A	21.08%	22.14%	21.50%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	N/A	20.46%	21.25%	20.77%

Reflects second year of three year phase-in of assumption changes for employer contribution rate

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

The employer contribution rates for FYE 2022 are shown in the table below, split by tier (1-4) and membership class (General or Safety).

Table V-1(b)				
Development of the Net Employer Contribution Rate as of June 30, 2020 for FYE 2022				
	Tier 1	Tier 2 & 3	Tier 4	Total
General (County)				
1. Total Normal Cost Rate	17.80%	17.20%	15.57%	16.50%
2. Member Contribution Rate	<u>1.81%</u>	<u>8.63%</u>	<u>7.79%</u>	<u>8.25%</u>
3. Employer Normal Cost Rate (1-2)	15.99%	8.57%	7.79%	8.25%
3a. Employer Normal Cost Rate with Phase-in	15.23%	8.43%	7.43%	8.01%
4. UAL Amortization	5.09%	5.09%	5.09%	5.09%
4a. UAL Amortization with Phase-in	4.58%	4.58%	4.58%	4.58%
5. Net Employer Contribution Rate (3+4)	21.08%	13.66%	12.88%	13.34%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	19.81%	13.01%	12.01%	12.59%
General (Non-County)				
1. Total Normal Cost Rate	17.80%	17.20%	15.57%	16.50%
2. Member Contribution Rate	<u>1.81%</u>	<u>8.63%</u>	<u>7.79%</u>	<u>8.25%</u>
3. Employer Normal Cost Rate (1-2)	15.99%	8.57%	7.79%	8.25%
3a. Employer Normal Cost Rate with Phase-in	15.23%	8.43%	7.43%	8.01%
4. UAL Amortization	12.28%	12.28%	12.28%	12.28%
4a. UAL Amortization with Phase-in	11.77%	11.77%	11.77%	11.77%
5. Net Employer Contribution Rate (3+4)	28.27%	20.85%	20.07%	20.53%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	27.00%	20.20%	19.20%	19.78%
Safety (County)				
1. Total Normal Cost Rate	N/A	23.46%	25.83%	24.33%
2. Member Contribution Rate	<u>N/A</u>	<u>11.37%</u>	<u>12.92%</u>	<u>11.94%</u>
3. Employer Normal Cost Rate (1-2)	N/A	12.09%	12.92%	12.39%
3a. Employer Normal Cost Rate with Phase-in	N/A	12.15%	12.45%	12.26%
4. UAL Amortization	N/A	9.10%	9.10%	9.10%
4a. UAL Amortization with Phase-in	N/A	7.79%	7.79%	7.79%
5. Net Employer Contribution Rate (3+4)	N/A	21.19%	22.02%	21.49%
5a. Net Employer Contribution Rate with Phase-in (3a+4a)	N/A	19.93%	20.23%	20.04%

Reflects first year of three year phase-in of assumption changes for employer contribution rate

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

The combined General and Safety employer contribution rates for FYE 2023 are shown in the table below, split by tier (1-4). Separate rates are shown above and below the first \$161.54 of biweekly compensation (Social Security Integration).

Table V-2(a)				
Development of the Employer Contribution Rate as of June 30, 2021 for FYE 2023 with Social Security Integration				
	Tier 1	Tier 2 & 3	Tier 4	Total
General and Safety				
1. Employer Normal Cost Rate:	15.65%	9.18%	8.67%	8.97%
a. Rate on first \$161.54 of biweekly compensation	10.69%	6.26%		
b. Rate on biweekly compensation in excess of \$161.54	16.04%	9.38%		
2. UAL Rate:	5.56%	6.29%	6.15%	6.23%
a. Rate on first \$161.54 of biweekly compensation	3.80%	4.28%		
b. Rate on biweekly compensation in excess of \$161.54	5.70%	6.43%		
3. Total Rate (1 + 2):	21.20%	15.47%	14.82%	15.19%
a. Rate on first \$161.54 of biweekly compensation	14.49%	10.54%		
b. Rate on biweekly compensation in excess of \$161.54	21.73%	15.81%		

Reflects second year of three year phase-in of assumption changes for employer contribution rate

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

The employer contribution rates for FYE 2023 are shown in the table below, split by tier (1-4), membership class (General or Safety), and for the General class, employer (County or Non-County). Separate rates are shown above and below the first \$161.54 of biweekly compensation (Social Security Integration).

SAMPLE

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

Table V-2(b)				
Development of the Employer Contribution Rate as of June 30, 2021 for FYE 2023 with Social Security Integration				
	Tier 1	Tier 2 & 3	Tier 4	Total
General (County)				
1. Employer Normal Cost Rate:	15.65%	8.24%	7.62%	7.97%
a. Rate on first \$161.54 of biweekly compensation	10.69%	5.62%		
b. Rate on biweekly compensation in excess of \$161.54	16.04%	8.43%		
2. UAL Rate:	4.98%	4.98%	4.98%	4.98%
a. Rate on first \$161.54 of biweekly compensation	3.40%	3.40%		
b. Rate on biweekly compensation in excess of \$161.54	5.10%	5.09%		
3. Total Rate (1 + 2):	20.63%	13.22%	12.60%	12.95%
a. Rate on first \$161.54 of biweekly compensation	14.10%	9.02%		
b. Rate on biweekly compensation in excess of \$161.54	21.14%	13.52%		
General (Non-County)				
1. Employer Normal Cost Rate:	15.65%	8.24%	7.62%	7.97%
a. Rate on first \$161.54 of biweekly compensation	10.69%	5.62%		
b. Rate on biweekly compensation in excess of \$161.54	16.04%	8.43%		
2. UAL Rate:	12.30%	12.30%	12.30%	12.30%
a. Rate on first \$161.54 of biweekly compensation	8.40%	8.39%		
b. Rate on biweekly compensation in excess of \$161.54	12.61%	12.58%		
3. Total Rate (1 + 2):	27.95%	20.54%	19.92%	20.27%
a. Rate on first \$161.54 of biweekly compensation	19.10%	14.01%		
b. Rate on biweekly compensation in excess of \$161.54	28.65%	21.01%		
Safety (County)				
1. Employer Normal Cost Rate:	N/A	11.99%	12.77%	12.30%
a. Rate on first \$161.54 of biweekly compensation	N/A	8.13%		
b. Rate on biweekly compensation in excess of \$161.54	N/A	12.20%		
2. UAL Rate:	N/A	8.47%	8.47%	8.47%
a. Rate on first \$161.54 of biweekly compensation	N/A	5.75%		
b. Rate on biweekly compensation in excess of \$161.54	N/A	8.63%		
3. Total Rate (1 + 2):	N/A	20.46%	21.25%	20.77%
a. Rate on first \$161.54 of biweekly compensation	N/A	13.88%		
b. Rate on biweekly compensation in excess of \$161.54	N/A	20.83%		

Reflects second year of three year phase-in of assumption changes for employer contribution rate

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

Table V-3 below shows information on each layer of the June 30, 2021 UAL. At its October 28, 2015 meeting, the Board adopted 19-year layered amortization of the UAL. The UAL as of June 30, 2015 is being amortized over a closed 19-year period as a level percentage of payroll, assuming payroll increases of 3.00% per year, and subsequent changes in the UAL due to experience gains and losses, assumption changes, or plan changes will be amortized over new closed 19-year periods.

**Table V-3
Development of Amortization Payment
For the June 30, 2021 Actuarial Valuation**

Type of Base	Date Established	Initial Amount	Initial Amortization Years	June 30, 2021 Outstanding Balance	Remaining Amortization Years	Amortization Amount
1. Initial UAL	06/30/2015	201,848,216	19	184,076,930	13	18,223,144
2. (Gain)/Loss Base	06/30/2016	38,033,040	19	35,554,375	14	3,325,826
3. (Gain)/Loss Base	06/30/2017	25,611,386	19	24,425,468	15	2,169,709
4. Assumption Change Base	06/30/2017	82,259,297	19	78,450,339	15	6,968,726
5. POB Contribution Base	06/30/2017	(233,100,233)	19	(222,306,691)	15	(19,747,454)
6. (Gain)/Loss Base	06/30/2018	23,781,349	19	23,066,161	16	1,954,200
7. (Gain)/Loss Base	06/30/2019	12,251,268	19	12,039,459	17	976,525
8. (Gain)/Loss Base	06/30/2020	23,103,302	19	22,926,594	18	1,786,295
9. Assumption Change Base	06/30/2020	42,435,148	19	42,110,576	18	3,280,990
10. (Gain)/Loss Base	06/30/2021	(1,383,632)	19	<u>(1,383,632)</u>	19	<u>(103,864)</u>
Total				\$ 198,959,581		\$ 18,834,097

*Does not reflect phase-in of 2019 assumption change base.
Numbers may not add to totals due to rounding.*

If the UAL payment above of \$18,834,097 is calculated based on a single-equivalent period with the June 30, 2021 UAL of \$198,959,581, the number of years to fully pay off the UAL would be approximately 14 years.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

Table V-4 below shows the development of the UAL amortization rates. The payroll split between County General and Non-County General is based on pensionable payroll by employer for FYE 2021 provided for the GASB 67/68 report. Following direction from Staff, the pensionable payroll for TCAG is excluded from the County's share.

As shown below (and described earlier in this section), the cost impact of the contribution from POB proceeds has been allocated to the County only.

Table V-4 Development of UAL Amortization Rates for FYE 2023	
General (County)	
1. General County Projected Payroll for FYE June 30, 2022	\$ 203,116,618
2. Total General Projected Payroll for FYE June 30, 2022	\$ 220,836,538
3. County Share (1 divided by 2)	91.9760%
4. UAL Payment, not including POB Contribution	\$ 27,708,893
5. UAL Payment for POB Contribution	\$ (14,872,243)
6. County Share of 4. (3 multiplied by 4)	\$ 25,485,532
7. County Share of 5. (100% of 5)	<u>\$ (14,872,243)</u>
8. Total General County UAL Payment (6+7)	\$ 10,613,289
9. General County UAL Rate (8 divided by 1)*	5.23%
General (Non-County)	
1. General Non-County Projected Payroll for FYE June 30, 2022	\$ 17,719,920
2. Total General Projected Payroll for FYE June 30, 2022	\$ 220,836,538
3. Non-County Share (1 divided by 2)	8.0240%
4. UAL Payment, not including POB Contribution	\$ 27,708,893
5. UAL Payment for POB Contribution	\$ (14,872,243)
6. Non-County Share of 4. (3 multiplied by 4)	\$ 2,223,361
7. Non-County Share of 5. (0% of 5)	<u>\$ 0</u>
8. Total General Non-County UAL Payment (6+7)	\$ 2,223,361
9. General Non-County UAL Rate (8 divided by 1)*	12.55%
Safety (County)	
1. County Safety Projected Payroll for FYE June 30, 2022	\$ 65,657,354
2. Total Safety Projected Payroll for FYE June 30, 2022	\$ 65,657,354
3. County Share (1 divided by 2)	100.0000%
4. UAL Payment, not including POB Contribution	\$ 10,872,658
5. UAL Payment for POB Contribution	\$ (4,875,211)
6. County Share of 4. (3 multiplied by 4)	\$ 10,872,658
7. County Share of 5. (100% of 5)	<u>\$ (4,875,211)</u>
8. Total County Safety UAL Payment (6+7)	\$ 5,997,447
9. County Safety UAL Rate (8 divided by 1)*	9.13%

**Rates shown are prior to phase-in of assumption changes
Numbers may not add to totals due to rounding.*

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

The employer contribution rates for FYE 2023 are shown in Table V-5 below, split by membership class, employer (County or non-County for General members), and tier (1-4). Separate rates are displayed for normal cost and UAL Amortization, both of which are further split into Basic and COLA rates. Table V-6 below shows employee contribution rates for FYE 2023 at sample ages.

Table V-5 Detailed Employer Contribution Rate as of June 30, 2021 for FYE 2023										
Member Type	Tier	Normal Cost			UAL Amortization Cost			Total Cost		
		Basic Rate	COLA Rate	Total Rate	Basic Rate	COLA Rate	Total Rate	Basic Rate	COLA Rate	Total Rate
General (County)	1	12.99%	2.66%	15.65%	4.13%	0.85%	4.98%	17.12%	3.51%	20.63%
General (County)	2&3	6.85%	1.39%	8.24%	4.14%	0.84%	4.98%	10.99%	2.23%	13.22%
General (County)	4	6.21%	1.41%	7.62%	4.06%	0.92%	4.98%	10.27%	2.33%	12.60%
General (Non-County)	1	12.99%	2.66%	15.65%	10.21%	2.09%	12.30%	23.20%	4.75%	27.95%
General (Non-County)	2&3	6.85%	1.39%	8.24%	10.22%	2.08%	12.30%	17.07%	3.47%	20.54%
General (Non-County)	4	6.21%	1.41%	7.62%	10.03%	2.27%	12.30%	16.24%	3.68%	19.92%
General (Total)	1	12.99%	2.66%	15.65%	4.61%	0.95%	5.56%	17.60%	3.61%	21.21%
General (Total)	2&3	6.85%	1.39%	8.24%	4.62%	0.94%	5.56%	11.47%	2.33%	13.80%
General (Total)	4	6.21%	1.41%	7.62%	4.53%	1.03%	5.56%	10.74%	2.44%	13.18%
Safety (County)	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Safety (County)	2&3	9.72%	2.26%	11.99%	6.87%	1.60%	8.47%	16.60%	3.86%	20.46%
Safety (County)	4	10.24%	2.54%	12.77%	6.79%	1.68%	8.47%	17.03%	4.22%	21.25%

Reflects second year of three year phase-in of assumption changes for employer contribution rate

Table V-6 Employee Contribution Rate at Sample Ages as of June 30, 2021 for FYE 2023						
Member Type	Tier	Age 25	Age 35	Age 45	Single Rate	
General	1	4.86%	5.96%	7.34%	N/A	
General	2&3	7.66%	9.39%	11.50%	N/A	
General	4	5.69%	7.89%	10.67%	N/A	
Safety	1	N/A	N/A	N/A	N/A	
Safety	2&3	11.13%	13.19%	15.28%	N/A	
Safety	4	11.54%	15.24%	19.28%	N/A	

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

Table V-7 below shows projected annual employer contributions for FYE 2023, split by membership class, employer (County or non-County for General members), and tier (1-4). The contribution amounts are further split into normal cost and UAL Amortization components.

Table V-7				
Estimated Annual Employer Contributions for FYE 2023				
Member Type	Tier	Normal Cost	UAL Amortization	Contributions Total
General (County)	1	\$ 70,766	\$ 22,525	\$ 93,291
General (County)	2&3	9,336,227	5,640,887	14,977,115
General (County)	4	7,295,213	4,769,525	12,064,738
General (Non-County)	1	6,174	4,853	11,027
General (Non-County)	2&3	814,494	1,215,457	2,029,950
General (Non-County)	4	636,435	1,027,702	1,664,137
General (Total)	1	76,940	27,378	104,318
General (Total)	2&3	10,150,721	6,856,344	17,007,065
General (Total)	4	7,931,648	5,797,227	13,728,875
Safety (County)	1	0	0	0
Safety (County)	2&3	4,942,096	3,493,867	8,435,962
Safety (County)	4	3,383,556	2,244,251	5,627,807

*Reflects second year of three-year phase-in of assumption changes for employer contribution rate
Numbers may not add to totals due to rounding.*

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION V – CONTRIBUTIONS

Table V-8 below shows a projection of the expected contributions (for the fiscal year beginning one year after the valuation date) to cover the employer normal cost and UAL amortization over the next 20 years.

Table V-8 Retirement Contributions						
Valuation Year	Employer Normal Cost Contribution	Employer UAL Amortization Contribution	Total Employer Contributions	Employer Rate (%)	Employee Contribution	Employee Rate (%)
2021	\$ 26,484,961	\$ 18,419,066	\$ 44,904,027	15.2%	\$ 26,779,901	9.1%
2022	27,564,012	19,563,093	47,127,106	15.5%	27,565,505	9.1%
2023	28,374,188	19,734,288	48,108,476	15.4%	28,375,112	9.1%
2024	29,209,025	20,114,189	49,323,215	15.3%	29,209,897	9.1%
2025	30,069,642	20,278,648	50,348,290	15.2%	30,073,794	9.1%
2026	30,959,065	20,032,823	50,991,887	14.9%	30,964,635	9.1%
2027	31,875,964	19,825,190	51,701,154	14.7%	31,884,214	9.1%
2028	32,821,833	19,780,299	52,602,132	14.5%	32,833,351	9.0%
2029	33,797,548	19,436,615	53,234,163	14.2%	33,810,015	9.0%
2030	34,801,973	19,076,279	53,878,252	14.0%	34,818,481	9.0%
2031	35,838,385	19,323,946	55,162,330	13.9%	35,855,431	9.0%
2032	36,904,701	19,878,092	56,782,793	13.9%	36,922,090	9.0%
2033	38,002,111	20,471,997	58,474,108	13.9%	38,022,154	9.0%
2034	39,133,510	-	39,133,510	9.0%	39,153,613	9.0%
2035	40,297,855	-	40,297,855	9.0%	40,319,654	9.0%
2036	41,497,694	1,521,958	43,019,652	9.4%	41,517,725	9.0%
2037	42,731,497	-	42,731,497	9.0%	42,749,742	9.0%
2038	44,000,961	-	44,000,961	9.0%	44,018,425	9.0%
2039	45,308,413	-	45,308,413	9.0%	45,324,602	9.0%
2040	46,654,888	-	46,654,888	9.0%	46,670,338	9.0%
2041	48,042,175	-	48,042,175	9.0%	48,054,195	9.0%

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION VI – ANNUAL COMPREHENSIVE FINANCIAL REPORTING INFORMATION

The GASB adopted Statement Nos. 67 and 68, replacing GASB Statement Nos. 25 and 27. GASB 67 was effective for periods beginning after June 15, 2013 (first effective June 30, 2014 for the Plan) and GASB 68 was effective for fiscal years beginning after June 15, 2014 (first effective for the fiscal year July 1, 2014 to June 30, 2015 for the Employers). The disclosures needed to satisfy the GASB requirements will be included in the TCERA GASB 67/68 Report as of June 30, 2021.

In accordance with Government Finance Officers Association (GFOA) and their recommended checklist for Annual Comprehensive Financial Reports (ACFRs), we continue to prepare the Schedule of Funded Liabilities by Type disclosure, as shown in Table VI-1. As requested by TCERA, we have also included the Schedule of Funding Progress (Table VI-2) and the Schedule of Employer Contributions (Table VI-3).

Table VI-1								
SCHEDULE OF FUNDED LIABILITIES BY TYPE								
(in thousands)								
Valuation Date June 30,	(A) Active/Inactive Member Contributions	(B) Retirees And Beneficiaries	(C) Remaining Active Members' Liabilities	Reported Assets	Portion of Actuarial Liabilities Covered by Reported Assets			
					(A)	(B)	(C)	
2012	\$ 231,491	\$ 570,367	\$ 299,598	\$ 981,946	100%	100%	60%	
2013	238,200	621,125	326,732	1,048,160	100%	100%	58%	
2014	252,883	660,147	358,802	1,101,929	100%	100%	53%	
2015	264,870	698,147	395,418	1,156,587	100%	100%	49%	
2016	272,740	748,703	409,993	1,192,642	100%	100%	42%	
2017	278,900	808,799	485,707	1,461,755	100%	100%	77%	
2018	287,078	869,729	499,550	1,523,030	100%	100%	73%	
2019	301,935	925,027	514,321	1,598,431	100%	100%	72%	
2020	319,562	1,008,432	547,804	1,670,786	100%	100%	63%	
2021	339,547	1,050,032	568,406	1,759,025	100%	100%	65%	

Numbers may not add to totals due to rounding.

June 30, 2014 and earlier numbers calculated by prior actuary

June 30, 2017 assets include receivable for expected contribution from POB



**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION VI – ANNUAL COMPREHENSIVE FINANCIAL REPORTING INFORMATION

Table VI-2						
SCHEDULE OF FUNDING PROGRESS						
(dollars in thousands)						
Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Liability (AL)	Unfunded AL	Funded Ratio	Covered Payroll	Unfunded AL as a % of Covered Payroll
June 30, 2001	\$ 574,417	\$ 491,228	\$ (83,189)	116.9%	\$ 142,970	-58.2%
June 30, 2002	612,469	561,377	(51,092)	109.1%	158,263	-32.3%
June 30, 2003	634,249	608,505	(25,744)	104.2%	162,397	-15.9%
June 30, 2004	665,244	649,649	(15,595)	102.4%	158,032	-9.9%
June 30, 2005	681,618	714,656	33,038	95.4%	164,777	20.1%
June 30, 2006	729,899	792,844	62,945	92.1%	186,949	33.7%
June 30, 2007	800,967	846,030	45,063	94.7%	204,803	22.0%
June 30, 2008	879,051	946,414	67,363	92.9%	226,836	29.7%
June 30, 2009	919,179	996,747	77,568	92.2%	227,306	34.1%
June 30, 2010	946,640	1,033,211	86,571	91.6%	217,811	39.7%
June 30, 2011	969,681	1,072,144	102,463	90.4%	219,854	46.6%
June 30, 2012	981,946	1,101,456	119,510	89.1%	222,635	53.7%
June 30, 2013	1,048,160	1,186,057	137,897	88.4%	230,955	59.7%
June 30, 2014	1,101,929	1,271,832	169,903	86.6%	234,569	72.4%
June 30, 2015	1,156,587	1,358,435	201,848	85.1%	239,055	84.4%
June 30, 2016	1,192,642	1,431,436	238,794	83.3%	248,514	96.1%
June 30, 2017	1,461,755	1,573,406	111,651	92.9%	254,941	43.8%
June 30, 2018	1,523,030	1,656,357	133,326	92.0%	262,714	50.7%
June 30, 2019	1,598,431	1,741,283	142,851	91.8%	272,416	52.4%
June 30, 2020	1,670,786	1,875,797	205,011	89.1%	284,272	72.1%
June 30, 2021	1,759,025	1,957,985	198,960	89.8%	286,886	69.4%

Numbers may not add to totals due to rounding.

June 30, 2014 and earlier numbers calculated by prior actuary.

June 30, 2017 assets include receivable for expected contribution from POB.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

SECTION VI – ANNUAL COMPREHENSIVE FINANCIAL REPORTING INFORMATION

Table VI-3				
SCHEDULE OF EMPLOYER CONTRIBUTIONS				
(dollars in thousands)				
Year Ended June, 30	Actuarially Determined Contribution	Actual Contribution	Percentage Contributed	
2001	\$ 18,872	\$ 18,872	100%	
2002	\$ 6,186	\$ 6,186	100%	
2003	5,245	5,245	100%	
2004	9,595	9,595	100%	
2005	10,502	10,502	100%	
2006	12,443	12,443	100%	
2007	17,975	17,975	100%	
2008	22,692	22,692	100%	
2009	22,431	22,431	100%	
2010	25,339	25,339	100%	
2011	23,434	23,434	100%	
2012	25,257	25,257	100%	
2013	29,847	29,847	100%	
2014	25,953	25,953	100%	
2015	30,992	30,992	100%	
2016	31,297	31,297	100%	
2017	33,616	33,616	100%	
2018	36,263	36,263	100%	
2019	33,494	33,494	100%	
2020	35,310	35,310	100%	
2021	36,766	36,766	100%	

June 30, 2014 and earlier numbers calculated by prior actuary.

June 30, 2017 assets include receivable for expected contribution from POB.

Note that the actual contributions do not include the contribution from POB proceeds above the actuarially determined amount.



**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

The data for this valuation was provided by the Tulare County staff as of June 30, 2021. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

SUMMARY OF TOTAL ACTIVE MEMBERSHIP			
	June 30, 2020	June 30, 2021	Change
Total (General & Safety)			
Count	4,605	4,484	-2.6%
Average Age	41.9	42.4	1.2%
Average Service	9.9	10.5	6.2%
Annual Projected Payroll	\$ 284,272,002	\$ 286,886,367	0.9%
Average Annual Pay	\$ 61,731	\$ 63,980	3.6%

SUMMARY OF INACTIVE MEMBERSHIP*			
	June 30, 2020	June 30, 2021	Change
General			
Count	1,852	1,935	4.5%
Average Age	43.7	43.9	0.5%
Total Contribution Balance	\$ 43,402,585	\$ 46,297,586	6.7%
Average Contribution Balance	\$ 23,436	\$ 23,926	2.1%
Safety			
Count	331	360	8.8%
Average Age	39.2	39.3	0.2%
Total Contribution Balance	\$ 12,835,551	\$ 14,311,843	11.5%
Average Contribution Balance	\$ 38,778	\$ 39,755	2.5%
Total			
Count	2,183	2,295	5.1%
Average Age	43.1	43.2	0.4%
Total Contribution Balance	\$ 56,238,136	\$ 60,609,429	7.8%
Average Contribution Balance	\$ 25,762	\$ 26,409	2.5%

*Includes unclaimed accounts.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

SUMMARY OF RETIRED MEMBERSHIP				
	June 30, 2020	June 30, 2021	Change	
General				
Count	2,815	2,865	1.8%	
Average Age	71.2	71.5	0.5%	
Total Annual Allowance	\$ 62,618,882	\$ 65,750,480	5.0%	
Average Annual Allowance	\$ 22,245	\$ 22,950	3.2%	
Safety				
Count	593	607	2.4%	
Average Age	64.9	65.0	0.1%	
Total Annual Allowance	\$ 21,793,355	\$ 22,872,888	5.0%	
Average Annual Allowance	\$ 36,751	\$ 37,682	2.5%	
Total				
Count	3,408	3,472	1.9%	
Average Age	70.1	70.4	0.4%	
Total Annual Allowance	\$ 84,412,237	\$ 88,623,368	5.0%	
Average Annual Allowance	\$ 24,769	\$ 25,525	3.1%	

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

SUMMARY OF ACTIVE GENERAL MEMBERSHIP				
	June 30, 2020	June 30, 2021	Change	
General Tier 1				
Count	8	7	-12.5%	
Average Age	67.6	68.0	0.6%	
Average Service	36.5	36.8	0.9%	
Annual Projected Payroll	\$ 651,897	\$ 476,784	-26.9%	
Average Annual Pay	\$ 81,487	\$ 68,112	-16.4%	
General Tier 2 & 3				
Count	1,880	1,776	-5.5%	
Average Age	48.5	49.0	1.0%	
Average Service	15.9	16.9	6.6%	
Annual Projected Payroll	\$ 123,014,040	\$ 119,402,048	-2.9%	
Average Annual Pay	\$ 65,433	\$ 67,231	2.7%	
General Tier 4				
Count	1,848	1,855	0.4%	
Average Age	36.5	37.4	2.4%	
Average Service	3.4	4.0	19.7%	
Annual Projected Payroll	\$ 94,939,152	\$ 101,344,393	6.7%	
Average Annual Pay	\$ 51,374	\$ 54,633	6.3%	
General Total				
Count	3,736	3,638	-2.6%	
Average Age	42.6	43.1	1.2%	
Average Service	9.7	10.4	6.7%	
Annual Projected Payroll	\$ 218,605,089	\$ 221,223,225	1.2%	
Average Annual Pay	\$ 58,513	\$ 60,809	3.9%	

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

SUMMARY OF ACTIVE SAFETY MEMBERSHIP				
	June 30, 2020	June 30, 2021	Change	
Safety Tier 1				
Count	0	0	0.0%	
Average Age	0	0	0.0%	
Average Service	0	0	0.0%	
Annual Projected Payroll	\$ 0	\$ 0	0.0%	
Average Annual Pay	\$ 0	\$ 0	0.0%	
Safety Tier 2 & 3				
Count	503	468	-7.0%	
Average Age	44.0	44.7	1.7%	
Average Service	15.7	16.6	5.8%	
Annual Projected Payroll	\$ 41,496,639	\$ 39,977,926	-3.7%	
Average Annual Pay	\$ 82,498	\$ 85,423	3.5%	
Safety Tier 4				
Count	366	378	3.3%	
Average Age	31.9	32.6	2.2%	
Average Service	3.3	3.9	17.1%	
Annual Projected Payroll	\$ 24,170,274	\$ 25,685,216	6.3%	
Average Annual Pay	\$ 66,039	\$ 67,950	2.9%	
Safety Total				
Count	869	846	-2.6%	
Average Age	38.9	39.3	1.1%	
Average Service	10.5	11.0	4.2%	
Annual Projected Payroll	\$ 65,666,913	\$ 65,663,142	0.0%	
Average Annual Pay	\$ 75,566	\$ 77,616	2.7%	

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

SUMMARY OF RETIRED GENERAL MEMBERSHIP			
	June 30, 2020	June 30, 2021	Change
Service Retirement			
Count	2,226	2,262	1.6%
Average Age	71.2	71.4	0.3%
Total Annual Allowance	\$ 52,711,040	\$ 55,447,906	5.2%
Average Annual Allowance	\$ 23,680	\$ 24,513	3.5%
Disability			
Count	207	204	-1.4%
Average Age	64.5	65.0	0.9%
Total Annual Allowance	\$ 4,426,622	\$ 4,501,396	1.7%
Average Annual Allowance	\$ 21,385	\$ 22,066	3.2%
Beneficiaries			
Count	382	399	4.5%
Average Age	74.9	75.4	0.6%
Total Annual Allowance	\$ 5,481,220	\$ 5,801,178	5.8%
Average Annual Allowance	\$ 14,349	\$ 14,539	1.3%
Total			
Count	2,815	2,865	1.8%
Average Age	71.2	71.5	0.5%
Total Annual Allowance	\$ 62,618,882	\$ 65,750,480	5.0%
Average Annual Allowance	\$ 22,245	\$ 22,950	3.2%

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

SUMMARY OF RETIRED SAFETY MEMBERSHIP				
	June 30, 2020	June 30, 2021	Change	
Service Retirement				
Count	348	357	2.6%	
Average Age	66.2	66.3	0.1%	
Total Annual Allowance	\$ 14,780,132	\$ 15,528,655	5.1%	
Average Annual Allowance	\$ 42,472	\$ 43,498	2.4%	
Disability				
Count	140	138	-1.4%	
Average Age	59.4	59.7	0.6%	
Total Annual Allowance	\$ 4,542,057	\$ 4,597,665	1.2%	
Average Annual Allowance	\$ 32,443	\$ 33,316	2.7%	
Beneficiaries				
Count	105	112	6.7%	
Average Age	67.7	67.1	-0.9%	
Total Annual Allowance	\$ 2,471,166	\$ 2,746,568	11.1%	
Average Annual Allowance	\$ 23,535	\$ 24,523	4.2%	
Total				
Count	593	607	2.4%	
Average Age	64.9	65.0	0.1%	
Total Annual Allowance	\$ 21,793,355	\$ 22,872,888	5.0%	
Average Annual Allowance	\$ 36,751	\$ 37,682	2.5%	

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE GENERAL MEMBERS AS OF JUNE 30, 2021																						
TIER 1																						
Attained Age	YEARS OF CREDITED SERVICE																					
	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	53,364	1	53,364
65 to 69	0	0	0	0	1	119,240	0	0	0	0	0	0	0	1	76,894	1	49,374	2	65,687	5	75,376	
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	46,539	0	0	1	46,539	
Total	0	0	0	0	1	119,240	0	0	0	0	0	0	0	1	76,894	2	47,957	3	61,579	7	68,112	

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE GENERAL MEMBERS AS OF JUNE 30, 2021																						
TIER 2 & 3																						
Attained Age	YEARS OF CREDITED SERVICE																					
	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0
25 to 29	0	0	0	0	6	42,977	0	0	0	0	0	0	0	0	0	0	0	0	0	6	42,977	
30 to 34	0	0	1	75,855	45	58,695	40	56,382	2	54,800	0	0	0	0	0	0	0	0	88	57,750		
35 to 39	0	0	4	99,437	73	70,258	122	67,694	38	65,022	0	0	0	0	0	0	0	0	237	68,591		
40 to 44	0	0	9	63,903	51	65,684	129	68,485	121	68,116	39	66,032	0	0	0	0	0	0	349	67,555		
45 to 49	0	0	3	96,640	41	72,574	89	65,057	79	67,431	84	64,047	20	72,482	0	0	0	0	316	67,127		
50 to 54	0	0	3	64,409	22	56,124	53	61,493	76	68,471	65	61,554	36	63,919	9	65,687	0	0	264	63,576		
55 to 59	0	0	1	141,091	23	59,400	56	67,523	64	66,624	66	66,128	36	68,301	19	75,788	2	69,139	267	67,244		
60 to 64	0	0	0	0	13	80,754	36	73,190	37	63,074	49	61,827	18	65,449	24	88,333	9	79,471	2	72,792	188	70,249
65 to 69	0	0	0	0	7	66,091	10	79,618	11	103,955	10	57,344	3	76,371	3	88,689	1	88,975	0	0	45	79,109
70 & up	0	0	0	0	1	318,652	4	81,768	4	71,360	4	98,499	2	71,754	0	0	1	43,557	0	0	16	94,514
Total	0	0	21	79,665	282	66,615	539	66,674	432	68,009	317	64,093	115	67,481	55	80,313	13	75,850	2	72,792	1,776	67,231



**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE GENERAL MEMBERS AS OF JUNE 30, 2021																						
TIER 4																						
YEARS OF CREDITED SERVICE																						
Attained Age	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	19	\$ 40,211	53	\$ 41,598	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	72	\$ 41,232
25 to 29	43	52,166	249	46,787	84	49,117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	376	47,923
30 to 34	37	60,808	257	53,296	202	61,972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	496	57,390
35 to 39	30	51,180	167	54,403	136	61,653	0	0	0	0	0	0	0	0	0	0	0	0	0	0	333	57,074
40 to 44	24	60,430	116	56,519	70	59,443	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210	57,941
45 to 49	15	51,916	65	50,990	46	57,783	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	53,580
50 to 54	11	51,199	55	59,644	35	54,145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101	56,819
55 to 59	7	56,544	27	57,727	34	60,653	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	59,068
60 to 64	6	49,383	23	54,300	20	63,057	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	57,272
65 to 69	1	28,356	10	65,228	11	58,883	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	60,380
70 & up	0	0	0	0	2	38,602	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	38,602
Total	193	53,395	1,022	52,102	640	59,049	0	0	1,855	54,633												

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE SAFETY MEMBERS AS OF JUNE 30, 2021																						
TIER 1																						
YEARS OF CREDITED SERVICE																						
Attained Age	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	Average		Average		Average		Average		Average		Average		Average		Average		Average		Average		Average	
	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.
Under 25	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0
25 to 29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE SAFETY MEMBERS AS OF JUNE 30, 2021																						
TIER 2 & 3																						
YEARS OF CREDITED SERVICE																						
Attained Age	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	Average		Average		Average		Average		Average		Average		Average		Average		Average		Average		Average	
	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.	No.	Comp.
Under 25	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0
25 to 29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	22	75,198	10	77,914	0	0	0	0	0	0	0	0	0	0	0	0	32	76,047
35 to 39	1	76,182	2	81,299	22	76,692	57	80,072	26	84,736	0	0	0	0	0	0	0	0	0	0	108	80,493
40 to 44	1	70,476	1	78,855	13	78,360	52	83,421	36	85,380	12	91,528	0	0	0	0	0	0	0	0	115	84,156
45 to 49	0	0	0	0	5	81,383	29	82,964	32	85,932	27	97,446	5	122,008	0	0	0	0	0	0	98	89,834
50 to 54	0	0	0	0	3	68,076	13	82,779	19	86,027	22	90,768	19	93,309	3	159,955	0	0	0	0	79	90,690
55 to 59	0	0	0	0	1	84,391	7	101,512	5	71,619	8	96,164	4	76,416	5	105,920	0	0	0	0	30	91,921
60 to 64	0	0	0	0	0	0	0	0	2	75,606	3	74,748	0	0	1	71,910	0	0	0	0	6	74,561
65 to 69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	73,329	3	80,484	66	76,603	168	82,582	120	84,754	72	93,331	28	96,021	9	120,153	0	0	0	0	468	85,423



**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

AGE AND SERVICE DISTRIBUTION WITH ANNUAL AVERAGE SALARY OF ACTIVE SAFETY MEMBERS AS OF JUNE 30, 2021 TIER 4																						
Attained Age	YEARS OF CREDITED SERVICE																					
	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up		Total	
	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	16	\$ 43,588	18	\$ 62,291	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	34	\$ 53,490
25 to 29	21	56,112	95	66,364	19	70,995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135	65,421
30 to 34	4	58,217	66	68,660	45	70,800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115	69,134
35 to 39	1	52,535	18	72,903	25	74,087	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	73,113
40 to 44	2	62,506	8	69,765	9	74,716	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	71,346
45 to 49	0	0	5	69,442	6	83,579	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	77,153
50 to 54	3	72,333	3	74,543	3	71,570	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	72,815
55 to 59	1	76,881	4	91,453	3	104,776	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	94,628
60 to 64	0	0	1	78,600	1	84,262	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	81,431
65 to 69	0	0	0	0	1	87,879	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	87,879
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	48	53,751	218	68,087	112	73,770	0	0	0	0	0	0	0	0	0	0	0	0	0	0	378	67,950

**Average Increases in Pay
(for upcoming year, based on valuation data)**

Longevity and Promotion Component	2.22%
Wage Inflation Component	3.00%
Total	5.22%

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX A – MEMBERSHIP INFORMATION

AGE DISTRIBUTION OF TOTAL INACTIVE PARTICIPANTS PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JUNE 30, 2021								
Age	Disability Retirements		Normal, Early Deferred Vested Retirements		Surviving Spouses and Beneficiaries Receiving Benefits		Total	
	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit
Under 55	89	\$ 2,685,267	48	\$ 787,203	36	\$ 515,990	173	\$ 3,988,460
55-59	45	1,186,160	211	5,404,682	19	329,555	275	6,920,397
60-64	46	1,225,890	377	10,285,891	45	659,257	468	12,171,038
65-69	61	1,458,778	608	17,927,426	69	1,291,682	738	20,677,886
70-74	59	1,587,289	618	17,629,434	92	1,648,209	769	20,864,932
75-79	26	659,772	435	11,686,933	82	1,366,985	543	13,713,690
80 & Over	16	295,905	322	7,254,992	168	2,736,068	506	10,286,965
Total	342	\$ 9,099,061	2,619	\$ 70,976,561	511	\$ 8,547,746	3,472	\$ 88,623,368

AGE DISTRIBUTION OF INACTIVE GENERAL PARTICIPANTS PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JUNE 30, 2021								
Age	Disability Retirements		Normal, Early Deferred Vested Retirements		Surviving Spouses and Beneficiaries Receiving Benefits		Total	
	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit
Under 55	34	\$ 728,987	26	\$ 229,108	17	\$ 140,772	77	\$ 1,098,867
55-59	27	604,320	136	2,031,590	13	198,791	176	2,834,701
60-64	30	730,452	312	7,779,271	32	356,392	374	8,866,115
65-69	44	919,207	531	14,414,161	48	660,372	623	15,993,740
70-74	41	933,254	566	14,735,350	76	1,185,621	683	16,854,225
75-79	20	443,983	380	9,433,354	68	1,076,393	468	10,953,730
80 & Over	8	141,193	311	6,825,072	145	2,182,837	464	9,149,102
Total	204	\$ 4,501,396	2,262	\$ 55,447,906	399	\$ 5,801,178	2,865	\$ 65,750,480



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APPENDIX A – MEMBERSHIP INFORMATION

AGE DISTRIBUTION OF INACTIVE SAFETY PARTICIPANTS PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JUNE 30, 2021									
Age	Disability Retirements		Normal, Early Deferred Vested Retirements		Surviving Spouses and Beneficiaries Receiving Benefits		Total		
	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit	
Under 55	55	\$ 1,956,280	22	\$ 558,095	19	\$ 375,218	96	\$ 2,889,593	
55-59	18	581,840	75	3,373,092	6	130,764	99	4,085,696	
60-64	16	495,438	65	2,506,620	13	302,865	94	3,304,923	
65-69	17	539,571	77	3,513,265	21	631,310	115	4,684,146	
70-74	18	654,035	52	2,894,084	16	462,588	86	4,010,707	
75-79	6	215,789	55	2,253,579	14	290,592	75	2,759,960	
80 & Over	8	154,712	11	429,920	23	553,231	42	1,137,863	
Total	138	\$ 4,597,665	357	\$ 15,528,655	112	\$ 2,746,568	607	\$ 22,872,888	

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APPENDIX A – MEMBERSHIP INFORMATION

Retirants and Beneficiaries Added to and Removed From Payroll										
Plan Year Ended June 30	At Beginning of Year	Added During Year	Annual Allowances Added to the Rolls	Removed During Year	Annual Allowances Removed from the Rolls	At End of Year	Annual Allowance	% Increase in Annual Allowance	Average Annual Allowance	
2011	2,181	191	\$ 4,602,464	59	\$ 873,415	2,313	\$ 45,224,268	8.99%	\$ 19,552	
2012	2,313	181	\$ 4,736,189	70	\$ 985,645	2,424	\$ 48,974,812	8.29%	\$ 20,204	
2013	2,424	183	\$ 4,745,718	65	\$ 483,264	2,542	\$ 53,237,266	8.70%	\$ 20,943	
2014	2,542	224	\$ 4,198,797	75	\$ 659,212	2,691	\$ 56,776,851	6.65%	\$ 21,099	
2015	2,691	218	\$ 4,360,151	88	\$ 1,432,880	2,821	\$ 59,960,567	5.61%	\$ 21,255	
2016	2,821	185	\$ 4,540,356	66	\$ 986,150	2,940	\$ 64,292,378	7.22%	\$ 21,868	
2017	2,940	191	\$ 4,483,587	59	\$ 896,529	3,072	\$ 68,669,924	6.81%	\$ 22,353	
2018	3,072	178	\$ 5,487,994	58	\$ 830,938	3,192	\$ 73,731,771	7.37%	\$ 23,099	
2019	3,192	174	\$ 4,705,555	54	\$ 1,098,384	3,312	\$ 78,971,061	7.11%	\$ 23,844	
2020	3,312	163	\$ 4,626,973	67	\$ 925,421	3,408	\$ 84,412,237	6.89%	\$ 24,769	
2021	3,408	141	\$ 3,908,186	77	\$ 1,434,138	3,472	\$ 88,623,368	4.99%	\$ 25,525	

Data prior to 2015 was compiled by the previous actuary.

Starting in 2015, Annual Allowances Added to the Rolls no longer includes cost of living adjustments for existing retirees.

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APPENDIX A – MEMBERSHIP INFORMATION

Reconciliation of System Membership Since Prior Valuation											
Total Members											
	Active	Deferred Vested	Deferred Vested - Transferred	Ordinary Disability	Duty Disability	Retired	Beneficiaries	Non-Vested Terminations Due Refund	QDRO	Deferred QDRO	Totals
June 30, 2020	4,605	448	654	123	224	2,574	436	1,065	51	16	10,196
New Entrants	264										264
Rehires	12	(6)	(1)					(5)			-
Duty Disabilities	(2)				3	(1)					-
Ordinary Disabilities		(1)		1							-
Retirements	(89)	(15)	(24)			128					-
Vested Terminations	(68)	68									-
Non-Vested Terminations and Death without beneficiary	(151)		(1)	(2)	(2)	(46)		147			(55)
Death with beneficiary	(1)				(5)	(38)	44				-
Transfers	(14)	(8)	34					(11)			1
Beneficiary Deaths							(27)				(27)
Domestic Relations Orders									4		4
Deferred Domestic Relations Orders										3	3
Withdrawals Paid	(72)	(18)	(7)					(43)		(1)	(141)
Data Corrections		(1)		(1)	1	2	1	2	2	2	6
June 30, 2021	4,484	467	655	121	221	2,619	454	1,155	57	18	10,251

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APPENDIX A – MEMBERSHIP INFORMATION

Reconciliation of System Membership Since Prior Valuation											
General Members											
	Active	Deferred Vested	Deferred Vested - Transferred	Ordinary Disability	Duty Disability	Retired	Beneficiaries	Non-Vested Terminations Due Refund	QDRO	Deferred QDRO	Totals
June 30, 2020	3,736	371	542	105	102	2,226	351	932	31	7	8,403
New Entrants	208										208
Rehires	11	(6)	-					(5)			-
Duty Disabilities	(1)	-			2	(1)					-
Ordinary Disabilities	-	(1)		1							-
Retirements	(71)	(14)	(21)			106					-
Vested Terminations	(54)	54									-
Non-Vested Terminations and Death without beneficiary	(119)	-	(1)	(2)		(42)		116		-	(48)
Death with beneficiary	-		-	-	(3)	(30)	33				-
Transfers	(14)	(6)	26					(7)			(1)
Beneficiary Deaths							(21)				(21)
Domestic Relations Orders									4		4
Deferred Domestic Relations Orders										3	3
Withdrawals Paid	(58)	(13)	(6)					(36)		(1)	(114)
Data Corrections		-		(1)		3	(1)	1	2		4
June 30, 2021	3,638	385	540	103	101	2,262	362	1,001	37	9	8,438

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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APPENDIX A – MEMBERSHIP INFORMATION

Reconciliation of System Membership Since Prior Valuation											
Safety Members											
	Active	Deferred Vested	Deferred Vested - Transferred	Ordinary Disability	Duty Disability	Retired	Beneficiaries	Non-Vested Terminations Due Refund	QDRO	Deferred QDRO	Totals
June 30, 2020	869	77	112	18	122	348	85	133	20	9	1,793
New Entrants	56										56
Rehires	1	-	(1)								-
Duty Disabilities	(1)				1						-
Ordinary Disabilities											-
Retirements	(18)	(1)	(3)			22					-
Vested Terminations	(14)	14	-								-
Non-Vested Terminations and Death without beneficiary	(32)				(2)	(4)		31			(7)
Death with beneficiary	(1)				(2)	(8)	11				-
Transfers		(2)	8					(4)			2
Beneficiary Deaths							(6)				(6)
Domestic Relations Orders									-		-
Deferred Domestic Relations Orders										-	-
Withdrawals Paid	(14)	(5)	(1)					(7)		-	(27)
Data Corrections		(1)		-	1	(1)	2	1			2
June 30, 2021	846	82	115	18	120	357	92	154	20	9	1,813

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

**APPENDIX B – STATEMENT OF CURRENT ACTUARIAL
ASSUMPTIONS AND METHODS**

The methods and assumptions used in the actuarial valuation as of June 30, 2021 are outlined on the following pages.

A. Actuarial Methods

1. Actuarial Cost Method

The actuarial valuation is prepared using the entry age actuarial cost method (CERL 31453.5). Under the principles of this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit (until maximum retirement age). For members who transferred between plans, entry age is based on original entry into the system. The normal cost for the Plan is based on the sum of the individual normal costs for each member (Individual Entry Age Method).

The UAL (or Surplus) is amortized as a percentage of the projected salaries of present and future members of TCERA. At its October 28, 2015 meeting, the Board adopted 19-year layered amortization of the UAL. The UAL as of June 30, 2015 is being amortized over a closed 19-year period as a level percentage of payroll, assuming payroll increases of 3.00% per year, and subsequent changes in the UAL due to experience gains and losses, assumption changes, or plan changes will be amortized over new closed 19-year periods.

2. Valuation of Assets

Beginning in fiscal year 2009, the assets are valued using a 10-year smoothed method based on the difference between the expected market value and the actual market value of the assets, net of expenses, as of June 30 and December 31 of each year. The expected market value at the end of each period is the beginning market value increased with the net increase in the cash flow of funds, all increased with interest at the expected investment return rate assumption.

A 30% asset corridor limit is applied.

The contribution of \$250 million expected to be made on or before June 30, 2018 from the proceeds of a POB was included in the 2017 valuation as a receivable in both the Market and Actuarial Values of Assets as of June 30, 2017. Accordingly, it was not recorded as a contribution during the FY 2017-2018.

3. Changes in Actuarial Methods

None.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

**APPENDIX B – STATEMENT OF CURRENT ACTUARIAL
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B. Actuarial Assumptions

The TCERA Board has the authority to select economic and demographic assumptions for the Plan. The assumptions used in this report reflect the results of an Experience Study performed by Cheiron covering the period July 1, 2017 through June 30, 2020.

1. Rate of Return

Assets are assumed to earn 7.00% net of investment and administrative expenses.

2. Inflation

The Consumer Price Index (CPI) is assumed to increase at the rate of 2.75% per year. This assumption is also used to project the compensation limit for PEPRA members.

3. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.6% per year for Tier 1 and 2% per year for Tiers 2-4.

4. Internal Revenue Code Limits and PEPRA Pensionable Compensation Limits

The maximum benefit and maximum compensation limitations under Internal Revenue Code Sections 415 and 401(a)(17), respectively, are not reflected in the valuation for funding purposes. Any limitation is reflected in a member's benefit after retirement. The PEPRA compensation limit, which was \$128,059 for calendar year 2021 for members participating in Social Security, was applied.

5. Interest on Member Contributions

The annual credited interest rate on member contributions is assumed to be 7.00%.

6. Family Composition

Percentage married for deferred vested terminations and all active members who retire, become disabled, or die during active service is shown below. Spouses of male members are assumed to be female and three years younger. Spouses of female members are assumed to be male and two years older. Actual spouse demographic data is reflected following benefit commencement.

Division	Gender	Percentage
General	Male	80%
General	Female	60%
Safety	Male	85%
Safety	Female	65%

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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**APPENDIX B – STATEMENT OF CURRENT ACTUARIAL
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7. Increases in Pay

Wage inflation component: 3.00%

Additional longevity and promotion component:

Longevity and Promotion Increases		
Service	General	Safety
0	8.00%	9.00%
1	6.50%	6.00%
2	5.50%	5.00%
3	4.00%	3.00%
4	3.00%	3.00%
5	2.00%	2.00%
6	1.75%	2.00%
7	1.50%	2.00%
8	1.00%	1.00%
9	1.00%	1.00%
10	1.00%	1.00%
11	1.00%	1.00%
12	1.00%	1.00%
13	1.00%	1.00%
14	1.00%	1.00%
15+	0.50%	1.00%

8. Sick Leave Service Credit Upon Service Retirement

Active members' service retirement benefits are adjusted by a percentage, 1% for General and 2% for Safety, for anticipated conversions of sick leave to retirement service credit.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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**APPENDIX B – STATEMENT OF CURRENT ACTUARIAL
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9. Termination

Age	Rates of Termination						
	General				Safety		
	Years of Service				Years of Service		
	Less than 3	3 to 5	5 to 10	10 or more	Less than 3	3 to 5	5 or more
20	15.00%	12.00%	10.00%	10.00%	11.00%	7.00%	6.00%
21	15.00%	12.00%	10.00%	10.00%	11.00%	7.00%	6.00%
22	15.00%	12.00%	10.00%	10.00%	11.00%	7.00%	6.00%
23	15.00%	12.00%	10.00%	10.00%	11.00%	7.00%	6.00%
24	15.00%	12.00%	10.00%	10.00%	11.00%	7.00%	6.00%
25	15.00%	8.00%	8.00%	8.00%	11.00%	7.00%	6.00%
26	15.00%	8.00%	8.00%	8.00%	11.00%	7.00%	6.00%
27	15.00%	8.00%	8.00%	8.00%	11.00%	7.00%	6.00%
28	15.00%	8.00%	8.00%	8.00%	11.00%	7.00%	6.00%
29	15.00%	8.00%	8.00%	8.00%	11.00%	7.00%	6.00%
30	15.00%	8.00%	6.00%	5.00%	11.00%	7.00%	4.50%
31	15.00%	8.00%	6.00%	5.00%	11.00%	7.00%	4.50%
32	15.00%	8.00%	6.00%	5.00%	11.00%	7.00%	4.50%
33	15.00%	8.00%	6.00%	5.00%	11.00%	7.00%	4.50%
34	15.00%	8.00%	6.00%	5.00%	11.00%	7.00%	4.50%
35	15.00%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
36	15.00%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
37	15.00%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
38	15.00%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
39	15.00%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
40	14.25%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
41	14.25%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
42	14.25%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
43	14.25%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
44	14.25%	8.00%	5.00%	3.00%	11.00%	7.00%	4.00%
45	13.50%	8.00%	5.00%	3.00%	8.00%	6.00%	3.50%
46	13.50%	8.00%	5.00%	3.00%	8.00%	6.00%	3.50%
47	13.50%	8.00%	5.00%	3.00%	8.00%	6.00%	3.50%
48	13.50%	8.00%	5.00%	3.00%	8.00%	6.00%	3.50%
49	13.50%	8.00%	5.00%	3.00%	8.00%	6.00%	3.50%
50	12.75%	5.00%	5.00%	3.00%	8.00%	6.00%	0.00%
51	12.75%	5.00%	5.00%	3.00%	8.00%	6.00%	0.00%
52	12.75%	5.00%	5.00%	3.00%	8.00%	6.00%	0.00%
53	12.75%	5.00%	5.00%	3.00%	8.00%	6.00%	0.00%
54	12.75%	5.00%	5.00%	3.00%	8.00%	6.00%	0.00%
55	12.00%	5.00%	5.00%	3.00%	5.00%	6.00%	0.00%
56	12.00%	5.00%	5.00%	3.00%	5.00%	6.00%	0.00%
57	12.00%	5.00%	5.00%	3.00%	5.00%	6.00%	0.00%
58	12.00%	5.00%	5.00%	3.00%	5.00%	6.00%	0.00%
59	12.00%	5.00%	5.00%	3.00%	5.00%	6.00%	0.00%
60	11.25%	5.00%	5.00%	3.00%	0.00%	0.00%	0.00%
61	11.25%	5.00%	5.00%	3.00%	0.00%	0.00%	0.00%
62	11.25%	5.00%	5.00%	3.00%	0.00%	0.00%	0.00%
63	11.25%	5.00%	5.00%	3.00%	0.00%	0.00%	0.00%
64	11.25%	5.00%	5.00%	3.00%	0.00%	0.00%	0.00%
65 and over	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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Rates of termination apply to active Members who terminate their employment. Rates are assumed not to apply after eligibility for retirement.

Former members with contributions on deposit are assumed to receive a retirement benefit commencing at the following ages:

General Members: Age 60

Safety Members: Age 55

10. Rates of Deferred Vested Termination

Rates of deferred vested termination are a percentage of the termination rates shown on the previous page.

Service	General Males	General Females	Safety
5-10	75%	55%	60%
10-15	85%	70%	60%
15-20	85%	75%	60%
20+	85%	75%	100%

11. Reciprocal Transfers

60% of General and 65% of Safety deferred vested terminated members that leave their member contributions on deposit with the Plan are assumed to be reciprocal.

Reciprocal members are assumed to remain with the reciprocal agency until retirement, and receive annual salary increases of 3.50% for General members and 4.00% for Safety members.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
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**APPENDIX B – STATEMENT OF CURRENT ACTUARIAL
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12. Rates of Disability

Disability rates of active participants are shown below.

Age	Rates of Disability					
	General - Males		General - Females		Safety	
	Ordinary	Duty	Ordinary	Duty	Ordinary	Duty
20	0.000%	0.010%	0.000%	0.010%	0.000%	0.110%
21	0.000%	0.010%	0.000%	0.010%	0.000%	0.120%
22	0.000%	0.010%	0.000%	0.010%	0.000%	0.130%
23	0.000%	0.010%	0.000%	0.010%	0.000%	0.140%
24	0.000%	0.010%	0.000%	0.010%	0.000%	0.150%
25	0.010%	0.010%	0.010%	0.010%	0.050%	0.170%
26	0.010%	0.010%	0.010%	0.010%	0.050%	0.200%
27	0.010%	0.010%	0.010%	0.010%	0.050%	0.250%
28	0.010%	0.010%	0.010%	0.010%	0.050%	0.300%
29	0.010%	0.010%	0.010%	0.010%	0.050%	0.350%
30	0.010%	0.010%	0.010%	0.010%	0.050%	0.400%
31	0.010%	0.010%	0.010%	0.010%	0.050%	0.450%
32	0.010%	0.010%	0.010%	0.010%	0.050%	0.500%
33	0.010%	0.010%	0.010%	0.010%	0.050%	0.520%
34	0.010%	0.010%	0.010%	0.010%	0.050%	0.540%
35	0.020%	0.020%	0.080%	0.020%	0.050%	0.560%
36	0.020%	0.020%	0.080%	0.020%	0.050%	0.580%
37	0.020%	0.020%	0.080%	0.020%	0.050%	0.600%
38	0.030%	0.030%	0.120%	0.030%	0.050%	0.620%
39	0.030%	0.030%	0.130%	0.030%	0.050%	0.640%
40	0.030%	0.030%	0.140%	0.030%	0.075%	0.660%
41	0.040%	0.045%	0.160%	0.045%	0.075%	0.670%
42	0.040%	0.045%	0.170%	0.045%	0.080%	0.680%
43	0.040%	0.045%	0.180%	0.045%	0.085%	0.690%
44	0.050%	0.050%	0.190%	0.050%	0.090%	0.700%
45	0.050%	0.055%	0.200%	0.055%	0.095%	0.750%
46	0.050%	0.060%	0.220%	0.060%	0.100%	0.800%
47	0.060%	0.070%	0.240%	0.070%	0.150%	0.850%
48	0.070%	0.080%	0.260%	0.080%	0.200%	0.900%
49	0.080%	0.090%	0.280%	0.090%	0.250%	0.950%
50	0.090%	0.100%	0.300%	0.100%	0.300%	1.000%
51	0.100%	0.150%	0.320%	0.150%	0.350%	1.250%
52	0.120%	0.200%	0.340%	0.200%	0.400%	1.500%
53	0.140%	0.250%	0.360%	0.250%	0.450%	1.750%
54	0.160%	0.300%	0.380%	0.300%	0.500%	2.000%
55	0.180%	0.350%	0.400%	0.350%	0.550%	2.250%
56	0.200%	0.400%	0.420%	0.400%	0.600%	2.300%
57	0.220%	0.450%	0.440%	0.450%	0.650%	2.350%
58	0.240%	0.500%	0.480%	0.500%	0.700%	2.400%
59	0.260%	0.550%	0.520%	0.550%	0.750%	2.450%
60	0.280%	0.600%	0.540%	0.600%	0.000%	0.000%
61	0.300%	0.650%	0.560%	0.650%	0.000%	0.000%
62	0.320%	0.700%	0.600%	0.700%	0.000%	0.000%
63	0.340%	0.750%	0.620%	0.750%	0.000%	0.000%
64	0.360%	0.800%	0.640%	0.800%	0.000%	0.000%
65 and over	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

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13. Rates of Mortality for Healthy Lives

Mortality rates for General actives, retirees, beneficiaries (both General and Safety), terminated vested, and reciprocals are based on the sex distinct Retired Pensioner (RP) 2014 Combined Healthy Tables, published by the Society of Actuaries, with Generational improvement using Projection Scale MP-2019, and increased by 2.2% for males and 8.0% for females to reflect Plan experience.

Mortality rates for Safety actives, retirees, terminated vested, and reciprocals are based on the sex distinct Retired Pensioner (RP) 2014 Combined Healthy Tables with blue-collar adjustment, published by the Society of Actuaries, with Generational improvement using Projection Scale MP-2019, and increased by 4.5% for males to reflect Plan experience.

14. Rates of Mortality for Retired Disabled Lives

Mortality rates for disabled retirees are based on the sex distinct Retired Pensioner (RP) 2014 Disabled Retiree Mortality Table, published by the Society of Actuaries, with Generational improvement using Projection Scale MP-2019.

15. Duty-Related Deaths (Safety Employees Only)

Percentage of deaths assumed to be duty related	
Age	
20-24	37%
25-30	42%
31-34	45%
35-43	50%
44-45	52%
46-47	54%
48-49	56%
50-54	58%
55-56	60%
57-58	62%
59	63%

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16. Rates of Retirement

Rates of retirement are based on age and service according to the following below.

Age	General Years of Service		Safety Years of Service	
	Less than 30	30 or more	Less than 20	20 or more
45	0.00%	0.00%	7.00%	7.00%
46	0.00%	0.00%	7.00%	7.00%
47	0.00%	0.00%	7.00%	7.00%
48	0.00%	0.00%	7.00%	7.00%
49	0.00%	0.00%	7.00%	7.00%
50	5.00%	10.00%	7.00%	7.00%
51	5.00%	10.00%	7.00%	7.00%
52	5.00%	10.00%	7.00%	7.00%
53	5.00%	10.00%	7.00%	7.00%
54	5.00%	10.00%	7.00%	7.00%
55	6.00%	10.00%	10.00%	18.00%
56	6.00%	10.00%	10.00%	18.00%
57	6.00%	10.00%	10.00%	18.00%
58	6.00%	10.00%	10.00%	18.00%
59	6.00%	10.00%	10.00%	18.00%
60	15.00%	20.00%	20.00%	40.00%
61	15.00%	20.00%	20.00%	40.00%
62	15.00%	20.00%	20.00%	40.00%
63	15.00%	20.00%	20.00%	40.00%
64	15.00%	20.00%	20.00%	40.00%
65	35.00%	35.00%	40.00%	75.00%
66	35.00%	35.00%	40.00%	75.00%
67	35.00%	35.00%	40.00%	75.00%
68	35.00%	35.00%	40.00%	75.00%
69	35.00%	35.00%	40.00%	75.00%
70	35.00%	35.00%	100.00%	100.00%
71	35.00%	35.00%	100.00%	100.00%
72	35.00%	35.00%	100.00%	100.00%
73	35.00%	35.00%	100.00%	100.00%
74	35.00%	35.00%	100.00%	100.00%
75 and over	100.00%	100.00%	100.00%	100.00%

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17. Disclosures regarding Models Used

In accordance with Actuarial Standard of Practice (ASOP) No. 56 *Modeling*, the following disclosures are made:

a. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate liabilities and projected benefit payments. We have reviewed the underlying workings of this model to the degree feasible and consistent with ASOP No. 56 and believe them to be appropriate for the purposes of the valuation.

b. Projections

This valuation report includes projections of future contributions and funded status for the purpose of assisting the Retirement Board and the sponsors of the System with the management of the Fund.

The projections are based on the same census data and financial information as of June 30, 2021 as disclosed in this actuarial valuation. The projections assume continuation of the plan provisions and actuarial assumptions in effect as of June 30, 2021 and do not reflect the impact of any changes in benefits or actuarial assumptions that may be adopted after June 30, 2021.

The projections assume that all future assumptions are met except where specifically indicated. The future outcomes become increasingly uncertain over time, and therefore the general trends and not the absolute values should be considered in the review of these projections. Further, for the purpose of these projections, we have only reflected the impact of new entrants entering the plan in aggregate and have not developed individual liabilities or detailed profiles related to these potential new entrants. We feel this is appropriate for the purpose of these projections, but if they were to be used for other purposes, this may not be appropriate and alternative projections may need to be developed.

18. Changes in Assumptions

None.

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All actuarial calculations are based on our understanding of the statutes governing the TCERA as contained in the County Employees Retirement Law (CERL) of 1937, with provisions adopted by the County Board of Supervisors, a district Board of Directors, or the TCERA Board, effective through June 30, 2021. The benefit and contribution provisions of this law are summarized briefly below, *(along with corresponding references to the State Code)*. This summary does not attempt to cover all the detailed provisions of the law.

There have been no changes to the Plan provisions since the prior valuation.

A. Membership in Retirement Plans

The County has established several defined benefit tiers based primarily on a member's date of entry into TCERA and in some cases, bargaining unit. There are two types of TCERA members:

Safety members: Employees whose principal duty is active law enforcement or active fire suppression are eligible to be Safety members. Membership in a particular tier depends upon date of entry to the system.

General members: All non-Safety employees are eligible to be General members. Membership in a particular tier depends primarily upon date of entry to the system.

Tier 1: General and Safety employees hired on or before December 31, 1979.

Tier 2: General and Safety employees hired on or after January 1, 1980 through December 31, 1989.

Tier 3: General and Safety employees hired on or after January 1, 1990 through December 31, 2012.

Tier 4 (PEPRA): All new members hired on or after January 1, 2013. Employees who transfer from and are eligible for reciprocity with another public employer will not be PEPRA members if their service in the reciprocal system was under a pre-PEPRA tier.

B. Member Contributions

Basic: Contributions are based on the entry age and class of each member and are required of all members. See Appendix F for details on this calculation. Current member rates are shown in the Appendix. (31621.5, 31621.2, 31639.5, 31639.25)

Contributions cease for all non-PEPRA members credited with 30 years of service. (31625, 31625.2)

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Tier 4: PEPRAs members must contribute half of the normal cost of the Plan. Contributions for these members will be based on the Normal Cost associated with their benefits; General and Safety members will pay different rates.

Interest is credited to contributions semiannually on June 30 and December 31 at an interest rate set by the Board of Retirement on amounts that have been on deposit for at least six months. (31591, 31700)

Cost-of-Living: The following loads are applied to Tier 1-3 Basic rates to pay for the employee portion of Cost-of-Living Adjustments. For PEPRAs members, the cost of COLAs is included in the normal cost, of which they contribute half.

	Tier 1	Tier 2-3
2020 Actual	53.70% (General)	25.29% (General)
	68.45% (Safety)	31.01% (Safety)
2021 Actual	53.70% (General)	25.29% (General)
	68.45% (Safety)	31.01% (Safety)

C. Employer Contributions:

The employer (County or District) contributes to the retirement fund a percentage of the total compensation provided for all members based on an actuarial investigation, valuation, and recommendation of the actuary. (31453, 31453.5, 31453.6, 31454, 31454.1, 31581)

D. Service Retirement Allowance:

Eligibility:

General Plan members:

Tiers 1-3: Age 50 with 10 years of service;
Any age with 30 years of service; or
Age 70 regardless of service. (31672, 31672.1)

Tier 4 (PEPRA): Age 52 with 5 years of service.

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Safety Plan members:

Tiers 1-3: Age 50 with 10 years of service;
Any age with 20 years of service. (31663.25)

Tier 4 (PEPRA): Age 50 with 5 years of service.

Final Compensation:

Tier 1: Monthly average of a member's highest 12 consecutive months of compensation. (31462.1)

Tiers 2-3: Monthly average of a member's highest 36 consecutive months of compensation. (31462)

Tier 4 (PEPRA): Monthly average of a member's highest 36 consecutive months of compensation, limited to the Social Security Wage Base on January 1, 2013, adjusted based on the annual change in the CPI-U each January 1 thereafter.

Compensation

Limit: The amount of compensation that is taken into account in computing benefits payable to any person who first becomes a member on or after July 1, 1996, shall not exceed the dollar limitations in Section 401(a)(17) of Title 26 of the US Code. (31671)

Integration with

Social Security: General and Safety Tier 1-3 members' benefits are integrated with Social Security. Benefits payable from the first \$161.54 of bi-weekly compensation are reduced by 1/3.

Monthly Allowance:

General Plan members:

Tier 1: Sum of (a) + (b):
(a) $1/60 \times \text{Final Compensation} \times \text{Plan Age Factor} \times \text{Years of Service}$ prior to 7/1/2005 (31676.11); plus
(b) $1/50 \times \text{Final Compensation} \times \text{Plan Age Factor} \times \text{Years of Service}$ after 7/1/2005 (31676.12)

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Tiers 2-3: Sum of (a) + (b):
 (a) $1/60 \times \text{Final Compensation} \times \text{Plan Age Factor} \times \text{Years of Service}$ prior to 7/1/2005 (31676.1); plus
 (b) $1/50 \times \text{Final Compensation} \times \text{Plan Age Factor} \times \text{Years of Service}$ after 7/1/2005 (31676.12)

Tier 4 (PEPRA): $2\% \times \text{Final Compensation} \times \text{PEPRA Age Factor} \times \text{Years of Service}$

Safety Plan members:

Tiers 1-3: $2\% \times \text{Final Compensation} \times \text{Plan Age Factor} \times \text{Years of Service}$ (31664)

Tier 4 (PEPRA): $2\% \times \text{Final Compensation} \times \text{PEPRA Age Factor} \times \text{Years of Service}$

Code Section: Label: Base: Age	Age Factors By Plan General				Safety	
	31676.11	31676.1	31676.12	PEPRA	31664	PEPRA
	1.67% @ 55	1.67% @ 57.5	2% @ 57	2% @ 62	2% @ 50	2% @ 50
					2.00%	2.00%
41					0.6258	
42					0.6625	
43					0.7004	
44					0.7397	
45					0.7805	
46					0.8226	
47					0.8678	
48					0.9085	
49					0.9522	
50	0.7454	0.7091	0.6681		1.0000	1.0000
51	0.7882	0.7457	0.7056		1.0516	1.0500
52	0.8346	0.7816	0.7454	0.5000	1.1078	1.1000
53	0.8850	0.8181	0.7882	0.5500	1.1692	1.1500
54	0.9399	0.8556	0.8346	0.6000	1.2366	1.2000
55	1.0000	0.8954	0.885	0.6500	1.3099	1.2500
56	1.0447	0.9382	0.9399	0.7000	1.3099	1.3000
57	1.1048	0.9846	1.0000	0.7500	1.3099	1.3500
58	1.1686	1.0350	1.0447	0.8000	1.3099	1.3500
59	1.2365	1.0899	1.1048	0.8500	1.3099	1.3500
60	1.3093	1.1500	1.1686	0.9000	1.3099	1.3500
61	1.3608	1.1947	1.2365	0.9500	1.3099	1.3500
62	1.4123	1.2548	1.3093	1.0000	1.3099	1.3500
63	1.4638	1.3186	1.3093	1.0500	1.3099	1.3500
64	1.5153	1.3865	1.3093	1.1000	1.3099	1.3500
65	1.5668	1.4593	1.3093	1.1500	1.3099	1.3500
66	1.5668	1.4593	1.3093	1.2000	1.3099	1.3500
67	1.5668	1.4593	1.3093	1.2500	1.3099	1.3500

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Maximum Allowance:

Allowance may not exceed 100% of Final Compensation.

Unmodified Retirement Allowance (Normal Form):

All Plans: Life Annuity payable to retired member with 60% continuance to an eligible spouse. (31760.1)

Eligible survivor includes certain domestic partners and dependent children. (31780.2) If there is no eligible survivor, any unpaid remainder of the member's accumulated contributions will be paid to the member's designated beneficiary.

Death after Retirement:

All Plans: Upon a member's death after retirement, a special lump sum of \$5,000 is payable to an eligible survivor, or the member's estate. (31789.3)

All Allowances: All allowances are made on a pro-rata basis (based on the number of days in that month) if not in effect for the entire month of retirement. (31600)

Supplemental Retiree Benefit Reserve:

The County has adopted the financial provisions of Article 5.5 of the 1937 Act for Tiers 1-3. The Article requires that in certain cases, a portion of investment earnings be allocated to a Supplemental Retiree Benefit Reserve (SRBR). Earnings allocated to the SRBR are to be used for the benefit of members in Tiers 1-3. Members of Tier 4 are not eligible for supplemental benefits. (31618)

Level 1: Members with at least 20 years of service are eligible for a supplemental benefit up to \$250 a month. The multiplier in effect is as follows:

Period	Multiplier
Prior to July 1, 2013	\$18.00
After July 1, 2013	\$17.00
After July 1, 2014	\$16.00
After July 1, 2015	\$15.00
After July 1, 2016	\$14.00
After July 1, 2017	\$12.50

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Members with less than 20 years of service are eligible for benefits in accordance with the schedule below:

Years of Service	Percentage of Full Benefit
Less than 10	0.00%
10	50.0%
11	55.0%
12	60.0%
13	65.0%
14	70.0%
15	75.0%
16	80.0%
17	85.0%
18	90.0%
19	95.0%

Only years of service with Tulare County are included for this benefit. 50% of member's reduced allowance is payable to an eligible spouse, or minor children if no eligible spouse exists.

Level 2: In addition to the Level 1 benefit, a supplemental COLA is available to retirees and beneficiaries who have lost more than 15% of their purchasing power, measured by their COLA Banks. The design of this COLA is to allow retirees to retain at least 85% of their purchasing power.

Level 3: 60% of a service retirement or 100% of a service-connected disability is payable to a spouse not married to the member at retirement. The spouse must be at least age 55 at the member's date of retirement, must have been married for at least two years, and the member must have elected the Unmodified Allowance retirement option to be eligible for this benefit.

E. Service-Connected Disability Retirement Allowance

Eligibility:

All Plans: Any age and length of service; disability must result from occupational injury or disease, and member must be permanently incapacitated for the performance of duty. (31720, 31720.5, 31720.6, 31720.7, 31720.9)

Monthly Allowance:

All Plans: Greater of (1) 50% of final compensation, and (2) the service retirement allowance, if eligible to retire. (31727.4)

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Normal Form of Payment:

All Plans: Life Annuity payable to retired member with 100% continuance to an eligible spouse.

Death after Retirement:

All Plans: Upon a member's death after retirement, a special lump sum of \$5,000 is payable to an eligible survivor, or the member's estate. (31789.3)

F. Non-Service-Connected Disability Retirement Allowance

Eligibility:

All Plans: Any age with five (5) years of service and permanently incapacitated for the performance of duty. (31720)

Monthly Allowance:

All Plans: The monthly allowance is equal to a service retirement allowance if the member is eligible to retire and the service retirement allowance exceeds the benefits described below. Otherwise, allowance equals 20% of Final Compensation, plus 2% for each year of service over five, with a maximum allowance of 40% of Final Compensation at 15 years of service. (31727.7)

Normal Form of Payment:

All Plans: Life Annuity with 60% continuance to a surviving spouse (or eligible children). (31760.1)

Death after Retirement:

All Plans: Upon a member's death after retirement, a special lump sum of \$5,000 is payable to an eligible survivor, or the member's estate. (31789.3)

G. Service-Connected Death Benefits

Eligibility:

All Plans: Active members who die in service as a result of injury or disease arising out of and in the course of employment. (31486.7, 31787)

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Monthly Allowance:

All Plans: A monthly allowance is payable to an eligible survivor equal to the greater of the Member's Service Retirement Allowance or Non-Service-Connected Disability Allowance (if he is eligible for service retirement or non-service disability at his date of death), and (b) $50\% \times$ Final Compensation. (31787)

A lump sum is payable to an eligible survivor equal to $1/12 \times$ final 12 months' Salary \times years of service (up to max of 6 years). (31781)

H. Non-Service-Connected Death Benefits

Eligibility:

All Plans: Active members who die while in service but not as a result of injury or disease arising out of and in the course of employment.

Monthly Allowance:

All Plans: If an active member is eligible for Non-Service-Connected Disability at his date of death, then a monthly allowance is payable to an eligible survivor equal to $60\% \times$ the member's non-service connected disability allowance. Otherwise, the benefit is a refund of contributions. (31781.1)

I. Deferred Vested Benefits

Eligibility:

All other Plans: Member contributions must be left on deposit and the member must have terminated with five (5) years of service or entered a reciprocal agency. Members are eligible for service retirement when they reach service retirement eligibility (based on years of service at termination plus reciprocal service, if any). (31700, 31701, 31702)

Monthly Allowance:

All other Plans: Same as service retirement allowance; payable any time after the member would have been eligible for service retirement. (31703, 31704, 31705)

J. Cost-of-Living Increases

Cost-of-living increases (or decreases) are applied to all retirement allowances (service and disability), optional death allowances, and annual death allowances effective April 1, based on changes in the average annual Consumer Price Index (CPI), rounded to the nearest $\frac{1}{2}$ of 1%. (31870, 31870.1)

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All Plans (excluding Tier 1):

Members (and their beneficiaries) are limited to a maximum 2% cost-of-living increase. (31870)

Tier 1:

Members (and their beneficiaries) are limited to a maximum 3% cost-of-living increase. (31870.1)

COLA Bank:

All Plans:

When the CPI exceeds the applicable percentage, the difference between the actual CPI and the maximum cost-of-living increase given in any year is credited to the COLA Accumulation (COLA Bank). It may be used in future years to provide cost-of-living increases when the CPI falls below the applicable percentage. (31874, 31874.1, 31874.2, 31874.3)

K. Optional Forms

In addition to the Unmodified Allowance, retirees may choose one of the following options:

Option 1: A slightly reduced monthly retirement allowance will be paid throughout the member's life, with the provision that accumulated contributions less the sum of the annuity portion of the payments received by the member will be paid upon death to the beneficiary.

Option 2: A reduced monthly retirement allowance will be paid to the member for life, with 100% of the allowance continued after death to the beneficiary.

Option 3: A reduced monthly retirement allowance will be paid to the member for life, with 50% of the allowance continued after death to the beneficiary.

Option 4: This option allows the member to name multiple beneficiaries and provides for a reduced monthly retirement allowance paid to the member for the member's lifetime with an actuarially calculated benefit continued throughout the life of the beneficiaries named at retirement.

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Assumptions Used for Optional Forms:

Our understanding is that the following assumptions are used to calculate the reduced monthly retirement allowances for Options 1-4 described above.

General

Mortality: RP-2000 Healthy Annuitant Mortality Table with adjustment for white-collar workers (healthy), RP-2000 Disabled Annuitant Mortality Table (disabled)

Gender Blend: 1/3 male, 2/3 female

Discount Rate: 7.25% per annum

Post-Retirement COLA: 3% per annum (Tier 1), 2% per annum (Tiers 2-3)

Safety

Mortality: RP-2000 Healthy Annuitant Mortality Table with adjustment for blue-collar workers (healthy), RP-2000 Disabled Annuitant Mortality Table with 2-year setback (disabled)

Gender Blend: 5/6 male, 1/6 female

Discount Rate: 7.25% per annum

Post-Retirement COLA: 3% per annum (Tier 1), 2% per annum (Tiers 2-3)

APPENDIX D – GLOSSARY

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs such as mortality, withdrawal, disability, retirement, changes in compensation, and rates of investment return.

2. Actuarial Cost Method

A procedure for determining the actuarial present value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a normal cost and an Actuarial Liability.

3. Actuarial Gain (Loss)

The difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

4. Actuarial Liability

The portion of the actuarial present value of projected benefits which will not be paid by future normal costs. It represents the value of the past normal costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The actuarial present value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made.

6. Actuarial Valuation

The determination, as of a specified date, of the normal cost, Actuarial Liability, Actuarial Value of Assets, and related actuarial present values for a pension plan.

7. Actuarial Value of Assets

The value of cash, investments, and other property belonging to a pension plan as used by the actuary for the purpose of an actuarial valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values.

8. Actuarially Equivalent

Of equal actuarial present value, determined as of a given date, with each value based on the same set of actuarial assumptions.

APPENDIX D – GLOSSARY

9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal Actuarial Cost Method

A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

11. Funded Ratio

The ratio of the Actuarial Value of Assets to the Actuarial Liability.

12. Normal Cost

That portion of the actuarial present value of pension plan benefits and expenses which is allocated to a valuation year by the actuarial cost method.

13. Projected Benefits

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of actuarial assumptions, taking into account such items as increases in future compensation and service credits.

14. Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets.

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APPENDIX E – MEMBER CONTRIBUTION RATES

Assumptions used to develop member contribution rates match valuation assumptions detailed in Appendix B, other than mortality which is static for member contribution rates. Additionally, only service retirement benefits are included in Tiers 1-3 member basic rate development.

The table below shows the applicable Code Section for Tier 1-3 member contribution rates as well as the corresponding annuity funded by the member.

Plan/Tier	Code Section	Member Contribution Provides Average Annuity	FAS Period
General Tier 1	31621.5	1/200 of Final Average Salary (FAS) at age 60	1 year
General Tier 2	31621.2	1/100 of Final Average Salary (FAS) at age 60	3 years
General Tier 3	31621.2	1/100 of Final Average Salary (FAS) at age 60	3 years
Safety Tier 1	31639.5	1/200 of Final Average Salary (FAS) at age 50	1 year
Safety Tier 2	31639.25	1/100 of Final Average Salary (FAS) at age 50	3 years
Safety Tier 3	31639.25	1/100 of Final Average Salary (FAS) at age 50	3 years

For Tiers 1-3, the following COLA loads were applied to the Basic rates. Starting in 2015, based on discussion with TCERA staff, we developed separate loads for General and Safety.

	Tier 1	Tier 2-3
2020 Actual	53.70% (General) 68.45% (Safety)	25.29% (General) 31.01% (Safety)
2021 Actual	53.70% (General) 68.45% (Safety)	25.29% (General) 31.01% (Safety)

For PEPRAs members, the cost of COLAs is included in the normal cost, of which they contribute half.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

2021 Member Contribution Rates (for fiscal year ending 2023)

Entry Age	General Tier 1		General Tiers 2 and 3		Safety Tier 1		Safety Tiers 2 and 3		Tier 4 Members	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	General	Safety
16	2.75%	4.13%	4.34%	6.51%	4.65%	6.97%	6.95%	10.43%	4.42%	9.61%
17	2.81%	4.22%	4.43%	6.64%	4.65%	6.97%	6.95%	10.43%	4.42%	9.61%
18	2.87%	4.31%	4.52%	6.78%	4.65%	6.97%	6.95%	10.43%	4.42%	9.61%
19	2.93%	4.40%	4.62%	6.93%	4.65%	6.97%	6.95%	10.43%	4.42%	9.61%
20	2.99%	4.49%	4.71%	7.07%	4.65%	6.97%	6.95%	10.43%	4.42%	9.61%
21	3.05%	4.58%	4.81%	7.22%	4.73%	7.09%	7.07%	10.60%	4.67%	9.99%
22	3.12%	4.68%	4.91%	7.37%	4.81%	7.21%	7.19%	10.78%	4.92%	10.38%
23	3.18%	4.77%	5.01%	7.52%	4.89%	7.33%	7.31%	10.96%	5.17%	10.76%
24	3.25%	4.87%	5.12%	7.68%	4.97%	7.45%	7.43%	11.14%	5.43%	11.15%
25	3.31%	4.97%	5.23%	7.84%	5.05%	7.57%	7.55%	11.33%	5.69%	11.54%
26	3.39%	5.08%	5.33%	8.00%	5.13%	7.70%	7.68%	11.52%	5.91%	11.91%
27	3.45%	5.18%	5.44%	8.16%	5.22%	7.83%	7.81%	11.72%	6.13%	12.28%
28	3.53%	5.29%	5.55%	8.33%	5.31%	7.96%	7.94%	11.91%	6.35%	12.64%
29	3.60%	5.40%	5.67%	8.50%	5.40%	8.10%	8.07%	12.11%	6.58%	12.99%
30	3.67%	5.51%	5.79%	8.68%	5.49%	8.24%	8.21%	12.32%	6.80%	13.34%
31	3.75%	5.62%	5.91%	8.86%	5.59%	8.38%	8.35%	12.53%	7.01%	13.72%
32	3.83%	5.74%	6.03%	9.04%	5.68%	8.52%	8.50%	12.75%	7.22%	14.10%
33	3.91%	5.86%	6.15%	9.23%	5.78%	8.67%	8.65%	12.97%	7.44%	14.47%
34	3.99%	5.98%	6.28%	9.42%	5.88%	8.82%	8.79%	13.19%	7.66%	14.85%
35	4.07%	6.10%	6.41%	9.61%	5.99%	8.98%	8.95%	13.43%	7.89%	15.24%
36	4.15%	6.23%	6.54%	9.81%	6.09%	9.14%	9.11%	13.67%	8.12%	15.59%
37	4.24%	6.36%	6.68%	10.02%	6.21%	9.31%	9.29%	13.93%	8.36%	15.94%
38	4.33%	6.49%	6.81%	10.22%	6.33%	9.49%	9.46%	14.19%	8.62%	16.30%
39	4.42%	6.63%	6.96%	10.44%	6.45%	9.67%	9.65%	14.47%	8.88%	16.67%
40	4.51%	6.77%	7.11%	10.66%	6.58%	9.87%	9.81%	14.72%	9.14%	17.07%
41	4.61%	6.91%	7.26%	10.89%	6.73%	10.09%	9.97%	14.95%	9.40%	17.46%
42	4.71%	7.06%	7.41%	11.12%	6.82%	10.23%	10.11%	15.16%	9.66%	17.86%
43	4.81%	7.22%	7.57%	11.35%	6.92%	10.38%	10.22%	15.33%	9.99%	18.33%
44	4.92%	7.38%	7.71%	11.57%	7.04%	10.56%	10.33%	15.49%	10.33%	18.81%
45	5.01%	7.51%	7.85%	11.77%	7.11%	10.66%	10.37%	15.56%	10.67%	19.28%
46	5.09%	7.64%	7.99%	11.99%	7.20%	10.80%	10.35%	15.52%	11.09%	19.68%
47	5.19%	7.79%	8.14%	12.21%	7.19%	10.79%	10.19%	15.28%	11.51%	20.09%
48	5.29%	7.93%	8.29%	12.44%	7.15%	10.73%	10.52%	15.78%	11.85%	20.50%
49	5.39%	8.09%	8.45%	12.68%	6.99%	10.48%	10.87%	16.31%	12.19%	20.93%
50	5.51%	8.26%	8.62%	12.93%	6.99%	10.48%	10.87%	16.31%	12.52%	20.93%
51	5.63%	8.44%	8.77%	13.16%	6.99%	10.48%	10.87%	16.31%	12.86%	20.93%
52	5.73%	8.59%	8.91%	13.37%	6.99%	10.48%	10.87%	16.31%	13.18%	20.93%
53	5.83%	8.75%	9.03%	13.55%	6.99%	10.48%	10.87%	16.31%	13.50%	20.93%
54	5.94%	8.91%	9.11%	13.66%	6.99%	10.48%	10.87%	16.31%	13.79%	20.93%
55	6.01%	9.01%	9.12%	13.68%	6.99%	10.48%	10.87%	16.31%	14.03%	20.93%
56	6.05%	9.07%	9.06%	13.59%	6.99%	10.48%	10.87%	16.31%	14.29%	20.93%
57	6.02%	9.03%	8.93%	13.40%	6.99%	10.48%	10.87%	16.31%	14.49%	20.93%
58	5.96%	8.94%	9.23%	13.84%	6.99%	10.48%	10.87%	16.31%	14.65%	20.93%
59	5.85%	8.77%	9.53%	14.30%	6.99%	10.48%	10.87%	16.31%	14.71%	20.93%
Assumptions:										
Interest:	7.00%		7.00%		7.00%		7.00%		7.00%	
Salary:	3.00%		3.00%		3.00%		3.00%		3.00%	
COLA:	2.60%		2.00%		2.60%		2.00%		2.00%	
Mortality:	For General: Retired Pensioner (RP) 2014 Combined Healthy Table, with 20-year Generational improvement using Projection Scale MP-2019, in 8.0% for females to reflect Plan experience, and blended 30% male and 70% female For Safety: Retired Pensioner (RP) 2014 Combined Healthy Table with blue-collar adjustment, with 20-year Generational improvement using Pro increased by 4.5% for males to reflect Plan experience, and blended 75% male and 25% female									

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

The tables on the next six pages show the 2021 member contribution rates split into the Basic and COLA components, by tier.

SAMPLE

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

Entry Age	General Tier 1					
	Basic Rate		COLA Rate		Total Rate	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54
16	1.79%	2.69%	0.96%	1.44%	2.75%	4.13%
17	1.83%	2.75%	0.98%	1.47%	2.81%	4.22%
18	1.87%	2.80%	1.00%	1.51%	2.87%	4.31%
19	1.91%	2.86%	1.02%	1.54%	2.93%	4.40%
20	1.95%	2.92%	1.05%	1.57%	2.99%	4.49%
21	1.99%	2.98%	1.07%	1.60%	3.05%	4.58%
22	2.03%	3.04%	1.09%	1.64%	3.12%	4.68%
23	2.07%	3.10%	1.11%	1.67%	3.18%	4.77%
24	2.11%	3.17%	1.13%	1.70%	3.25%	4.87%
25	2.16%	3.23%	1.16%	1.74%	3.31%	4.97%
26	2.20%	3.31%	1.18%	1.77%	3.39%	5.08%
27	2.25%	3.37%	1.21%	1.81%	3.45%	5.18%
28	2.29%	3.44%	1.23%	1.85%	3.53%	5.29%
29	2.34%	3.51%	1.26%	1.89%	3.60%	5.40%
30	2.39%	3.58%	1.28%	1.93%	3.67%	5.51%
31	2.44%	3.66%	1.31%	1.96%	3.75%	5.62%
32	2.49%	3.73%	1.34%	2.01%	3.83%	5.74%
33	2.54%	3.81%	1.36%	2.05%	3.91%	5.86%
34	2.59%	3.89%	1.39%	2.09%	3.99%	5.98%
35	2.65%	3.97%	1.42%	2.13%	4.07%	6.10%
36	2.70%	4.05%	1.45%	2.18%	4.15%	6.23%
37	2.76%	4.14%	1.48%	2.22%	4.24%	6.36%
38	2.82%	4.22%	1.51%	2.27%	4.33%	6.49%
39	2.88%	4.31%	1.54%	2.32%	4.42%	6.63%
40	2.94%	4.40%	1.58%	2.37%	4.51%	6.77%
41	3.00%	4.50%	1.61%	2.41%	4.61%	6.91%
42	3.06%	4.59%	1.64%	2.47%	4.71%	7.06%
43	3.13%	4.70%	1.68%	2.52%	4.81%	7.22%
44	3.20%	4.80%	1.72%	2.58%	4.92%	7.38%
45	3.26%	4.89%	1.75%	2.62%	5.01%	7.51%
46	3.31%	4.97%	1.78%	2.67%	5.09%	7.64%
47	3.38%	5.07%	1.81%	2.72%	5.19%	7.79%
48	3.44%	5.16%	1.85%	2.77%	5.29%	7.93%
49	3.51%	5.26%	1.88%	2.83%	5.39%	8.09%
50	3.58%	5.37%	1.92%	2.89%	5.51%	8.26%
51	3.66%	5.49%	1.97%	2.95%	5.63%	8.44%
52	3.73%	5.59%	2.00%	3.00%	5.73%	8.59%
53	3.80%	5.69%	2.04%	3.06%	5.83%	8.75%
54	3.86%	5.80%	2.08%	3.11%	5.94%	8.91%
55	3.91%	5.86%	2.10%	3.15%	6.01%	9.01%
56	3.93%	5.90%	2.11%	3.17%	6.05%	9.07%
57	3.92%	5.88%	2.10%	3.15%	6.02%	9.03%
58	3.88%	5.82%	2.08%	3.12%	5.96%	8.94%
59	3.80%	5.71%	2.04%	3.06%	5.85%	8.77%
Assumptions:						
Interest:	7.00%					
Salary:	3.00%					
COLA:	2.60%					
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table, with 20-year Generational improvement using Projection Scale MP-2019, increased by 2.2% for males and 8.0% for females to reflect Plan experience, and blended 30% male and 70% female					

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

Entry Age	General Tiers 2 and 3					
	Basic Rate		COLA Rate		Total Rate	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54
16	3.46%	5.20%	0.88%	1.31%	4.34%	6.51%
17	3.53%	5.30%	0.89%	1.34%	4.43%	6.64%
18	3.61%	5.41%	0.91%	1.37%	4.52%	6.78%
19	3.69%	5.53%	0.93%	1.40%	4.62%	6.93%
20	3.76%	5.64%	0.95%	1.43%	4.71%	7.07%
21	3.84%	5.76%	0.97%	1.46%	4.81%	7.22%
22	3.92%	5.88%	0.99%	1.49%	4.91%	7.37%
23	4.00%	6.00%	1.01%	1.52%	5.01%	7.52%
24	4.09%	6.13%	1.03%	1.55%	5.12%	7.68%
25	4.17%	6.26%	1.05%	1.58%	5.23%	7.84%
26	4.26%	6.39%	1.08%	1.61%	5.33%	8.00%
27	4.34%	6.51%	1.10%	1.65%	5.44%	8.16%
28	4.43%	6.65%	1.12%	1.68%	5.55%	8.33%
29	4.52%	6.78%	1.14%	1.72%	5.67%	8.50%
30	4.62%	6.93%	1.17%	1.75%	5.79%	8.68%
31	4.71%	7.07%	1.19%	1.79%	5.91%	8.86%
32	4.81%	7.22%	1.22%	1.82%	6.03%	9.04%
33	4.91%	7.37%	1.24%	1.86%	6.15%	9.23%
34	5.01%	7.52%	1.27%	1.90%	6.28%	9.42%
35	5.11%	7.67%	1.29%	1.94%	6.41%	9.61%
36	5.22%	7.83%	1.32%	1.98%	6.54%	9.81%
37	5.33%	8.00%	1.35%	2.02%	6.68%	10.02%
38	5.44%	8.16%	1.38%	2.06%	6.81%	10.22%
39	5.56%	8.33%	1.40%	2.11%	6.96%	10.44%
40	5.67%	8.51%	1.43%	2.15%	7.11%	10.66%
41	5.79%	8.69%	1.47%	2.20%	7.26%	10.89%
42	5.92%	8.88%	1.50%	2.24%	7.41%	11.12%
43	6.04%	9.06%	1.53%	2.29%	7.57%	11.35%
44	6.16%	9.23%	1.56%	2.34%	7.71%	11.57%
45	6.26%	9.39%	1.58%	2.38%	7.85%	11.77%
46	6.38%	9.57%	1.61%	2.42%	7.99%	11.99%
47	6.50%	9.75%	1.64%	2.46%	8.14%	12.21%
48	6.62%	9.93%	1.67%	2.51%	8.29%	12.44%
49	6.75%	10.12%	1.71%	2.56%	8.45%	12.68%
50	6.88%	10.32%	1.74%	2.61%	8.62%	12.93%
51	7.00%	10.50%	1.77%	2.66%	8.77%	13.16%
52	7.11%	10.67%	1.80%	2.70%	8.91%	13.37%
53	7.21%	10.82%	1.82%	2.73%	9.03%	13.55%
54	7.27%	10.90%	1.84%	2.76%	9.11%	13.66%
55	7.28%	10.92%	1.84%	2.76%	9.12%	13.68%
56	7.23%	10.85%	1.83%	2.74%	9.06%	13.59%
57	7.13%	10.70%	1.80%	2.70%	8.93%	13.40%
58	7.36%	11.05%	1.86%	2.79%	9.23%	13.84%
59	7.61%	11.41%	1.92%	2.89%	9.53%	14.30%
Assumptions:						
Interest:	7.00%					
Salary:	3.00%					
COLA:	2.00%					
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table, with 20-year Generational improvement using Projection Scale MP-2019, increased by 2.2% for males and 8.0% for females to reflect Plan experience, and blended 30% male and 70% female					

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

General Tier 4			
Entry Age	Basic Rate	COLA Rate	Total Rate
16	3.62%	0.80%	4.42%
17	3.62%	0.80%	4.42%
18	3.62%	0.80%	4.42%
19	3.62%	0.80%	4.42%
20	3.62%	0.80%	4.42%
21	3.81%	0.86%	4.67%
22	4.01%	0.91%	4.92%
23	4.22%	0.95%	5.17%
24	4.43%	1.00%	5.43%
25	4.65%	1.04%	5.69%
26	4.83%	1.08%	5.91%
27	5.01%	1.12%	6.13%
28	5.20%	1.15%	6.35%
29	5.39%	1.19%	6.58%
30	5.57%	1.23%	6.80%
31	5.75%	1.26%	7.01%
32	5.93%	1.29%	7.22%
33	6.11%	1.33%	7.44%
34	6.30%	1.36%	7.66%
35	6.49%	1.40%	7.89%
36	6.69%	1.43%	8.12%
37	6.89%	1.47%	8.36%
38	7.11%	1.51%	8.62%
39	7.32%	1.56%	8.88%
40	7.54%	1.60%	9.14%
41	7.77%	1.63%	9.40%
42	7.99%	1.67%	9.66%
43	8.27%	1.72%	9.99%
44	8.55%	1.78%	10.33%
45	8.83%	1.84%	10.67%
46	9.18%	1.91%	11.09%
47	9.52%	1.99%	11.51%
48	9.82%	2.03%	11.85%
49	10.11%	2.08%	12.19%
50	10.40%	2.12%	12.52%
51	10.70%	2.16%	12.86%
52	10.99%	2.19%	13.18%
53	11.28%	2.22%	13.50%
54	11.54%	2.25%	13.79%
55	11.76%	2.27%	14.03%
56	12.01%	2.28%	14.29%
57	12.21%	2.28%	14.49%
58	12.37%	2.28%	14.65%
59	12.46%	2.25%	14.71%
Assumptions:			
Interest:	7.00%		
Salary:	3.00%		
COLA:	2.00%		
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table, with 22-year Generational improvement using Projection Scale MP-2019, increased by 2.2% for males and 8.0% for females to reflect Plan experience, and blended 30% male and 70% female		

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

Entry Age	Safety Tier 1					
	Basic Rate		COLA Rate		Total Rate	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54
16	2.76%	4.14%	1.89%	2.83%	4.65%	6.97%
17	2.76%	4.14%	1.89%	2.83%	4.65%	6.97%
18	2.76%	4.14%	1.89%	2.83%	4.65%	6.97%
19	2.76%	4.14%	1.89%	2.83%	4.65%	6.97%
20	2.76%	4.14%	1.89%	2.83%	4.65%	6.97%
21	2.81%	4.21%	1.92%	2.88%	4.73%	7.09%
22	2.85%	4.28%	1.95%	2.93%	4.81%	7.21%
23	2.90%	4.35%	1.99%	2.98%	4.89%	7.33%
24	2.95%	4.42%	2.02%	3.03%	4.97%	7.45%
25	3.00%	4.49%	2.05%	3.08%	5.05%	7.57%
26	3.05%	4.57%	2.09%	3.13%	5.13%	7.70%
27	3.10%	4.65%	2.12%	3.18%	5.22%	7.83%
28	3.15%	4.73%	2.16%	3.23%	5.31%	7.96%
29	3.21%	4.81%	2.19%	3.29%	5.40%	8.10%
30	3.26%	4.89%	2.23%	3.35%	5.49%	8.24%
31	3.32%	4.97%	2.27%	3.41%	5.59%	8.38%
32	3.37%	5.06%	2.31%	3.46%	5.68%	8.52%
33	3.43%	5.15%	2.35%	3.52%	5.78%	8.67%
34	3.49%	5.24%	2.39%	3.58%	5.88%	8.82%
35	3.55%	5.33%	2.43%	3.65%	5.99%	8.98%
36	3.62%	5.43%	2.48%	3.71%	6.09%	9.14%
37	3.68%	5.53%	2.52%	3.78%	6.21%	9.31%
38	3.76%	5.63%	2.57%	3.86%	6.33%	9.49%
39	3.83%	5.74%	2.62%	3.93%	6.45%	9.67%
40	3.91%	5.86%	2.67%	4.01%	6.58%	9.87%
41	3.99%	5.99%	2.73%	4.10%	6.73%	10.09%
42	4.05%	6.07%	2.77%	4.16%	6.82%	10.23%
43	4.11%	6.16%	2.81%	4.22%	6.92%	10.38%
44	4.18%	6.27%	2.86%	4.29%	7.04%	10.56%
45	4.22%	6.33%	2.89%	4.33%	7.11%	10.66%
46	4.27%	6.41%	2.93%	4.39%	7.20%	10.80%
47	4.27%	6.41%	2.92%	4.38%	7.19%	10.79%
48	4.25%	6.37%	2.91%	4.36%	7.15%	10.73%
49	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
50	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
51	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
52	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
53	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
54	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
55	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
56	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
57	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
58	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
59	4.15%	6.22%	2.84%	4.26%	6.99%	10.48%
Assumptions:						
Interest:	7.00%					
Salary:	3.00%					
COLA:	2.60%					
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table with blue-collar adjustment, with 20-year Generational improvement using Projection Scale MP-2019, increased by 4.5% for males to reflect Plan experience, and blended 75% male and 25% female					

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

Entry Age	Safety Tiers 2 and 3					
	Basic Rate		COLA Rate		Total Rate	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54
16	5.31%	7.96%	1.65%	2.47%	6.95%	10.43%
17	5.31%	7.96%	1.65%	2.47%	6.95%	10.43%
18	5.31%	7.96%	1.65%	2.47%	6.95%	10.43%
19	5.31%	7.96%	1.65%	2.47%	6.95%	10.43%
20	5.31%	7.96%	1.65%	2.47%	6.95%	10.43%
21	5.39%	8.09%	1.67%	2.51%	7.07%	10.60%
22	5.49%	8.23%	1.70%	2.55%	7.19%	10.78%
23	5.58%	8.37%	1.73%	2.59%	7.31%	10.96%
24	5.67%	8.50%	1.76%	2.64%	7.43%	11.14%
25	5.77%	8.65%	1.79%	2.68%	7.55%	11.33%
26	5.86%	8.79%	1.82%	2.73%	7.68%	11.52%
27	5.96%	8.95%	1.85%	2.77%	7.81%	11.72%
28	6.06%	9.09%	1.88%	2.82%	7.94%	11.91%
29	6.16%	9.24%	1.91%	2.87%	8.07%	12.11%
30	6.27%	9.40%	1.94%	2.92%	8.21%	12.32%
31	6.38%	9.56%	1.98%	2.97%	8.35%	12.53%
32	6.49%	9.73%	2.01%	3.02%	8.50%	12.75%
33	6.60%	9.90%	2.05%	3.07%	8.65%	12.97%
34	6.71%	10.07%	2.08%	3.12%	8.79%	13.19%
35	6.83%	10.25%	2.12%	3.18%	8.95%	13.43%
36	6.96%	10.43%	2.16%	3.24%	9.11%	13.67%
37	7.09%	10.63%	2.20%	3.30%	9.29%	13.93%
38	7.22%	10.83%	2.24%	3.36%	9.46%	14.19%
39	7.36%	11.05%	2.28%	3.42%	9.65%	14.47%
40	7.49%	11.24%	2.32%	3.48%	9.81%	14.72%
41	7.61%	11.41%	2.36%	3.54%	9.97%	14.95%
42	7.71%	11.57%	2.39%	3.59%	10.11%	15.16%
43	7.80%	11.70%	2.42%	3.63%	10.22%	15.33%
44	7.88%	11.82%	2.44%	3.67%	10.33%	15.49%
45	7.92%	11.88%	2.46%	3.68%	10.37%	15.56%
46	7.90%	11.85%	2.45%	3.67%	10.35%	15.52%
47	7.78%	11.66%	2.41%	3.62%	10.19%	15.28%
48	8.03%	12.05%	2.49%	3.73%	10.52%	15.78%
49	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
50	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
51	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
52	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
53	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
54	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
55	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
56	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
57	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
58	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
59	8.30%	12.45%	2.57%	3.86%	10.87%	16.31%
Assumptions:						
Interest:	7.00%					
Salary:	3.00%					
COLA:	2.00%					
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table with blue-collar adjustment, with 20-year Generational improvement using Projection Scale MP-2019, increased by 4.5% for males to reflect Plan experience, and blended 75% male and 25% female					

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

Safety Tier 4			
Entry Age	Basic Rate	COLA Rate	Total Rate
16	7.71%	1.90%	9.61%
17	7.71%	1.90%	9.61%
18	7.71%	1.90%	9.61%
19	7.71%	1.90%	9.61%
20	7.71%	1.90%	9.61%
21	8.01%	1.98%	9.99%
22	8.32%	2.06%	10.38%
23	8.63%	2.13%	10.76%
24	8.94%	2.21%	11.15%
25	9.26%	2.28%	11.54%
26	9.56%	2.35%	11.91%
27	9.86%	2.42%	12.28%
28	10.16%	2.48%	12.64%
29	10.45%	2.54%	12.99%
30	10.74%	2.60%	13.34%
31	11.05%	2.67%	13.72%
32	11.35%	2.75%	14.10%
33	11.65%	2.82%	14.47%
34	11.96%	2.89%	14.85%
35	12.27%	2.97%	15.24%
36	12.57%	3.02%	15.59%
37	12.86%	3.08%	15.94%
38	13.15%	3.15%	16.30%
39	13.46%	3.21%	16.67%
40	13.79%	3.28%	17.07%
41	14.11%	3.35%	17.46%
42	14.45%	3.41%	17.86%
43	14.84%	3.49%	18.33%
44	15.23%	3.58%	18.81%
45	15.63%	3.65%	19.28%
46	15.98%	3.70%	19.68%
47	16.34%	3.75%	20.09%
48	16.72%	3.78%	20.50%
49	17.10%	3.83%	20.93%
50	17.10%	3.83%	20.93%
51	17.10%	3.83%	20.93%
52	17.10%	3.83%	20.93%
53	17.10%	3.83%	20.93%
54	17.10%	3.83%	20.93%
55	17.10%	3.83%	20.93%
56	17.10%	3.83%	20.93%
57	17.10%	3.83%	20.93%
58	17.10%	3.83%	20.93%
59	17.10%	3.83%	20.93%
Assumptions:			
Interest:	7.00%		
Salary:	3.00%		
COLA:	2.00%		
Mortality:	Retired Pensioner (RP) 2014 Combined Healthy Table with blue-collar adjustment, with 22-year Generational improvement using Projection Scale MP-2019, increased by 4.5% for males to reflect Plan experience, and blended 75% male and 25% female		

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX E – MEMBER CONTRIBUTION RATES

2020 Member Contribution Rates (for fiscal year ending 2022)

Entry Age	General Tier 1		General Tiers 2 and 3		Safety Tier 1		Safety Tiers 2 and 3		Tier 4 Members	
	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	First \$161.54	Over \$161.54	General	Safety
16	2.75%	4.13%	4.34%	6.51%	4.65%	6.97%	6.95%	10.43%	4.43%	9.60%
17	2.81%	4.22%	4.43%	6.64%	4.65%	6.97%	6.95%	10.43%	4.43%	9.60%
18	2.87%	4.31%	4.52%	6.78%	4.65%	6.97%	6.95%	10.43%	4.43%	9.60%
19	2.93%	4.40%	4.62%	6.93%	4.65%	6.97%	6.95%	10.43%	4.43%	9.60%
20	2.99%	4.49%	4.71%	7.07%	4.65%	6.97%	6.95%	10.43%	4.43%	9.60%
21	3.05%	4.58%	4.81%	7.22%	4.73%	7.09%	7.07%	10.60%	4.67%	9.98%
22	3.12%	4.68%	4.91%	7.37%	4.81%	7.21%	7.19%	10.78%	4.92%	10.36%
23	3.18%	4.77%	5.01%	7.52%	4.89%	7.33%	7.31%	10.96%	5.18%	10.75%
24	3.25%	4.87%	5.12%	7.68%	4.97%	7.45%	7.43%	11.14%	5.43%	11.14%
25	3.31%	4.97%	5.23%	7.84%	5.05%	7.57%	7.55%	11.33%	5.69%	11.53%
26	3.39%	5.08%	5.33%	8.00%	5.13%	7.70%	7.68%	11.52%	5.91%	11.90%
27	3.45%	5.18%	5.44%	8.16%	5.22%	7.83%	7.81%	11.72%	6.14%	12.26%
28	3.53%	5.29%	5.55%	8.33%	5.31%	7.96%	7.94%	11.91%	6.36%	12.63%
29	3.60%	5.40%	5.67%	8.50%	5.40%	8.10%	8.07%	12.11%	6.58%	12.98%
30	3.67%	5.51%	5.79%	8.68%	5.49%	8.24%	8.21%	12.32%	6.81%	13.33%
31	3.75%	5.62%	5.91%	8.86%	5.59%	8.38%	8.35%	12.53%	7.02%	13.71%
32	3.83%	5.74%	6.03%	9.04%	5.68%	8.52%	8.50%	12.75%	7.23%	14.09%
33	3.91%	5.86%	6.15%	9.23%	5.78%	8.67%	8.65%	12.97%	7.45%	14.46%
34	3.99%	5.98%	6.28%	9.42%	5.88%	8.82%	8.79%	13.19%	7.67%	14.83%
35	4.07%	6.10%	6.41%	9.61%	5.99%	8.98%	8.95%	13.43%	7.89%	15.22%
36	4.15%	6.23%	6.54%	9.81%	6.09%	9.14%	9.11%	13.67%	8.13%	15.58%
37	4.24%	6.36%	6.68%	10.02%	6.21%	9.31%	9.29%	13.93%	8.37%	15.93%
38	4.33%	6.49%	6.81%	10.22%	6.33%	9.49%	9.46%	14.19%	8.63%	16.28%
39	4.42%	6.63%	6.96%	10.44%	6.45%	9.67%	9.65%	14.47%	8.89%	16.66%
40	4.51%	6.77%	7.11%	10.66%	6.58%	9.87%	9.81%	14.72%	9.14%	17.06%
41	4.61%	6.91%	7.26%	10.89%	6.73%	10.09%	9.97%	14.95%	9.41%	17.44%
42	4.71%	7.06%	7.41%	11.12%	6.82%	10.23%	10.11%	15.16%	9.67%	17.85%
43	4.81%	7.22%	7.57%	11.35%	6.92%	10.38%	10.22%	15.33%	10.00%	18.31%
44	4.92%	7.38%	7.71%	11.57%	7.04%	10.56%	10.33%	15.49%	10.34%	18.79%
45	5.01%	7.51%	7.85%	11.77%	7.11%	10.66%	10.37%	15.56%	10.68%	19.26%
46	5.09%	7.64%	7.99%	11.99%	7.20%	10.80%	10.35%	15.52%	11.10%	19.66%
47	5.19%	7.79%	8.14%	12.21%	7.19%	10.79%	10.19%	15.28%	11.52%	20.07%
48	5.29%	7.93%	8.29%	12.44%	7.15%	10.73%	10.52%	15.78%	11.86%	20.48%
49	5.39%	8.09%	8.45%	12.68%	6.99%	10.48%	10.87%	16.31%	12.20%	20.91%
50	5.51%	8.26%	8.62%	12.93%	6.99%	10.48%	10.87%	16.31%	12.53%	20.91%
51	5.63%	8.44%	8.77%	13.16%	6.99%	10.48%	10.87%	16.31%	12.87%	20.91%
52	5.73%	8.59%	8.91%	13.37%	6.99%	10.48%	10.87%	16.31%	13.20%	20.91%
53	5.83%	8.75%	9.03%	13.55%	6.99%	10.48%	10.87%	16.31%	13.52%	20.91%
54	5.94%	8.91%	9.11%	13.66%	6.99%	10.48%	10.87%	16.31%	13.81%	20.91%
55	6.01%	9.01%	9.12%	13.68%	6.99%	10.48%	10.87%	16.31%	14.05%	20.91%
56	6.05%	9.07%	9.06%	13.59%	6.99%	10.48%	10.87%	16.31%	14.30%	20.91%
57	6.02%	9.03%	8.93%	13.40%	6.99%	10.48%	10.87%	16.31%	14.50%	20.91%
58	5.96%	8.94%	9.23%	13.84%	6.99%	10.48%	10.87%	16.31%	14.66%	20.91%
59	5.85%	8.77%	9.53%	14.30%	6.99%	10.48%	10.87%	16.31%	14.73%	20.91%
Assumptions:										
Interest:	7.00%		7.00%		7.00%		7.00%		7.00%	
Salary:	3.00%		3.00%		3.00%		3.00%		3.00%	
COLA:	2.60%		2.00%		2.60%		2.00%		2.00%	
Mortality:	For General: Retired Pensioner (RP) 2014 Combined Healthy Table, with 20-year Generational improvement using Projection Scale MP-2019, increased by 2.2% for males and 8.0% for females to reflect Plan experience, and blended 30% male and 70% female For Safety: Retired Pensioner (RP) 2014 Combined Healthy Table with blue-collar adjustment, with 20-year Generational improvement using Projection Scale MP-2019, increased by 4.5% for males to reflect Plan experience, and blended 75% male and 25% female									

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX F – SUPPLEMENTAL TABLES FOR REPORTING PURPOSES

The tables on this page and the next three pages show selected demographic assumption rates based on age or service as reflected in the June 30, 2021 actuarial valuation.

General - Male

Age	Demographic Assumption Rates - Age				
	Service Retirement Rate*	Mortality of Active Members Rate		Withdrawal (Termination) Rate**	
		Ordinary	Service		
25	0.000	0.000590	0.000000	0.0800	
30	0.000	0.000603	0.000000	0.0800	
35	0.000	0.000724	0.000000	0.0800	
40	0.000	0.000809	0.000000	0.0800	
45	0.000	0.001079	0.000000	0.0800	
50	0.050	0.001689	0.000000	0.0500	
55	0.060	0.002788	0.000000	0.0500	
60	0.150	0.004891	0.000000	0.0500	
65	0.350	0.008654	0.000000	0.0000	
70	0.350	0.013827	0.000000	0.0000	

*The Service Retirement Rates above assume less than 30 years of service.

**The Withdrawal Rates above assume at least 3 but less than 5 years of service.

General - Female

Age	Demographic Assumption Rates - Age				
	Service Retirement Rate*	Mortality of Active Members Rate		Withdrawal (Termination) Rate**	
		Ordinary	Service		
25	0.000	0.000223	0.000000	0.0800	
30	0.000	0.000297	0.000000	0.0800	
35	0.000	0.000392	0.000000	0.0800	
40	0.000	0.000498	0.000000	0.0800	
45	0.000	0.000731	0.000000	0.0800	
50	0.050	0.001158	0.000000	0.0500	
55	0.060	0.001834	0.000000	0.0500	
60	0.150	0.002783	0.000000	0.0500	
65	0.350	0.004016	0.000000	0.0000	
70	0.350	0.006471	0.000000	0.0000	

*The Service Retirement Rates above assume less than 30 years of service.

**The Withdrawal Rates above assume at least 3 but less than 5 years of service.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX F – SUPPLEMENTAL TABLES FOR REPORTING PURPOSES

Safety - Male

Age	Demographic Assumption Rates - Age				
	Service Retirement Rate*	Mortality of Active Members Rate		Withdrawal (Termination) Rate**	
		Ordinary	Service		
25	0.000	0.000453	0.000328	0.0700	
30	0.000	0.000463	0.000336	0.0700	
35	0.000	0.000479	0.000479	0.0700	
40	0.000	0.000536	0.000536	0.0700	
45	0.070	0.000685	0.000743	0.0600	
50	0.070	0.000939	0.001296	0.0600	
55	0.100	0.001476	0.002213	0.0600	
60	0.200	0.002395	0.004078	0.0000	
65	0.400	0.004237	0.007214	0.0000	
70	1.000	0.006525	0.011110	0.0000	

*The Service Retirement Rates above assume less than 20 years of service.

**The Withdrawal Rates above assume at least 3 but less than 5 years of service.

Safety - Female

Age	Demographic Assumption Rates - Age				
	Service Retirement Rate*	Mortality of Active Members Rate		Withdrawal (Termination) Rate**	
		Ordinary	Service		
25	0.000	0.000134	0.000097	0.0700	
30	0.000	0.000179	0.000129	0.0700	
35	0.000	0.000204	0.000204	0.0700	
40	0.000	0.000259	0.000259	0.0700	
45	0.070	0.000364	0.000395	0.0600	
50	0.070	0.000505	0.000698	0.0600	
55	0.100	0.000762	0.001143	0.0600	
60	0.200	0.001069	0.001821	0.0000	
65	0.400	0.001543	0.002627	0.0000	
70	1.000	0.002451	0.004174	0.0000	

*The Service Retirement Rates above assume less than 20 years of service.

**The Withdrawal Rates above assume at least 3 but less than 5 years of service.

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX F – SUPPLEMENTAL TABLES FOR REPORTING PURPOSES

General - Male

Demographic Assumption Rates - Years of Service		
Service	Service Retirement Rate*	Withdrawal (Termination) Rate**
5	0.150	0.050
10	0.150	0.030
15	0.150	0.030
20	0.150	0.030
25	0.150	0.030
30	0.200	0.030
35	0.200	0.030
40	0.200	0.030
45	0.200	0.030
50	0.200	0.030

**The Service Retirement Rates above apply to a member at age 60.*

***The Withdrawal Rates above apply to a member at age 40.*

General - Female

Demographic Assumption Rates - Years of Service*		
Service	Service Retirement Rate*	Withdrawal (Termination) Rate**
5	0.150	0.050
10	0.150	0.030
15	0.150	0.030
20	0.150	0.030
25	0.150	0.030
30	0.200	0.030
35	0.200	0.030
40	0.200	0.030
45	0.200	0.030
50	0.200	0.030

**The Service Retirement Rates above apply to a member at age 60.*

***The Withdrawal Rates above apply to a member at age 40.*

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2021**

APPENDIX F – SUPPLEMENTAL TABLES FOR REPORTING PURPOSES

Safety - Male

Demographic Assumption Rates - Years of Service*		
Service	Service Retirement Rate*	Withdrawal (Termination) Rate**
5	0.200	0.040
10	0.200	0.040
15	0.200	0.040
20	0.400	0.040
25	0.400	0.040
30	0.400	0.040
35	0.400	0.040
40	0.400	0.040
45	0.400	0.040
50	0.400	0.040

**The Service Retirement Rates above apply to a member at age 60.*

***The Withdrawal Rates above apply to a member at age 40.*

Safety - Female

Demographic Assumption Rates - Years of Service*		
Service	Service Retirement Rate*	Withdrawal (Termination) Rate**
5	0.200	0.040
10	0.200	0.040
15	0.200	0.040
20	0.400	0.040
25	0.400	0.040
30	0.400	0.040
35	0.400	0.040
40	0.400	0.040
45	0.400	0.040
50	0.400	0.040

**The Service Retirement Rates above apply to a member at age 60.*

***The Withdrawal Rates above apply to a member at age 40.*

SAMPLE



Classic Values, Innovative Advice

Appendix F
Corporate Resolution

CORPORATION CERTIFICATE OF AUTHORITY

I, Anu Patel, Corporate Secretary of
(name of corporate secretary)

Cheiron, Inc., a Delaware
(complete name of corporation) (state of incorporation)

for profit corporation (the "Corporation"), **DO HEREBY CERTIFY** that the
(non-profit or for profit)
following is a true and correct excerpt from the minutes of the meeting of the Board of Directors
duly called and held on August 29, 2016, and that the same is now in full force and effect:
(date of meeting)

RESOLVED, that the Board hereby delegates to the Vice Presidents [as listed below] the additional authority to execute contracts and legal instruments on behalf of and under the seal of the Corporation after notification and consultation with the Chief Operating Officer or Assistant COO or, in the absence of either, after notification and consultation with the President."

FURTHER, I CERTIFY that the following is a true and correct excerpt from the By Laws of the Corporation defining the authority of the President listed below to execute contracts:

"He shall execute bonds, mortgages and other contracts requiring a seal, under the seal of the Corporation, except where required or permitted by law to be otherwise signed and executed and except where the signing and execution thereof shall be expressly delegated by the Board of Directors to some other officers or agents of the Corporation."

FURTHER, I CERTIFY that Gene Kalwarski is Chairman
Gene Kalwarski is President & CEO
Karen Mallett, Fiona Liston, John Colberg are Vice President(s),
Chris Mietlicki is Assistant Treasurer,
Anu Patel is COO and Corporate Secretary,
Peter Hardcastle is Chief Financial Officer, and
Christian Benjaminson, Michele Domash, Margaret Tempkin, Kevin Woodrich and Karen Zangara are Officers.

FURTHER, I CERTIFY that any of the aforementioned officers or employees of the Corporation are authorized to execute and commit the Corporation to the conditions, obligations, stipulations and undertakings contained in the foregoing Contract between the City and the above-referenced Corporation and that all necessary corporate approvals have been obtained in relationship thereto.

IN WITNESS THEREOF, I have set my hand this 8th day of March, 2021.
CORPORATE SEAL
(if any)

Anu Patel
Corporation Secretary



PLEASE NOTE THAT THE PERSON WHO SIGNS THE CONTRACT ON BEHALF OF YOUR CORPORATION MUST BE ONE OF THE INDIVIDUALS LISTED ABOVE AS PERSON AUTHORIZED TO EXECUTE CONTRACTS IN THE NAME OF AND ON BEHALF OF THE CORPORATION.

Sworn to and subscribed
before me this
8th day of March, 2021

Jo A. Butler
Notary Public

JO A. BUTLER
NOTARY PUBLIC OF NEW JERSEY
Comm. # 50082459
My Commission Expires 5/14/2023

Appendix G

Exhibit B: Actuarial Fee Schedule

ATTACHMENT 3

Dollar Cost Bid

ACTUARIAL FEE SCHEDULE

Fixed Fee Structure

Calendar Year	April 2021 through March 2022	April 2022 through March 2023	April 2023 through March 2024
A. Annual Valuations—includes one presentation to the Board of Retirement Contract sections 1.B. (1) & (3)	\$ 60,000 06/30/22 Valuation	\$ 62,000 06/30/23 Valuation	\$ 64,000 06/30/24 Valuation
B. GASB 67 Valuation Contract section 1.C. (1)	\$ 10,500	\$ 11,000	\$ 11,500
C. GASB 68 Valuation ¹ Contract section 1.C. (1)	\$ 15,000	\$ 15,500	\$ 16,000
D. SRBR Tier 3 Contract section 1.C. (3)	\$ 9,000	\$ 9,300	\$ 9,500
E. Annual COLA and COLA bank Contract section 1.C. (2)	\$ 2,000	\$ 2,100	\$ 2,150
F. 415 Limit Calculations Contract section 1.C. (4)	\$ 18,000	\$ 18,500	\$ 19,000
G. Triennial Experience Study Included in contract section 1.B.(2)	\$ 0	\$ 55,000	\$ 0
Total for Fixed Fees	\$114,500	\$173,400	\$122,150

¹Not including additional work for the Hospital Authority.

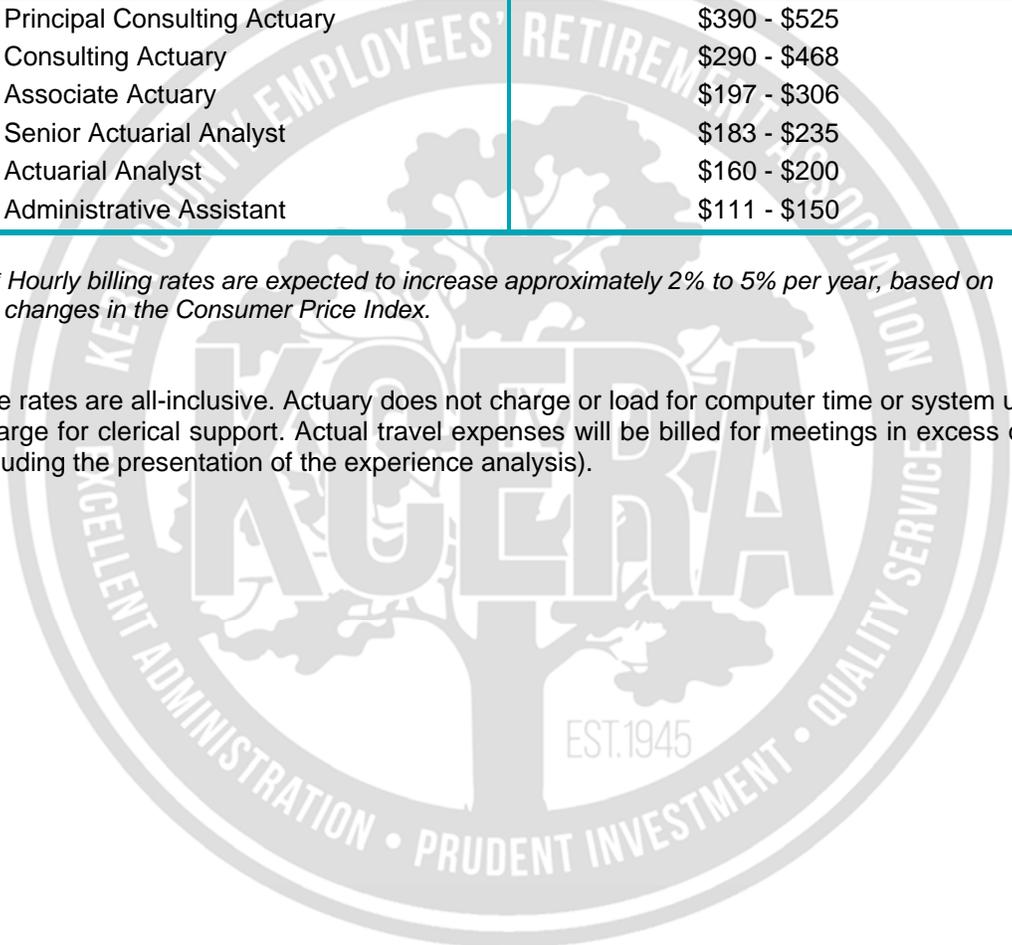
These fees include attendance at two Board or other meetings per year (as part of annual valuations), plus two additional meetings to present the experience analysis.

Hourly Rates

Category/Consultant	2022 Hourly Rates*
Principal Consulting Actuary	\$390 - \$525
Consulting Actuary	\$290 - \$468
Associate Actuary	\$197 - \$306
Senior Actuarial Analyst	\$183 - \$235
Actuarial Analyst	\$160 - \$200
Administrative Assistant	\$111 - \$150

** Hourly billing rates are expected to increase approximately 2% to 5% per year, based on changes in the Consumer Price Index.*

The above rates are all-inclusive. Actuary does not charge or load for computer time or system usage, nor do we charge for clerical support. Actual travel expenses will be billed for meetings in excess of two per year (excluding the presentation of the experience analysis).



Appendix H

Attachment 1 - Respondent Guarantees

Attachment 2 - Respondent Warranties

ATTACHMENT 1

RESPONDENT GUARANTEES

The respondent certifies it can and will provide, at a minimum, all services set forth in Exhibit B, Scope of Services.

Signature of Official:



Name (typed):

Kevin Woodrich

Title:

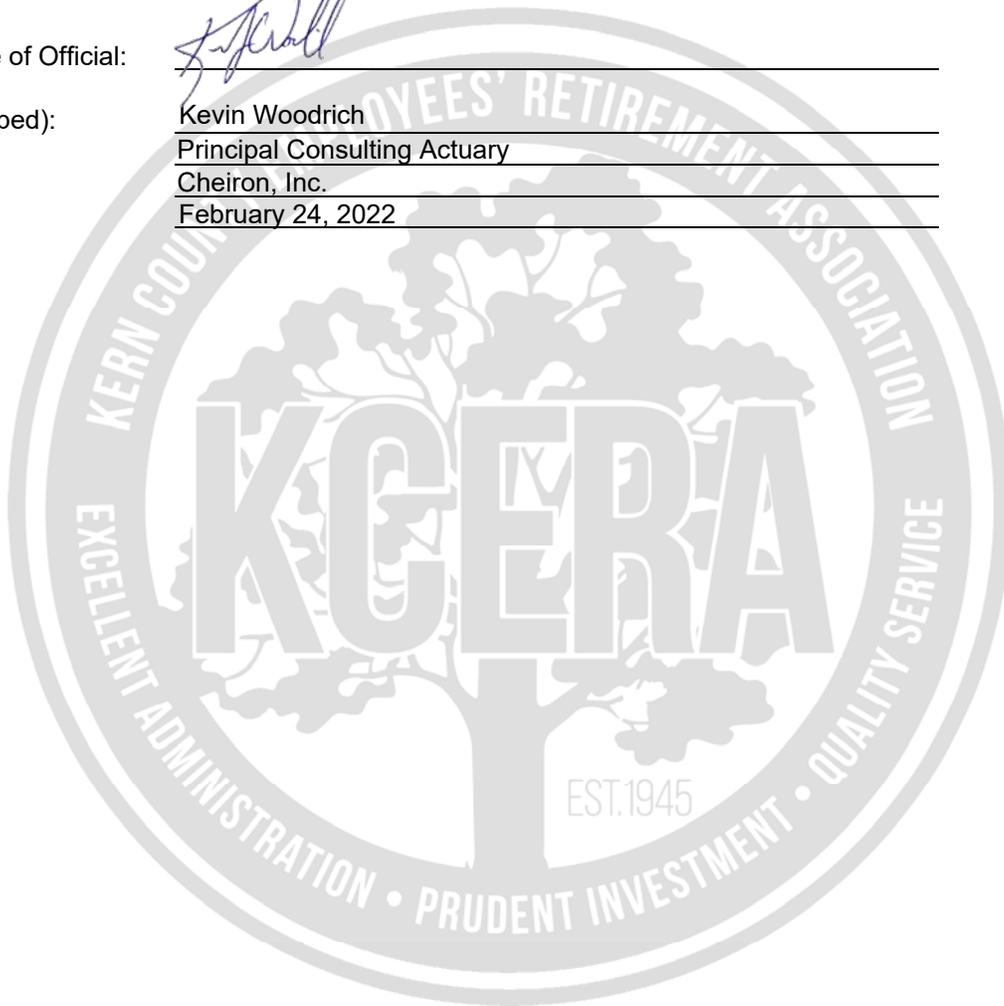
Principal Consulting Actuary

Firm:

Cheiron, Inc.

Date:

February 24, 2022



ATTACHMENT 2

RESPONDENT WARRANTIES

- A. Respondent warrants that it is willing and able to comply with State of California laws with respect to foreign (non-California) corporations.
- B. Respondent warrants that it is willing and able to obtain an errors and omissions insurance policy providing a prudent amount of coverage for the willful or negligent acts, or omissions of any officers, employees or agents thereof.
- C. Respondent warrants that it will not delegate or subcontract its responsibilities under an agreement without the prior written permission of KCERA.
- D. Respondent warrants that all information provided by it in connection with this proposal is true and accurate.

Signature of Official: _____



Name (typed): _____

Kevin Woodrich

Title: _____

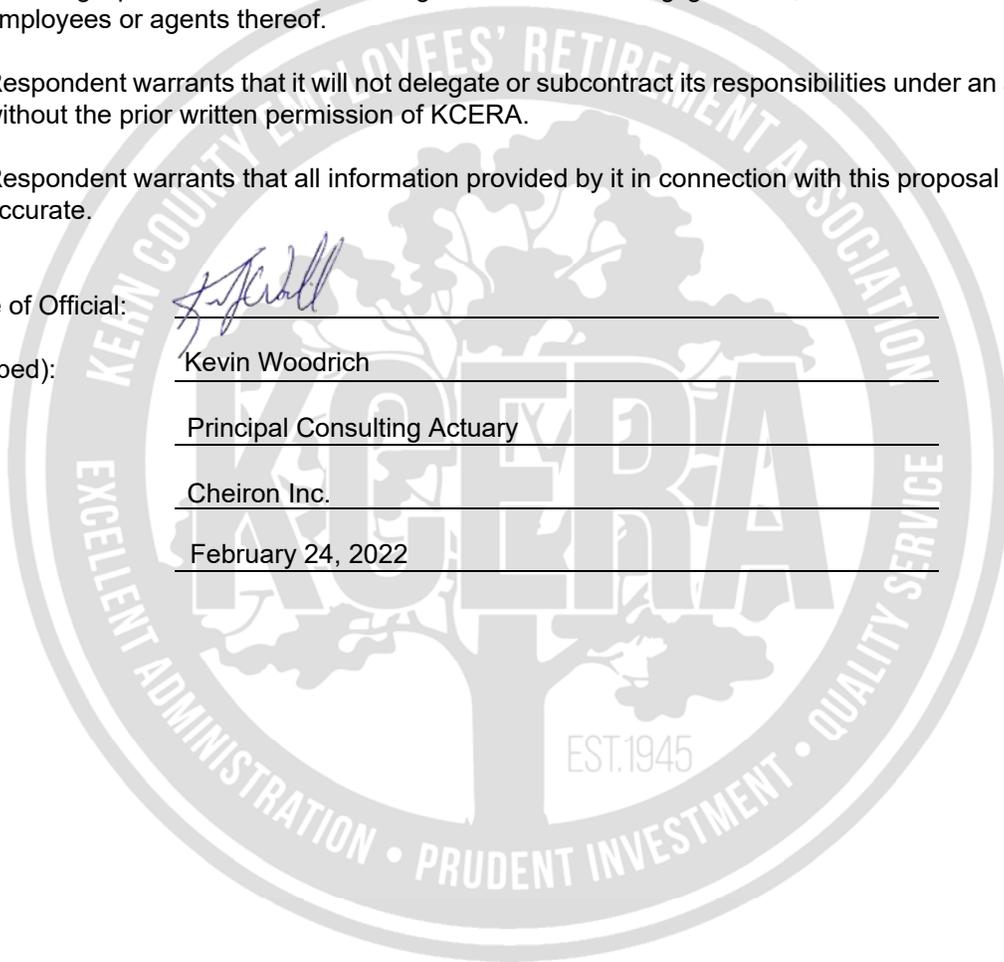
Principal Consulting Actuary

Firm: _____

Cheiron Inc.

Date: _____

February 24, 2022





Actuarial Services

Kern County Employees' Retirement Association (KCERA)

February 25, 2022 / Paul Angelo, Senior Vice President and Actuary



Paul Angelo
Senior Vice President
415-263-8273
pangelo@segalco.com

180 Howard Street
Suite 1100
San Francisco, CA 94105-6147
segalco.com

February 25, 2022

Matt Henry, Chief Operations Officer
Kern County Employees' Retirement Association
11125 River Run Boulevard
Bakersfield CA 93311
matt.henry@kcera.org

Re: Kern County Employees' Retirement Association- Actuarial Services RFP

Dear Matt:

The Segal Company (Western States), Inc. d/b/a Segal (Segal) is pleased to submit this response to provide actuarial services for the Kern County Employees' Retirement Association (KCERA) in accordance with this Request for Proposal (RFP).

Segal has been KCERA's appointed actuary for eleven years. We are very familiar with your plan, including your benefits, tiers, funding policies, funding history, member demographics and more. We have extensive experience serving in this capacity for a wide range of clients, including a dedicated practice supporting public sector entities and governmental organizations. Our depth of experience and length of time working with California county pension systems operating under the 1937 CERL is unmatched, and we believe this experience gives us a strong advantage in continuing to provide exceptional actuarial services to KCERA. Our proposal describes our qualifications and experience and demonstrates our commitment to deliver strategic and technical insight in a responsive manner.

Following is our response to the information requested in *Section VI, B. Proposal Cover Letter*.

1) Identification of the RFP

Segal submits our response for Kern County Employees' Retirement Association (KCERA's) request for actuarial services and looks forward to continuing to serve KCERA as a trusted advisor and experienced actuarial consultant.

2) Respondent's ability to supply the requested services

Segal is prepared to continue to provide the requested scope of services, including annual valuations, an experience study every three years, and other actuarial services on an "as needed" basis for a three-year term. We have all resources required and the team already familiar to KCERA remains the same. This includes the same two lead actuaries; Paul Angelo, Senior Vice President and Actuary and Molly Calcagno, Actuary

that are currently serving your account. Paul and Molly are experienced public sector consultant actuaries who understand well not only the needs of KCERA but also work with other California county and city retirement plans, as well as the University of California.

3) Respondent's willingness to provide the requested services subject to the terms and conditions set forth in the RFP.

We anticipate no issues reaching an agreement and have reviewed the terms and conditions of the RFP. Additionally, we refer KCERA to Segal's current contract as evidence of our ability to reach mutually agreeable terms.

4) Authority to sign

As a senior vice president of Segal, Paul Angelo is authorized to legally bind the company, as indicated by the attached Segal resolution indicating that authority.

Our Commitment

Segal is dedicated to total client satisfaction and is the architect of responsive and creative solutions to our clients' benefit needs. Our proposal describes in detail how Segal intends to approach this assignment and why we are ideally suited to provide these services. We want to highlight the following points:

- **Commitment to the Public Sector:** Segal has been working with public sector plans for more than 60 years, providing a valuable historical perspective and base of experience. We have a dedicated team of public sector consultants and have no plans to leave the industry.
- **Commitment to Service:** We have assembled a consulting team that possesses extraordinary experience and talent both with California public retirement systems in general and with KCERA in particular.
- **Commitment to Quality:** Actuarial work requires complex calculations and high-level computer programming, as well as a sophisticated understanding of the client's environment and objectives. Our intensive and multi-layered quality review process not only checks the accuracy of the calculations, but also analyzes the results and recommendations to assure consistency with both client needs and standards of practice. These local quality standards are reinforced by annual on-site quality audits by our National Office Chief Actuary and quality audit staff.
- **Commitment to Clarity:** Actuarial consulting often involves deep technical issues, which nevertheless have definite policy implications. Our consultants are skilled in making the technical issues clear and accessible so that our clients can make informed and independent policy decisions. These communication skills are developed not only in our client assignments but also in our many seminars and presentations to Californian and national retirement associations.
- **Commitment to Dependability:** Actuarial valuations for public retirement systems require a substantial commitment of staff and resources. Furthermore, many of the services we perform must be completed within a very short time frame. We always have and will continue to

dedicate the staff and resources necessary to meet the timing requirements of this project. This is especially important for a system like KCERA with often distinctive and challenging service requirements.

Segal would be privileged to continue our relationship with KCERA to provide actuarial and consulting services. Our proposal is intended to be fully responsive to the RFP. We welcome the opportunity to meet with the Board or a selection committee to answer any questions or to discuss our experience and qualifications in greater detail.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Angelo". The signature is fluid and cursive, with a large initial "P" and "A".

Paul Angelo
Senior Vice President and Actuary

THE SEGAL COMPANY (WESTERN STATES), INC.

CORPORATE RESOLUTION CERTIFICATION

I, Steven C. Greenspan, Corporate Secretary of The Segal Company (Western States), Inc. a Corporation duly organized and operating under the laws of Maryland.

DO HEREBY CERTIFY *that a Unanimous Written Consent dated November 29, 2006 was signed, which gives the Corporate Secretary and/or the Treasurer authority to certify, on behalf of the Board of Directors, that officers of The Segal Company (Western States), Inc. may execute proposals, agreements, and other legal documents.*

I further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect:

I further CERTIFY that Paul Angelo, FSA, FCA, MAAA, EA, Senior Vice President is empowered to execute and deliver in the name and on behalf of this Corporation contracts, bids and other documents to Kern County Employees' Retirement Association, and to bind the Corporation to such contracts, bids and other documents.

IN WITNESS WHEREFORE, the undersigned has affixed his/her signature and the Corporate Seal of the Corporation, this 25th day of February, 2022.

Steven C. Greenspan

Steven C. Greenspan, Senior Vice President,
General Counsel and Corporate Secretary



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1. Ability to Perform Scope of Services

The Respondent should demonstrate in this section an ability to meet the requirements set forth in Section II, Scope of Services, and should address in detail how it intends to complete each task. The detailed description should be organized to reflect the sequence in which the work will be performed and address the strategies that the Respondent will use to achieve the proper level of detail. The Respondent should also specify the extent of involvement required of KCERA staff, outlining the amount of time, skills and knowledge needed in order for the Respondent to meet the deliverables. Finally, Respondent must complete the questionnaire attached as Exhibit C, providing detailed information about the firm and its employees

Ability to meet scope of services

As KCERA's incumbent actuary, we understand well the scope of services requested. Your proposed team lead by Paul Angelo, FSA, EA, MAAA, will continue to deliver robust actuarial consulting services that are both on-time and accurate. We have extensive experience providing actuarial valuation services for many retirement systems operating under the County Employees' Retirement Law of 1937 ("the 1937 CERL"), including KCERA itself. Our knowledge includes delivering valuations and experience studies, as well as other as-needed actuarial services that have covered a range of projects and topics. The team currently working with KCERA remains the same and KCERA will continue to have access to our robust national resources as well.

As your actuary and consultant since 2011, we understand the challenges facing KCERA. Working with our Segal team, you have a partner who understands your needs, based on working closely with your Board and your staff over the past 11 years. In particular, we understand the importance you place on making prudent and reasonable actuarial decisions, managing the impact of those decisions on your stakeholders, and expecting full transparency and communication every step of the way.

We hope our proposal demonstrates how KCERA will benefit from a continued relationship with Segal because of our:

Historical Perspective: Your Segal team has extensive knowledge of your particular circumstances, gained through over ten years of continued service. KCERA has grown over the past decade, and your Segal team has worked closely with the Board and KCERA's executive staff in implementing changes in the most efficient and effective ways possible. Some recent projects include:

Date	Solution	Value to KCERA
2012 and 2018	Review of actuarial funding policy in 2012; develop and implement declining employer payroll policy in 2018	Effectively achieve full actuarial funding of benefits administered by KCERA over time. Maintain the reasonable and equitable allocation of the employer's cost to current and future taxpayers.
2011, 2014, 2017 and 2020	Conduct experience studies and adopt actuarial assumptions used in annual actuarial valuations	Reviewed reasonable alternative assumptions and helped the Board choose assumptions, with clear understanding of the impact on the member and employer contribution rates.
2013	Implementation of Tier IIB and Tier III	Provided full actuarial support for the implementation of the California Public Employees' Pension Reform Act (PEPRA).
2014, 2017 and 2022	Supplemental Retiree Benefit Reserve (SRBR) benefit design	Provided analysis on benefit enhancements provided by excess earnings allocated to the SRBR.
2019	Conducted a thorough risk assessment review for the plan	Examined key risk factors, analyzed historical trends, and projected assets, liabilities and cash flows by tier, in addition to investment return scenario testing and stochastic modeling of future funding positions.

Continued Partnership: Based on our work with KCERA, we understand your internal department structure, your plans and their specific benefits, and how those retirement benefits impact your participants. That institutional knowledge helps guide the future as we navigate an increasingly complicated environment. One particular example of this in action is working with staff to quantify the impact on KCERA of the California Supreme Court decision in the Alameda County Deputy Sheriffs' Assn. et al. v. Alameda County Employees' Retirement Assn. litigation. We look forward to continuing to partner with KCERA to provide our expertise on actuarial subject matter.

Creating Efficiency: We streamline processes to maximize efficiency and reduce your costs. For instance, in the initial set-up of IRC Section 415 calculations, we were able to leverage our experience from providing similar services to our other California public retirement system clients to ask relevant questions and set up the complex calculations.

National Resources with Local, Boutique Service: KCERA will continue to have the advantage of being serviced by national experts yet still receive the customized, "hands-on" service of a smaller, full-service firm from our KCERA team in San Francisco. We'll also continue to provide access to firmwide research and expertise to help you in your role, including publications and webinars on benefit developments, and reports on industry data and benchmarking.

Legislative and Compliance Expertise: Our in-house Compliance team ensures that you will continue to stay informed and be prepared for late-breaking legislation and other compliance issues. Our publications for the public sector community include our deep-topic Public Sector Letters and Compliance News. What this means for KCERA is that we keep you aware of the ever-changing environment that KCERA must adapt to.

Helping you
manage change

Unbiased Consulting: We are an independent, private, employee- owned company. We don't have any stake in selling pre-packaged solutions or conflicts of interests from external ownership or affiliations. Our only goal is to continue to help KCERA.

Public Sector Leadership: Segal has been assisting public plans and employers for more than 60 years. Serving the public sector is the sole focus of your Segal team and is one of the major sectors served by our firm. In addition to active participation and leadership in industry associations and conferences, we want to note one aspect of Segal's commitment to public sector pension plans that has particular significance. Throughout his career at Segal, the firm has supported Mr. Angelo's substantial dedication of resources to emerging issues crucial to public sector pension plans. These include:

- An activist and thought leadership role in the ongoing controversy of applying market-based valuation techniques to public pension plan liabilities through Mr. Angelo's participation on committees and programs of the American Academy of Actuaries and the Society of Actuaries.
- An organizational role as the founding chair of the Public Plans Committee of the Conference of Consulting Actuaries, providing a forum for the development and advocacy of sound actuarial practices for public plans. Mr. Angelo also now serves on the Board of the Conference of Consulting Actuaries.
- A public policy role as a former member of the GASB Postemployment Benefits Accounting and Financial Reporting Task Force, as the current chair of the California Actuarial Advisory Panel and as a member of the Committee on Retirement and Benefits Administration of the Government Finance Officers Association (GFOA CORBA).

The investment made by Segal through Mr. Angelo and Segal staff in these industry activities not only allows us to keep all of our clients, including KCERA, up-to-date on both the research and new developments as they relate to public pension plans, but also enables us to be at the forefront of developing best practices that directly benefit plans like KCERA.

Rigorous Quality Control and Peer Review: We will continue to provide accurate and on- time deliverables. Our intensive three-tier quality review process not only checks the accuracy of the calculations but also analyzes the results.

Continuity of Service: Because we are your Plan's current actuarial consultant, there would be no service interruption or "ramp-up" time needed.

Courageous Consulting: Over the years, Segal has worked with KCERA through the actuarial challenges facing the Plan, including changes to the actuarial assumptions and

methods used in our valuations. Our approach has always been to help KCERA address these challenges by offering our knowledge and understanding of the most prudent practices suitable to the Plan at any given time. We've done this by giving you all the information KCERA has needed to consider in making these difficult decisions, and by working with you through the implementation of those decisions even when, as we well understand, the consequences are difficult for your stakeholders. Having worked closely with KCERA's staff and trustees over the years, we stand by our reputation and record of being a consultant KCERA will always be able to rely upon to deliver sound actuarial recommendations which might not always appear favorable in the short term, but will prove most beneficial to the Plan over the long run. That's been our commitment to KCERA from day one, and we will continue to provide our brand of responsive and realistic advice. This is how we view our responsibility to our clients.

We look forward to continuing our service relationship with KCERA for the next three years.

Methodology for scope of services

We address below all items in **Section II: Scope of Services**.

- 1) *Actuarial Policy. Annually review the KCERA's policies governing its funding methods and objectives and provide written recommendations to the Board on appropriate changes, additions, or deletions to the policies.*

We will make recommendations, as appropriate, regarding possible improvements or modifications in the policies governing KCERA's funding methods and objectives. In particular, we have considerable experience in the review of policies regarding the measurement and funding of the unfunded actuarial accrued liability.

2) *Annual Actuarial Report*

- a) *Actuaries shall prepare an actuarial valuation study for the periods ending June 30, 2022, 2023, and 2024 which complies with section 2(c) herein and which reviews the funded status of the KCERA and recommends employer contribution rates to be effective the subsequent fiscal year.*

The valuation reports for KCERA will describe in detail both the results and the recommendations arising from the valuations. Segal will generally deliver the valuation reports within eight weeks of receipt of complete data.

If analysis of the current data during the performance of the valuation indicates any material variations from those assumptions, we will discuss the variations in the valuation report and present an estimate of the effect on the normal cost and/or on the unfunded actuarial accrued liability of the Plan.

b) During 2023, Actuaries shall conduct an actuarial study which complies with the provisions of Government Code section 31611, including the annual valuation study and an experience investigation and evaluation which covers the mortality, service and compensation experience of the members and their beneficiaries (non-economic assumptions), and a valuation of the assets and liabilities of the retirement fund. In addition to performing an experience investigation of non-economic experience, Actuaries shall also review and analyze economic assumptions and shall prepare a final report containing findings and recommendations and certifying the methods and procedures which produced the recommended economic and non-economic assumptions. In addition, KCERA requires performance of a valuation study on an annual basis. The valuation studies include separate valuation of the Supplemental Retiree Benefit Reserve (SRBR), established pursuant to CERL Section 31618.

We will prepare comprehensive triennial experience study for KCERA for the period July 1, 2019 through June 30, 2022. Our results will be presented in a formal written report and an oral presentation. The assumptions that will be included in the experience investigation are:

- Refund of member contributions
- Termination with a Vested Benefit
- Non-service connected Death
- Service connected Death
- Service Retirement
- Disability Retirement
- Percentage of members married at retirement
- Reciprocity percentage for terminated vested members
- Mortality after service retirement
- Mortality after disability retirement
- Investment return
- Individual compensation increases
- Aggregate payroll growth
- Inflation and COLA increases

For the demographic assumptions, the main technique in the study will be to identify in full detail how closely the actual experience tracks the experience that was expected during the three-year experience period. This will be done by age, service, employee category and gender, as appropriate. These demographic assumptions will be analyzed separately, as appropriate, for member classifications within KCERA. All this information will be used to develop recommended specific changes to actuarial assumptions.

Before recommending a change to assumptions, we will assure ourselves that the observed assumption deviations during the experience period are not just short-term or transitory in nature. This will be done by discussing observations with staff and reviewing the results of earlier experience studies. We will also include a breakdown of the contribution rate impact to the employee and the employer.

Please see **Appendix E** for a sample triennial actuarial experience study.

c) Each actuarial valuation study performed during the term this Agreement shall also include:

- i. An analysis and recommendation of the funding available for benefits under the KCERA Supplemental Retiree Benefit Reserve ("SRBR") program pursuant to Government Code section 31610-31610, inclusive;*
- ii. Calculation of the KCERA's funding progress based on a generally accepted actuarial methodology agreed upon by Actuaries and the Board; and*
- iii. Analysis of actuarial gains and losses during the year and the effects of such on employer(s) and employee contribution rates.*

We will prepare actuarial valuations for KCERA every year during the course of this contract. Our results will be presented in a formal written report and an oral presentation, in accordance with model practices established by the California Actuarial Advisory Panel and consistent with the Actuarial Standards of Practice. In addition to contribution rates, our valuation reports will include, but not be limited to, the following information:

- a. An executive summary designed to provide highlights of the valuation results.
- b. A narrative discussion of the key valuation results.
- c. An actuarial valuation certification.
- d. An analysis of actuarial gain/loss including a comparison of actual to expected assets and the impact of actuarial gain/loss on recommended contribution rates.
- e. Measures of funding progress (funding ratios) relative to the accrued liability (under KCERA's actuarial cost method).
- f. Analysis of Financial Experience as specified by the Government Finance Officers Association.
- g. Supplemental calculations and financial disclosures required by GASB Statement 67 and 68, or successor standards.
- h. Tabular or graphic presentation of demographic information, including age and service matrices for actives and age and benefit type for retirees.
- i. Summary of plan provisions.
- j. Description of actuarial assumptions and methods.
- k. A glossary of terms and sufficient explanatory text regarding methods and assumptions.

In addition, if there is a change in actuarial assumptions, we will measure the liability and contribution rate impact as a result of applying the new assumptions.

We also include a reconciliation of the change in unfunded actuarial accrued liability, employer and employee rates in the valuation report for the plan as a whole for all of our California public system clients. Each valuation will also include an actuarial gain/loss analysis and identification of the percentage of change in the recommended employer contribution rate (if any) attributable to various factors, including a description of the reasons for any changes in the contribution rates from year to year, based on a comparison of actual changes in liabilities with expected changes according to each of the various actuarial assumptions.

A separate actuarial valuation report will be prepared annually to measure the funding status of the benefits provided by the Supplemental Retiree Benefit Reserve.

Please see **Appendix E** for a sample actuarial valuation report.

3) Actuaries shall annually provide the following services:

- a) Provide special actuarial calculations and/or reports required by auditors in (GASB 67 and 68, as applicable). Actuaries will also provide letters and representations required for the KCERA Annual Comprehensive Financial Report (ACFR) consistent with the requirements set forth by the Government Finance Officers Association (GFOA) for the "Certificate of Achievement for Excellence in Financial Reporting."*

As the incumbent consulting actuary, we will continue to prepare responses to questions and data request from independent auditors, Plan Sponsors and Plan Sponsors' auditors regarding GASB 67 and GASB 68 valuation reports and the assumptions, methods and data used as requested by KCERA for financial reporting purposes.

- b) A written report and recommendation on the annual cost-of-living adjustment to retirement and death allowances, as provided in Government Code section 31870 or such other plan provisions which are operative in Kern County by action of the Board or Board of Supervisors;*

We will continue to calculate the annual cost-of-living adjustments to be used by KCERA in accordance with Section 31870.1 of the 1937 CERL and provide a written report.

- c) Calculations required to determine whether additional Tier 3 SRBR benefits are due existing retirees and beneficiaries; and*

We will continue to calculate any additional Tier 3 SRBR benefits due existing retirees and beneficiaries on an annual basis and provide our findings to KCERA staff to allow for timely payment of any such increases to retirees and beneficiaries.

d) Annual calculations of IRC section 415 limits for those retirees and active members nearing retirement identified by the KCERA.

Segal is experienced in assisting and advising public retirement plans on the applicable IRC §415 rules and the impacts on individual members and retirees. This is supported by our compliance consultant Melanie Walker, JD who is part of the team for KCERA. Our experience and services include the following:

- Providing §415(b) defined benefit dollar limits tables annually for all ages of retirement, including the regular governmental plan limits and the private sector limits for governmental entities that have elected and retained the 1988 TAMRA grandfather option, both reflecting required actuarial assumptions
- §415 limit screening systems to identify potential excess benefit situations
- Special forms, policies and procedures for service purchase limits for both qualified permissive service credit and nonqualified credit under IRC 415(n)
- Section 415 coordination and plan aggregation issues with other qualified plans
Implementation of §415 excess benefit arrangements
- Application of §415 limits for disability and survivor annuity benefits
- Consultation to determine actual §415 benefit limits and strategies for minimizing impacts

4) In addition, the Actuary will provide actuarial services described herein below on an "as needed" and timely basis at the request of the Board or the KCERA Executive Director:

- a) Calculation of the present value of any active member's community property interest in future pension benefits;*
- b) Calculation of the optional retirement allowances permitted under Government Code sections 31760-31764, inclusive;*
- c) Annual review and update on temporary annuity factors pursuant to Government Code section 31810;*
- d) Calculations of the present value of continued benefits payable to minor children of deceased active members;*
- e) Calculations of the actuarial equivalent of disability retirement benefits in connection with actions by the Board against third parties causing or contributing to a member's injury which results in liability to the KCERA;*

We have been and will continue to conduct actuarial reviews of individual benefit applications, (e.g., optional survivor benefit calculations or complex marriage dissolutions) and perform complex computations related to these cases.

- f) Respond to questions by the KCERA's auditors and provide such documents as deemed necessary to complete an annual audit;*

We will work cooperatively and will be responsive to the selected audit firm while they conduct their audit and develop their audit report.

- g) Telephone consulting to the KCERA staff on an actuarial matter relating to the administration of the existing retirement system;*

Segal will continue to provide responsive consulting by phone or in person to address KCERA staff questions and needs.

- h) Calculations on benefit enhancements available through the adoption of optional sections of the CERL, as requested by plan sponsors and authorized by the Chief Executive Officer;*
- i) Assist in developing the design, structure, and provide benefit calculations for the KCERA's "SRBR" program;*
- j) Calculations related to the unfunded liability owed by plan sponsor(s) under the Declining Employer Payment Policy and/or Termination Policy; and*
- k) Such other actuarial services as may from time to time be requested by the Board or Chief Executive Officer.*

We will provide actuarial consultation and advisory services on any technical, policy, legal or administrative problems arising during the course of operations, by attending occasional KCERA meetings and responding to routine telephone calls and written correspondence.

- 5) Actuaries will provide testing of the plan for tax qualification under the federal tax code, as requested, and subject to review by KCERA's legal counsel.*

Segal has extensive experience in providing analysis to support public pension plans for tax qualification under the federal code. The KCERA Segal team has provided this previously and will be available to do so upon request. While final review will be provided by KCERA legal counsel, the Segal team includes Melanie Walker, JD, who has a detailed understanding of the tax code and can provide insight and additional perspective as needed.

Exhibit C – Questionnaire

Organization and Ownership

1. *Provide the following information:*

- a) *Date of Response:* 02/25/2022
- b) *Name of Firm:* Segal
- c) *Primary Contact Person:* Paul Angelo, FSA, MAAA, FCA, EA
- d) *Title:* Senior Vice President and Actuary
- e) *Address:* 180 Howard Street, Suite 1100, San Francisco, CA 94105-6147
- f) *Telephone Number:* (415) 263-8273
- g) *Facsimile Number:* (415) 376-1167
- h) *E-mail Address:* pangelo@segalco.com

2. *Describe the background and ownership of the firm. Describe any material changes in organization structure or ownership that have occurred in the past five years.*

- a) *Year firm was formed and began providing actuarial consulting services to institutional clients.*

Segal was founded as the Martin E. Segal Company in October 1939, early in the development of employee benefit plans in American industry. From the beginning, Segal has been involved in developing health and retirement programs that meet the needs of employees and employers.

The firm's first services focused on consulting for group health insurance and, soon after World War II, Segal began offering retirement plan consulting, including actuarial services. By the early 1950s, our leadership in retirement consulting services for collectively bargained plans brought us national recognition when our firm was asked to help set up the first multiemployer pension plan under the Taft-Hartley Act. Within a few years, Segal assisted in the establishment of numerous national industry-wide pension plans. These activities aided employees of industries such as entertainment, apparel, transportation and construction in which employees do not typically have prolonged employment with a single employer.

For over 80 years, Segal has been involved in developing retirement programs to meet the critical needs of employees and employers. Many widely accepted benefit practices were and are today innovations first conceived, designed, and introduced by Segal.

Today, Segal provides employee benefits and human resource consulting that serves public sector and multiemployer clients on the full range of health and welfare, retirement and human resource-related issues.

The business has operated as the Segal Company since 1991 and the company name was recently rebranded as Segal, a member of The Segal Group. Segal is a member of The Segal Group and remains an independent, employee-owned firm that provides unbiased consulting.

Acquisitions over the years included Sibson Consulting (acquired in 2002), Marco Consulting Group (acquired in 2017), Segal Benz (acquired in 2019) and LRWL Inc. (acquired in 2020).

b) The ownership structure. Indicate all entities that have an ownership stake in the firm (name and percentage).

Segal has been employee owned by its officers since 1978. There are currently 320 employee owners, with no shareholder owning more than 5% of the company. An 11-member Board of Directors sets policy and governs the organization. Implementation of policies, development of strategies and day-to-day operations are the responsibilities of the Chief Executive Officer.

The Segal Group, Inc. owns 100% of the business units as noted below:

- The Segal Company (Eastern States), Inc. d/b/a Segal
- The Segal Company (Midwest), Inc. d/b/a Segal
- The Segal Company (Western States), Inc. d/b/a Segal
- The Segal Group, Inc. owns 100% of The Segal Company, Ltd.

As an employee-owned consulting firm, we provide only unbiased counsel for our clients. We are not affiliated with any insurance company, third-party administrative agency or provider network. Segal's objective consulting approach means we have no stake in providing answers tied to products or pre-packaged solutions. Our advice is tailored to the particular needs and circumstances of each client. By investing our resources and developing our expertise based on the current and emerging needs of our clients, we have a long track record of creating durable, innovative and flexible solutions.

c) Affiliated companies or joint ventures.

Members of the Segal family include benefits specialists Segal, benefits communication specialists Segal Benz and investment solutions specialists Segal Marco Advisors.

Our teams help a wide range of industries. No matter who you are, we can assist you with:

Administration and
Technology Consulting
Benefit Audit Solutions
Compensation and
Career Strategies
Compliance

Health and Welfare
Benefits
HR and Benefits
Technology
Insurance
Organizational
Effectiveness
Retirement Benefits

Benefits Communication
Communication Strategy
Personalized Benefit
Statements
Surveys and Focus Groups
Website and Portal Design

Advisory Investment Solutions
Corporate Governance
and Proxy Voting
Defined Contribution Consulting
Discretionary Consulting



Not any solution—your solution. Personalized advice and help.

d) Recent or planned changes to the ownership or organization structure.

In October 2016, a carefully planned leadership transition took place: David Blumenstein, Segal's National Director of Multiemployer Consulting, who has been with the firm for over 25 years, succeeded Joseph A. LoCicero as President and CEO of The Segal Group, Inc. Mr. LoCicero continues in a senior role with the firm as Chairman, and Howard Fluhr, who served as President and CEO before Mr. LoCicero and was Chairman, transitioned to Chairman Emeritus, a role also held by another former President and CEO, Robert D. Krinsky.

While company names and logos have evolved over the firm's 80-year history, we do not expect any changes in the ownership structure and expect that Segal will continue to be independent and employee owned

e) Transition plans for retirement of key executives.

Our firm continually strives to ensure that we have succession plans in place for our senior consultants, actuaries and managers. This is true for any professional services firm, but Segal has many staff members who have been with us for decades and who are very established in their careers and with their clients. We believe that the best way to provide for succession is to build the next generation of senior actuaries and consultants from current staff with capability and expressed desire to make this business their lifelong career. We actively bring more junior analysts along to client meetings to help prepare them for that eventual succession to senior positions. We also provide extensive training and development on consulting skills. In addition, we continually look toward succession in each new hire to the company, conducting not only extensive interviews and reference checks, but also outside background checks on their previous work experience.

In June of 2019, we explicitly sought out new top talent and hired Todd Tauzer to help us achieve our "succession planning" goal of transitioning towards new leadership within our public sector practice. Mr. Tauzer brings both extensive experience within public pension plans and vital expertise in sustainable pension risk management. He works directly with your California based team and is available to KCERA for any particular need.

f) Importance of actuarial consulting services to your parent company's (if applicable) or your firm's overall business strategy.

Within Segal, our specialty is actuarial consulting, in particular for large retirement and health benefit systems. We are a nationally recognized leader in actuarial consulting services to systems governed by boards comprised of representatives of employers and members, including both Taft-Hartley plans (jointly trustee'd by labor and management) and public sector plans (with trustees both appointed by employers and elected by active and retired members).

g) Percentage of parent company's (if applicable) or your firm's revenues from actuarial consulting services.

The majority of our business is working for public sector and multiemployer plans and approximately 75% relates to actuarial and traditional consulting work for their health and retirement plans. The remaining 25% of the work that we do for these plans includes such services as Communications, Investment Consulting and Fiduciary Liability services.

*3. Provide as **Appendix A** one organization chart that diagrams the ownership of your firm and any interrelationships between the parent-subsidary, affiliate, and joint venture entities.*

Please see **Appendix A**.

*4. Provide as **Appendix B** another organization chart that depicts the structure of the actuarial consulting group and that identifies this group's key people and the people that will be involved in providing direct services to KCERA.*

Please see **Appendix B**.

5. List the locations of each of the firm's offices from which actuarial consulting services are provided. For each office, provide the function(s) performed and the number of professionals in that office. Indicate which office would be primarily responsible for servicing the KCERA account.

Comprehensive actuarial services are provided in all our offices by consultants and actuaries with broad experience and extensive knowledge of the employee benefits field. We will draw upon the other offices' expertise as necessary to ensure appropriate and timely insight into issues affecting our clients. Segal is headquartered in New York City and has 21 physical offices as well as virtual presence in 23 cities throughout the U.S. and Canada. Our San Francisco office would continue to be responsible for servicing the KCERA account.

Employees by Office	Total
New York	377
Atlanta	44
Austin	11
Boston	48
Boston-Marco	4

Employees by Office	Total
Chicago	147
Chicago-Marco	46
Cleveland	19
Denver	11
Detroit	9
Dublin	1
Edmonton	1
Fort Washington, PA	3
Glendale/Los Angeles	30
Hartford	29
Juneau	1
Minneapolis	13
Montreal (physical office closed 2020)	1
Philadelphia	1
Phoenix	33
Princeton	23
San Francisco	59
San Francisco-Benz	30
Toronto	15
Washington, DC	86
Worcester	4
Total	1,046

6. Provide as **Appendix C** the latest two years' audited financial reports for your firm. Provide any additional information necessary to demonstrate financial stability including total revenue, net income/(loss), assets, liabilities, and net worth for each year.

We provide **Appendix C** as a separate, secure file per Company policy. A copy of the associated cover letter is found in Section 9.

In addition, Segal has been financially sound throughout its existence and no has no record of bankruptcy or significant financials issues to disclose.

7. Describe the firm's objectives with respect to future growth. What products/services will be emphasized or de-emphasized in the future? What are the firm's expectations for its products, and how does it plan to manage the future growth of these products? Discuss how the firm plans to make sure that future growth does not compromise the quality of your existing actuarial consulting services. Include in your answer how you plan to manage growth in your client/actuarial consultant ratio.

Our staffing requirements respond to the needs of our clients. If additional resources are needed to better serve our clients, we recruit qualified experts who share our goal of providing value-added assistance and delivering creative and successful solutions for our clients

Each month, our firm's management group reviews the number of clients, new clients and projected growth of new clients in conjunction with current staffing and hours capacity and determines the need for short-term, mid-term and long-term hiring needs. The firm will not take on new clients or opportunities without making sure we would have appropriate staffing levels to meet our, and our client's, quality and satisfaction levels.

We note that despite a sizable public sector client list within California, we have consistently delivered on every service commitment to every one of these clients, including KCERA. We have performed special projects such as major reviews and revisions of funding policies, design and pricing of DROP programs, studies of the 2013 California Public Employees' Pension Reform Act (PEPRA) benefit cost studies and more, always in a timely and professional manner.

We have accomplished all this work through a combination of experienced staff, increased production efficiencies, and thoughtful allocation of current staff resources. We add to staff and/or other resources as needed to maintain our high quality and range of services to clients. Based on this careful management, we are fully prepared to deliver both routine valuations and special studies to KCERA.

Segal's overall business objectives with respect to actuarial services are to continue to provide independent, unbiased guidance to plan sponsors and help by:

- Forecasting funding requirements
- Identifying options and alternatives
- Alerting them to changes and trends and explaining the significance for their plans

An area of emphasis is risk assessment and mitigation using our experienced consulting and sophisticated predictive modeling capabilities to assist our clients in considering scenarios and making informed decisions.

The members of the proposed team, and all Segal employees, have a scheduled client workload of roughly 1,200 to 1,400 hours per year. However, the actual hours worked in a year are over 2,000. This gap allows for the addition of new clients and/or new projects from existing clients, professional development as well as to accommodate any emergency-type situations that may arise during the year. The number of accounts per

relationship manager varies widely due to the range of services and complexities of each unique client. Senior managers typically have between 6-10 client relationships.

8. Discuss in general the firm's competitive advantage over other firms in the actuarial consulting industry. Why should KCERA hire your firm?

Segal brings several distinguishing advantages to KCERA:

- The two lead actuaries and team assigned to KCERA are highly experienced in providing actuarial consulting and actuarial auditing services. We have been the actuary for KCERA since 2011.
- Superior communication skills of your principal actuary
- Substantial experience with public retirement systems in California, especially with systems like KCERA that operate under the 1937 CERL.
- Leading edge research and expertise on both current practices and new developments for public retirement systems, both in California and nationwide
- Independence of ownership, resources and systems
- Industry standard valuation systems and quality control procedures
- National resources and local responsiveness
- National commitment to Public Sector Retirement Systems

We focus on a few particular features of our service that distinguish us from our competition.

The first is our extensive experience with systems like KCERA that operate under the 1937 CERL. The 1937 CERL retirement systems have many features that distinguish them from other county public retirement systems even in California, including local control in establishing the level of funding, the use of excess earnings to provide benefits in some jurisdictions, and distinctive COLA provisions. Furthermore, our many other city retirement client engagements keep us immediately aware of emerging developments and practices in California. Taken together our current client base and our long history with these systems allow us to provide unmatched service to these distinctive systems.

The second is the superior communication and presentation skills of our principal actuary. As noted in the biographical information, Paul Angelo is a frequent speaker at conferences, workshops and seminars sponsored by SACRS, CALAPRS, NASRA, and NCTR. More importantly, we bring these skills to our client boards both through routine presentations at board meetings and at special board seminars and workshops. We would note in particular the many workshops and other presentations we have held for the various county and city retirement boards and other interested parties. We urge you to consider your own experience and to contact our other clients for their appreciation of our ability to make actuarial policy issues both clear and engaging, to agree that they never thought possible.

And lastly is our broad public sector experience. We currently perform health, retirement and/or defined contribution consulting for 36 states, nine of the largest U.S. cities, 12

California county retirement systems, District of Columbia, U.S. Virgin Islands and Puerto Rico.



Segal’s San Francisco office currently provides actuarial valuation and consulting services similar to the RFP’s statement of work to the following California public employee retirement systems. Except as noted, we provide full actuarial valuation, experience analysis, and consulting services to each of these client systems. This includes five California city retirement systems and 12 1937 CERL California county retirement systems

- Los Angeles City Employees’ Retirement System
- Los Angeles City Fire and Police Pension Plan
- Los Angeles Water & Power Employees’ Retirement Plan
- City of Fresno Employees’ Retirement System
- City of Fresno Fire and Police Retirement System
- Orange County Employees Retirement System
- San Diego County Employees Retirement Association
- San Bernardino County Employees’ Retirement Association
- Ventura County Employees’ Retirement Association
- Contra Costa County Employees’ Retirement Association
- Alameda County Employees’ Retirement Association
- Sacramento County Employees’ Retirement System
- Fresno County Employees’ Retirement Association

- Sonoma County Employees' Retirement Association
- Imperial County Employees' Retirement System
- Mendocino County Employees' Retirement Association
- East Bay Municipal Utility District
- University of California Retirement System

Our company's sole business is consulting and actuarial work for all phases of employee benefits, compensation, and human resources. Working with so many public sector clients, both nationwide and in California, gives us the depth and breadth of experience to help clients make their decisions in the broader context of what other jurisdictions are doing.

9. Over the past five years, has your organization or any officer or principal been involved in any business litigation or other legal proceedings related to any actuarial consulting activities? If so, provide a brief explanation and indicate the current status. Has the firm or any officer or employee of the firm 1) been sued by KCERA or 2) entered into a settlement agreement with KCERA to resolve a claim or dispute? If yes, provide details.

Segal has been a trusted advisor to our clients for more than 80 years and provides services to more than 2,700 current clients. Throughout our long history, Segal has occasionally been named as a party in litigation involving the performance of its services. No litigation has ever affected Segal's ability to provide services to its clients or materially affected Segal's financial position or operations.

10. Has your firm or any actuary you employ, within the last ten years, been censured or fined by any regulatory body? If so, please indicate the dates and describe the situation.

To the best of our knowledge, no.

11. Is the firm affiliated with any other firm(s) offering non-actuarial services that could represent conflicts of interest? If yes, briefly describe your firm's policies and procedures for doing business with these affiliates while safeguarding against conflicts of interest.

Segal provides a range of HR and benefits related consulting, some of which is non-actuarial in nature. None of these other consulting services result in any conflicts of interest for Segal's actuarial clients.

12. List and describe any professional relationship your firm or any of your actuarial consulting group staff have with any member of the KCERA Retirement Board, KCERA staff, or a KCERA plan sponsor (e.g., County of Kern).

Segal currently provides actuarial services for KCERA and has a consulting relationship with KCERA Board members and staff.

13. Has anyone in your firm provided any gifts, travel expenses, entertainment, or meals to any member of the KCERA Retirement Board or KCERA staff in the last twelve months? If yes, describe the expense and the purpose.

No.

Actuarial Services Staffing

14. How many actuaries does your firm employ?

Segal has 160 credentialed actuaries.

15. Describe in general the background of the professionals in the firm's actuarial consulting services group:

a) Are they brought in from outside of the firm or promoted to their positions from within the organization?

Segal both hires and promotes within and also hires experienced actuaries and providing training for new college graduates as well.

b) For those recruited from the outside, what prior experience and educational credentials are generally sought?

Segal has a documented, formal process by which it sources, interviews, assesses and hires talent. It begins with developing a sourcing strategy that targets qualified talent pools to include diversity talent pools. Interview selection teams are identified relevant to the position under recruitment, and interviewers are assigned interview / probing roles that focus on the range of criteria for the position.

c) What percentage are currently Fellows of the Society of Actuaries? Enrolled actuaries?

- 41% FSA
- 66% EA

d) What ongoing educational programs are economically supported and/or required? If economic support is offered, state the extent of this.

Segal engages in ongoing staff development and training. Learning and teaching are part of our vision and values. We are committed to providing both the highest level of quality service to our clients and professional development opportunities for our employees. We operate numerous programs to train, enrich and mentor our professional staff. Highlights of our Learning and Development programs include:

- **Robust onboarding** program for new employees
- **New Employee Actuarial Training (NEAT)** program provides a centralized resource of introductory training materials for new and newly hired employees in the retirement practice, designed to facilitate the onboarding of new Actuarial Analysts to Segal's standardized tools, processes and expected client deliverables. The 12 eLearning modules provide an introduction to the actuarial concepts, technology and methodologies used in the practice.

They also highlight best practices and quality assurance standards required in the Segal Actuarial Quality Control Principles.

- **National Exposure and X-Training (NEXT)** for junior-level consultants to learn from experienced consultants about consulting best practices, services and technical and client management skills, such as through interview-style webinar sessions with Segal's leaders.
- **Technical Actuarial Meeting (TAM):** Segal conducts a Technical Actuarial Meeting (TAM) each year, as well as other professional development opportunities, which help actuarial staff meet continuing education requirements.
- **Participation in industry conferences, seminars and associations.** Not only does Segal encourage consultants to actively engage in external events, Segal organizes many of these conferences and seminars each year and serves as a corporate sponsor to a number of benefits-related associations.
- **The Segal Advantage Program** offers both new and current employees the opportunity to learn about Segal's different services and practice offerings. Each month a practice leader, or other senior members of their team, leads a webinar about their specific practice or services provided to our clients.
- Segal's **Mentorship Program** encourages both career and personal development of our employees. It provides the opportunity to leverage the skills and strengths of employees in order to train and develop each other.

In addition, we offer the following specialized/professional credential training:

- **Actuarial and Investment Consulting:** Segal considers the attainment of professional credentials to be an important element of a successful actuarial career. To encourage the passing of actuarial and other professional credential exams, the company provides support and financial rewards through its exam program and periodically reviews this program to ensure its relevance to the professional credentialing requirements and the professional industry. Segal's health and retiree health actuaries are subject to the continuing education and qualification standards promulgated by the Society of Actuaries and the American Academy of Actuaries.
- **Health Practice Training:** Segal's Health Practice offers a Continuing Education Program to support our ongoing commitment to the training and development of our health staff. The program offers a comprehensive variety of over 76 technical and educational courses for analytical health staff and consultants. Each health practice staff member is required to complete a minimum number of training hours, based upon position and experience level, and progress is actively monitored and reported to managers. The training program is self-directed, which allows staff the flexibility to create a customized curriculum that best fits their individual and departmental training needs.
- **Insurance License Continuing Education:** Segal consultants who provide consulting services to health clients must maintain appropriate insurance licenses. External trainers and programs ensure Segal employees meet the continuing education requirements for license holders.
- **CFA** credentialing for our Investment Consulting practice through the CFA Institute
- **Training** provided to enhance presentation skills and business writing skills

- **Active training committees** with each practice area that identify specific training needs and conduct training sessions and workshops on a broad range of professional and technical topics. These sessions also serve as an opportunity for our senior consultants to interface and share their knowledge of industry trends and innovations.

16. For the key executives and professionals in the actuarial consulting group, including the Primary ACTUARY and all Secondary Actuaries that would be assigned to KCERA, provide a table that identifies the following information:

- Name
- Title
- Responsibilities within the firm. If a person has multiple responsibilities, indicate the percentage of time spent on each function in a footnote to the table
- Years of relevant experience
- Years with the firm
- Degrees and professional designations
- Institution awarding each degree and designation
- Publications authored

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary

Years in Industry: 43

Years with Segal: 24

Job Responsibilities: Design and administration of large defined benefit plans, regular valuation and consulting assignments, collective bargaining negotiations, arbitrations on matters of plan design and funding. Assignments have included DROP valuations, funding policy design, pension obligation bond issues, and consulting to bargaining parties on benefit design.

Degrees/Professional Designations:

- BS in Mathematics – University of Notre Dame
 - MA in Mathematics – Harvard University
- MAS (Actuarial Science) from University of Michigan Graduate School of Business
- Fellow of the Society of Actuaries
- Member of the American Academy of Actuaries
- Fellow of the Conference of Consulting Actuaries
- ERISA Enrolled Actuary

Published Works:

- Angelo, Paul. “Understanding the Valuation of Public Pension Liabilities”, American Enterprise Institute, May 2013. Updated and reprinted for In The Public Interest, January 2016.
- Segal’s Public Sector Letters on GASB 67/68 and the “Market Valuation Controversy.”
- Angelo, Paul, and James, Drew. “ARC for ARC’s Sake? A Work-in-Progress Discussion of Additional Retirement Credits under the 1937 Act.” The Journal July 2003: 1-6.

<p>Molly Calcagno, ASA, MAAA, EA Actuary Years in Industry: 15 Years with Segal: 15</p>	<p>Job Responsibilities: Provides actuarial valuation work, experience analyses, GASB 67/68 reports, benefit improvement studies and special projects for public sector pension clients.</p> <p>Degrees/Professional Designations:</p> <ul style="list-style-type: none"> • BA in Mathematics and International Relations – Carleton College • Associate of the Society of Actuaries • Member of the American Academy of Actuaries • ERISA Enrolled Actuary
<p>Mark Hamwee, FSA, MAAA, EA Vice President, Actuary Years in Industry: 30 Years with Segal: 27</p>	<p>Job Responsibilities: Supervises the production of actuarial valuation reports and related projects, and serves as enrolled actuary for both multiemployer and single-employer pension plans. He also conducts analysis of PPA '06 and its impact, plan redesign studies, experience analysis and studies to assist large unions and employers in bargaining.</p> <p>Degrees/Professional Designations:</p> <ul style="list-style-type: none"> • BS in Engineering • Active member of the Society of Actuaries • Active member of the American Academy of Actuaries
<p>Sam Tsang Senior Actuarial Associate Years in Industry: 8 Years with Segal: 6</p>	<p>Job Responsibilities: performs annual actuarial valuations, experience analyses and other special projects for public sector pension clients.</p> <p>Degrees/Professional Designations:</p> <ul style="list-style-type: none"> • BA in Mathematics
<p>Melanie Beth Walker, JD Vice President, National Compliance Practice Years in Industry: 20 Years with Segal: 20</p>	<p>Job Responsibilities: Provides ongoing and special project compliance services for employee benefit plans to clients in Segal's three market divisions (public sector, private sector and multiemployer). Serves as a national resource and frequently authors Segal publications and other written articles, as well as a speaker for various associations.</p> <p>Degrees/Professional Designations:</p> <ul style="list-style-type: none"> • BA in Political Science and International Affairs • JD from the University of Colorado School of Law • Active member of NAPPA and NAGDCA <p>Published Works:</p> <p>Ms. Walker frequently authors Segal publications for distribution to Segal's public sector retirement plan clients and has written articles for the NAPPA and NAGDCA newsletters.</p>

17. How long has the current group of key executives and professionals in your actuarial consulting group been together?

Overall, Segal's group of key executives and professionals maintain long-term team commitments. As in all companies, personnel changes do occur and replacement members are added. Our Segal team for KCERA has stayed largely consistent over our 11-year relationship.

18. For the Primary ACTUARY and all Secondary Actuaries that will directly provide services to KCERA, provide biographies and label these as Appendix D.

Please see **Appendix D**.

19. For the Primary ACTUARY and all Secondary Actuaries, state the length of time these individuals have all worked together as a team.

Paul Angelo, FSA, MAAA, FCA, EA
 Senior Vice President & Actuary
 Length of time with Team: 24 years
 Years with the Firm: 24
 Years in the Industry: 43

Molly Calcagno, ASA, MAAA, EA
 Actuary
 Length of time with Team: 15 years
 Years with the Firm: 15
 Years in the Industry: 15

21. For the Primary ACTUARY and all Secondary Actuaries, list their actuarial consulting assignments for the past five years. Include for each assignment the date of the final actuarial report, whether the Actuary served as the primary or secondary Actuary, and the client's name and size (number of pension plan members and annuitants).

Entity Name	Membership	Served by	Last Valuation Completed
Kern County Employees' Retirement Association (KCERA)	21,424	Primary: Angelo Secondary: Calcagno	6/30/2021
Orange County Employees Retirement System (OCERS)	47,796	Primary: Angelo Secondary: Calcagno	12/31/2020
Fresno County Employees' Retirement Association (FCERA)	19,950	Primary: Angelo Secondary: Calcagno	6/30/2021
Mendocino County Employees' Retirement Association (MCERA)	3,334	Primary: Angelo	6/30/2021
Sacramento County Employees' Retirement System (SCERS)	29,605	Primary: Angelo Secondary: Calcagno	6/30/2021
San Diego County Employees Retirement Association (SDCERA)	45,704	Primary: Angelo	6/30/2021

Entity Name	Membership	Served by	Last Valuation Completed
Sonoma County Employees' Retirement Association (SCERA)	10,882	Primary: Angelo Secondary: Calcagno	12/31/2020
San Bernardino County Employees' Retirement Association (SBCERA)	43,989	Primary: Angelo Secondary: Calcagno	6/30/2021
Ventura County Employees' Retirement Association (VCERA)	19,733	Primary: Angelo Secondary: Calcagno	6/30/2021
Contra Costa County Employees' Retirement Association (CCCERA)	23,708	Primary: Angelo	12/31/2020
Los Angeles City Employees' Retirement System (LACERS)	56,835	Primary: Angelo	6/30/2021
Los Angeles Department of Fire and Police Pensions	26,983	Primary: Angelo	6/30/2021
Los Angeles Water & Power Employees' Retirement Plan	21,877	Primary: Angelo	6/30/2021
City of Fresno Employees' Retirement System	4,974	Primary: Angelo Secondary: Calcagno	6/30/2021
City of Fresno Fire and Police Retirement System	2,386	Primary: Angelo Secondary: Calcagno	6/30/2021
University of California Retirement System (UCRS)	320,401	Primary: Angelo Secondary: Calcagno	7/1/2021

22. For the Primary ACTUARY and all Secondary Actuaries that will directly provide services to KCERA, state the role each would play in providing the required KCERA services.

Following is the team that would be providing the required services for KCERA.

Principal Actuary	Paul Angelo, FSA, MAAA, FCA, EA Senior Vice President & Actuary
Supervising Actuary	Molly Calcagno, ASA, MAAA, EA Actuary
Reviewing Actuary	Mark Hamwee, FSA, MAAA, EA Vice President & Actuary
Senior Actuarial Analyst	Sam Tsang Senior Actuarial Associate
Compliance Consultant	Melanie Walker, JD Vice President, National Compliance Practice

As Principal Actuary Mr. Angelo will have overall responsibility for the work performed for KCERA and will be the primary presenter to the Board.

As Supervising Actuary Ms. Calcagno will have primary responsibility for supervising the production and certification of our services to KCERA and will be the primary daily contact for KCERA staff.

As Reviewing Actuary Mr. Hamwee will provide senior support to Ms. Calcagno in reviewing the work product developed by Mr. Tsang. Other actuarial analysts may be involved as needed.

Ms. Walker will provide compliance consulting support, generally on a special project basis

23. State for the Primary ACTUARY and each Secondary Actuary the total number of clients currently assigned to these individuals.

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary
Number of Clients: 16

Molly Calcagno, ASA, MAAA, EA
Assistant Actuary
Number of Clients: 9

24. For the Primary ACTUARY and all Secondary Actuaries, state whether any of these individuals are affiliated with any other business entity or activity that could pose a potential conflict of interest with their KCERA assignments. If so, provide details on the entity or activity.

The proposed team has no other business activities that would post a conflict of interest with their KCERA assignments.

25. Describe your compensation and incentive program for actuaries in your firm. How are actuaries evaluated and rewarded? What incentives are provided to attract and retain superior individuals? Identify the percentage of compensation which is:

- a) *Base salary*- Yes, described below.
- b) *Performance bonus*- Yes, described below.
- c) *Equity incentives*- No.
- d) *Other- support for educational and professional advancement*- Yes, see Question 15.d above.
- e) *Do you offer direct ownership, phantom stock, profit sharing, and/or performance bonus?* Yes
- f) *Who is eligible to participate?*

Senior staff are eligible to become employee-owners and purchase Company stock. All staff are eligible for performance related bonus, which varies by level in addition to performance.

- g) *On what basis are these incentives determined—is compensation tied to success factors such as client base growth, performance, or other factors? Please list and indicate the weight of each in determining total compensation.*

Segal's annual, year-end incentive program that provides bonuses to staff based on three components: (1) the company's overall performance; (2) the performance of the business unit; and (3) the individual's performance against established objectives for the year, as well as the individual's performance relative to others within the business unit.

Incentive compensation represents a meaningful percentage of our staff's cash compensation package.

We do not provide equity incentives; instead, we offer senior officers the opportunity to invest in the company and share in the company's results through the purchase of the company's common stock.

Profit sharing is provided in most years, through bonuses and additional 401(k) matches, at the discretion of the Board of Directors. While Segal provides a competitive compensation package, our primary incentive for employees to continue with the firm is not just monetary, it also includes the collegial culture and shared company vision in which we perform client services.

- h) *How does your compensation structure/levels compare with other firms in the industry?*

As a benefits consulting firm, we believe our approach to compensation is both equitable and market competitive.

Recruitment

Segal recruits employees from colleges, insurance companies, other corporations, not-for-profits and academia. We take a broad approach in sourcing talent in order to have an employee base with diverse background, experience and expertise.

To foster outstanding service, our human resources policies and practices are based upon a core competency model for employee performance. We refer to it as the Success Factors. The Success Factors provide clear targets for employee development efforts and client service, as well as establishing a meaningful development partnership with each employee. The development partnership requires commitment to development goals, investment of time and effort to achieve goals, and regular feedback and other forms of support.

Segal listens to, recognizes and rewards great ideas from employees at all levels. Moreover, we are committed to supporting our employees' efforts to grow to their full potential. Employees of Segal are expected to take ownership of mapping their careers and professional development.

The company shares this responsibility by encouraging both formal and informal performance feedback, mentoring and providing both internal and external education and training opportunities to help achieve professional goals.

26. Discuss the causes and impact of any executive and professional staff turnover (departures or hiring/promotions) in the actuarial consulting group that has occurred in the last five years. Provide a table listing all the professionals that have departed from that group over the past five years. For each individual, provide the following information:

- a) Date of Departure*
- b) Name*
- c) Title*
- d) Responsibilities*
- e) Years with the firm*
- f) Reason for leaving the firm*

While Segal does not maintain or share details concerning staff turnover, we are committed to our employees' enrichment and professional development which has enabled us to have a low employee turnover rate. As a result, we have a culture of long-term employment and a steadfast workforce.

Segal's annual rates of turnover across the entire firm for the last three years are as follows:

- 2021 (June 30): 3.4%
- 2020: 3.5%
- 2019: 3.9%

In Segal's San Francisco office, we have lost three credentialed actuaries during the past five years. One actuary was hired by one of our long-time public sector clients as an actuarial manager of the client's Actuarial Services Group. Of the two other actuaries, one retired after a 40-year career with Segal and the other decided to pursue other interests.

27. Does the firm have a transition plan to deal with the possible sudden departure of key professionals within the group? Describe the plan.

Yes. As with any professional services firm, Segal is aware of the need to assure that we have succession plans in place for our senior consultants, actuaries and managers. Segal's commitment to employee enrichment and professional development has enabled us to have a low employee turnover rate. As a result, we have a culture of long-term employment and a steadfast workforce.

In the context of succession planning, we also note that, in June 2019, our San Francisco office strategically hired public pension actuary Todd Tauzer from the financial services firm S&P Global Ratings. In recent years, S&P's U.S. Public Finance division of over 100 analysts had placed new focus on the financial ramifications that pensions had on governments, and after a national search had hired Mr. Tauzer as Director of Municipal Pensions. In that role, he helped lead the team in evaluating state and local pension plans across all 50 states for plan health and long-term sustainability. He did this through the creation of a risk framework that assessed plan-specific risk factors and looked to model practices that could facilitate robust funding and secure benefits. Prior to S&P, Mr. Tauzer was a Senior Pension Actuary at CalPERS, where he led a team focused on CalPERS' risk management through risk modeling, the development of improved funding policies, and other forms of Asset Liability Management (ALM). We are excited to have Mr. Tauzer at Segal, enhancing the strong work we have already been doing for California public retirement systems over the past 20 years. Mr. Tauzer also now serves as Segal's National Public Sector Retirement Practice Leader.

Methodology

28. Describe the specific methodology to be used for the required scope of services identified in Section II of this RFP.

Provided in **Section 1. Ability to Perform Scope of Services, Methodology** for scope of services.

29. Provide how you will achieve the timeline for completion of the work as identified in Section III of this RFP. Indicate dates by which your firm must have specific input data from KCERA and indicate points in the project when your firm would plan to meet with KCERA staff at our office.

Below is a sample timeline for annual valuation services.

- Data provided to Actuary by September 1
- Draft report sent to KCERA staff by December 1

- Final report completed by February 1
- Presented to Board of Retirement by February 15

Step	Proposed Timeline
Define for KCERA the data fields needed to perform the actuarial valuation.	No later than June 30 th of each year, unless KCERA extends that date to accommodate program changes.
Review the data when received. Run membership through “edit and distribution” programs to verify completeness and reasonableness. Discuss any problems with KCERA staff and determine assumptions to be made for missing or unreasonable data.	Within two (2) weeks of receipt of complete data from the KCERA. Anticipated to be by September 1 st .
Test all computer programs.	Within four (4) weeks of receipt of complete data.
Complete the actuarial calculations. Run final versions of computer valuation programs. Compile results. Check all calculations for mathematical accuracy.	Within four (4) weeks of receipt of complete data.
Review the actuarial valuation. This review is conducted by Ms. Calcagno and encompasses the entire process including participant and financial data preparation, calculation, and programs.	Within five (5) weeks of receipt of complete data.
Draft valuation report. The report will be reviewed initially by Ms. Calcagno.	Ongoing throughout the valuation process. Completed draft within six (6) weeks after receipt of complete data and before December 1 st .
Final review actuarial valuation report. This review is conducted by Mr. Angelo and Ms. Calcagno. Discuss key valuation results with KCERA staff.	Within seven (7) weeks after receipt of complete data and before February 1 st .
Deliver actuarial valuation report, complete with actuarial certifications.	No later than eight (8) weeks after receipt of complete data and before February 15 th .
Prepare and present valuation report to Board.	At Board meeting, as scheduled.
Prepare and present special studies reports to Board.	Four (4) weeks after the necessary data report is received by Segal, unless both KCERA and Segal agree on a different delivery date.

Segal will deliver the experience study within a timeframe agreed upon with KCERA. The analyses will describe the reasons for changes in the assumptions and will include the impact on contribution rates and liabilities if the recommended assumption changes are approved by the Board.

Before recommending a change to assumptions, we will assure ourselves that the observed assumption deviations during the experience period are not just short-term or transitory in nature. This will be done by discussing observations with staff and reviewing the results of earlier experience studies. Below is a summary of the data we will need for the annual valuation process.

- **Membership Information.** We will generally need to have detailed information on actives, deferred vested, retirees and beneficiaries covered by KCERA. For actives and deferred vested members, we will need their demographic profile (e.g. age, gender, date of hire, etc.), salaries and services. For retirees and beneficiaries, we will need their demographic profile, benefits and forms of payment.
- **Financial Information.** We will need to have detailed financial information (e.g., balance sheet, income statements, reserve balance, etc.) as well as contributions received and benefits paid.
- **Other Information.** We will need to be apprised of any changes (e.g., modification to asset allocation, adoption of new benefit formula, change in allocation of contributions between the employer and employee, etc.) that may have taken place during the year.

Below is a summary of the data we will need for the experience analysis.

- **Membership Information.** This will generally be the membership information discussed above that we collect for the annual valuation augmented by data for members who change status (e.g. retire from a deferred vested status, die after receiving benefit as a retiree, etc.) during the experience study period.
- **Asset allocation and capital market assumptions** used by KCERA's Investment consultant. Again, this will generally be the financial information discussed above that we collect for the annual valuation.
- **Other Information.** This will include any other unusual data elements that will be routinely collected and analyzed during the annual valuation (e.g. conversion of additional cashouts into pensionable salary during the year of retirement, etc.).

While our preference is to receive the membership data in Excel or ASCII format, we would work with KCERA on receiving the data in a format that can more readily be generated by KCERA's pension administration system.

30. Describe your firm's theory and methodology used in recommending an appropriate actuarial cost method for a public pension fund.

Actuarial cost methods are budgeting techniques, and the choice among them is driven by the principles and practices the plan sponsor uses to set budgets for long-term obligations, such as pension plans. All actuarial cost methods will ultimately accumulate the full actuarial value of the promised benefits. However, the pattern of the incidence of annual cost among different accounting periods will vary considerably, depending on the method selected.

Most plan sponsors and retirement boards follow the principle of equity among generations of taxpayers. This principle suggests that current taxpayers should pay for current services, and not defer the cost of current services to future generations. The actuarial cost method and amortization method selection will reflect a retirement board's views regarding these issues.

The two most commonly reviewed actuarial cost methods are the Projected Unit Credit (PUC) method and the Entry Age (EA) method. The EA method can be further refined as to whether it spreads cost as a level dollar amount over the participant's career, or

whether it spreads the cost as a level percentage of payroll. Typically, other actuarial cost methods will produce results in the same cost range as the PUC or the two EA methods. Even though special circumstances unique to the plan sponsor may call for consideration of one of the actuarial cost methods over another actuarial cost method, we generally recommend the level percentage of the payroll version of the EA method, which is by far the most commonly used among ongoing public retirement systems because it produces costs that are expected to stay level (as a percentage of pay over an employee's entire career).

31. Describe your firm's theory and methodology for development of actuarial assumptions (except for the interest rate assumption, which is addressed separately).

There are two approaches to reviewing actuarial assumptions:

1. Review assumptions against the most recent experience study
2. Benchmark assumptions against national or comparable standards

Actuarial assumptions can be divided into two general groupings - demographic assumptions and economic assumptions. The ultimate test of a set of actuarial assumptions is the aggregate effect on the actuarially calculated contribution rate from year to year. If rates are stable and circumstances are not changing, then the assumptions are probably appropriate. To determine whether there are any important sources of actuarial experience gains or losses, most large plans conduct periodic investigations to test whether actual experience is being accurately projected by the actuarial assumptions. These experience reviews are useful tools for measuring the continued appropriateness of existing assumptions and to serve as early warning devices for identifying potential important trends that may be developing.

Demographic Assumptions to be reviewed include:

- Mortality: may be gender distinct and reviewed to see if it matches plan experience, including gain/loss by source.
- Withdrawal: generally should include select and ultimate rates and be checked for competition with other assumptions. Also verify whether termination assumptions include disability to avoid double deducting for this decrement.
- Retirement: should be watched for the impact of rehired retirees.
- Disability: may be a separate decrement or combined into withdrawal decrement but should be specified.
- Merit salary increase: may be select and ultimate (if appropriate) and must be consistent with COLA assumption and any specific compensation program.
- Other including marriage percents and participation rates.

Economic Assumptions to be reviewed include:

- Investment return: should be relative to plan's asset mix and comparable to other similar plans.

- Payroll growth: should be structurally consistent with inflation and merit assumptions
- Inflation: should be reasonable for the long term.
- Expenses: should be consistent with plan experience and with expected net investment returns.
- Use of Static versus Generational Mortality Tables

The Society of Actuaries (SOA) has recently published the RP-2010 family of mortality tables and associated life expectancy improvement scales includes mortality rates developed for annuitants on both a “headcount” weighted basis that weight all retirees at the same age the same way without regard to the level of benefits those annuitants are receiving from a retirement plan as well as a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. The benefit-weighted basis is the more common practice and is the approach currently used by Segal for its California public system clients (including KCERA) and by other public sector actuaries in California.

As for the life expectancy improvement scales, they can be applied in one of two ways. Currently, the more common application is to use a “generational” approach where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. This is in contrast to a “static” approach to anticipate a fixed level of mortality improvement for all annuitants receiving benefits from a retirement plan. The generational approach is used by Segal for its California public system clients (including KCERA) and is most commonly used by other public sector actuaries in California and nationwide.

The SOA has released annual updates to the two-dimensional life expectancy improvement scale to better reflect the most recent data of mortality improvement from the Social Security Administration.

Segal believes that given the continuing trend towards longer life expectancies, it would be prudent for the public plans in California to adopt the Amount-Weighted RP-2010 mortality table, adjusted for the experience of those plans along with the most recent mortality improvement scale applied generationally.

32. Describe the methodology you use to formulate a pension fund’s actuarial interest rate assumption. How may this methodology differ from client to client? Under what circumstances would you recommend KCERA change its interest rate assumption?

We recognize that the interest assumption has the greatest impact of any single assumption in determining the funding requirements of the Plan. For that reason, we assist boards in assessing the appropriateness of the interest assumption by examining simultaneously a number of key issues:

- In coordination with the investment consultant, can we determine the extent to which the current asset allocation will, over the long-term, support the interest assumption?
- How does the interest assumption correlate with other economic assumptions? Is it consistent with the payroll assumptions, salary scale assumptions and inflation assumptions?
- What is the long-term impact to the Plan if the assumption is set too low? Too high?
- What are other similarly situation plans assuming?

Generally, we find assumed interest rates that support board's policies tend to be in a range of acceptable interest rates—rarely is there one “correct” rate. Then, recommending a rate within a range becomes an issue of risk assessment and management.

Actuarial Standard of Practice No. 27 (ASOP 27), entitled “Selection of Economic Assumptions for Measuring Pension Obligations,” addresses acceptable methodologies for setting the interest rate assumption. One of the acceptable methodologies described in ASOP 27 is the “Building-Block Method”, which is the type of method we use in our analysis.

Under the Building-Block Method, expected future real rates of return (expected returns, net of inflation) are developed for each asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage. The building block model then adds expected inflation and subtracts expected investment expenses and a risk margin.

The role of the risk adjustment is to adjust the real rate of return assumption for the portfolio to reflect potential risk of shortfalls in the return assumptions. The standard deviation of the system's asset allocation determines this portfolio risk, since volatility varies by asset class.

The purpose of this risk adjustment is to increase the likelihood of achieving the expected investment return. The expected real rate of return determined above is the expected average arithmetic return and treated as having an expectation to be met or exceeded 50% of the time. The risk adjustment is intended to increase this probability, which is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

In our model, the confidence level represents the likelihood that the actual average return would be at least the assumed value over a 15-year period. For example, our real rate of return assumption is set using a risk adjustment that produces a confidence level of 55%, then there would be a 55% chance that the average return over 15 years will be equal to or greater than the assumed value.

We typically use the same general methodology for examining investment return assumptions across all our clients, though there can be some variation introduced from situation to situation, particularly with respect to the input items like the asset allocation of the retirement systems. In addition, some clients prefer to have return assumptions that are net of administrative expenses and others prefer to have an explicit administrative expense assumption built into the normal cost.

33. Describe your firm's approach to recommendations regarding the amortization of unfunded liabilities.

We work with our client systems to identify an amortization method appropriate for both the plan and the employer. The range of possible amortization methods includes various policy alternatives, including:

- Whether the amortization should be a level percentage of payroll or a level dollar amount,

- Whether there should be a single amortization layers or multiple amortization layers,
- Whether the amortization periods should be open (rolling) or closed (fixed), and
- The length of the period(s) for amortizing the unfunded accrued liability.

Our approach to developing an amortization policy is consistent with the development of the model actuarial funding policies and practices recommended by the California Actuarial Advisory Panel. This approach evaluates the policy alternatives based on stated policy objectives. One such policy objective is that the method is expected to fully fund the actuarial accrued liabilities. This argues against open or rolling period methods that never fully amortize the unfunded liability, and in favor of closed or fixed amortization periods. Other policy objectives of transparency and accountability argue for multiple, separate amortization layers for each newly identified source of unfunded liability.

The other key result under this approach is that the amortization method should balance the competing policy objectives of assuring intergenerational equity and managing contribution volatility. Maintaining that balance argues against amortization periods that are either too long or too short. This leads to a relatively narrow range of acceptable amortization periods, where the choice of a specific period from within that range will reflect the policy preferences and other circumstances of the plan and the employer.

We note that this policy objective-based approach was the basis for the actuarial funding policy that we developed for KCERA.

34. Describe your approach to measuring funded status and funding progress in order to facilitate the assessment of trends over several valuations of a client.

Funding status and progress is measured retrospectively using ratios of accrued liabilities to the actuarial value of assets; in addition, we also look at funded ratios on a market value of assets basis. We believe funded ratios are one measure of a plan's health and need to be used, not as a single point measure, but to reveal the trend in funding progress over time.

This is consistent with rating agencies, which examine the plan's financial health both at a point in time and over time—in order to assess the ability of the employers to manage their financial obligation to the workforce.

To help our clients understand the trends that have affected their funded status over time, our valuation reports and Board presentations include a graphical depiction of the history of each plan's funded status, and a projection of future unfunded liability balances and payments as the plan works towards full funding.

35. Describe the capabilities of your valuation system(s) and your computer system support.

Segal has a dedicated actuarial software development team, Actuarial Technology and Systems (ATS), and we are continually investing in expanding our technical and systems capabilities. For example, Segal has built and maintained our own actuarial software in-house for many years. This allows us to customize our deliverables based

on the unique needs of our clients. Our dedicated ATS team is comprised of a group of systems developers responsible for providing and supporting the company's state-of-the-art actuarial valuation system. This system has been designed internally to maintain control and flexibility to allow for modifications to best meet the unique needs of our clients.

Beginning in 2020, Segal launched an initiative to adapt actuarial software to a centralized cloud model. This is a complex undertaking that will span several years resulting in an architecture that will centralize and future proof the applications while providing optimal performance.

36. Describe your quality control processes for actuarial services & reports. How are these services monitored and reviewed?

Segal has quality control principles in place that mandate two levels of review for all actuarial work. Following the completion of the work product by an actuarial analyst or a senior actuarial analyst, a mid-level actuary will review it for accuracy, consistency, reasonableness and completeness. Included in this review are the data provided, the plan of benefits, the liability programming, the cost calculations and the text of the actuarial communication. After this process is completed, a credentialed actuary will give the product another review, ensuring that the conclusions are reasonable, that they correlate appropriately with prior results, and that the results are correctly and clearly stated for the client. This actuary is also responsible for ensuring that all of Segal's processes were followed appropriately in completing the work, and that the Actuarial Standards of Practice mandated by the American Academy of Actuaries have been followed.

In addition to our standard review process for all work, members of Segal's National Health Practice and other senior Health staff from other Segal offices visit each Segal office annually to complete a technical peer review of the department's work. This internal review will randomly select many of the work files to further ensure that the internal quality procedures have been followed. Segal's professional staff's individual compensation is tied to the results of these internal reviews.

Segal has a strict regimen of quality control processes and enforcement policies that is second to none in our industry. We have various quality control policies and procedures for our different services and practices. Here are the three policies most relevant to the actuarial services we would provide to KCERA.

Actuarial Department. Our internal quality control standards require a three-stage production and review process for all major actuarial projects, including annual valuations and experience investigations. After basic production, all results receive a "detailed review" that specifically checks all computer programs, valuation summaries and reports. Then a senior actuary in the department performs a "final review" ensuring that all procedures and checklists have been followed, as well as providing a fresh look to ensure that our results are consistent with all external documents such as plan documents, summary booklet and financial reports. Each level of review is documented in "review notes" that become part of the ongoing documentation for each client.

Departmental quality procedures are detailed, thorough and rigorous. They include standardized file contents and organization, procedural checklists specific to the type of valuation and exhaustive individual “test life” requirements.

Annual Quality Audits. At least once each year our Chief Actuary performs a two-day audit of each actuarial department. About ten valuations are selected at random for detailed review to check that all department procedures have been followed. The audit also includes a review of the consulting advice contained in our reports. The results of the audits are discussed in detail with local actuarial manager, the office head, and the senior staff for the audited cases.

Senior Review. Every piece of client communication that leaves our office is reviewed by another consultant with expertise in the specific field and who does not work on the assignment in question. This review focuses on the consulting information and presentation, and complements the technical review performed within the actuarial department.

More detail provided in the **Quality** section on page 48.

37. Provide as Appendix E one recent actuarial report as provided to an existing client.

Please refer to **Appendix E**.

Relevant Experience

38. Complete the following table, reporting only those client relationships where actuarial services similar to this mandate have been or are being provided.

As of June 30:

	2017	2018	2019	2020	2021
Number of Actuarial Clients	825	825	825	827	833
Number of Public Pension Plan Actuarial Clients	133	133	133	133	142

* Includes basic retirement plan actuarial and consulting services.

39. For all current public pension plan clients, state the client’s name, the first year of your initial Contract with the plan, and their asset and membership size as of June 30, 2021. Designate by asterisk which of these clients are multi-employer plans.

Segal provides a broad range of professional services to many Retirement Associations and health and welfare plans sponsored by states and political subdivisions. The following table details the public pension plan clients served by the San Francisco office:

Entity Name	Year Retained	Membership	Assets	Scope of Services
City of Los Angeles Department of Water & Power	2002	18,615	\$2.2 billion	Retiree Health Valuation
Los Angeles City Employees' Retirement System (LACERS)	2004	57,120	\$17.6 billion	Annual Valuations, Experience Analysis, Special Projects
Los Angeles Department of Fire and Police Pensions	2006	27,352	\$23.5 billion	Annual Valuations, DROP Analysis, Experience Analysis, Special Projects
Los Angeles Water & Power Employees' Retirement Plan	1999	21,877	\$16.6 billion	Annual Valuations, Experience Analysis, Special Projects
City of Fresno Employees' Retirement System*	2006	4,718	\$1.3 billion	Annual Valuations, DROP Analysis, Experience Analysis, Special Projects
City of Fresno Fire and Police Retirement System*	2006	2,328	\$1.6 billion	Annual Valuations, DROP Analysis, Experience Analysis, Special Projects
Alameda County Employees' Retirement Association (ACERA) *	2003	24,235	\$8.7 billion	Annual Valuations, Experience Analysis, Special Projects
Contra Costa County Employees' Retirement Association (CCCERA) *	2003	23,450	\$8.1 billion	Annual Valuations, Experience Analysis, Special Projects
Fresno County Employees' Retirement Association (FCERA) *	2006	19,725	\$4.9 billion	Annual Valuations, Experience Analysis, Special Projects
Imperial County Employees' Retirement System (ICERS) *	2007	4,098	\$895 million	Annual Valuations, Experience Analysis, Special Projects
Kern County Employees' Retirement Association (KCERA) *	2011	21,136	\$4.4 billion	Annual Valuations, Experience Analysis, Special Projects
Mendocino County Employees' Retirement Association (MCERA) *	2011	3,273	\$533 million	Annual Valuations, Experience Analysis, Special Projects
Orange County Employees' Retirement System (OCERS)*	2004	47,197	\$16.5 billion	Annual Valuations, Experience Analysis, Special Projects
Sacramento County Employees' Retirement System (SCERS) *	2004	29,173	\$9.9 billion	Annual Valuations, Experience Analysis, Special Projects
San Bernardino County Employees' Retirement Association (SBCERA) *	2002	43,141	\$10.2 billion	Annual Valuations, Experience Analysis, Special Projects

Entity Name	Year Retained	Membership	Assets	Scope of Services
San Diego County Employees Retirement Association (SDCERA) *	2003	45,157	\$12.8 billion	Annual Valuations, Experience Analysis, Special Projects
Sonoma County Employees' Retirement Association (SCERA) *	2007	10,685	\$2.9 billion	Annual Valuations, Experience Analysis, Special Projects
Ventura County Employees' Retirement Association (VCERA) *	2003	19,383	\$5.9 billion	Annual Valuations, Experience Analysis, Special Projects
East Bay Municipal Utility District Employees Retirement System (EBMUD)	2007	4,120	\$1.8 billion	Annual Valuations, Experience Analysis, Special Projects
University of California Retirement System (UCRS)	2004	314,854	\$70.9 billion	Annual Valuations, Experience Analysis, Special Projects
Public Employees Retirement System of the State of Nevada	1976	201,954	\$46.7 billion	Annual Valuation, Experience Analysis Legislative Analysis
County of Santa Clara	2011	29,034	\$1.1 billion	Actuarial Valuation (OPEB)
City of San Jose Federated City Employees' Retirement System	2016	8,513	\$2 billion	Actuarial Audit and Review of Experience Study, Pension and OPEB Audit, Review Return Assumption
City of San Jose Police and Fire Department Plan	2016	4,065	3.2 billion	Actuarial Audit and Review of Experience Study, Pension and OPEB Audit, Review Return Assumption
Merced County Employees' Retirement Association	2016	3,271	\$686 million	Actuarial Audit and Review of Experience Study

* Indicates Multiple Employer Plans

40. Provide the name, title, address, and telephone number for the following client references for whom your firm has provided full service actuarial consulting similar to this mandate, as specified in each question:

a) The client that most recently terminated your firm's full-service actuarial consulting Contract.

At Segal, we prioritize client satisfaction and are proud of our high client retention rate, with many client relationships extending back 40 years or more. Our California Public Sector Retirement Practice, and specifically the KCERA team, has not had a client terminate a full-service actuarial consulting contract.

b) The client with the longest full-service actuarial consulting relationship with your firm.

Public Employees Retirement System of the State of Nevada
Ms. Tina Leiss, Operations Officer
693 West Nye Lane
Carson City, Nevada 89703
775-687-4200
tleiss@nvpers.org

c) A multi-employer public pension plan client for whom your firm has provided full-service actuarial consulting for at least three years.

San Bernardino County Employees' Retirement Association
Ms. Debby Cherney, Chief Executive Officer
348 W. Hospitality Lane, 3rd Floor
San Bernardino, CA 92415
909-885-7980 x335
dcherney@sbcera.org

d) A full-service actuarial consulting client that has been assigned for at least two years to the Primary Actuary proposed for the KCERA account.

Ventura County Employees' Retirement Association
Ms. Linda Webb, Retirement Administrator
1190 S. Victoria Avenue, Suite 200
Ventura, CA 93003
805-339-4262
Linda.Webb@ventura.org

41. List all pension plan clients that have terminated their actuarial service contracts with your firm in the last five years. Include the client firm's name, size (number of pension plan members and annuitants), date of contract termination, and reason(s) for contract termination.

We have no pension clients terminate an actuarial services contract in the last five years. We have had some contracts run their full term due to project completion, such as for an actuarial audit, but no contracts have been terminated.

42. Within the last five years, has your firm been notified by any actuarial consulting services client that your firm is in default of its contract, or that conditions exist endangering continuation of that contract? If so, state the client firm's name, year the notice was received, reasons for the notice, and resolution or current status of the relationship.

No.

43. Have your firm's actuarial consulting service products been audited by another actuarial firm within the last five years? If so, state the number of such audits and whether any resulted in revisions to your clients' annual valuation results, actuarial assumptions, or actuarial cost methods.

Segal is a trusted advisor to more than 2,500 current clients. Through the normal course of ongoing consulting work in the last five years, our services have been audited by other actuarial firms many times. None of these audits have produced findings that have resulted in a significant revision to past work performed. In some cases, minor changes in assumptions or methods were identified for use in either current or future valuations.

Resources

44. Would your firm propose to use any subcontracts in the provision of the required KCERA services? If so, describe the specific services that would be subcontracted, the name of the subcontractor, the cost to your firm of these services, and how you would control the quality of services provided.

Segal will not require any subcontractors to deliver the scope of services requested.

45. Does your firm use internal or external legal expertise, or both? If external is used, state its source and nature.

Segal has a compliance practice staffed with tax and legal experts with a wide range of expertise. Melanie Walker, JD, in our Denver office will lead our regional and national team of compliance attorneys and technical experts, working in conjunction with KCERA's legal counsel, who is expected to have the responsibility for the final review and determination in all legal and tax matters

46. What investments has the firm made in information technology?

Segal continually invests in technology through a portfolio of projects approved by our IT Steering Committee to ensure that we maintain continuous operations, grow our business and mitigate risk. In addition to regular investment in the life cycle of all our systems, Segal is investing substantially in modernizing all systems and adopting cloud services to enhance business capabilities and constantly improve our security posture. Investment in cloud technologies is expanding our internal and external collaboration, improving scalability and performance of business systems, and enhancing data analytics to improve client services.

In addition, Segal is committed to investing in research and systems enhancements to consistently achieve our mission of providing trusted advice to clients. Segal is a leader in identifying emerging issues and proposing innovative solutions to assist our clients in meeting operational challenges to their benefit programs. Our innovative consulting approach is also reflected in our contributions to the industry. Many widely accepted benefit practices were innovations first conceived, designed and introduced by Segal.

For example, Segal's *Innovation Lab* enhances and supports the culture of innovation at Segal and with our clients. Through in-depth expertise, research, collaborations with clients and colleagues, and the use of content curation and artificial intelligence tools,

the Lab develops solutions to target client concerns and opportunities; identify emerging trends and opportunities to enrich our strategic consulting; manage our innovation pipeline and process to bring our clients meaningful, transformative solutions; and develop intellectual capital, insights and strategies to support clients and consultants.

47. Do you have plans/arrangements in place for alternative work sites should either your headquarters facility or the facility that will primarily provide services to KCERA become inoperative because of fire, earthquake, etc.? Briefly describe your emergency and disaster recovery plans. Include in your description your disaster recovery plans related to client data files.

Yes. Segal has a detailed Disaster Recovery plan that includes use of backup sites, also Segal offices, to quickly provide services in case of business interruption.

In the event that a Segal office experiences a disaster, power failure or other facility or systems incident, recovery and restoration of services are performed. The IT infrastructure provides for rapid recovery, utilizing replicated systems and remote access capabilities. Once an incident is declared, following the Segal Business Continuity Plan, systems are failed over to the alternate site, making systems available immediately, beginning with communication systems and remote access services followed by the recovery of all business systems.

Segal replicates and backs up data to alternate storage sites in order to ensure the availability of data in the event of a disaster or incident that impacts the primary data center.

Segal performs nightly backups of server data to guard against data loss due to hardware failure or data corruption. Encrypted tapes are stored offsite at a data archive vendor facility in secured and environmentally controlled environments. Backup integrity checks are performed on a regular basis. Restoration of file servers from backups are performed periodically on a test basis.

Segal's Contingency planning policies are contained in the HIPAA Security Rule Policies, as well as in the Segal Business Continuity Plan. The Segal Business Continuity Plan identifies the critical infrastructure, applications and data to be restored, and priority of restoration, in the event of a disaster or other emergency mode operation. This plan addresses the roles and responsibilities of various parties in the event of a restoration, as well as the procedures for performing the restoration.

This plan is available to all employees. An assessment and prioritization of critical infrastructure, applications and data are conducted on at least an annual basis and updated in the Business Continuity Plan. Contingency Operations processes have been implemented to ensure the restoration of data as defined in The Segal Business Continuity Plan. The Segal Business Continuity Plan calls for recovery of operations at an alternate Segal facility that is subject to and is consistent with Segal's standard security measures including security guards, access cards and/or key locks.

Segal conducts an annual review of its Business Continuity Plan to assess effectiveness and revisions as necessary. The Business Continuity Plan is reviewed annually by National Facilities and Offices Services, the IT Department and appropriate

representatives of the business to confirm that all processes are accurate and up-to-date based on changing business, regulatory, technical and security requirements.

48. Please describe the levels of coverage for errors and omissions insurance and any fiduciary or professional liability insurance your firm carries. Is the coverage on a per-client basis, or is the dollar figure applied to the firm as a whole? List the insurance carriers.

Segal maintains \$20 million in aggregate E&O insurance coverage as follows:

\$12.5 million with Greenwich Insurance Company and \$7.5 million with Everest Indemnity Insurance Company.

Policy term: January 31, 2022 - January 30, 2023.

49. How does the firm monitor and measure actuarial client satisfaction?

Our approach to account management and client satisfaction is proactive: to understand client issues and anticipate client needs rather than react to them. Our rigorous quality standards are maintained by the implementation of the following programs and include client feedback programs:

- **Relationship management:** Segal's consultants listen to client needs and proactively help clients meet their goals.
- **Mandatory peer review of actuarial and underwriting reports:** Actuarial and health analysis managers complete these reviews. The company has separate, detailed quality-control standards for its actuarial and health analytical work.
- **Work product quality assurance:** Reports, memoranda and letters on complex or technical matters are prepared by an experienced team member and reviewed by the senior consultant who is an expert in the area addressed by the material.
- **Team consulting:** Through the client service team, we make checks and balances for quality control an organic feature of the consulting process. Meetings and phone calls with the client are documented in file memoranda that are shared with the team. In the course of keeping one another informed about client developments, the team members go through an automatic quality-review procedure.
- **Early warning system:** Each office and region has an early warning system to identify and deal with potential difficulties and anomalies as they emerge and before they become problematic.

50. Describe the resources your firm has that specifically address the needs of public fund clients.

Segal has been helping public sector retirement systems and employers with their retirement plans for over 60 years – through multiple economic cycles and market volatility. We are known for designing retirement plans that reflect the special needs and priorities of public entities and their employees. Our public sector retirement practice provides a full range of services, including:

Actuarial services

Segal's experts can help public sector plan sponsors:

- Forecast plan funding requirements
- Identify available options and explore alternatives for plan funding
- Identify industry changes and trends

Plan design

Today's difficult economy and volatile financial markets demand careful planning and creativity to ensure that the design of pension and other retirement income programs will meet the goals and needs of plan participants over the long term.

Plan governance

Benefit plan sponsors and administrators need to keep administration procedures up-to-date in order to comply with regulations. This need is more urgent than ever, making now a good time to take a fresh, intensive look at your plan's operations.

Risk assessment and mitigation

Because retirement plans can face significant fluctuations in contributions from year to year, public sector plans need tools that can help:

- Predict how changes and economic and budgetary conditions could affect plan contributions
- What steps can be taken to mitigate risk

Investment solutions

Through Segal Marco Advisors, our SEC-registered investment solutions affiliate, we work with defined contribution and defined benefit plan sponsors on:

- Investment manager selection
- Manager performance
- Policy development

In addition to our expert knowledge of defined benefit and hybrid plans, we also offer specialized expertise in public sector defined contribution plans.

Segal's Public Sector Retirement Practice is recognized for its in-depth knowledge of public sector retirement plan issues and for providing strategic, carefully crafted, individual solutions to difficult challenges. Our retirement practice leaders have decades of experience in guiding clients, and they figure prominently in industry associations and conferences.

Fees

51. Describe how fees are determined for your firm's actuarial services.

We have (a) fixed fees for regularly recurring work including valuation reports and experience studies, which are based on estimates of actual hourly time charges for similar projects, and (b) hourly rates for special projects that are billed based on actual time charges for the project.

52. How are fees billed (billing periods and prospective versus arrears)?

We would continue our current practice of billing KCERA quarterly in arrears.

53. The proposed fee should include administrative, third-party, travel, and all other costs.

Fee quote provided in **Section 3. Fees** is all-inclusive of such costs.

2. Quality Assurance

The Respondent must identify and discuss how it controls cost, quality, timeliness and confidentiality of its services.

We maintain an established quality control process to ensure accurate and high-quality deliverables for our clients. Segal's formal policy for quality control was established in 1985 and has evolved over time to include additional best practices. Our commitment to clients is evidenced by the loyalty of our clients, many of whom have maintained long-standing relationships with us spanning several decades.

Your primary consultant will continue to oversee the relationship with KCERA by monitoring workflow, responding to client inquiries and needs, and communicating progress to the client. Our approach to client satisfaction is proactive: we seek to understand client business issues and *anticipate* client needs, rather than react to them. We will solicit feedback and keep KCERA updated on issues that arise in the industry and may have an impact on the client's programs.

Our quality standards are maintained by the implementation of the following programs, in addition to separate, detailed quality control procedures for our actuarial work:

- **Mandatory peer review of actuarial reports:** Actuarial managers oversee a comprehensive, three-stage review process for all technical actuarial work: an actuarial analyst completes the basic work, which is checked in detail by a more experienced actuary; then, a final review is conducted by at least one more senior actuary. This ensures that current regulations and requirements are considered, all assumptions and calculations have been appropriately documented, checked and reviewed, quality control checklists completed and followed, the review process is fully documented, data reasonability criteria met, and adherence is maintained with all of the firm's policies and procedures as well as professional actuarial standards.
- **Work product quality assurance:** Reports, memoranda and letters on complex or technical matters all follow the same process indicated above. They are prepared by the actuarial team and reviewed by a senior consultant familiar with the client's situation and the area addressed by the material.
- **Team consulting:** Our client service teams enable us to make "checks and balances" for quality control an organic feature of the consulting process. Meetings, calls and other contacts with the client are documented in file memoranda that are shared with the team. In the course



of keeping one another informed about client developments, the team members go through an automatic quality-review procedure.

- **Early warning system:** Each office and region has an early warning system to identify and deal with potential difficulties and anomalies as they emerge and before they become problematic. As an example, Segal has a solvency reporting policy where notification is required if a plan is expected to become insolvent within the next few years. Depending on the situation, our policy requires consultation with the local actuarial manager, the Office of the Chief Actuary, market experts and/or in-house General Counsel.
- **Company-wide standards and training:** We engage in ongoing staff development and training to ensure the consistency and quality in the delivery of services. We are committed to providing both the highest level of quality service to our clients and professional development opportunities for our employees. We operate numerous programs to train, enrich and mentor our professional staff. Highlights include:
 - Participation in industry conferences, seminars, and associations. Not only do we encourage consultants to actively engage in external events, but we also organize many of these conferences and seminars each year and serves as a corporate sponsor to a number of benefits-related associations.
 - Training initiatives for time management, presentation techniques, written communications and negotiations
 - Leadership and management training for senior managers. These sessions also serve as an opportunity for our senior consultants to interface and share their knowledge of industry trends and innovations.
 - Active training committees within each practice area that identify specific training needs and conduct training sessions and workshops on a broad range of professional and technical topics. These comprehensive, ongoing internal educational efforts are led by experts.
- **Relationship management:** Segal realizes that each project's success depends on the team supporting the project. Therefore, we focus on involving the appropriate mix of technical and resource staff in each project to develop achievable solutions.
- **National peer review program:** Our health and retirement actuarial work for clients is subject to an annual on-site peer review of each actuarial practice or department in the company, in accordance with Segal's actuarial policy and quality standards.
- **Software:** To maintain accuracy and quality, the firm's actuarial software is internally developed and tested by credentialed actuaries working in our national Actuarial Technology and Systems unit. The same basic actuarial modeling software is used in all valuations, with customized applications that develop appropriate results for each type of plan.

Actuarial training and quality control

Many members of our staff are Fellows and Associates of the Society of Actuaries, Members of the American Academy of Actuaries, Fellows and Members of the Conference of Consulting Actuaries, Enrolled Actuaries and Fellows of the Canadian Institute of Actuaries. In addition, several of our firm's senior actuaries have served on committees of the American Academy of Actuaries, the Society of Actuaries, the Conference of Consulting Actuaries and the Actuarial Standards Board and on the Advisory Committee of the Joint Board for the Enrollment of Actuaries.

Because of staff involvement in professional actuarial organizations, the company has a Director of Actuarial Continuing Education, who arranges a Technical Actuarial Meeting each year, as well as other professional development opportunities, which help actuarial staff meet continuing education requirements.

3. Signed Respondent Guarantees Form – Attachment 1

ATTACHMENT 1

RESPONDENT GUARANTEES

The respondent certifies it can and will provide, at a minimum, all services set forth in Exhibit B, Scope of Services.



Signature of Official: _____

Name (typed): _____

Paul Angelo

Title: _____

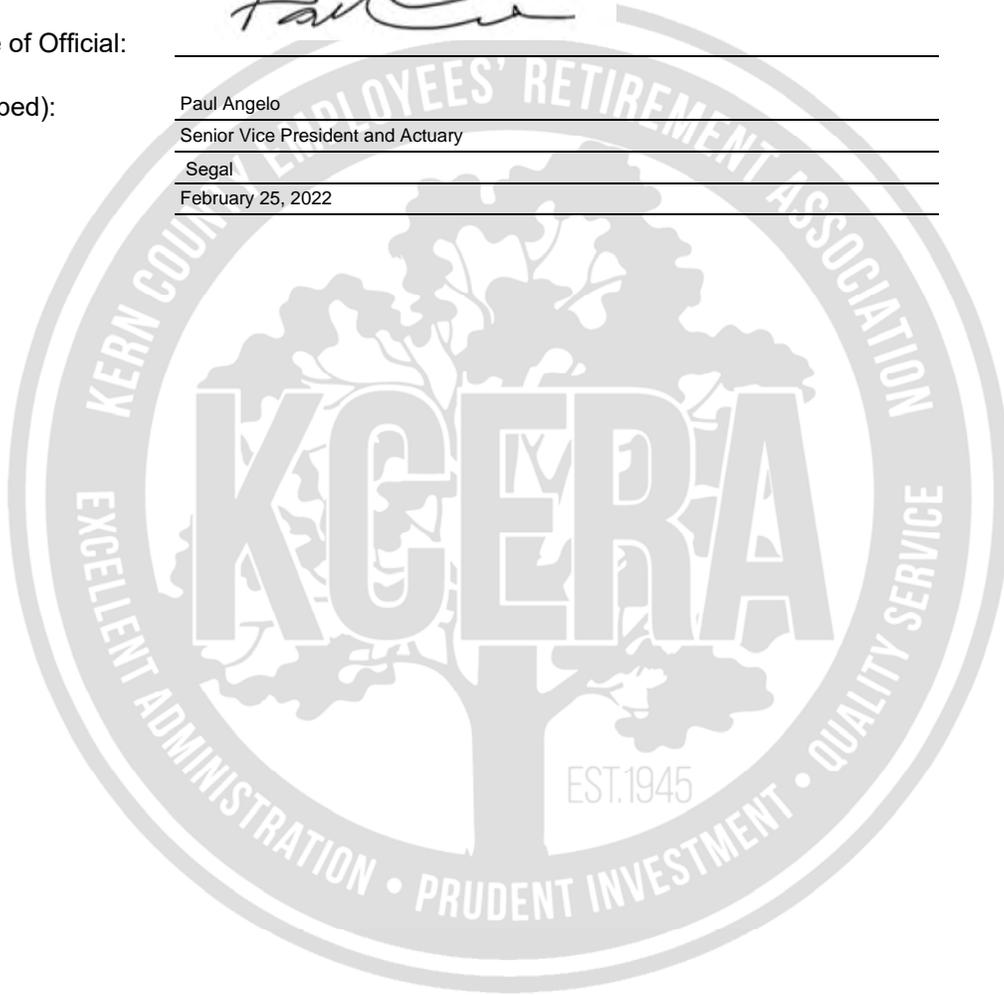
Senior Vice President and Actuary

Firm: _____

Segal

Date: _____

February 25, 2022



4. Signed Respondent Warranties Form – Attachment 2

ATTACHMENT 2

RESPONDENT WARRANTIES

- A. Respondent warrants that it is willing and able to comply with State of California laws with respect to foreign (non-California) corporations.
- B. Respondent warrants that it is willing and able to obtain an errors and omissions insurance policy providing a prudent amount of coverage for the willful or negligent acts, or omissions of any officers, employees or agents thereof.
- C. Respondent warrants that it will not delegate or subcontract its responsibilities under an agreement without the prior written permission of KCERA.
- D. Respondent warrants that all information provided by it in connection with this proposal is true and accurate.

Signature of Official:



Name (typed):

Paul Angelo

Title:

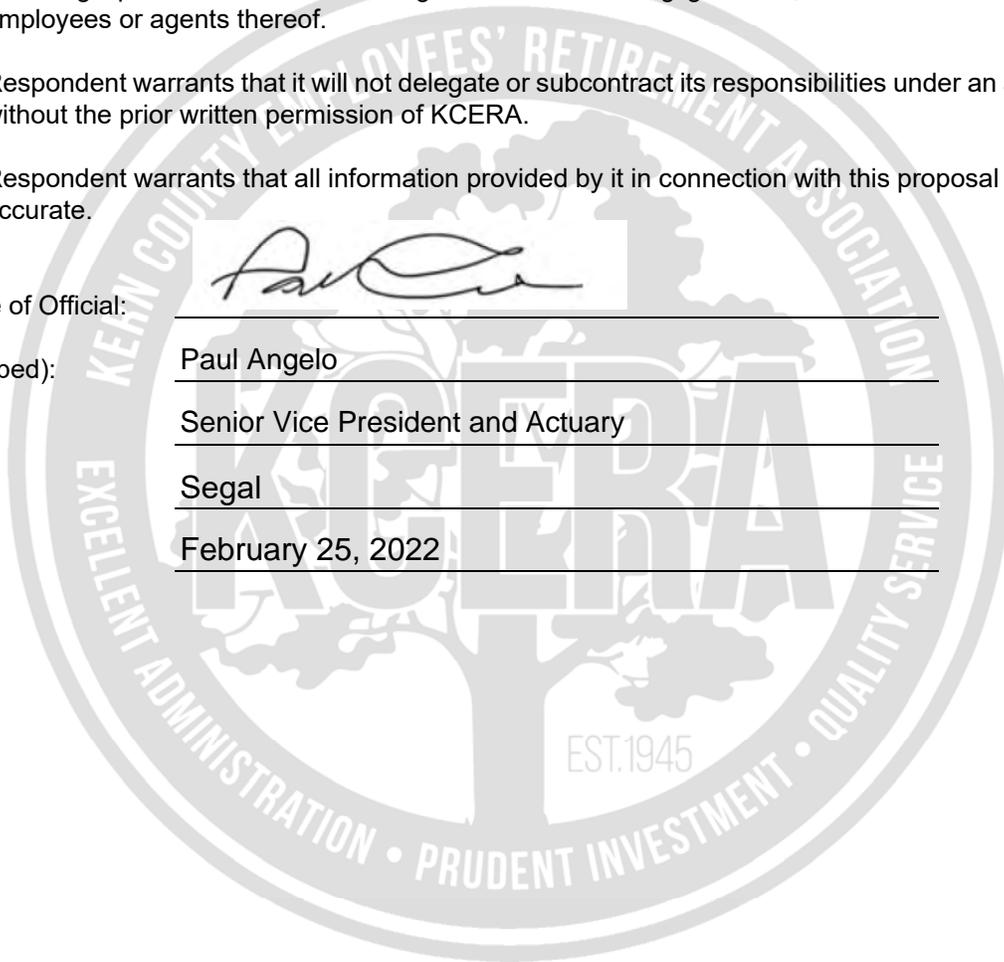
Senior Vice President and Actuary

Firm:

Segal

Date:

February 25, 2022



5. Dollar Cost Bid – Attachment 3

The Respondent is to submit a fixed fee proposal for all services outlined in the Scope of Services.

Fixed Fee Valuation Services

	Proposed: April 2022 through March 2023	Proposed: April 2023 through March 2024	Proposed: April 2024 through March 2025
Actuarial Valuation (includes one meetings)	\$70,000	\$72,000	\$74,000
GASB 67 Valuation	\$13,500	\$14,000	\$14,500
GASB 68 Valuation ¹	\$20,000	\$20,500	\$21,000
SRBR Tier 3	\$9,750	\$10,000	\$10,250
Annual COLA and COLA bank	\$2,300	\$ 2,400	\$ 2,500
Triennial Experience Study (includes two meetings)		\$52,000	

Fees for 415 Limit Calculations and other non-fixed fees services will continue to be performed on an hourly rate basis. Note that the fee for the Triennial Experience Study includes two meetings.

Hourly Rates

	Proposed: April 2022 through March 2023	Proposed: April 2023 through March 2024	Proposed: April 2024 through March 2025
Principal Actuary (Angelo)	\$560	\$570	\$580
Reviewing Actuary	\$540	\$550	\$560
Supervising Actuary (Calcagno)	\$520	\$530	\$540
Senior Actuarial Analyst	\$350-\$440	\$360-\$450	\$370-\$460
Actuarial Analyst	\$250-\$340	\$260-\$350	\$270-\$360
Compliance Consultant	\$520	\$530	\$540
Clerical	No Charge	No Charge	No Charge

¹ This does not include the additional work for the Hospital Authority. That work will continue to be performed on an hourly rate basis.

ATTACHMENT 3

Dollar Cost Bid

ACTUARIAL FEE SCHEDULE

Fixed Fee Structure

Calendar Year	April 2021 through March 2022	April 2022 through March 2023	April 2023 through March 2024
A. Annual Valuations—includes one presentation to the Board of Retirement Contract sections 1.B. (1) & (3)	\$ 06/30/22 Valuation	\$ 06/30/23 Valuation	\$ 06/30/24 Valuation
B. GASB 67 Valuation Contract section 1.C. (1)	\$ 13,500	\$ 14,000	\$ 14,500
C. GASB 68 Valuation ¹ Contract section 1.C. (1)	\$ 20,000	\$ 20,500	\$ 21,000
D. SRBR Tier 3 Contract section 1.C. (3)	\$ 9,750	\$ 10,000	\$ 10,250
E. Annual COLA and COLA bank Contract section 1.C. (2)	\$ 2,300	\$ 2,400	\$ 2,500
F. 415 Limit Calculations* Contract section 1.C. (4)	\$	\$	\$
G. Triennial Experience Study Included in contract section 1.B.(2)	\$	\$ 52,000	\$
Total for Fixed Fees	\$ 45,550	\$98,900	\$48,250

¹This does not include the additional work we have been asked to do each year for the Hospital Authority. That work will continue to be performed on an hourly rate basis.

These fees include attendance at two Board or other meetings per year (as part of annual valuations), plus two additional meetings to present the experience analysis.

* This work will be performed on an hourly rate basis.

Actuary does not charge or load for computer time or system usage, nor do we charge for clerical support. Actual travel expenses will be billed for meetings in excess of two per year (excluding the presentation of the experience analysis).

Hourly Rates

Class of Personnel	Standard Hourly Rate		
	Year 2021/2022	Year 2022/2023	Year 2023/2024
Primary Actuary (NAME)	\$ 560	\$ 570	\$ 580
Reviewing Actuaries	\$ 540	\$ 550	\$ 560
Supervising Actuary (Name)	\$ 520	\$ 530	\$ 540
Senior Actuarial Analysts	\$ 350-440	\$ 360-450	\$ 370-460
Actuarial Analysts	\$ 250-340	\$ 260-350	\$ 270-360
Compliance Consultants	\$ 520	\$ 530	\$ 540
Clerical	\$ No Charge	\$ No Charge	\$ No Charge

The above rates are all-inclusive. Actuary does not charge or load for computer time or system usage, nor do we charge for clerical support. Actual travel expenses will be billed for meetings in excess of two per year (excluding the presentation of the experience analysis).

6. Assumptions

The Respondent must identify and discuss all assumptions it has made in preparing its cost proposals. Further, the Respondent must state that there are no other assumptions related to meeting the requirements of the RFP other than those enumerated in this section of the proposal. Any other assumptions elsewhere in the Respondent's proposal will not be recognized by KCERA

Our only fee related assumptions are:

(1) As noted above, the fixed fee valuation services listed will include attendance at one Board or other meeting per year for the annual valuation, plus two additional meetings to present the experience analysis, and

(2) All other services will be performed on an hourly rate basis.

7. Exceptions

The Respondent must affirm that it has read and understands the RFP and the terms and conditions included in the RFP. The Respondent must state any and all exceptions it takes with the requirements set forth in the RFP and/or with any terms and conditions contained in the RFP relating to the ensuing contract. Only the exceptions identified in this section of the proposal will be considered by KCERA; any other exceptions embedded elsewhere in the proposal will not be recognized by KCERA.

We have read the RFP and terms and conditions and anticipate no issues reaching mutually agreeable terms. As evidence of our ability to work compatibly with KCERA, we refer you to the current Segal contract in place.

8. References

The Respondent should include a list of at least three (3) clients for whom the Respondent has provided consulting services that are the same or similar to those services requested in this RFP. Any California "1937 Act" county pension fund for which the Respondent has provided these products and services should be included. Information provided should include the name, address, and telephone number of the client and the name, title, e-mail address, and phone/fax numbers of a person who may be contacted for further information.

Ventura County Employees' Retirement Association (VCERA)

Ms. Linda Webb, Retirement Administrator
1190 S Victoria Avenue, Suite 200
Ventura, CA 93003
P: 805-339-4262
Linda.Webb@ventura.org

San Bernadino County Employees' Retirement Association (SBCERA)

Ms. Debby Cherney, Chief Executive Officer
348 W Hospitality Lane, 3rd Floor
San Bernardino, CA 92415
P: 909-885-7980 x335
dcherney@sbcera.org

Orange County Employees Retirement System (OCERS)

Mr. Steve Delaney, Chief Executive Officer
2223 E. Wellington Avenue, Suite 100
Santa Ana, CA 92701
P: 714-558-6222
sdelaney@ocers.org

Sonoma County Employees' Retirement Association (SCERA)

Ms. Julie Wyne, Chief Executive Officer
433 Aviation Boulevard, Suite 100
Santa Rosa, California 95403
P: 707-565-8103
jwyne@sonoma-county.org

9. Financial Statements

The Respondent must provide a copy of the firm's most recent financial statements.

Per RFP instructions, addressed within **Appendix C**.

Appendices

Appendix A – Firm Organization Chart with Ownership

Segal consists of three divisions as noted below.



Our teams help a wide range of industries. No matter who you are, we can assist you with:

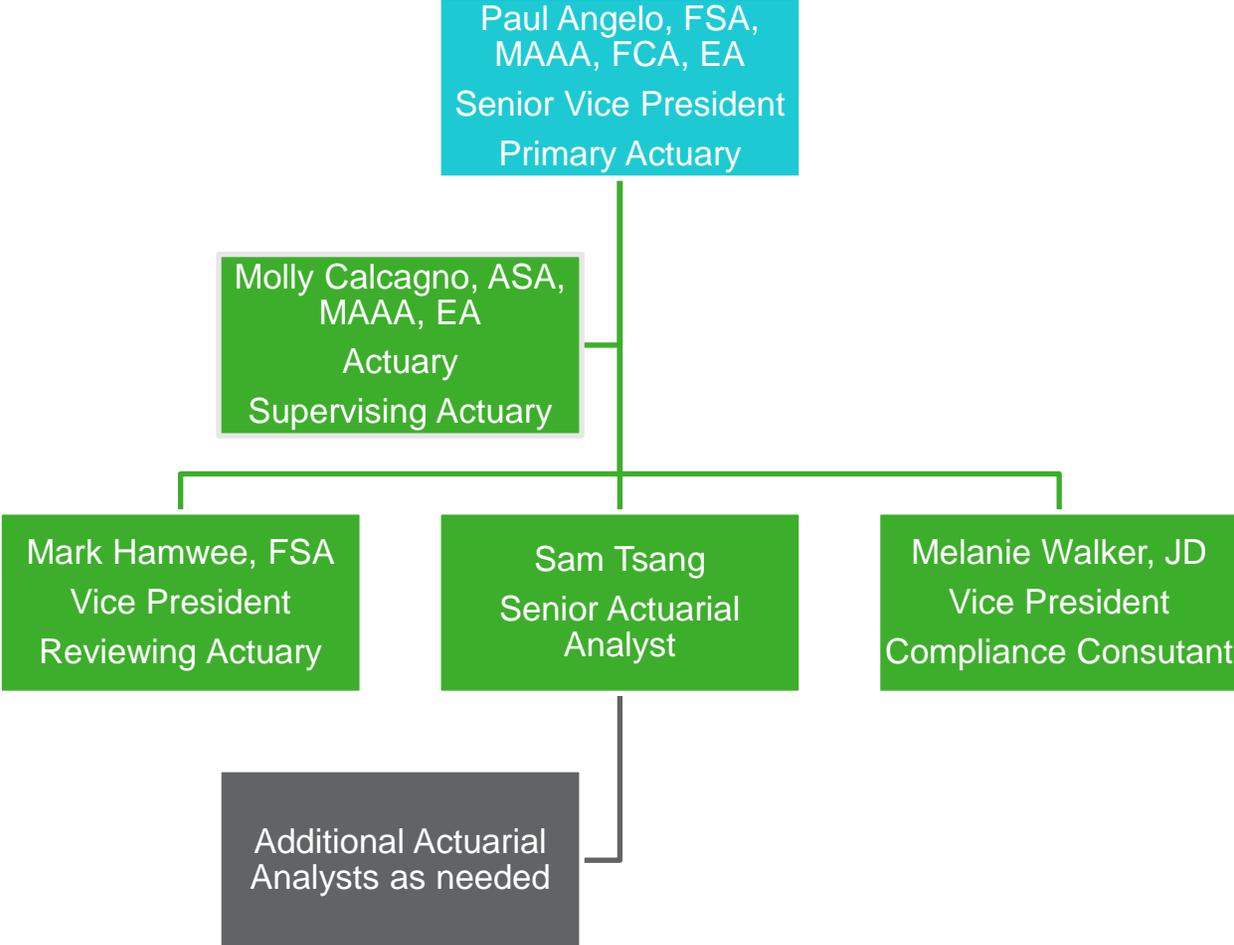
Administration and
Technology Consulting
Benefit Audit Solutions
Compensation and Career
Strategies
Compliance

Health and Welfare Benefits
HR and Benefits Technology
Insurance
Organizational Effectiveness
Retirement Benefits

Benefits Communication
Communication Strategy
Personalized Benefit Statements
Surveys and Focus Groups
Website and Portal Design

Advisory Investment Solutions
Corporate Governance
and Proxy Voting
Defined Contribution Consulting
Discretionary Consulting

Appendix B – Actuarial Consulting Group Organization Chart



Appendix C – Audited Financials

Due to company policy, this is provided as a separate password-protected file.
A copy of the accompanying cover letter follows.



Joseph Fristachi
Chief Financial Officer
T 212.251.5149
M 646.483.2578
jfristachi@segalco.com

333 West 34th Street
New York, NY 10001-2402
segalco.com

Kern County Employees' Retirement Association
Matt Henry
11125 River Run Boulevard
Bakersfield, CA 93311

Re: Request for Proposals – Kern County Employees' Retirement Association

Dear Mr. Henry:

Pursuant to the above referenced RFP, on behalf of Kern County Employees' Retirement Association, we are hereby submitting a password-protected electronic (Email) copy of Segal's audited financial statements for the years ended December 31, 2019 – December 31, 2020 which are Proprietary/Confidential Materials." We request that only you, and/or the member(s) of your staff directly responsible for the evaluation of this information, view our financial statements.

At the conclusion of the evaluation, please delete any of our financial information from your computer systems. Thank you for maintaining the confidentiality of this material.

If you have any questions, please feel free to contact me.

Sincerely yours,

A handwritten signature in black ink that reads "Joseph M. Fristachi".

Joseph Fristachi
Chief Financial Officer

cc: Paul Angelo

Appendix D- Team Biographies

Principal Actuary	Paul Angelo, FSA, MAAA, FCA, EA Senior Vice President & Actuary
Supervising Actuary	Molly Calcagno, ASA, MAAA, EA Actuary
Reviewing Actuary	Mark Hamwee, FSA, MAAA, EA Vice President & Actuary
Senior Actuarial Analyst	Sam Tsang Senior Actuarial Associate
Compliance Consultant	Melanie Walker, JD Vice President National Compliance Practice

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President and Actuary,
San Francisco

Project Role: Primary Actuary



Expertise

Mr. Angelo is a Senior Vice President and Actuary in Segal's San Francisco office. He has over 35 years of experience in the design, valuation and administration of large defined benefit plans, including corporate, governmental, Taft-Hartley and other collectively bargained plans.

Mr. Angelo currently serves as Valuation Actuary for 16 major California county and city retirement systems and associations, as well as the University of California Retirement Systems. His assignments for these systems have included funding policy design and review, analysis of pension reform proposals and consulting to bargaining parties on benefit design.

Mr. Angelo is a former member of the GASB Postemployment Benefits Accounting and Financial Reporting Task Force and currently serves on the California Actuarial Advisory Panel, as well as the Committee on Retirement and Benefits Administration of the Government Finance Officers Association (GFOA CORBA).

Education/professional designations

Mr. Angelo has a BS in Mathematics from the University of Notre Dame and an MA in Mathematics from Harvard University. He also holds a Master of Actuarial Science degree from the University of Michigan Graduate School of Business Administration. Mr. Angelo is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, a Fellow of the Conference of Consulting Actuaries and an ERISA Enrolled Actuary.

Mr. Angelo is active in several national actuarial organizations. He currently serves as a member of the Board of Directors of the Conference of Consulting Actuaries (CCA), as well as Chair of the Public Plans Community of the CCA and as head of the Public Plans Section of the CCA's Annual Meeting Committee. Mr. Angelo is active in the American Academy of Actuaries Pension Practice Council and has served as chair of its Public Plans Subcommittee. He is a past Chair of the Pension Section Council of the Society of Actuaries and is a current member of the Society's Social Insurance & Public Finance Section Council.

In 2012, Mr. Angelo was named the Most Valuable Volunteer by the Conference of Consulting Actuaries.

Publications/speeches

Mr. Angelo is an active speaker on retirement topics. He has made frequent presentations to both California and national associations of public retirement systems.

Recent presentation topics include new developments in funding policy guidance and practice, and the ongoing debate regarding financial economics and public sector plans. Mr. Angelo is also a frequent speaker on public pension topics and financial economics at conferences sponsored by the American Academy of Actuaries, the Conference of Consulting Actuaries and the Society of Actuaries.

In May 2013, Mr. Angelo wrote and presented a paper, "Understanding the Valuation of Public Pension Liabilities: Expected Cost versus Market Price," for the American Enterprise Institute. That paper was updated and reprinted in the January 2016 issue of "In the Public Interest," the newsletter of the Society's Social Insurance & Public Finance Section. He has also authored papers on public pension funding in California's Public Retirement Journal.

Molly K. Calcagno, ASA, MAAA, EA
Actuary, San Francisco
Project Role: Supervising Actuary



Expertise

Ms. Calcagno is an Actuary in Segal's San Francisco office with almost 16 years of experience in the actuarial consulting field. She provides actuarial valuation work, experience analyses, benefit improvement studies and special projects for public sector pension clients. Ms. Calcagno serves as secondary actuary on seven systems that operate under the 1937 CERL including:

- Kern County Employees' Retirement Association
- San Bernardino County Employees' Retirement Association
- Ventura County Employees' Retirement Association
- Sonoma County Employees' Retirement Association
- Orange County Employees Retirement System
- Fresno County Employees' Retirement Association
- Sacramento County Employees' Retirement System

Education/professional designations

Ms. Calcagno is a graduate of Carleton College in Minnesota with a BA in Mathematics and International Relations. She is an Associate of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

Mark Hamwee, FSA, MAAA, EA
Vice President, Actuary, San Francisco
Project Role: Reviewing Actuary



Expertise

Mr. Hamwee is a Vice President and Actuary in Segal's San Francisco office. Mr. Hamwee supervises the production of actuarial valuation reports and related projects, and serves as enrolled actuary for both multiemployer and single-employer pension plans. He also conducts analysis of PPA '06 and its impact, plan redesign studies, experience analysis and studies to assist large unions and employers in bargaining.

Education/professional designations

Mr. Hamwee is a graduate of Princeton University with a BS in Engineering. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary.

Sam Tsang

Senior Actuarial Associate, San Francisco

Project Role: Senior Actuarial Analyst

Expertise

Mr. Tsang is a Senior Actuarial Associate in Segal's San Francisco office with eight years of actuarial experience. He performs annual actuarial valuations, experience analyses and other special projects for public sector pension clients.



Education/professional designations

Mr. Tsang received a BA in Mathematics from the University of California, Berkeley.

Melanie Walker, JD

Senior Vice President, National Compliance Practice, Denver

Project Role: Compliance Consultant



Expertise

Ms. Walker is a Senior Vice President in Segal's National Compliance Practice, based in the firm's Denver office. She has provided ongoing and special project compliance services for employee benefit plans for 20 years. Her primary area of expertise is with public sector retirement plans, and she serves as a national resource for Segal in this area. Ms. Walker's specialized expertise includes:

- Performing comprehensive compliance reviews for public sector defined benefit and defined contribution plans
- Analyzing, drafting and reviewing governing plan documents such as state/local statutes, administrative rules and policy manuals
- Researching and analyzing statutory, regulatory and agency guidance on tax rules and employee benefit laws
- Providing advice and training on fiduciary rules and plan governance structure
- Consulting with public entities on retiree health plan design and funding options
- Assisting public plans with administrative and operational issues relating to plan design and plan reform

Professional background

Prior to joining Segal, Ms. Walker worked in employment law at a firm in Denver.

Education/professional designations

Ms. Walker received a BA in Political Science and International Affairs with an area of concentration in the former Soviet Union at the University of Colorado at Boulder and a JD from the University of Colorado School of Law. She is a licensed attorney in the State of Colorado.

Ms. Walker is an active member of the National Association of Public Pension Attorneys (NAPPA), where she serves on the Tax & Benefits Committee. She is also a member of the National Association of Government Defined Contribution Administrators (NAGDCA) where she currently serves on the legislative committee.

Publications/speeches

Ms. Walker frequently authors publications for distribution to Segal's public sector clients and has written articles for the NAPPA and NAGDCA newsletters. She is also a frequent speaker on public sector benefits issues, including teaching a course on the fundamentals of employee benefit plans for the International Foundation of Employee Benefit Plans and providing regulatory updates at NAGDCA conferences.

Appendix E: Sample Reports

We include a sample funding report, SRBR report, experience study and risk report on the following pages.

Kern County Employees' Retirement Association

Actuarial Valuation and Review

As of June 30, 2021



This report has been prepared at the request of the Board of Retirement to assist in administering the Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Retirement and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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December 2, 2021

Board of Retirement
Kern County Employees' Retirement Association
11125 River Run Blvd.
Bakersfield, CA 93311

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2021. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for July 1, 2022 to June 30, 2023.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement Association. The census information and financial information on which our calculations were based was prepared by the staff of the Association. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Molly Calcagno, ASA, MAAA and Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Association.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal

A handwritten signature in black ink, appearing to read "Paul Angelo", written over a horizontal line.

Paul Angelo, FSA, EA, MAAA, FCA
Senior Vice President and Actuary

A handwritten signature in blue ink, appearing to read "Molly Calcagno", written over a horizontal line.

Molly Calcagno, ASA, MAAA, EA
Actuary

ST/jl

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal to present a valuation of the Kern County Employees' Retirement Association ("KCERA" or "the Association") as of June 30, 2021. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of current plan assets to cover the estimated cost of settling the Association's accrued benefit obligations.

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; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Association, as administered by the Board of Retirement;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of June 30, 2021, provided by KCERA;
- The assets of the Association as of June 30, 2021, provided by KCERA;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board of Retirement for the June 30, 2021 valuation;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. adopted by the Board of Retirement for the June 30, 2021 valuation; and
- The funding policy adopted by the Board of Retirement.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the Association's liabilities, and which, as a percentage of payroll, remain as level as possible for each generation of active members. Annual actuarial valuations measure the progress toward this goal, as well as test the adequacy of the contribution rates.

Section 1: Actuarial Valuation Summary

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association's liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the Association's staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

The contribution requirements are determined as a percentage of payroll. The Association's employer rates provide for both Normal Cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have applied the funding policy last reviewed with the Board of Retirement in 2012. Details of the funding policy are provided in *Section 4, Exhibit 1* on pages 109 and 110.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit H* starting on page 90. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit I* starting on page 95.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2022 through June 30, 2023.

Section 1: Actuarial Valuation Summary

Effect of Gain Sharing Provisions

The 7.25% investment return assumption used in this valuation has been developed without taking into consideration any impact of the 50/50 excess earnings allocation between the retirement and Supplemental Retiree Benefits Reserve (SRBR) asset pools. This is based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% allocation of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than is used for interest crediting. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption of 7.25%.

Actuarial Standard of Practice (ASOP) No. 4 (“Measuring Pension Obligations and Determining Pension Plan Costs or Contributions”) states that some plan provisions, including gain sharing provisions, “may create pension obligations that are difficult to appropriately measure using traditional valuation procedures.” ASOP No. 4 further states that “for such plan provisions, the actuary should consider using alternative valuation procedures, such as stochastic modeling ... to reflect the impact of variations in experience from year to year.”

Accordingly, we performed stochastic modeling to estimate the impact of the 50% allocation of future excess earnings to the SRBR. The results of our model indicated that the 50/50 allocation of future excess earnings would have about the same impact as an “outflow” (i.e., assets not available to fund the benefits included in this valuation) that would average approximately 0.3% of assets over time.

For informational purposes only, when we applied the results of our stochastic model to this valuation we have estimated that such an annual outflow would increase the actuarial accrued liability measured in this valuation using a 7.25% investment return assumption from \$7.16 billion to \$7.43 billion (for a difference of about \$262 million) and would increase the employer’s contribution rate by about 4.2% of payroll.

Section 1: Actuarial Valuation Summary

Valuation Highlights

1. On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriffs' Assn. et al. v. Alameda County Employees' Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRA members. In response, the Board adopted Resolution 2020-1, which detailed the implementation of the Alameda decision including reclassifying certain pay items for inclusion in compensation earnable and pensionable compensation. The results in this valuation reflect the reclassification of those pay codes as well as the recovery or refunds of benefits and/or member contributions previously paid in conjunction with these pay items, which decreased the UAAL by \$28.9 million and decreased the average employer contribution rate by 0.15% of payroll. The decrease in the average employer contribution rate is a result of the amortization of the \$28.9 million decrease in UAAL offset somewhat by an increase in the UAAL contribution rate due to a lower total payroll base after the reclassification of pay items.
- Pgs. 27-28 2. The Market Value of Assets earned a return of 23.68% for the July 1, 2020 to June 30, 2021 plan year. The Actuarial Value of Assets earned a return of 9.08% for the same period due to the deferral of most of the current year investment gains and the recognition of prior investment gains and losses. While this is greater than the assumed 7.25% assumed in the valuation as of June 30, 2020, the excess return was used to build up the Contingency Reserve from -\$16.4 million as of June 30, 2020 to \$53.6 million as of June 30, 2021, following the Board's Regular Interest and Excess Interest Crediting Policy. As a result, the Valuation Value of Assets earned a return of 7.93% for the same period, which resulted in an actuarial gain when measured against the assumed rate of return of 7.25% for the 2020-2021 plan year. This actuarial investment gain decreased the average employer contribution rate by 0.38% of payroll.

As part of the review of the assumed long-term rate of return on investments and other assumptions in the next triennial experience study scheduled before the June 30, 2023 valuation, we will examine the low fixed income interest rate environment and evolving expectations of future investment returns for various asset classes. This will allow us to assist the Board as they continue to monitor anticipated investment returns relative to the assumed long-term rate of return on investments of 7.25%.
- Pgs. 55-56 3. The funded ratio (the ratio of the Valuation Value of Assets to Actuarial Accrued Liability) is 67.1%, compared to the prior year funded ratio of 64.4%. This ratio is one measure of funding status, and its history is a measure of funding progress. The funded ratio measured on a market value basis is 73.1%, compared to 61.6% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Association's benefit obligation or the need for or the amount of future contributions.
- Pg. 32 4. The Association's UAAL (which is based on the Valuation Value of Assets) has decreased from \$2.50 billion to \$2.36 billion. The decrease in UAAL is primarily due to lower than expected individual salary increases during 2020-2021, investment return (after "smoothing") greater than the 7.25% return assumption, the implementation of the Alameda Decision and gains from retirement experience, offset by contributions less than expected. A complete reconciliation of the Association's UAAL is provided in *Section 2, Subsection E*.
- Pg. 26 5. The net actuarial loss from investment and contribution experience is \$3.1 million, or 0.04% of Actuarial Accrued Liability. This loss is primarily due to contributions less than expected, due to the lower than expected increase in the total payroll used to pay the UAAL

Section 1: Actuarial Valuation Summary

contributions for the year and the phase-in of the impact of the new actuarial assumptions on the UAAL contribution rate for the County Safety group. That loss was offset somewhat by the investment return (after “smoothing”) greater than the 7.25% return assumption. The net experience gain from sources other than investment and contribution experience was \$66.3 million, or 0.93% of the Actuarial Accrued Liability.

- Pg. 34 6. The average recommended employer contribution rate calculated in this valuation decreased from 49.16% of payroll to 49.10% of payroll. This decrease is primarily due to lower than expected individual salary increases during 2020-2021, investment return (after “smoothing”) greater than the 7.25% return assumption, changes in member demographics amongst the tiers, and gains from retirement experience, offset by amortizing the prior year’s UAAL over a smaller than expected total payroll. A complete reconciliation of the Association’s average employer rate is provided in *Section 2, Subsection F*.
7. Last year, the Retirement Board elected to phase-in the impact of new actuarial assumptions adopted for the June 30, 2020 valuation on the UAAL contribution rate over a three-year period, beginning with the 2021-2022 fiscal year for the County Safety group. This is the second year of the phase-in. The recommended pre-phase in contribution rates for 2021-2022 and 2022-2023 are shown in this report. The aggregate required contribution rate after reflecting the phase-in is 48.91% of payroll and is shown in a separate letter that follows this report.
- Pg. 35 8. The average member rate calculated in this valuation has increased from 6.74% of payroll to 6.82% of payroll. This change is primarily due to changes in member demographics amongst the tiers. A complete reconciliation of the Association’s average member rate is provided in *Section 2, Subsection F*.
- Pgs. 38-39, 44 9. Consistent with recent years, this valuation reflects that members of the San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) in Tier I and Tier IIA pay 50% of the total Normal Cost rate. There are different District Category III Tier I and Tier IIA employer contribution rates shown in this report for SJVAPCD and also for the Buttonwillow Recreation & Park District. Those employers should not use the combined District Category III employer contribution rate and instead should use their own Tier I and Tier IIA specific employer rates shown in the report along with the Tier IIB employer rate.
- Pgs. 45-46 10. Consistent with recent years, this valuation reflects the implementation of the Declining Employer Payroll Policy for Berrenda Mesa Water District and Inyokern Community Services District. Those employers were the only employers in District Category IV. They have been included in a “Declining Employers” category and should contribute based on the dollar contribution amounts (not rates) shown in this report. Unless otherwise noted, all results shown in this report include these declining employers.
- Pgs. 23-24 11. The total unrecognized net investment gain as of June 30, 2021 is about \$429 million as compared to an unrecognized net investment loss of \$196 million in the previous valuation. This deferred investment gain of \$429 million will be recognized in the determination of the Actuarial Value of Assets for funding purposes in the next few years as shown in *Section 2, Subsection B*.

The net deferred gains of \$429 million represent about 7.9% of the Market Value of Assets. Unless offset by future investment losses or other unfavorable experience, the recognition of the \$429 million market gains is expected to have an impact on the Association’s future funded ratio and contribution rate requirements. This potential impact may be illustrated as follows (without taking into consideration any possible impact of the 50/50 excess earnings allocation between the retirement and SRBR asset pools):

Section 1: Actuarial Valuation Summary

- a. If the net deferred gains in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the funded ratio would increase from 67.1% to 73.1%.

For comparison purposes, if all the net deferred losses in the June 30, 2020 valuation had been recognized immediately in the June 30, 2020 valuation, the funded ratio in last year's valuation would have decreased from 64.4% to 61.6%.

- b. If the net deferred gains in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the average employer contribution rate would decrease from 49.10% of payroll to 43.31% of payroll.

For comparison purposes, if all the net deferred losses in the June 30, 2020 valuation had been recognized immediately in the June 30, 2020 valuation, the average employer contribution rate in last year's valuation would have increased from 49.16% of payroll to 51.76% of payroll.

Pg. 88 12. During 2020-2021 there were no "excess earnings" credited to the valuation reserves or the SRBR. Also, at June 30, 2021, the COLA Contribution Reserve was zero and therefore not available to offset the 2% COLA contribution rate. Because the Contingency Reserve is now positive as of June 30, 2021, it is excluded from the Valuation Value of Assets per the Board's Interest Crediting Policy. A complete presentation of the Association's reserves is in *Section 3, Exhibit F*.

Pg. 60 13. The Actuarial Standards Board approved Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment, which was first effective with KCERA's June 30, 2019 actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Examples of key risks listed that are particularly relevant to KCERA are asset/liability mismatch risk, investment risk, and longevity risk. The standard also requires an actuary to consider if there is any ongoing contribution risk to the plan, however it does not require the actuary to evaluate the particular ability or willingness of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed assessment or risk report would be significantly beneficial for the intended user in order to examine particular financial risks. When making that recommendation, the actuary will take into account such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

Because the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the Association. We were engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Association's future financial condition based on the June 30, 2018 actuarial valuation. That analysis can be found in our separate risk assessment report dated September 4, 2019.

The risk assessment for the June 30, 2021 actuarial valuation, which includes a discussion of key risks that may affect the Association, can be found in *Section 2, Subsection J*.

Section 1: Actuarial Valuation Summary

14. It is important to note that this actuarial valuation is based on plan assets as of June 30, 2021. Due to the COVID-19 pandemic, market conditions have changed significantly since the onset of the Public Health Emergency. The Association's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the plan year. Moreover, this actuarial valuation does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after June 30, 2021. While it is impossible to determine how the pandemic will continue to affect market conditions and other demographic experience of the Association in future valuations, Segal is available to prepare projections of potential outcomes upon request.
15. Segal strongly recommends an actuarial funding policy that targets 100% funding of the Actuarial Accrued Liability. Generally, this implies payments that are ultimately at least enough to cover Normal Cost, interest on the UAAL and the principal balance. The funding policy adopted by the Board meets this standard.
16. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution (ADC) under the Association's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2021, will be provided separately. The accounting disclosures will utilize different methodologies from those employed in the funding valuation, as required by GASB. However, the ADC in this valuation is expected to be used as the ADC for GASB financial reporting.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results

	June 30, 2021		June 30, 2020	
	Total Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Employer Contribution Rates:²				
• County General without Courts	40.24%	\$167,048	40.38%	\$170,942
• Courts	40.21%	12,672	40.28%	13,201
• County Safety	77.51%	107,414	78.08%	108,481
• District Category I	54.13%	3,354	53.16%	3,265
• District Category II	50.47%	1,233	50.57%	1,295
• District Category III	47.25%	13,096	46.46%	13,407
• District Category V	44.92%	570	43.86%	618
• District Category VI	61.53%	165	60.43%	223
• Declining Employers ³	272.41%	474	317.37%	530
All Categories Combined	49.10%	\$306,026	49.16%	\$311,962

¹ Based on projected annual compensation for each valuation date.

² In practice, these blended employer contribution rates for combined Tier I, Tier IIA, Tier IIB and Tier III (as applicable) are used for each category (with the exception of District Category III). See *Section 2, Subsection F* for the employer contribution rates for each tier separately for these categories.

³ The two employers that were previously in District Category IV are now declining employers. Those employers will contribute based on the dollar contribution amounts shown (not rates).

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results (continued)

	June 30, 2021		June 30, 2020	
	Total Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Average Member Contribution Rates:				
• County General Tier I without Courts	5.39%	\$7,296	5.33%	\$7,878
• County General Tier IIA without Courts	6.77%	4,439	6.78%	4,673
• County General Tier IIB without Courts	6.23%	13,345	6.23%	12,873
• Courts Tier I	8.16%	1,064	8.16%	1,166
• Courts Tier IIA	6.48%	213	6.50%	237
• Courts Tier IIB	6.23%	946	6.23%	924
• County Safety Tier I	6.87%	6,473	6.82%	6,918
• County Safety Tier IIA	9.32%	709	9.34%	715
• County Safety Tier IIB	12.93%	4,751	13.07%	3,900
• District Category I Tier I	3.07%	133	3.16%	139
• District Category I Tier IIA	6.21%	42	6.22%	41
• District Category I Tier IIB	6.23%	75	6.23%	68
• District Category II Tier I	6.17%	87	5.53%	92
• District Category II Tier IIB	6.23%	64	6.23%	56
• District Category II Tier III	7.41%	0	7.35%	0
• District Category III Tier I (Buttonwillow)	8.55%	3	8.67%	3
• District Category III Tier I (SJVAPCD)	12.18%	2,093	12.27%	2,447
• District Category III Tier IIA (Buttonwillow)	6.23%	0	6.23%	0
• District Category III Tier IIA (SJVAPCD)	6.73%	64	6.73%	70
• District Category III Tier IIB	6.23%	594	6.23%	488
• District Category V Tier I	0.00%	0	5.63%	8
• District Category V Tier IIA	6.21%	25	6.08%	24
• District Category V Tier IIB	6.23%	49	6.23%	54
• District Category VI Tier I	0.00%	0	0.00%	0
• District Category VI Tier IIB	6.23%	0	6.23%	0
• Declining Employers Tier I	5.86%	10	5.50%	9
• Declining Employers Tier IIB	6.23%	0	6.23%	0
All Categories Combined	6.82%	\$42,475	6.74%	\$42,783

¹ Based on projected annual compensation for each valuation date.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results (continued)

		June 30, 2021 (\$ in '000s)	June 30, 2020 (\$ in '000s)
Actuarial Accrued Liability as of June 30:²	• Retired members and beneficiaries	\$4,777,275	\$4,591,235
	• Inactive vested members ¹	243,481	231,940
	• Active members	<u>2,143,469</u>	<u>2,182,414</u>
	• Total Actuarial Accrued Liability	\$7,164,225	\$7,005,589
	• Normal Cost for plan year beginning June 30	124,039	128,583
Assets as of June 30:	• Market Value of Assets (MVA) ³	\$5,235,090	\$4,312,314
	• Valuation Value of Assets (VVA)	4,806,026	4,508,548
Funded status as of June 30:	• Unfunded Actuarial Accrued Liability on Market Value of Assets basis	\$1,929,135	\$2,693,275
	• Funded percentage on MVA basis	73.07%	61.56%
	• Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis	\$2,358,199	\$2,497,041
	• Funded percentage on VVA basis	67.08%	64.36%
Key assumptions:	• Net investment return	7.25%	7.25%
	• Price inflation	2.75%	2.75%
	• Payroll growth	3.25%	3.25%

¹ Includes inactive members due a refund of member contributions.

² Excludes liabilities associated with benefits paid by the Supplemental Retiree Benefits Reserve. These liabilities are included in a separate valuation report.

³ Excludes non-valuation reserves.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results (continued)

		June 30, 2021	June 30, 2020	Change From Prior Year
Demographic data as of June 30:	Active Members:			
	• Number of members	9,072	9,326	-2.7%
	• Average age	42.1	41.9	0.2
	• Average service	9.7	9.5	0.2
	• Total projected compensation	\$623,294,085	\$634,569,637	-1.8%
	• Average projected compensation	\$68,705	\$68,043	1.0%
	Retired Members and Beneficiaries:			
	• Number of members:			
	– Service retired	6,699	6,559	2.1%
	– Disability retired	874	883	-1.0%
– Beneficiaries	<u>1,262</u>	<u>1,225</u>	3.0%	
– Total	8,835	8,667	1.9%	
• Average age	69.6	69.4	0.2	
• Average monthly benefit ¹	\$3,563	\$3,465	2.8%	
Inactive Vested Members:				
• Number of members ²	3,517	3,143	11.9%	
• Average age	42.0	42.3	-0.3	
Total Members:	21,424	21,136	1.4%	

¹ Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

² Includes inactive members due a refund of member contributions.

Section 1: Actuarial Valuation Summary

Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the Association. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the Market Value of Assets as of the valuation date, as provided by the Association. The Association uses a “Valuation Value of Assets” that differs from market value to gradually reflect six-month changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results that does not mean that the previous assumptions were unreasonable.
Models	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

The actuarial valuation is prepared at the request of the Association. Segal is not responsible for the use or misuse of its report, particularly by any other party.

An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:

- Differences between actual experience and anticipated experience;
- Changes in actuarial assumptions or methods;
- Changes in statutory provisions; and
- Differences between the contribution rates determined by the valuation and those adopted by the Board of Retirement.¹

Some actuarial results in this report are not rounded, but that does not imply precision.

If the Association is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Association should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the plan.

¹ KCERA has a proven track record of adopting the Actuarial Determined Contributions as determined by the valuation and based on the Board's Actuarial Funding Policy.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive vested members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B, and C.*

Member Population: 2012 – 2021

Year Ended June 30	Active Members	Inactive Vested Members ¹	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2012	8,253	1,748	6,890	8,638	1.05	0.83
2013	8,485	1,855	7,171	9,026	1.06	0.85
2014	8,512	1,949	7,397	9,346	1.10	0.87
2015	8,481	2,053	7,599	9,652	1.14	0.90
2016	8,627	2,218	7,847	10,065	1.17	0.91
2017	8,728	2,363	8,093	10,456	1.20	0.93
2018	8,867	2,604	8,301	10,905	1.23	0.94
2019	9,197	2,877	8,495	11,372	1.24	0.92
2020	9,326	3,143	8,667	11,810	1.27	0.93
2021	9,072	3,517	8,835	12,352	1.36	0.97

¹ Includes inactive members due a refund of member contributions.

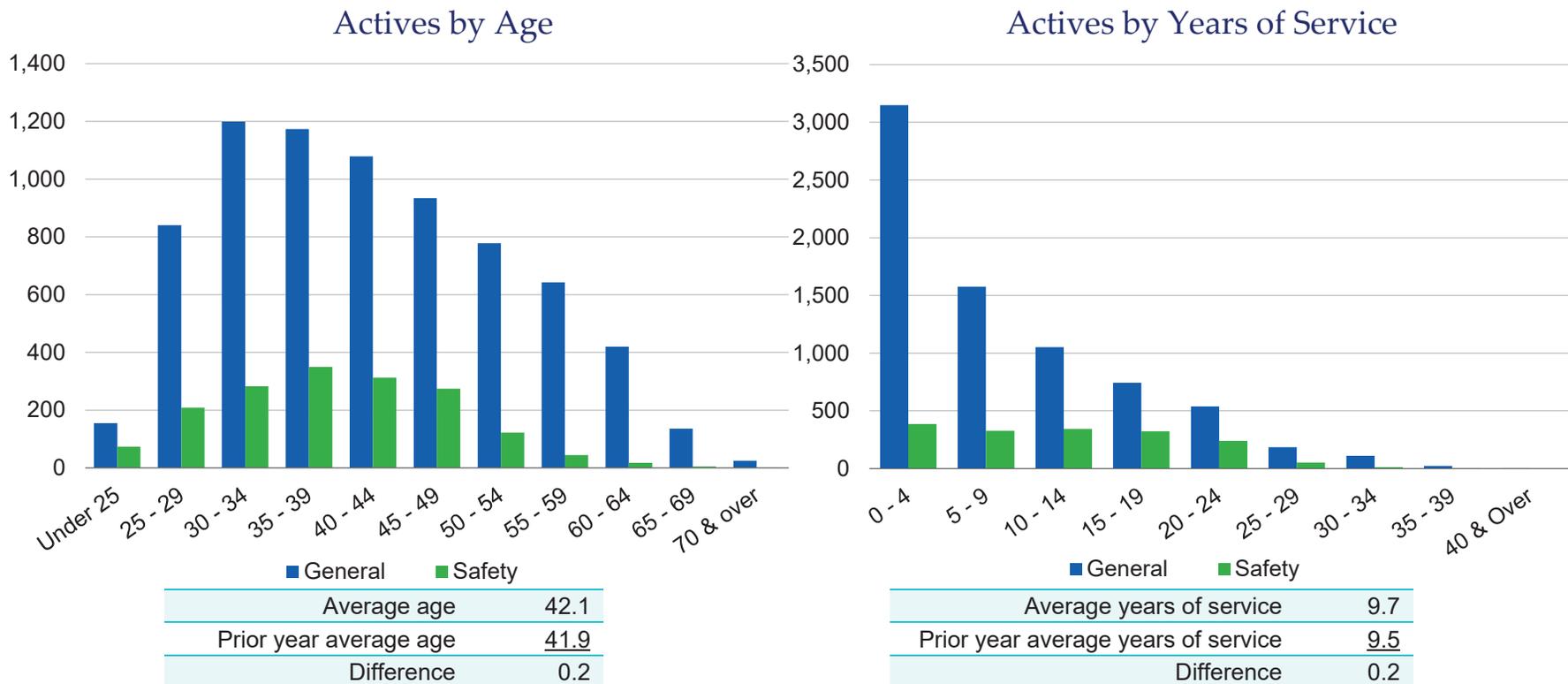
Section 2: Actuarial Valuation Results

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 9,072 active members with an average age of 42.1, average years of service of 9.7 years and average compensation of \$68,705. The 9,326 active members in the prior valuation had an average age of 41.9, average service of 9.5 years and average compensation of \$68,043.

Among the active members, there were none with unknown age information.

Distribution of Active Members as of June 30, 2021



Inactive Members

In this year's valuation, there were 3,517 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 3,143 in the prior valuation.

Section 2: Actuarial Valuation Results

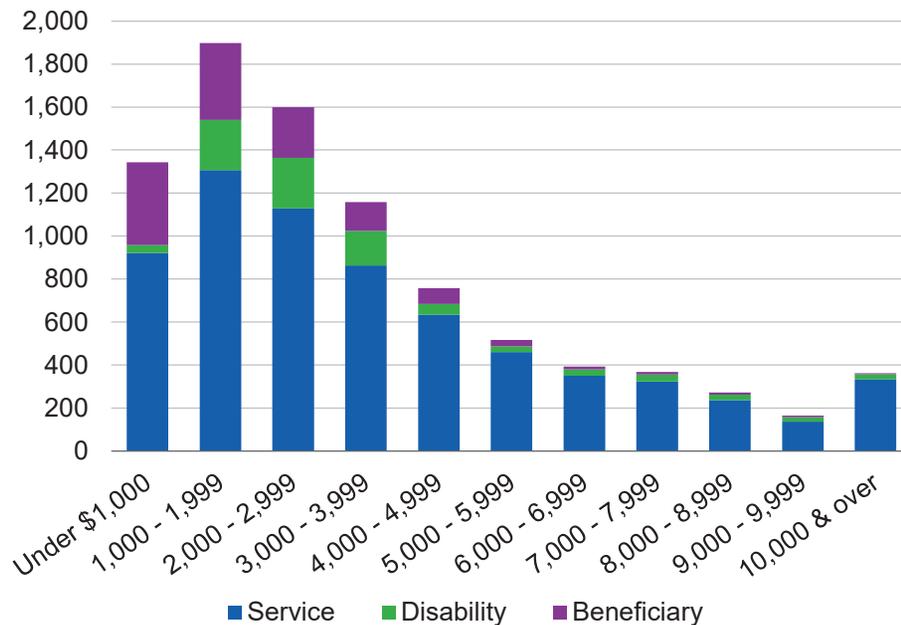
Retired Members and Beneficiaries

As of June 30, 2021, 7,573 retired members and 1,262 beneficiaries were receiving total monthly benefits of \$31,476,031. For comparison, in the previous valuation, there were 7,442 retired members and 1,225 beneficiaries receiving monthly benefits of \$30,028,202.

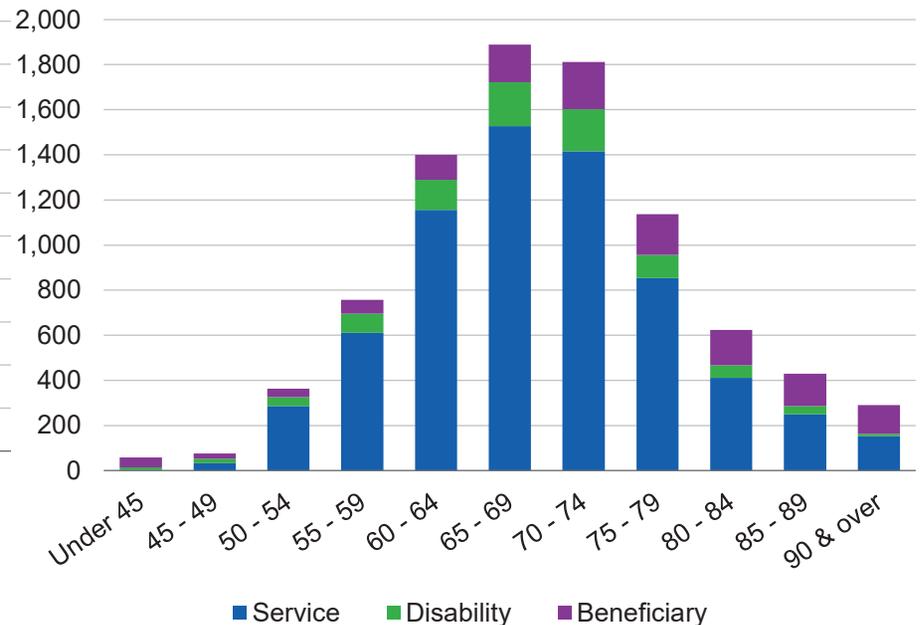
As of June 30, 2021, the average monthly benefit for retired members and beneficiaries is \$3,563, compared to \$3,465 in the previous valuation. The average age for retired members and beneficiaries is 69.6 in the current valuation, compared with 69.4 in the prior valuation.

Distribution of Retired Members and Beneficiaries as of June 30, 2021

Retired Members and Beneficiaries
by Type and Monthly Amount



Retired Members and Beneficiaries
by Type and Age



Section 2: Actuarial Valuation Results

Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

Member Data Statistics: 2012 – 2021

Year Ended June 30	Active Members			Retired Members and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2012	8,253	43.5	10.6	6,890	67.6	\$2,721
2013	8,485	42.9	10.2	7,171	67.7	2,827
2014	8,512	42.8	10.3	7,397	68.0	2,914
2015	8,481	42.8	10.4	7,599	68.2	3,000
2016	8,627	42.6	10.2	7,847	68.4	3,065
2017	8,728	42.3	10.0	8,093	68.6	3,157
2018	8,867	42.2	9.9	8,301	68.9	3,246
2019	9,197	41.9	9.5	8,495	69.2	3,363
2020	9,326	41.9	9.5	8,667	69.4	3,465
2021	9,072	42.1	9.7	8,835	69.6	3,563

Section 2: Actuarial Valuation Results

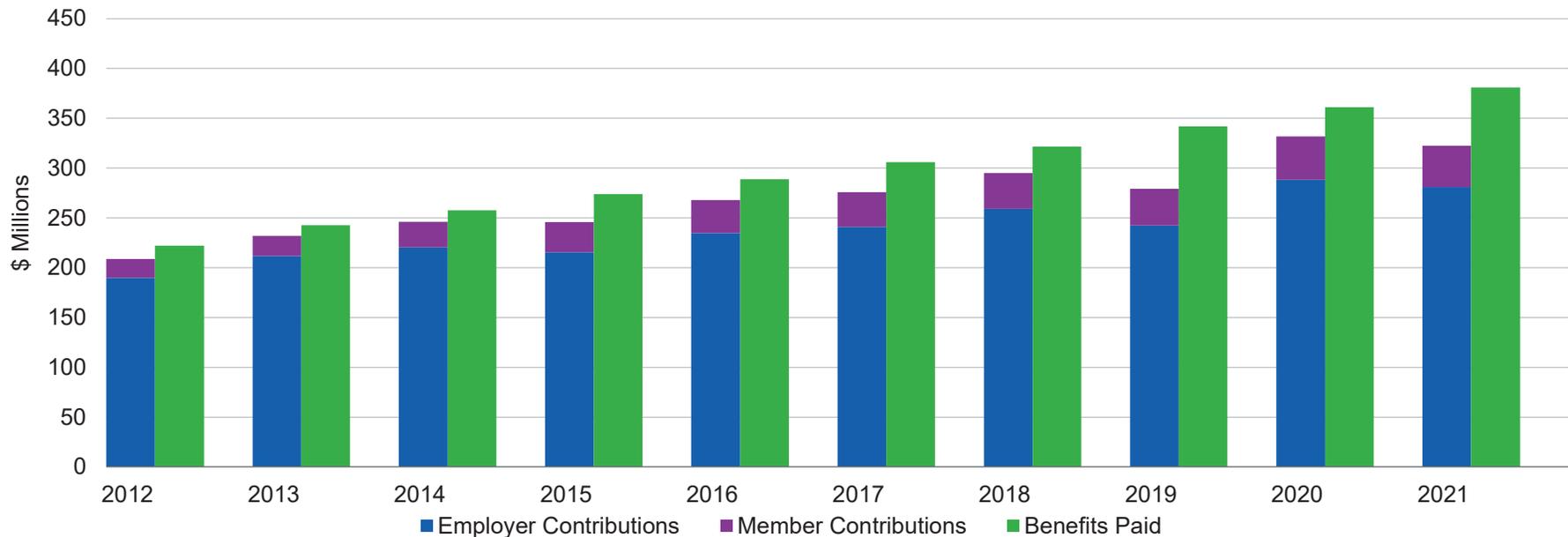
B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D, E, F and G.*

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the valuation asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

Comparison of Contributions Made with Benefits for Years Ended June 30, 2012 – 2021



Section 2: Actuarial Valuation Results

Determination of Actuarial Value of Assets for Year Ended June 30, 2021

1 Market Value of Assets						\$5,417,513,179
	Actual	Expected	Investment	Percent	Unrecognized	
2	Return	Return	Gain / (Loss)	Deferred	Amount	
a. Six-month period ended 6/30/2016	\$102,742,734	\$132,508,089	\$(29,765,355)	0%	\$0	
b. Six-month period ended 12/31/2016	160,552,179	135,836,079	24,716,100	0%	0	
c. Six-month period ended 6/30/2017	266,054,594	141,194,926	124,859,668	10%	12,485,967	
d. Six-month period ended 12/31/2017	253,352,676	148,484,992	104,867,684	20%	20,973,537	
e. Six-month period ended 6/30/2018	14,305,836	152,145,120	(137,839,284)	30%	(41,351,785)	
f. Six-month period ended 12/31/2018	(133,735,888)	151,819,366	(285,555,254)	40%	(114,222,102)	
g. Six-month period ended 6/30/2019	347,954,553	145,751,611	202,202,941	50%	101,101,471	
h. Six-month period ended 12/31/2019	202,028,683	157,497,125	44,531,558	60%	26,718,935	
i. Six-month period ended 6/30/2020	(74,167,569)	164,189,074	(238,356,644)	70%	(166,849,651)	
j. Six-month period ended 12/31/2020	581,412,997	160,447,752	420,965,246	80%	336,772,197	
k. Six-month period ended 6/30/2021	461,947,709	180,352,331	281,595,379	90%	253,435,841	
l. Total unrecognized return ¹					\$429,064,409	
3 Preliminary Actuarial Value of Assets: 1 – 2l						\$4,988,448,771
4 Corridor around Market Value of Assets						
a. Minimum – 50% of Market Value					\$2,708,756,590	
b. Maximum – 150% of Market Value					8,126,269,769	
5 Final Actuarial Value of Assets						\$4,988,448,771
6 Actuarial Value of Assets as a percentage of Market Value of Assets: 5 / 1						92.1%
7 Non-valuation reserves:						
a. Supplemental Retiree Benefit Reserve (SRBR) Unallocated to 0.5% COLA benefits					\$128,798,257	
b. Contingency Reserve					53,624,406	
c. COLA Contribution Reserve					0	
d. Subtotal					\$182,422,663	
8 Valuation Value of Assets: 5 – 7d						\$4,806,026,107

Note: Results may not add due to rounding.

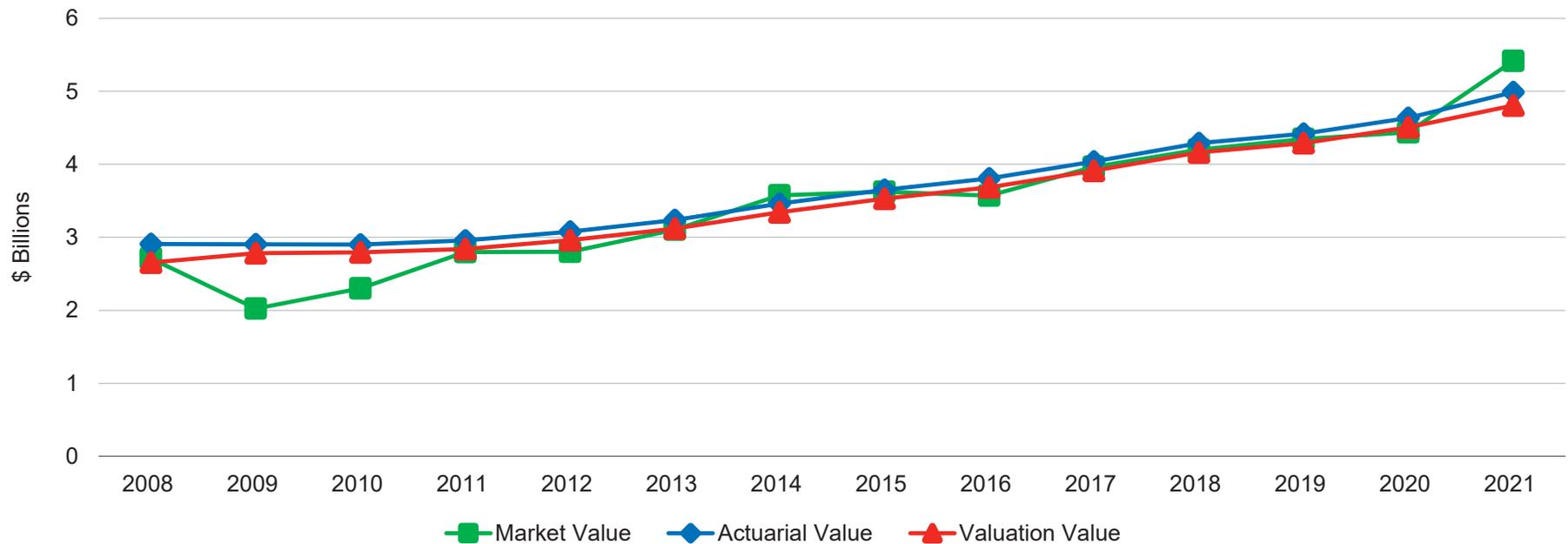
¹ Deferred return as of June 30, 2021 recognized in each of the next five years:

a. Amount recognized on June 30, 2022	\$90,968,292
b. Amount recognized on June 30, 2023	71,292,717
c. Amount recognized on June 30, 2024	121,967,402
d. Amount recognized on June 30, 2025	116,676,461
e. Amount recognized on June 30, 2026	28,159,537
f. Subtotal	\$429,064,409

Section 2: Actuarial Valuation Results

The Market Value, Actuarial Value and Valuation Value of Assets are representations of the plan's financial status. As investment gains and losses are gradually taken into account, the Actuarial Value of Assets tracks the Market Value of Assets. The Valuation Value of Assets is the Actuarial Value, excluding any non-valuation reserves. The Valuation Value of Assets is significant because the plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the Unfunded Actuarial Accrued Liability is an important element in determining the contribution requirement.

Market Value, Actuarial Value, and Valuation Value of Assets as of June 30, 2008 – 2021



Section 2: Actuarial Valuation Results

Allocation of Valuation Value of Assets as of June 30, 2021

	County General	District ¹	County Safety	Total
Member Deposit Reserves	\$314,166,823	\$33,028,625	\$158,711,480	\$505,906,928
Employer Advance Reserves	534,215,289	54,311,593	581,002,708	1,169,529,590
Cost-of-Living Reserves – 2%	868,328,628	69,633,732	619,640,596	1,557,602,957
Cost-of-Living Reserves – 0.5% ²	12,852,116	1,030,648	9,171,289	23,054,053
Retired Member Reserves	<u>1,065,163,397</u>	<u>84,924,514</u>	<u>399,844,668</u>	<u>1,549,932,579</u>
Valuation Value of Assets³	\$2,794,726,254	\$242,929,112	\$1,768,370,742	\$4,806,026,107

Note: Results may not add due to rounding.

¹ Includes Valuation Value of Assets allocated to the declining employers as follows:

Berrenda Mesa \$5,577,000
 Inyokern \$150,000

² Allocated in proportion to the Cost-of-Living Reserve – 2%.

³ Because the Contingency Reserve is positive, it is excluded from the Valuation Value of Assets per the Board's Interest Crediting Policy.

Section 2: Actuarial Valuation Results

C. Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the actuarially determined contribution will decrease from the previous year. On the other hand, the actuarially determined contribution will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. There are no changes in actuarial assumptions reflected in this valuation.

The net total gain is \$63.2 million, which includes \$30.4 million from investment gains, a loss of \$33.5 million from contribution experience and \$66.3 million in gains from all other sources. The net experience variation from individual sources other than investments and contributions was 0.9% of the Actuarial Accrued Liability. A discussion of the major components of the actuarial experience is on the following pages.

Actuarial Experience for Year Ended June 30, 2021

1	Net gain from investments ¹	\$30,447,000
2	Net loss from contribution experience ²	(33,503,000)
3	Net gain from other experience ³	<u>66,272,000</u>
4	Net experience gain: 1 + 2 + 3	\$63,216,000

¹ Details on next page.

² Due to UAAL contributions paid on lower than expected payroll and the phase-in of the impact of new actuarial assumptions on the UAAL contribution rate for the County Safety group.

³ See *Section 2, Subsection E* for further details. Does not include the effect of plan or assumption changes, if any.

Section 2: Actuarial Valuation Results

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Association's investment policy. The rate of return on the Market Value of Assets was 23.68% for the year ended June 30, 2021.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.25%. The actual rate of return on a valuation basis for the 2020-2021 plan year was 7.93%. Because the actual return for the year was greater than the assumed return, the Association experienced an actuarial gain during the year ended June 30, 2021 with regard to its investments.

Investment Experience for Year Ended June 30, 2021

	Market Value	Actuarial Value	Valuation Value
1 Net investment income	\$1,043,360,707	\$418,061,488	\$355,223,792
2 Average value of assets	4,406,473,633	4,602,708,444	4,479,675,293
3 Rate of return: 1 ÷ 2	23.68%	9.08%	7.93%
4 Assumed rate of return	7.25%	7.25%	7.25%
5 Expected investment income: 2 x 4	\$319,469,338	\$333,696,362	\$324,776,459
6 Actuarial gain/(loss): 1 - 5	\$723,891,369	\$84,365,126	\$30,447,333

Section 2: Actuarial Valuation Results

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial and valuation basis compared to the actual market value investment return for the last ten years, including averages over select time periods.

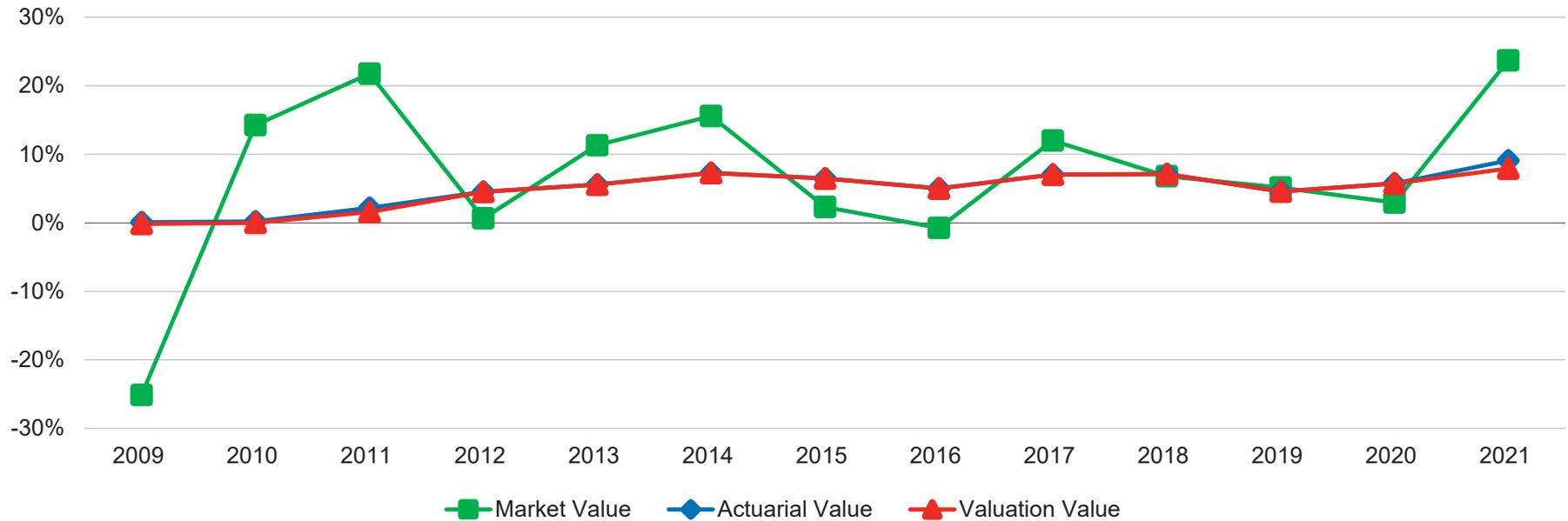
Investment Return – Market Value, Actuarial Value and Valuation Value: 2012 – 2021

Year Ended June 30	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2012	\$17,681,865	0.63%	\$133,360,035	4.52%	\$128,187,974	4.52%
2013	315,415,541	11.29%	171,131,798	5.57%	164,826,838	5.57%
2014	482,632,857	15.57%	235,294,994	7.28%	227,040,629	7.28%
2015	81,931,170	2.30%	222,215,376	6.45%	214,895,554	6.46%
2016	(27,535,157)	(0.76%)	181,835,568	5.00%	176,132,858	5.00%
2017	426,606,857	12.00%	265,683,238	7.01%	257,592,581	7.02%
2018	267,658,596	6.78%	285,584,383	7.10%	277,046,241	7.10%
2019	214,244,104	5.14%	194,249,223	4.56%	188,682,583	4.57%
2020	127,861,225	2.95%	251,758,339	5.72%	245,000,434	5.73%
2021	1,043,360,707	23.68%	418,061,488	9.08%	355,223,792	7.93%
Most recent five-year geometric average return		9.87%	6.68%		6.46%	
Most recent ten-year geometric average return		7.72%	6.22%		6.11%	

Section 2: Actuarial Valuation Results

Section 2, Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

Market, Actuarial and Valuation Rates of Return for Years Ended June 30, 2009 – 2021



Section 2: Actuarial Valuation Results

Contributions

Contributions for the year ended June 30, 2021 totaled \$322.4 million, compared to the projected amount of \$354.7 million. This resulted in a loss of \$33.5 million from contribution experience for the year, when adjusted for timing.

Non-Investment Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- salary increases (greater or smaller than projected), and
- cost-of-living adjustments (COLAs) higher or lower than anticipated.

The net gain from this other experience for the year ended June 30, 2021 amounted to \$66.3 million, which is 0.9% of the Actuarial Accrued Liability. See *Section 2, Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

Section 2: Actuarial Valuation Results

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of June 30, 2021 is \$7.2 billion, an increase of \$0.2 billion, or 2.3%, from the Actuarial Accrued Liability as of the prior valuation date. The liability is expected to grow each year with Normal Cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions and Methods

There were no changes in plan actuarial assumptions or methods since the prior valuation.

Details on actuarial assumptions and methods are in *Section 4, Exhibit 1*.

Plan Provisions

On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriff's Assn. et al., v. Alameda County Employees' Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRA members for that system and other similarly situated 1937 Act county employees retirement systems. See Item (1) on page 8 of this report for a discussion of the action taken by KCERA.

- The change in plan provisions resulted in a decrease of \$31.1 million in the Actuarial Accrued Liability (which along with a decrease of \$2.2 million in the Valuation Value of Assets resulted in a net decrease of \$28.9 million in the UAAL). In addition, there was a decrease of \$0.9 million in the Normal Cost as a result of the change in compensation earnable and pensionable compensation for active members.

A summary of plan provisions is in *Section 4, Exhibit 2*.

Section 2: Actuarial Valuation Results

E. Development of Unfunded Actuarial Accrued Liability

Development for Year Ended June 30, 2021 (\$ in '000s)

1	Unfunded Actuarial Accrued Liability at beginning of year	\$2,497,041
2	Total Normal Cost at middle of year ¹	127,191
3	Expected administrative expenses	5,708
4	Expected employer and member contributions ²	(354,745)
5	Interest	<u>175,142</u>
6	Expected Unfunded Actuarial Accrued Liability at end of year	\$2,450,337
7	Changes due to:	
	a. Investment return greater than expected (after “smoothing”)	\$(30,447)
	b. Actual contributions less than expected in item 4 ³	33,503
	c. Individual salary increases lower than expected	(39,749)
	d. Gains from retirement experience	(22,482)
	e. COLA increases lower than expected	(5,620)
	f. Other experience loss	1,579
	g. Implementation of Alameda decision ⁴	<u>(28,922)</u>
	Total changes	<u>\$(92,138)</u>
8	Unfunded Actuarial Accrued Liability at end of year	\$2,358,199

Note: The sum of items 7c through 7f equals the “Net gain from other experience” shown in *Section 2, Subsection C*.

¹ Excludes administrative expense load.

² Includes contributions towards administration expenses.

³ Due to UAAL contributions paid on lower than expected payroll and the phase-in of the impact of new actuarial assumptions on the UAAL contribution rate for the County Safety group.

⁴ On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriff’s Assn. et al., v. Alameda County Employees’ Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRAs members for that system and other similarly situated 1937 Act county employees retirement systems. See Item (1) on page 8 of this report for a discussion of the action taken by KCERA.

Section 2: Actuarial Valuation Results

F. Recommended Contribution

The recommended contribution is equal to the employer Normal Cost payment and a payment on the Unfunded Actuarial Accrued Liability. As of June 30, 2021, the average recommended employer contribution is 49.10% of compensation.

The Board sets the funding policy used to calculate the recommended contribution based on layered amortization periods. See *Section 4, Exhibit 1* for further details on the funding policy.

The contribution requirement as of June 30, 2021 is based on the data previously described, the actuarial assumptions and plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

Average Recommended Employer Contribution for Year Ended June 30

	2021		2020	
	Amount (\$ in '000s)	% of Projected Compensation ¹	Amount (\$ in '000s)	% of Projected Compensation ¹
1 Total Normal Cost ²	\$124,039	19.91%	\$128,583	20.26%
2 Expected member contributions	<u>42,475</u>	<u>6.82%</u>	<u>42,783</u>	<u>6.74%</u>
3 Employer Normal Cost: 1 – 2	\$81,564	13.09%	\$85,800	13.52%
4 Actuarial Accrued Liability	\$7,164,225		\$7,005,589	
5 Valuation Value of Assets	<u>4,806,026</u>		<u>4,508,548</u>	
6 Unfunded Actuarial Accrued Liability: 4 – 5	\$2,358,199		\$2,497,041	
7 Payment on Unfunded Actuarial Accrued Liability	<u>224,462</u>	<u>36.01%</u>	<u>226,162</u>	<u>35.64%</u>
8 Total average recommended employer contribution: 3 + 7	\$306,026	49.10%	\$311,962	49.16%
9 Projected compensation	\$623,295		\$634,570	

¹ Contributions are assumed to be paid at the middle of the year.

² Includes administrative expense load.

Section 2: Actuarial Valuation Results

Reconciliation of Average Recommended Employer Contribution Rate

The chart below details the changes in the average recommended employer contribution rate from the prior valuation to the current year's valuation.

Reconciliation from June 30, 2020 to June 30, 2021

	Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
1 Average Recommended Employer Contribution as of June 30, 2020	49.16%	\$311,962
2 Effect of investment return greater than expected (after "smoothing")	(0.38%)	(2,369)
3 Effect of actual contributions less than expected	0.42%	2,618
4 Effect of individual salary increases lower than expected	(0.49%)	(3,054)
5 Effect of gains on retirement experience	(0.28%)	(1,745)
6 Effect of COLA increases lower than expected	(0.07%)	(436)
7 Effect of amortizing prior year's UAAL over a smaller than expected projected total payroll	1.46%	9,100
8 Effect of changes in demographics of members amongst tiers on Normal Cost	(0.30%)	(1,870)
9 Effect of other net experience gains ²	(0.27%)	(7,245)
10 Effect of implementation of Alameda decision ³	(0.15%)	(935)
11 Total change	(0.06%)	\$(5,936)
12 Average Recommended Employer Contribution as of June 30, 2021	49.10%	\$306,026

¹ Based on projected compensation for each valuation date shown.

² Net of an adjustment to reflect 12-month delay between date of valuation and date of rate implementation for all actuarial experience (-0.19% of payroll). Estimated annual dollar cost also reflects the change in total projected compensation from the prior valuation.

³ On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriff's Assn. et al., v. Alameda County Employees' Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRAs members for that system and other similarly situated 1937 Act county employees retirement systems. See Item (1) on page 8 of this report for a discussion of the action taken by KCERA.

Section 2: Actuarial Valuation Results

Reconciliation of Average Recommended Member Contribution Rate

The chart below details the changes in the average recommended member contribution rate from the prior valuation to the current year's valuation.

Reconciliation from June 30, 2020 to June 30, 2021

		Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
1	Average Recommended Member Contribution as of June 30, 2020	6.74%	\$42,783
2	Effect of changes in member demographics amongst tiers	0.07%	436
3	Effect of net other changes ²	0.01%	(744)
4	Effect of implementation of Alameda decision ³	<u>0.00%</u>	<u>0</u>
5	Total change	0.08%	(308)
6	Average Recommended Member Contribution as of June 30, 2021	6.82%	\$42,475

¹ Based on projected compensation for each valuation date shown.

² Other differences in actual versus expected experience. Estimated annual dollar cost also reflects the change in total projected compensation from the prior valuation.

³ On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriff's Assn. et al., v. Alameda County Employees' Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRA members for that system and other similarly situated 1937 Act county employees retirement systems. See Item (1) on page 8 of this report for a discussion of the action taken by KCERA.

Section 2: Actuarial Valuation Results

Summary of KCERA Employers, Benefit Formulas and Member Contribution Rates

County and Courts

Plan (Tier I)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution Provides Average Annuity of:	Adopted 1997 MOU	Soc Sec Integration	Pre-Tax	5-yr Contribution Stop
General – County Tier I	County General Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	Yes	Varies ¹
General – County – Court Employees Tier I	Courts Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55 plus supplemental 8.0% ²	Yes	Yes	Yes	3/12/2011 ³
Safety – County Tier I	County Safety Tier I	31664.1 (3% @ 50)	31639.25	3/200 of FAS1 at age 50 ⁴	Yes	Yes	Yes	Varies ¹

Plan (Tier IIA)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution Provides Average Annuity of:	Tier Adoption Date	Soc Sec Integration	Pre-Tax
General – County Tier IIA	County General Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	10/27/2007 ⁵	Yes	Yes
General – County – Court Employees Tier IIA	Courts Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	3/12/2011	Yes	Yes
Safety – County Tier IIA	County Safety Tier IIA	31664 (2% @ 50)	31639.25	1/100 of FAS1 at age 50 ⁴	3/27/2012	Yes	Yes

Plan (Tier IIB)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution	Tier Adoption Date	Soc Sec Integration	Pre-Tax
General – County Tier IIB	County General Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
General – County – Court Employees Tier IIB	Courts Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
Safety – County Tier IIB	County Safety Tier IIB	31664 (2% @ 50)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes

FAS1 = 1-Year Final Average Salary

¹ See next page for member contribution rates by employee association and bargaining unit.

² Court employees in Tier I pay an additional 8% of the base salary for their entire career.

³ Court employees in Tier I hired prior to this date pay the full member contribution rates for only the first five years of service as a result of the 2010 Memorandum of Understanding (MOU).

⁴ Safety Tier I and Safety Tier IIA members stop paying contributions upon attaining 30 years of continuous county service.

⁵ KCPA (Prosecutors) employee association adopted Tier IIA effective July 5, 2008.

Section 2: Actuarial Valuation Results

Summary of KCERA Employers, Benefit Formulas and Member Contribution Rates (continued)

Summary of KCERA Member Contribution Rates – County Bargaining Units

Plan	Employee Association	Bargaining Unit	5-yr Contribution Stop ¹	1/6 th Rate Start ¹	1/3 rd Rate Start ¹	“Safety 3” Effective Date
County General	SEIU	1 – Supervisory, 2 – Professional, 3 – Technical Services, 4 – Clerical, 5 – Administrative, 6 – Trade/Crafts/Labor	8/7/2004	5/4/2013	5/3/2014	N/A
County General		D – Mid-management, M – Management, X – Confidential	9/4/2004 ²	7/13/2013	7/12/2014	N/A
County General	KCPA	P – Prosecutors	2/8/2005	8/10/2013	8/9/2014	N/A
County Safety	KCFFU	F – Firefighters, 7 – Supervisors	3/31/2007 ³	5/4/2013	5/3/2014	3/31/2007 ⁴
County Safety	KLEA	L – Sheriff Law Enforcement, 8 – Supervisors	11/10/2007	5/4/2013	5/3/2014	N/A
County Safety	KCSCA	N – Sheriff Lieutenants, R – Commanders	3/17/2007	5/4/2013	5/3/2014	N/A
County Safety	SEIU-CJU	J – Criminal Justice, S – Supervisors	12/8/2007	5/4/2013	5/3/2014	N/A
County Safety	KCPMA	O – Probation Management	4/7/2004	5/4/2013	5/3/2014	N/A
County Safety	KCPOA	Q – Probation Officers, Y – Supervisors	9/18/2007	8/10/2013	8/9/2014	9/18/2007 ⁴
County Safety	KCDOA	T – Detention Officers, V – Supervisors	6/23/2007	5/4/2013	5/3/2014	N/A
County Safety	KCSCA II	W – Detention Officers Lieutenants	9/15/2009	5/4/2013	5/3/2014	12/8/2007 to 9/14/2009 ⁵

¹ Tier I members hired prior to this date pay the full member contributions for only the first five years of service. These members will start paying one-sixth of their full member contributions on the “1/6th Rate Start” date, and will start paying one-third of their full member contributions on the “1/3rd Rate Start” date.

² Elected officials hired prior to this date do not pay member contributions. These members will start paying one-third of their full member contributions on the first day of the first biweekly payroll period in January 2015.

³ Firefighters hired prior to this date pay 1% of their base salary after the first five years of service. These members will start paying one-sixth of their full member contributions (not to exceed 2% of base salary) on the “1/6th Rate Start” date, and will start paying one-third of their full member contributions (not to exceed 4% of base salary) on the “1/3rd Rate Start” date.

⁴ Members hired after this date pay a uniform “Safety 3” rate for all entry ages. The uniform rate continues to be integrated with Social Security.

⁵ Effective December 8, 2007 through September 14, 2009, this flat rate applied to KCSCA II employees.

Section 2: Actuarial Valuation Results

Summary of KCERA Employers, Benefit Formulas and Member Contribution Rates (continued)

Districts

Plan (Tier I)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution Provides Average Annuity of:	Adopted 1997 MOU	Soc Sec Integration	Pre-Tax	5-yr Contribution Stop ¹
District – Berrenda Mesa Water Tier I	Declining Employers Tier I	31676.17 (3% @ 60) ²	31621.8	1/100 of FAS1 at age 55	Yes	No	Yes	1/1/2004
District – Buttonwillow Recreation & Park Tier I	District Category III Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55 (Member pays 50%) ³	No	No	No	N/A
District – East Kern Cemetery Tier I	District Category II Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	Yes	1/1/2004
District – Inyokern Community Services Tier I	Declining Employers Tier I	31676.17 (3% @ 60) ²	31621.8	1/100 of FAS1 at age 55	Yes	No	No	1/1/2004
District – Kern County Water Agency Tier I	District Category I Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55 (100% employer pickup if hired prior to 8/22/2004) ⁴	Yes	Yes	Yes	N/A
District – Kern Mosquito & Vector Control Tier I	District Category II Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	Yes	1/8/2005
District – North of River Sanitation Tier I	District Category V Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	Yes	8/7/2004
District – San Joaquin Valley Unified Air Pollution Control Tier I	District Category III Tier I	31676.17 (3% @ 60)	31621.8	Member pays 50% of Normal Cost rate ⁵	No	No	Yes	N/A
District – Shafter Recreation & Park Tier I	District Category II Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	Yes	1/1/2004
District – West Side Cemetery Tier I	District Category VI Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	No	N/A ⁶
District – West Side Mosquito Abatement Tier I	District Category II Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	No	1/1/2004
District – West Side Recreation & Park Tier I	District Category II Tier I	31676.17 (3% @ 60)	31621.8	1/100 of FAS1 at age 55	Yes	Yes	No	8/7/2004

FAS1 = 1-Year Final Average Salary

¹ Tier I Members hired prior to this date pay the full member contribution rates for only the first five years of service as a result of the 1997 Memorandum of Understanding (MOU).

² District Category IV adopted the 3% @ 60 Formula on a prospective basis only. Member contribution rates are the same as General Tier I.

³ Buttonwillow District Tier I (District Category III) did not adopt the 1997 MOU. Members in those districts pay 50% of the full rates, regardless of hire date.

⁴ For Kern County Water Agency (District Category I) employees hired prior to August 22, 2004, the employer picks up 100% of all member contributions.

⁵ Effective July 11, 2015, San Joaquin Valley Unified Air Pollution Control District Tier I members pay 28% of the total Normal Cost rate. That percent increases to 39% effective 2016-2017 and 50% effective 2017-2018.

⁶ West Side Cemetery (District Category VI) employees pay the full member contribution rates for only the first five years of service, regardless of hire date.

Section 2: Actuarial Valuation Results

Summary of KCERA Employers, Benefit Formulas and Member Contribution Rates (continued)

Districts (continued)

Plan (Tier IIA)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution Provides Average Annuity of:	Tier Adoption Date	Soc Sec Integration	Pre-Tax
District – Berrenda Mesa Water Tier IIA ¹	Declining Employers Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	1/12/2010	No	Yes
District – Buttonwillow Recreation & Park Tier IIA ¹	District Category III Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/17/2012	No	No
District – East Kern Cemetery Tier IIA ¹	District Category II Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/17/2012	Yes	Yes
District – Inyokern Community Services Tier IIA ¹	Declining Employers Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/13/2012	No	No
District – Kern County Water Agency Tier IIA	District Category I Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	1/1/2010	Yes	Yes
District – Kern Mosquito & Vector Control Tier IIA ¹	District Category II Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/12/2012	Yes	Yes
District – North of River Sanitation Tier IIA	District Category V Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	10/29/2007	Yes	Yes
District – San Joaquin Valley Unified Air Pollution Control Tier IIA	District Category III Tier IIA	31676.01 (1.62% @ 65)	31621	Member pays 50% of Normal Cost rate ²	7/31/2012	No	Yes
District – Shafter Recreation & Park Tier IIA ¹	District Category II Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/19/2012	Yes	Yes
District – West Side Cemetery Tier IIA ¹	District Category VI Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	12/18/2012	Yes	No
District – West Side Mosquito Abatement Tier IIA ¹	District Category II Tier IIA	31676.01 (1.62% @ 65)	31621	1/120 of FAS1 at age 60	11/15/2012	Yes	No

FAS1 = 1-Year Final Average Salary

¹ These districts adopted Tier IIA, but had no Tier IIA employees as of the valuation date.

² Effective July 8, 2017, San Joaquin Valley Unified Air Pollution Control District Tier IIA members pay 50% of the total Normal Cost rate.

Section 2: Actuarial Valuation Results

Summary of KCERA Employers, Benefit Formulas and Member Contribution Rates (continued)

Districts (continued)

Plan (Tier IIB and Tier III)	Valuation Report Label	Benefit Formula	Member Contribution Code Section	Member Contribution	Tier Adoption Date	Soc Sec Integration	Pre-Tax
District – Berrenda Mesa Water Tier IIB ¹	Declining Employers Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	No	Yes
District – Buttonwillow Recreation & Park Tier IIB ¹	District Category III Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	No	No
District – East Kern Cemetery Tier IIB	District Category II Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
District – Inyokern Community Services Tier IIB ¹	Declining Employers Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	No	No
District – Kern County Water Agency Tier IIB	District Category I Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
District – Kern Mosquito & Vector Control Tier IIB	District Category II Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
District – North of River Sanitation Tier IIB	District Category V Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
District – San Joaquin Valley Unified Air Pollution Control Tier IIB	District Category III Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	No	Yes
District – Shafter Recreation & Park Tier IIB	District Category II Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	Yes
District – West Side Cemetery Tier IIB ¹	District Category VI Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	No
District – West Side Mosquito Abatement Tier IIB	District Category II Tier IIB	31676.01 (1.62% @ 65)	7522.30(a)	50% of Normal Cost rate	1/1/2013	Yes	No
District – West Side Recreation & Park Tier III ¹	District Category II Tier III	7522.20(a) (2.50% @ 67)	7522.30(a)	50% of Normal Cost rate	1/1/2013	No	No

¹ These districts adopted Tier IIB or Tier III, but had no employees in those tiers as of the valuation date.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
County General Tier I without Courts								
Normal Cost	13.36%	\$18,085	4.26%	\$5,767	1.33%	\$1,800	18.95%	\$25,652
UAAL	21.29%	28,820	2.97%	4,020	5.53%	7,486	29.79%	40,326
Total Contributions	34.65%	\$46,905	7.23%	\$9,787	6.86%	\$9,286	48.74%	\$65,978
County General Tier IIA without Courts								
Normal Cost	3.87%	\$2,538	2.15%	\$1,410	0.66%	\$432	6.68%	\$4,380
UAAL	21.29%	13,961	2.97%	1,948	5.53%	3,626	29.79%	19,535
Total Contributions	25.16%	\$16,499	5.12%	\$3,358	6.19%	\$4,058	36.47%	\$23,915
County General Tier IIB without Courts								
Normal Cost	4.88%	\$10,453	1.03%	\$2,206	0.32%	\$686	6.23%	\$13,345
UAAL	21.29%	45,603	2.97%	6,362	5.53%	11,845	29.79%	63,810
Total Contributions	26.17%	\$56,056	4.00%	\$8,568	5.85%	\$12,531	36.02%	\$77,155
County General without Courts – Combined								
Normal Cost	7.49%	\$31,076	2.26%	\$9,383	0.70%	\$2,918	10.45%	\$43,377
UAAL	21.29%	88,384	2.97%	12,330	5.53%	22,957	29.79%	123,671
Total Contributions	28.78%	\$119,460	5.23%	\$21,713	6.23%	\$25,875	40.24%	\$167,048
Courts Tier I								
Normal Cost	10.59%	\$1,381	4.26%	\$555	1.33%	\$174	16.18%	\$2,110
UAAL	21.29%	2,776	2.97%	387	5.53%	721	29.79%	3,884
Total Contributions	31.88%	\$4,157	7.23%	\$942	6.86%	\$895	45.97%	\$5,994
Courts Tier IIA								
Normal Cost	4.16%	\$136	2.15%	\$71	0.66%	\$22	6.97%	\$229
UAAL	21.29%	699	2.97%	97	5.53%	181	29.79%	977
Total Contributions	25.45%	\$835	5.12%	\$168	6.19%	\$203	36.76%	\$1,206
Courts Tier IIB								
Normal Cost	4.88%	\$741	1.03%	\$156	0.32%	\$49	6.23%	\$946
UAAL	21.29%	3,234	2.97%	451	5.53%	841	29.79%	4,526
Total Contributions	26.17%	\$3,975	4.00%	\$607	5.85%	\$890	36.02%	\$5,472

¹ Based on June 30, 2021 projected compensation as shown on page 47.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
Courts – Combined								
Normal Cost	7.17%	\$2,258	2.48%	\$782	0.77%	\$245	10.42%	\$3,285
UAAL	21.29%	6,709	2.97%	935	5.53%	1,743	29.79%	9,387
Total Contributions	28.46%	\$8,967	5.45%	\$1,717	6.30%	\$1,988	40.21%	\$12,672
County Safety Tier I								
Normal Cost	17.47%	\$16,460	6.47%	\$6,096	2.08%	\$1,960	26.02%	\$24,516
UAAL	35.52%	33,467	6.91%	6,511	13.01%	12,258	55.44%	52,236
Total Contributions	52.99%	\$49,927	13.38%	\$12,607	15.09%	\$14,218	81.46%	\$76,752
County Safety Tier IIA								
Normal Cost	10.84%	\$825	4.97%	\$378	1.56%	\$119	17.37%	\$1,322
UAAL	35.52%	2,702	6.91%	526	13.01%	990	55.44%	4,218
Total Contributions	46.36%	\$3,527	11.88%	\$904	14.57%	\$1,109	72.81%	\$5,540
County Safety Tier IIB								
Normal Cost	9.75%	\$3,583	2.41%	\$886	0.77%	\$282	12.93%	\$4,751
UAAL	35.52%	13,051	6.91%	2,539	13.01%	4,781	55.44%	20,371
Total Contributions	45.27%	\$16,634	9.32%	\$3,425	13.78%	\$5,063	68.37%	\$25,122
County Safety – Combined								
Normal Cost	15.06%	\$20,868	5.31%	\$7,360	1.70%	\$2,361	22.07%	\$30,589
UAAL	35.52%	49,220	6.91%	9,576	13.01%	18,029	55.44%	76,825
Total Contributions	50.58%	\$70,088	12.22%	\$16,936	14.71%	\$20,390	77.51%	\$107,414
All County with Courts – Combined								
Normal Cost	9.26%	\$54,202	2.99%	\$17,525	0.95%	\$5,524	13.20%	\$77,251
UAAL	24.66%	144,313	3.90%	22,841	7.30%	42,729	35.86%	209,883
Total Contributions	33.92%	\$198,515	6.89%	\$40,366	8.25%	\$48,253	49.06%	\$287,134
District Category I Tier I								
Normal Cost	15.68%	\$677	4.26%	\$184	1.33%	\$57	21.27%	\$918
UAAL	26.85%	1,159	4.60%	199	5.85%	253	37.30%	1,611
Total Contributions	42.53%	\$1,836	8.86%	\$383	7.18%	\$310	58.57%	\$2,529

¹ Based on June 30, 2021 projected compensation as shown on page 47.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category I Tier IIA								
Normal Cost	4.43%	\$30	2.15%	\$14	0.66%	\$5	7.24%	\$49
UAAL	26.85%	180	4.60%	31	5.85%	40	37.30%	251
Total Contributions	31.28%	\$210	6.75%	\$45	6.51%	\$45	44.54%	\$300
District Category I Tier IIB								
Normal Cost	4.88%	\$59	1.03%	\$12	0.32%	\$4	6.23%	\$75
UAAL	26.85%	324	4.60%	55	5.85%	71	37.30%	450
Total Contributions	31.73%	\$383	5.63%	\$67	6.17%	\$75	43.53%	\$525
District Category I – Combined								
Normal Cost	12.35%	\$766	3.39%	\$210	1.09%	\$66	16.83%	\$1,042
UAAL	26.85%	1,663	4.60%	285	5.85%	364	37.30%	2,312
Total Contributions	39.20%	\$2,429	7.99%	\$495	6.94%	\$430	54.13%	\$3,354
District Category II Tier I								
Normal Cost	12.58%	\$178	4.26%	\$60	1.33%	\$20	18.17%	\$258
UAAL	26.85%	381	4.60%	65	5.85%	83	37.30%	529
Total Contributions	39.43%	\$559	8.86%	\$125	7.18%	\$103	55.47%	\$787
District Category II Tier IIB								
Normal Cost	4.88%	\$50	1.03%	\$11	0.32%	\$3	6.23%	\$64
UAAL	26.85%	275	4.60%	47	5.85%	60	37.30%	382
Total Contributions	31.73%	\$325	5.63%	\$58	6.17%	\$63	43.53%	\$446
District Category II Tier III								
Normal Cost	5.84%	\$0	1.20%	\$0	0.37%	\$0	7.41%	\$0
UAAL	26.85%	0	4.60%	0	5.85%	0	37.30%	0
Total Contributions	32.69%	\$0	5.80%	\$0	6.22%	\$0	44.71%	\$0
District Category II – Combined								
Normal Cost	9.34%	\$228	2.89%	\$71	0.94%	\$23	13.17%	\$322
UAAL	26.85%	656	4.60%	112	5.85%	143	37.30%	911
Total Contributions	36.19%	\$884	7.49%	\$183	6.79%	\$166	50.47%	\$1,233

¹ Based on June 30, 2021 projected compensation as shown on page 47.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category III Tier I (Buttonwillow)								
Normal Cost	10.20%	\$4	4.26%	\$2	1.33%	\$0	15.79%	\$6
UAAL	26.85%	11	4.60%	2	5.85%	2	37.30%	15
Total Contributions	37.05%	\$15	8.86%	\$4	7.18%	\$2	53.09%	\$21
District Category III Tier I (SJVAPCD)								
Normal Cost	9.38%	\$1,612	2.13%	\$366	0.67%	\$115	12.18%	\$2,093
UAAL	26.85%	4,615	4.60%	791	5.85%	1,005	37.30%	6,411
Total Contributions	36.23%	\$6,227	6.73%	\$1,157	6.52%	\$1,120	49.48%	\$8,504
District Category III Tier IIA (Buttonwillow)								
Normal Cost	3.70%	\$0	2.15%	\$0	0.66%	\$0	6.51%	\$0
UAAL	26.85%	0	4.60%	0	5.85%	0	37.30%	0
Total Contributions	30.55%	\$0	6.75%	\$0	6.51%	\$0	43.81%	\$0
District Category III Tier IIA (SJVAPCD)								
Normal Cost	5.31%	\$50	1.08%	\$10	0.34%	\$4	6.73%	\$64
UAAL	26.85%	255	4.60%	44	5.85%	56	37.30%	355
Total Contributions	32.16%	\$305	5.68%	\$54	6.19%	\$60	44.03%	\$419
District Category III Tier IIB								
Normal Cost	4.88%	\$466	1.03%	\$98	0.32%	\$30	6.23%	\$594
UAAL	26.85%	2,561	4.60%	439	5.85%	558	37.30%	3,558
Total Contributions	31.73%	\$3,027	5.63%	\$537	6.17%	\$588	43.53%	\$4,152
District Category III – Combined								
Normal Cost	7.69%	\$2,132	1.72%	\$476	0.54%	\$149	9.95%	\$2,757
UAAL	26.85%	7,442	4.60%	1,276	5.85%	1,621	37.30%	10,339
Total Contributions	34.54%	\$9,574	6.32%	\$1,752	6.39%	\$1,770	47.25%	\$13,096
District Category V Tier I								
Normal Cost	18.64%	\$14	4.26%	\$3	1.33%	\$1	24.23%	\$18
UAAL	26.85%	20	4.60%	3	5.85%	5	37.30%	28
Total Contributions	45.49%	\$34	8.86%	\$6	7.18%	\$6	61.53%	\$46

¹ Based on June 30, 2021 projected compensation as shown on page 47.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category V Tier IIA								
Normal Cost	4.43%	\$18	2.15%	\$9	0.66%	\$3	7.24%	\$30
UAAL	26.85%	110	4.60%	19	5.85%	24	37.30%	153
Total Contributions	31.28%	\$128	6.75%	\$28	6.51%	\$27	44.54%	\$183
District Category V Tier IIB								
Normal Cost	4.88%	\$38	1.03%	\$8	0.32%	\$3	6.23%	\$49
UAAL	26.85%	210	4.60%	36	5.85%	46	37.30%	292
Total Contributions	31.73%	\$248	5.63%	\$44	6.17%	\$49	43.53%	\$341
District Category V – Combined								
Normal Cost	5.46%	\$70	1.55%	\$20	0.61%	\$7	7.62%	\$97
UAAL	26.85%	340	4.60%	58	5.85%	75	37.30%	473
Total Contributions	32.31%	\$410	6.15%	\$78	6.46%	\$82	44.92%	\$570
District Category VI Tier I								
Normal Cost	18.64%	\$50	4.26%	\$11	1.33%	\$4	24.23%	\$65
UAAL	26.85%	72	4.60%	12	5.85%	16	37.30%	100
Total Contributions	45.49%	\$122	8.86%	\$23	7.18%	\$20	61.53%	\$165
District Category VI Tier IIB								
Normal Cost	4.88%	\$0	1.03%	\$0	0.32%	\$0	6.23%	\$0
UAAL	26.85%	0	4.60%	0	5.85%	0	37.30%	0
Total Contributions	31.73%	\$0	5.63%	\$0	6.17%	\$0	43.53%	\$0
District Category VI – Combined								
Normal Cost	18.64%	\$50	4.26%	\$11	1.33%	\$4	24.23%	\$65
UAAL	26.85%	72	4.60%	12	5.85%	16	37.30%	100
Total Contributions	45.49%	\$122	8.86%	\$23	7.18%	\$20	61.53%	\$165
Declining Employers Tier I (Berrenda)								
Normal Cost	12.18%	\$21	4.02%	\$7	1.15%	\$2	17.35%	\$30
UAAL	159.50%	278	48.27%	84	40.12%	69	247.89%	431
Total Contributions²	171.68%	\$299	52.29%	\$91	41.27%	\$71	265.24%	\$461

¹ Based on June 30, 2021 projected compensation as shown on page 47.

² These Districts are declining employers and they should contribute based on dollar contribution amounts shown (not rates).

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

June 30, 2021 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
Declining Employers Tier I (Inyokern)								
Normal Cost	N/A	\$0	N/A	\$0	N/A	\$0	N/A	\$0
UAAL	N/A	10	N/A	1	N/A	2	N/A	13
Total Contributions²	N/A	\$10	N/A	\$1	N/A	\$2	N/A	\$13
Declining Employers – Combined								
Normal Cost	12.07%	\$21	4.02%	\$7	1.15%	\$2	17.24%	\$30
UAAL	165.52%	288	48.85%	85	40.80%	71	255.17%	444
Total Contributions	177.59%	\$309	52.87%	\$92	41.95%	\$73	272.41%	\$474
All Districts – Combined								
Normal Cost	8.58%	\$3,267	2.09%	\$795	0.66%	\$251	11.33%	\$4,313
UAAL	27.48%	10,461	4.80%	1,828	6.02%	2,290	38.30%	14,579
Total Contributions	36.06%	\$13,728	6.89%	\$2,623	6.68%	\$2,541	49.63%	\$18,892
All Employers – Combined								
Normal Cost	9.22%	\$57,469	2.94%	\$18,320	0.93%	\$5,775	13.09%	\$81,564
UAAL	24.83%	154,774	3.96%	24,669	7.22%	45,019	36.01%	224,462
Total Contributions	34.05%	\$212,243	6.90%	\$42,989	8.15%	\$50,794	49.10%	\$306,026

¹ Based on June 30, 2021 projected compensation as shown on page 47.

² These Districts are declining employers and they should contribute based on dollar contribution amounts shown (not rates).

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Current Valuation (continued)

	June 30, 2021 Projected Compensation (\$ in '000s)		June 30, 2021 Projected Compensation (\$ in '000s)
County General Tier I without Courts	\$135,368	District Category I Tier I	\$4,318
County General Tier IIA without Courts	65,575	District Category I Tier IIA	672
County General Tier IIB without Courts	214,201	District Category I Tier IIB	1,206
Courts Tier I	13,038	District Category II Tier I	1,418
Courts Tier IIA	3,281	District Category II Tier IIB	1,025
Courts Tier IIB	15,192	District Category II Tier III	0
County Safety Tier I	94,220	District Category III Tier I (Buttonwillow)	40
County Safety Tier IIA	7,608	District Category III Tier I (SJVAPCD)	17,188
County Safety Tier IIB	36,744	District Category III Tier IIA (Buttonwillow)	0
		District Category III Tier IIA (SJVAPCD)	951
		District Category III Tier IIB	9,540
		District Category V Tier I	76
		District Category V Tier IIA	410
		District Category V Tier IIB	783
		District Category VI Tier I	267
		District Category VI Tier IIB	0
		Declining Employers Tier I (Berrenda)	174
		Declining Employers Tier I (Inyokern)	0
		All Districts	\$38,068
All County with Courts	\$585,227	Total	\$623,295

Note: As of June 30, 2021, the COLA Contribution Reserve was zero and, therefore, not available to offset the 2% COLA contribution rate.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
County General Tier I without Courts								
Normal Cost	13.58%	\$20,072	4.28%	\$6,326	1.33%	\$1,965	19.19%	\$28,363
UAAL	21.26%	31,423	3.40%	5,025	4.89%	7,228	29.55%	43,676
Total Contributions	34.84%	\$51,495	7.68%	\$11,351	6.22%	\$9,193	48.74%	\$72,039
County General Tier IIA without Courts								
Normal Cost	3.87%	\$2,667	2.15%	\$1,482	0.66%	\$455	6.68%	\$4,604
UAAL	21.26%	14,653	3.40%	2,343	4.89%	3,370	29.55%	20,366
Total Contributions	25.13%	\$17,320	5.55%	\$3,825	5.55%	\$3,825	36.23%	\$24,970
County General Tier IIB without Courts								
Normal Cost	4.87%	\$10,063	1.04%	\$2,149	0.32%	\$661	6.23%	\$12,873
UAAL	21.26%	43,930	3.40%	7,026	4.89%	10,104	29.55%	61,060
Total Contributions	26.13%	\$53,993	4.44%	\$9,175	5.21%	\$10,765	35.78%	\$73,933
County General without Courts – Combined								
Normal Cost	7.75%	\$32,802	2.35%	\$9,957	0.73%	\$3,081	10.83%	\$45,840
UAAL	21.26%	90,006	3.40%	14,394	4.89%	20,702	29.55%	125,102
Total Contributions	29.01%	\$122,808	5.75%	\$24,351	5.62%	\$23,783	40.38%	\$170,942
Courts Tier I								
Normal Cost	10.75%	\$1,536	4.28%	\$612	1.33%	\$190	16.36%	\$2,338
UAAL	21.26%	3,038	3.40%	486	4.89%	699	29.55%	4,223
Total Contributions	32.01%	\$4,574	7.68%	\$1,098	6.22%	\$889	45.91%	\$6,561
Courts Tier IIA								
Normal Cost	4.15%	\$151	2.15%	\$78	0.66%	\$25	6.96%	\$254
UAAL	21.26%	775	3.40%	124	4.89%	178	29.55%	1,077
Total Contributions	25.41%	\$926	5.55%	\$202	5.55%	\$203	36.51%	\$1,331
Courts Tier IIB								
Normal Cost	4.87%	\$723	1.04%	\$154	0.32%	\$47	6.23%	\$924
UAAL	21.26%	3,155	3.40%	505	4.89%	725	29.55%	4,385
Total Contributions	26.13%	\$3,878	4.44%	\$659	5.21%	\$772	35.78%	\$5,309

¹ Based on June 30, 2020 projected compensation as shown on page 54.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
Courts – Combined								
Normal Cost	7.35%	\$2,410	2.58%	\$844	0.80%	\$262	10.73%	\$3,516
UAAL	21.26%	6,968	3.40%	1,115	4.89%	1,602	29.55%	9,685
Total Contributions	28.61%	\$9,378	5.98%	\$1,959	5.69%	\$1,864	40.28%	\$13,201
County Safety Tier I								
Normal Cost	17.60%	\$17,852	6.48%	\$6,573	2.08%	\$2,110	26.16%	\$26,535
UAAL	35.71%	36,222	7.83%	7,942	11.67%	11,838	55.21%	56,002
Total Contributions	53.31%	\$54,074	14.31%	\$14,515	13.75%	\$13,948	81.37%	\$82,537
County Safety Tier IIA								
Normal Cost	10.97%	\$840	4.99%	\$382	1.58%	\$121	17.54%	\$1,343
UAAL	35.71%	2,734	7.83%	600	11.67%	893	55.21%	4,227
Total Contributions	46.68%	\$3,574	12.82%	\$982	13.25%	\$1,014	72.75%	\$5,570
County Safety Tier IIB								
Normal Cost	9.88%	\$2,948	2.43%	\$725	0.76%	\$227	13.07%	\$3,900
UAAL	35.71%	10,656	7.83%	2,336	11.67%	3,482	55.21%	16,474
Total Contributions	45.59%	\$13,604	10.26%	\$3,061	12.43%	\$3,709	68.28%	\$20,374
County Safety – Combined								
Normal Cost	15.58%	\$21,640	5.53%	\$7,680	1.76%	\$2,458	22.87%	\$31,778
UAAL	35.71%	49,612	7.83%	10,878	11.67%	16,213	55.21%	76,703
Total Contributions	51.29%	\$71,252	13.36%	\$18,558	13.43%	\$18,671	78.08%	\$108,481
All County with Courts – Combined								
Normal Cost	9.55%	\$56,852	3.11%	\$18,481	0.97%	\$5,801	13.63%	\$81,134
UAAL	24.63%	146,586	4.43%	26,387	6.48%	38,517	35.54%	211,490
Total Contributions	34.18%	\$203,438	7.54%	\$44,868	7.45%	\$44,318	49.17%	\$292,624
District Category I Tier I								
Normal Cost	15.75%	\$691	4.28%	\$188	1.33%	\$59	21.36%	\$938
UAAL	26.17%	1,149	4.81%	211	5.04%	221	36.02%	1,581
Total Contributions	41.92%	\$1,840	9.09%	\$399	6.37%	\$280	57.38%	\$2,519

¹ Based on June 30, 2020 projected compensation as shown on page 54.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category I Tier IIA								
Normal Cost	4.43%	\$29	2.15%	\$14	0.66%	\$4	7.24%	\$47
UAAL	26.17%	171	4.81%	32	5.04%	33	36.02%	236
Total Contributions	30.60%	\$200	6.96%	\$46	5.70%	\$37	43.26%	\$283
District Category I Tier IIB								
Normal Cost	4.87%	\$53	1.04%	\$11	0.32%	\$4	6.23%	\$68
UAAL	26.17%	287	4.81%	53	5.04%	55	36.02%	395
Total Contributions	31.04%	\$340	5.85%	\$64	5.36%	\$59	42.25%	\$463
District Category I – Combined								
Normal Cost	12.58%	\$773	3.48%	\$213	1.08%	\$67	17.14%	\$1,053
UAAL	26.17%	1,607	4.81%	296	5.04%	309	36.02%	2,212
Total Contributions	38.75%	\$2,380	8.29%	\$509	6.12%	\$376	53.16%	\$3,265
District Category II Tier I								
Normal Cost	13.38%	\$222	4.28%	\$71	1.33%	\$23	18.99%	\$316
UAAL	26.17%	435	4.81%	80	5.04%	84	36.02%	599
Total Contributions	39.55%	\$657	9.09%	\$151	6.37%	\$107	55.01%	\$915
District Category II Tier IIB								
Normal Cost	4.87%	\$44	1.04%	\$9	0.32%	\$3	6.23%	\$56
UAAL	26.17%	235	4.81%	43	5.04%	46	36.02%	324
Total Contributions	31.04%	\$279	5.85%	\$52	5.36%	\$49	42.25%	\$380
District Category II Tier III								
Normal Cost	5.78%	\$0	1.20%	\$0	0.37%	\$0	7.35%	\$0
UAAL	26.17%	0	4.81%	0	5.04%	0	36.02%	0
Total Contributions	31.95%	\$0	6.01%	\$0	5.41%	\$0	43.37%	\$0
District Category II – Combined								
Normal Cost	10.38%	\$266	3.12%	\$80	1.05%	\$26	14.55%	\$372
UAAL	26.17%	670	4.81%	123	5.04%	130	36.02%	923
Total Contributions	36.55%	\$936	7.93%	\$203	6.09%	\$156	50.57%	\$1,295

¹ Based on June 30, 2020 projected compensation as shown on page 54.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category III Tier I (Buttonwillow)								
Normal Cost	10.24%	\$4	4.28%	\$2	1.33%	\$0	15.85%	\$6
UAAL	26.17%	10	4.81%	2	5.04%	2	36.02%	14
Total Contributions	36.41%	\$14	9.09%	\$4	6.37%	\$2	51.87%	\$20
District Category III Tier I (SJVAPCD)								
Normal Cost	9.46%	\$1,886	2.14%	\$427	0.67%	\$134	12.27%	\$2,447
UAAL	26.17%	5,218	4.81%	959	5.04%	1,005	36.02%	7,182
Total Contributions	35.63%	\$7,104	6.95%	\$1,386	5.71%	\$1,139	48.29%	\$9,629
District Category III Tier IIA (Buttonwillow)								
Normal Cost	3.83%	\$0	2.15%	\$0	0.66%	\$0	6.64%	\$0
UAAL	26.17%	0	4.81%	0	5.04%	0	36.02%	0
Total Contributions	30.00%	\$0	6.96%	\$0	5.70%	\$0	42.66%	\$0
District Category III Tier IIA (SJVAPCD)								
Normal Cost	5.31%	\$55	1.09%	\$11	0.33%	\$4	6.73%	\$70
UAAL	26.17%	273	4.81%	50	5.04%	53	36.02%	376
Total Contributions	31.48%	\$328	5.90%	\$61	5.37%	\$57	42.75%	\$446
District Category III Tier IIB								
Normal Cost	4.87%	\$382	1.04%	\$82	0.32%	\$24	6.23%	\$488
UAAL	26.17%	2,051	4.81%	377	5.04%	396	36.02%	2,824
Total Contributions	31.04%	\$2,433	5.85%	\$459	5.36%	\$420	42.25%	\$3,312
District Category III – Combined								
Normal Cost	8.06%	\$2,327	1.81%	\$522	0.57%	\$162	10.44%	\$3,011
UAAL	26.17%	7,552	4.81%	1,388	5.04%	1,456	36.02%	10,396
Total Contributions	34.23%	\$9,879	6.62%	\$1,910	5.61%	\$1,618	46.46%	\$13,407
District Category V Tier I								
Normal Cost	13.28%	\$19	4.28%	\$6	1.33%	\$2	18.89%	\$27
UAAL	26.17%	38	4.81%	7	5.04%	7	36.02%	52
Total Contributions	39.45%	\$57	9.09%	\$13	6.37%	\$9	54.91%	\$79

¹ Based on June 30, 2020 projected compensation as shown on page 54.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
District Category V Tier IIA								
Normal Cost	4.57%	\$18	2.15%	\$9	0.66%	\$3	7.38%	\$30
UAAL	26.17%	105	4.81%	19	5.04%	21	36.02%	145
Total Contributions	30.74%	\$123	6.96%	\$28	5.70%	\$24	43.40%	\$175
District Category V Tier IIB								
Normal Cost	4.87%	\$42	1.04%	\$9	0.32%	\$3	6.23%	\$54
UAAL	26.17%	226	4.81%	41	5.04%	43	36.02%	310
Total Contributions	31.04%	\$268	5.85%	\$50	5.36%	\$46	42.25%	\$364
District Category V – Combined								
Normal Cost	5.63%	\$79	1.65%	\$24	0.56%	\$8	7.84%	\$111
UAAL	26.17%	369	4.81%	67	5.04%	71	36.02%	507
Total Contributions	31.80%	\$448	6.46%	\$91	5.60%	\$79	43.86%	\$618
District Category VI Tier I								
Normal Cost	18.80%	\$70	4.28%	\$16	1.33%	\$4	24.41%	\$90
UAAL	26.17%	97	4.81%	18	5.04%	18	36.02%	133
Total Contributions	44.97%	\$167	9.09%	\$34	6.37%	\$22	60.43%	\$223
District Category VI Tier IIB								
Normal Cost	4.87%	\$0	1.04%	\$0	0.32%	\$0	6.23%	\$0
UAAL	26.17%	0	4.81%	0	5.04%	0	36.02%	0
Total Contributions	31.04%	\$0	5.85%	\$0	5.36%	\$0	42.25%	\$0
District Category VI – Combined								
Normal Cost	18.80%	\$70	4.28%	\$16	1.33%	\$4	24.41%	\$90
UAAL	26.17%	97	4.81%	18	5.04%	18	36.02%	133
Total Contributions	44.97%	\$167	9.09%	\$34	6.37%	\$22	60.43%	\$223
Declining Employers Tier I (Berrenda)								
Normal Cost	12.68%	\$21	3.60%	\$6	1.19%	\$2	17.47%	\$29
UAAL	189.86%	317	62.12%	104	41.40%	69	293.38%	490
Total Contributions²	202.54%	\$338	65.72%	\$110	42.59%	\$71	310.85%	\$519

¹ Based on June 30, 2020 projected compensation as shown on page 54.

² These Districts are declining employers and they should contribute based on dollar contribution amounts shown (not rates).

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

June 30, 2020 Actuarial Valuation								
	Basic		2% COLA		0.5% COLA		Total	
	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)	Rate	Estimated Annual Amount ¹ (\$ in '000s)
Declining Employers Tier I (Inyokern)								
Normal Cost	N/A	\$0	N/A	\$0	N/A	\$0	N/A	\$0
UAAL	N/A	9	N/A	1	N/A	1	N/A	11
Total Contributions²	N/A	\$9	N/A	\$1	N/A	\$1	N/A	\$11
Declining Employers – Combined								
Normal Cost	12.57%	\$21	3.60%	\$6	1.20%	\$2	17.37%	\$29
UAAL	195.21%	326	62.87%	105	41.92%	70	300.00%	501
Total Contributions	207.78%	\$347	66.47%	\$111	43.12%	\$72	317.37%	\$530
All Districts – Combined								
Normal Cost	8.95%	\$3,536	2.18%	\$861	0.68%	\$269	11.81%	\$4,666
UAAL	26.88%	10,621	5.05%	1,997	5.21%	2,054	37.14%	14,672
Total Contributions	35.83%	\$14,157	7.23%	\$2,858	5.89%	\$2,323	48.95%	\$19,338
All Employers – Combined								
Normal Cost	9.52%	\$60,388	3.05%	\$19,342	0.95%	\$6,070	13.52%	\$85,800
UAAL	24.77%	157,207	4.47%	28,384	6.40%	40,571	35.64%	226,162
Total Contributions	34.29%	\$217,595	7.52%	\$47,726	7.35%	\$46,641	49.16%	\$311,962

¹ Based on June 30, 2020 projected compensation as shown on page 54.

² These Districts are declining employers and they should contribute based on dollar contribution amounts shown (not rates).

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rates – Prior Valuation (continued)

	June 30, 2020 Projected Compensation (\$ in '000s)		June 30, 2020 Projected Compensation (\$ in '000s)
County General Tier I without Courts	\$147,803	District Category I Tier I	\$4,390
County General Tier IIA without Courts	68,921	District Category I Tier IIA	655
County General Tier IIB without Courts	206,633	District Category I Tier IIB	1,097
Courts Tier I	14,291	District Category II Tier I	1,662
Courts Tier IIA	3,644	District Category II Tier IIB	899
Courts Tier IIB	14,839	District Category II Tier III	0
County Safety Tier I	101,434	District Category III Tier I (Buttonwillow)	39
County Safety Tier IIA	7,657	District Category III Tier I (SJVAPCD)	19,939
County Safety Tier IIB	29,839	District Category III Tier IIA (Buttonwillow)	0
		District Category III Tier IIA (SJVAPCD)	1,043
		District Category III Tier IIB	7,839
		District Category V Tier I	145
		District Category V Tier IIA	402
		District Category V Tier IIB	862
		District Category VI Tier I	370
		District Category VI Tier IIB	0
		Declining Employers Tier I (Berrenda)	167
		Declining Employers Tier I (Inyokern)	0
		All Districts	\$39,509
All County with Courts	\$595,061	Total	\$634,570

Note: As of June 30, 2020, the COLA Contribution Reserve was zero and, therefore, not available to offset the 2% COLA contribution rate.

Section 2: Actuarial Valuation Results

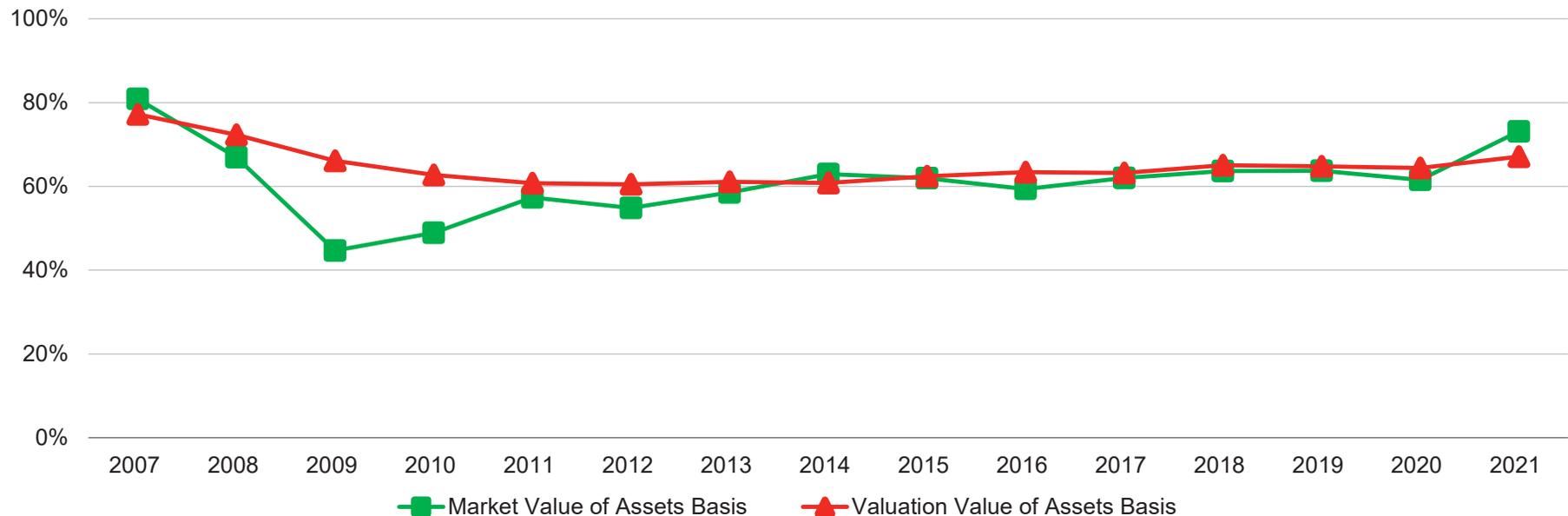
G. Funded Status

A commonly reported piece of information regarding the Association's financial status is the funded ratio. These ratios compare the Market and Valuation Value of Assets to the Actuarial Accrued Liability of the Association. High ratios indicate a well-funded plan while lower ratios may indicate recent changes to actuarial assumptions, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes.

The chart below depicts a history of the funded ratio for the Association. The chart on the next page shows the Association's schedule of funding progress for the last ten years.

The funded status measures shown in this valuation are appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Association's benefit obligations. As the chart below shows, the measures are different depending on whether the Valuation or Market Value of Assets is used.

Funded Ratio for Years Ended June 30, 2007 – 2021



Section 2: Actuarial Valuation Results

Schedule of Funding Progress for Years Ended June 30, 2012 – 2021

Actuarial Valuation Date as of June 30	Valuation Value of Assets ¹ (a)	Actuarial Accrued Liability (AAL) ² (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (%) [(b) - (a)] / (c)
2012	\$2,960,507,000	\$4,894,990,000	\$1,934,483,000	60.5%	\$543,558,000	355.9%
2013	3,120,632,000	5,108,619,000	1,987,987,000	61.1%	555,752,000	357.7%
2014	3,342,122,000	5,492,440,000	2,150,318,000	60.8%	555,634,000	387.0%
2015	3,529,786,000	5,657,173,000	2,127,387,000	62.4%	556,824,000	382.1%
2016	3,685,447,000	5,813,092,000	2,127,645,000	63.4%	567,261,000	375.1%
2017	3,913,073,000	6,191,433,000	2,278,360,000	63.2%	572,081,000	398.3%
2018	4,163,476,000	6,398,814,000	2,235,338,000	65.1%	584,180,000	382.6%
2019	4,291,573,000	6,622,495,000	2,330,922,000	64.8%	612,277,000	380.7%
2020	4,508,548,000	7,005,589,000	2,497,041,000	64.4%	634,570,000	393.5%
2021	4,806,026,000	7,164,225,000	2,358,199,000	67.1%	623,295,000	378.3%

¹ Excludes assets for SRBR Reserves Unallocated to 0.5% COLA benefits and COLA Contribution Reserve. Excludes assets for Contingency Reserve (unless the Contingency Reserve is negative).

² Excludes liabilities held for SRBR Reserves Unallocated to 0.5% COLA benefits.

Section 2: Actuarial Valuation Results

H. Actuarial Balance Sheet

An overview of the Association's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Association for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the Actuarial Present Value of Future Benefits of the Association.

Second, this Actuarial Present Value of Future Benefits is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Association, the present value of future member contributions, the present value of future employer Normal Cost contributions, and the present value of future employer amortization payments for the Unfunded Actuarial Accrued Liability.

Actuarial Balance Sheet for Year Ended

	June 30, 2021 (\$ in '000s)	June 30, 2020 (\$ in '000s)
Actuarial Present Value of Future Benefits		
• Present value of benefits for retired members and beneficiaries	\$4,777,275	\$4,591,235
• Present value of benefits for inactive vested members ¹	243,481	231,940
• Present value of benefits for active members	<u>3,097,679</u>	<u>3,164,715</u>
Total Actuarial Present Value of Future Benefits	\$8,118,435	\$7,987,890
Current and future assets		
• Total Valuation Value of Assets	\$4,806,026	\$4,508,548
• Present value of future contributions by members	373,180	374,416
• Present value of future employer contributions for:		
– Entry age Normal Cost	581,030	607,885
– Unfunded Actuarial Accrued Liability	<u>2,358,199</u>	<u>2,497,041</u>
Total of current and future assets	\$8,118,435	\$7,987,890

¹ Includes inactive members due a refund of member contributions.

Section 2: Actuarial Valuation Results

I. Volatility Ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the Market Value of Assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement because it is based on the current level of assets.

The current AVR is about 8.7. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.7% of one year's payroll. Because actuarial gains and losses are amortized over 18 years, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current total plan LVR is about 11.5, but is 9.5 for General compared to 18.5 for Safety. This means, for example, that assumption changes will have a greater impact on employer contribution rates for Safety than for General.

The chart on the next page shows how the asset and liability volatility ratios have varied over time.

Section 2: Actuarial Valuation Results

Volatility Ratios for Years Ended 2012 – 2021

Year Ended June 30	Asset Volatility Ratio			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2012	4.3	7.7	5.2	7.7	12.8	9.0
2013	4.7	8.0	5.6	8.0	12.7	9.2
2014	5.5	9.1	6.4	8.5	13.7	9.9
2015	5.6	9.2	6.5	8.8	14.1	10.2
2016	5.4	9.0	6.3	8.8	14.4	10.3
2017	5.8	10.4	6.9	9.2	16.0	10.8
2018	6.0	11.0	7.2	9.2	16.4	11.0
2019	5.8	11.4	7.1	9.0	16.9	10.8
2020	5.7	11.8	7.0	9.1	18.0	11.0
2021	7.1	14.4	8.7	9.5	18.5	11.5

Section 2: Actuarial Valuation Results

J. Risk Assessment

Because the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

Our separate risk assessment report dated September 4, 2019 based on the June 30, 2018 actuarial valuation contained a detailed analysis of the potential range of future measurements. This section provides descriptions and basic assessments of the primary risks that are likely to have an ongoing influence on the Association's financial condition, as well as a discussion of historical trends and maturity measures.

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

The most significant asset/liability mismatch risk to the Association is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any changes in the expected experience of asset growth rates.

Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.

- Investment Risk (the risk that investment returns will be different than expected)

The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial condition of the Association, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets, however investment experience can still have a sizable impact. As discussed in *Section 2, Subsection I, Volatility Ratios*, on page 58, a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.7% of one-year's payroll. Because actuarial gains and losses are amortized over 18 years, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain or loss.

The single year market value rate of return over the last 10 years has ranged from a low of -0.76% to a high of 23.68%.

Section 2: Actuarial Valuation Results

- Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This risk can be reduced by using tables appropriate for the Association (public experience tables) that are weighted by benefit levels, and by using generational mortality projections. Effective with the June 30, 2020 valuation, the Board has adopted a benefit-weighted mortality table with the generational projection approach.

- Other Risks

In addition to longevity, the valuation includes a variety of other assumptions that are unlikely to match future experience exactly. One example is projected salary scales over time. As salary is central to the determination of benefits paid in retirement, deviations from the projected salary scales could have a material impact on the benefits anticipated for each member. Examples of demographic assumptions include retirement, termination and disability assumptions, and will likely vary in significance for different groups (for example, disability assumptions are typically more significant for safety groups).

Some plans also carry significant contribution risk, defined as the potential for actual future contributions deviating from expected future contributions. However, the employers have a proven track-record of making the Actuarially Determined Contributions based on the Board's Actuarial Funding Policy, so contribution risk is minimal.

Evaluation of Historical Trends

Past experience can help demonstrate the sensitivity of key results to the plan's actual experience. Over the past ten years:

- The funded percentage on the Valuation Value of Assets has increased from 60.5% to 67.1%. For a more detailed history see *Section 2, Subsection G, Funded Status* starting on page 55.
- The geometric average investment return on the Actuarial Value of Assets over the last 10 years was 6.22%. This includes a high of a 9.08% return and a low of 4.52%. The average over the last 5 years 6.68%. For more details see the Investment Return table in *Section 2, Subsection C* on page 28.
- One of the primary sources of new UAAL was the strengthening of assumptions through multiple assumption changes. For example, the assumption changes in 2014 changed the discount rate from 7.75% to 7.50% and updated mortality tables adding \$204 million in unfunded liability. The assumption changes in 2017 changed the discount rate from 7.50% to 7.25% and updated mortality tables adding \$213 million in unfunded liability. The assumption changes in 2020 again updated mortality tables adding \$147 million in unfunded liability. For more details on the unfunded liability changes see *Section 3, Exhibit H, Table of Amortization Bases* starting on page 90.

Section 2: Actuarial Valuation Results

- The plan's funding policy effectively deals with these unfunded liabilities over time. This can be seen most clearly in the *Section 3, Exhibit I, Projection of UAAL Balances and Payments* on pages 95 and 96.

Maturity Measures

In the last 10 years the ratio of members in pay status to active participants has increased from 0.83 to 0.97. An increased ratio indicates that the plan has grown in maturity over time. This is to be expected, but is also informative to understanding plan sensitivity to particular risks. For more details see *Section 2, Subsection A, Member Data* on page 18.

As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the plan's asset allocation is aligned to meet emerging pension liabilities. Over the past year, benefits paid were \$65 million more than contributions received (net of administrative expenses). Plans with high levels of negative cash flows may have a need for a larger allocation to income generating assets, which can create a drag on investment return. For more details on historical cash flows see the Comparison of Contributions with Benefits in *Section 2, Subsection B, Financial Information* on page 22.

A further discussion of plan maturity measures and how they relate to changes in assets and liabilities is included in *Section 2, Subsection I, Volatility Ratios* on page 58.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage

Total Plan

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	9,072	9,326	-2.7%
• Average age	42.1	41.9	0.2
• Average years of service	9.7	9.5	0.2
• Total projected compensation	\$623,294,085	\$634,569,637	-1.8%
• Average projected compensation	\$68,705	\$68,043	1.0%
• Account balances	\$409,562,974	\$384,784,461	6.4%
• Total active vested members	5,574	5,568	0.1%
Inactive vested members:¹			
• Number	3,517	3,143	11.9%
• Average age	42.0	42.3	-0.3
Retired members:			
• Number in pay status	6,699	6,559	2.1%
• Average age	69.1	68.9	0.2
• Average monthly benefit ²	\$3,849	\$3,754	2.5%
Disabled members:			
• Number in pay status	874	883	-1.0%
• Average age	68.1	67.7	0.4
• Average monthly benefit ²	\$3,442	\$3,333	3.3%
Beneficiaries:			
• Number in pay status	1,262	1,225	3.0%
• Average age	73.1	73.6	-0.5
• Average monthly benefit ²	\$2,128	\$2,012	5.8%

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

General Tier I County with Courts

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	1,994	2,191	-9.0%
• Average age	51.4	51.0	0.4
• Average years of service	19.5	18.8	0.7
• Total projected compensation	\$148,405,938	\$162,093,865	-8.4%
• Average projected compensation	\$74,426	\$73,982	0.6%
• Account balances	\$148,182,279	\$146,508,105	1.1%
• Total active vested members	1,991	2,188	-9.0%
Inactive vested members:¹			
• Number	930	948	-1.9%
• Average age	49.2	48.9	0.3
Retired members:			
• Number in pay status	5,044	4,987	1.1%
• Average age	69.9	69.7	0.2
• Average monthly benefit ²	\$3,295	\$3,194	3.2%
Disabled members:			
• Number in pay status	438	451	-2.9%
• Average age	69.3	68.7	0.6
• Average monthly benefit ²	\$2,082	\$2,015	3.3%
Beneficiaries:			
• Number in pay status	806	786	2.5%
• Average age	74.1	74.6	-0.5
• Average monthly benefit ²	\$1,771	\$1,687	5.0%

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

General Tier IIA County with Courts

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	952	1,026	-7.2%
• Average age	46.3	45.3	1.0
• Average years of service	10.4	9.4	1.0
• Total projected compensation	\$68,855,902	\$72,564,278	-5.1%
• Average projected compensation	\$72,328	\$70,725	2.3%
• Account balances	\$46,799,595	\$43,508,370	7.6%
• Total active vested members	888	939	-5.4%
Inactive vested members:¹			
• Number	539	488	10.5%
• Average age	44.0	43.7	0.3
Retired members:			
• Number in pay status	79	57	38.6%
• Average age	65.7	66.0	-0.3
• Average monthly benefit ²	\$802	\$731	9.7%
Disabled members:			
• Number in pay status	2	1	100.0%
• Average age	57.6	58.9	-1.3
• Average monthly benefit ²	\$1,820	\$2,544	-28.5%
Beneficiaries:			
• Number in pay status	6	5	20.0%
• Average age	63.5	61.8	1.7
• Average monthly benefit ²	\$732	\$648	13.0%

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

General Tier IIB County with Courts

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	4,027	3,999	0.7%
• Average age	37.6	36.9	0.7
• Average years of service	3.5	3.0	0.5
• Total projected compensation	\$229,392,208	\$221,472,104	3.6%
• Average projected compensation	\$56,964	\$55,382	2.9%
• Account balances	\$50,815,026	\$40,189,986	26.4%
• Total active vested members	1,114	786	41.7%
Inactive vested members:¹			
• Number	1,451	1,171	23.9%
• Average age	36.9	36.8	0.1
Retired members:			
• Number in pay status	6	3	100.0%
• Average age	65.4	67.6	-2.2
• Average monthly benefit ²	\$926	\$710	30.4%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	1	0	N/A
• Average age	41.5	N/A	N/A
• Average monthly benefit ²	\$463	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Districts Tier I

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	212	242	-12.4%
• Average age	47.7	47.8	-0.1
• Average years of service	17.0	16.4	0.6
• Total projected compensation	\$23,481,338	\$26,711,469	-12.1%
• Average projected compensation	\$110,761	\$110,378	0.3%
• Account balances	\$22,637,401	\$23,753,321	-4.7%
• Total active vested members	212	242	-12.4%
Inactive vested members:¹			
• Number	142	144	-1.4%
• Average age	50.4	49.9	0.5
Retired members:			
• Number in pay status	308	288	6.9%
• Average age	68.0	67.6	0.4
• Average monthly benefit ²	\$4,135	\$3,994	3.5%
Disabled members:			
• Number in pay status	13	11	18.2%
• Average age	65.6	65.8	-0.2
• Average monthly benefit ²	\$2,478	\$2,419	2.4%
Beneficiaries:			
• Number in pay status	43	38	13.2%
• Average age	73.3	73.5	-0.2
• Average monthly benefit ²	\$2,614	\$2,443	7.0%

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Districts Tier IIA

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	20	21	-4.8%
• Average age	42.8	41.6	1.2
• Average years of service	10.5	9.5	1.0
• Total projected compensation	\$2,032,991	\$2,100,012	-3.2%
• Average projected compensation	\$101,650	\$100,001	1.6%
• Account balances	\$1,127,572	\$1,008,569	11.8%
• Total active vested members	20	21	-4.8%
Inactive vested members:¹			
• Number	10	9	11.1%
• Average age	38.5	37.6	0.9
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Districts Tier IIB

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	177	162	9.3%
• Average age	35.1	35.2	-0.1
• Average years of service	3.1	2.8	0.3
• Total projected compensation	\$12,554,054	\$10,697,620	17.4%
• Average projected compensation	\$70,927	\$66,035	7.4%
• Account balances	\$2,401,676	\$1,795,128	33.8%
• Total active vested members	45	32	40.6%
Inactive vested members:¹			
• Number	31	23	34.8%
• Average age	34.7	32.9	1.8
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Districts Tier III

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	0	0	N/A
• Average age	N/A	N/A	N/A
• Average years of service	N/A	N/A	N/A
• Total projected compensation	N/A	N/A	N/A
• Average projected compensation	N/A	N/A	N/A
• Account balances	N/A	N/A	N/A
• Total active vested members	N/A	N/A	N/A
Inactive vested members:¹			
• Number	0	0	N/A
• Average age	N/A	N/A	N/A
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Safety Tier I

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	1,015	1,107	-8.3%
• Average age	43.9	43.4	0.5
• Average years of service	17.5	16.7	0.8
• Total projected compensation	\$94,219,971	\$101,434,245	-7.1%
• Average projected compensation	\$92,828	\$91,630	1.3%
• Account balances	\$111,215,144	\$106,853,187	4.1%
• Total active vested members	1,013	1,106	-8.4%
Inactive vested members:¹			
• Number	248	237	4.6%
• Average age	42.3	42.0	0.3
Retired members:			
• Number in pay status	1,261	1,223	3.1%
• Average age	66.2	66.0	0.2
• Average monthly benefit ²	\$6,199	\$6,130	1.1%
Disabled members:			
• Number in pay status	421	420	0.2%
• Average age	67.1	66.7	0.4
• Average monthly benefit ²	\$4,895	\$4,774	2.5%
Beneficiaries:			
• Number in pay status	406	396	2.5%
• Average age	71.5	71.6	-0.1
• Average monthly benefit ²	\$2,809	\$2,632	6.7%

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Safety Tier IIA

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	94	98	-4.1%
• Average age	37.3	36.5	0.8
• Average years of service	9.5	8.4	1.1
• Total projected compensation	\$7,607,736	\$7,656,577	-0.6%
• Average projected compensation	\$80,933	\$78,128	3.6%
• Account balances	\$6,039,571	\$5,272,647	14.5%
• Total active vested members	93	97	-4.1%
Inactive vested members:¹			
• Number	26	21	23.8%
• Average age	37.2	35.2	2.0
Retired members:			
• Number in pay status	1	1	0.0%
• Average age	66.9	65.9	1.0
• Average monthly benefit ²	\$1,009	\$984	2.5%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Safety Tier IIB

Category	Year Ended June 30		Change From Prior Year
	2021	2020	
Active members in valuation:			
• Number	581	480	21.0%
• Average age	31.6	31.6	0.0
• Average years of service	3.9	3.9	0.0
• Total projected compensation	\$36,743,947	\$29,839,467	23.1%
• Average projected compensation	\$63,243	\$62,166	1.7%
• Account balances	\$20,344,711	\$15,895,148	28.0%
• Total active vested members	198	157	26.1%
Inactive vested members:¹			
• Number	140	102	37.3%
• Average age	32.8	32.5	0.3
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes inactive members due a refund of member contributions.

² Excludes monthly benefits paid from the Supplemental Retiree Benefit Reserve.

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation

Total Plan

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	229	229	—	—	—	—	—	—	—	—
	\$48,311	\$48,311	—	—	—	—	—	—	—	—
25 – 29	1,048	937	111	—	—	—	—	—	—	—
	\$54,576	\$53,450	\$64,083	—	—	—	—	—	—	—
30 – 34	1,482	848	554	80	—	—	—	—	—	—
	\$61,186	\$55,248	\$67,630	\$79,507	—	—	—	—	—	—
35 – 39	1,524	582	432	388	121	1	—	—	—	—
	\$69,209	\$58,542	\$66,106	\$82,768	\$87,831	\$104,492	—	—	—	—
40 – 44	1,391	329	290	320	341	109	2	—	—	—
	\$73,724	\$58,436	\$65,253	\$79,532	\$84,060	\$93,353	\$55,712	—	—	—
45 – 49	1,208	254	175	235	249	254	40	1	—	—
	\$77,945	\$64,395	\$65,750	\$81,018	\$83,126	\$90,385	\$87,728	\$90,438	—	—
50 – 54	900	144	141	156	157	194	81	26	1	—
	\$77,409	\$62,671	\$62,856	\$76,011	\$81,281	\$89,418	\$89,963	\$92,658	\$119,305	—
55 – 59	687	109	89	118	103	134	68	54	12	—
	\$71,006	\$57,377	\$70,216	\$68,796	\$71,903	\$75,896	\$76,756	\$81,665	\$79,535	—
60 – 64	436	72	79	72	68	63	32	33	12	5
	\$72,813	\$66,710	\$63,867	\$73,592	\$72,651	\$75,090	\$77,384	\$86,037	\$96,273	\$91,514
65 – 69	141	29	25	26	23	17	12	6	3	—
	\$70,774	\$63,751	\$56,616	\$78,220	\$72,539	\$67,732	\$86,168	\$98,437	\$78,927	—
70 & over	26	2	7	2	3	6	3	2	—	1
	\$76,866	\$43,353	\$89,920	\$43,536	\$89,155	\$79,538	\$79,274	\$44,082	—	\$124,620
Total	9,072	3,535	1,903	1,397	1,065	778	238	122	28	6
	\$68,705	\$56,483	\$66,090	\$78,997	\$81,722	\$86,265	\$83,509	\$85,471	\$88,064	\$97,032

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

General Tier I County with Courts

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
25 – 29	—	—	—	—	—	—	—	—	—	—
30 – 34	7	—	1	6	—	—	—	—	—	—
35 – 39	134	—	1	95	38	—	—	—	—	—
40 – 44	361	2	3	132	176	46	2	—	—	—
45 – 49	404	—	3	94	159	129	18	1	—	—
50 – 54	407	—	3	68	119	140	57	19	1	—
55 – 59	377	1	—	62	86	114	57	48	9	—
60 – 64	220	1	—	32	60	58	23	31	11	4
65 – 69	70	—	—	15	22	14	11	6	2	—
70 & over	14	—	—	1	3	6	1	2	—	1
Total	1,994	4	11	505	663	507	169	107	23	5
	\$74,426	\$114,876	\$82,671	\$69,662	\$73,591	\$77,528	\$75,528	\$80,183	\$84,419	\$94,988

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

General Tier IIA County with Courts

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
25 – 29	5	2	3	—	—	—	—	—	—	—
	\$43,500	\$39,808	\$45,962	—	—	—	—	—	—	—
30 – 34	91	—	72	19	—	—	—	—	—	—
	\$61,747	—	\$61,864	\$61,304	—	—	—	—	—	—
35 – 39	204	23	73	106	2	—	—	—	—	—
	\$73,176	\$62,707	\$68,015	\$79,073	\$69,371	—	—	—	—	—
40 – 44	189	19	79	89	1	1	—	—	—	—
	\$73,905	\$57,452	\$63,793	\$86,722	\$53,941	\$64,704	—	—	—	—
45 – 49	150	14	55	80	1	—	—	—	—	—
	\$77,792	\$89,389	\$69,671	\$81,000	\$105,443	—	—	—	—	—
50 – 54	122	5	55	62	—	—	—	—	—	—
	\$72,246	\$92,952	\$59,660	\$81,741	—	—	—	—	—	—
55 – 59	85	6	33	42	2	2	—	—	—	—
	\$70,256	\$43,166	\$70,921	\$75,018	\$64,266	\$46,543	—	—	—	—
60 – 64	73	7	29	35	1	1	—	—	—	—
	\$73,689	\$81,500	\$66,098	\$79,172	\$42,215	\$78,731	—	—	—	—
65 – 69	27	6	10	10	1	—	—	—	—	—
	\$69,860	\$81,571	\$47,483	\$87,196	\$50,013	—	—	—	—	—
70 & over	6	2	3	1	—	—	—	—	—	—
	\$67,232	\$43,353	\$89,342	\$48,660	—	—	—	—	—	—
Total	952	84	412	444	8	4	—	—	—	—
	\$72,328	\$68,277	\$64,830	\$80,304	\$64,860	\$59,130	—	—	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

General Tier IIB County with Courts

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	145	145	—	—	—	—	—	—	—	—
	\$43,820	\$43,820	—	—	—	—	—	—	—	—
25 – 29	781	720	61	—	—	—	—	—	—	—
	\$51,798	\$51,479	\$55,559	—	—	—	—	—	—	—
30 – 34	1,052	731	320	1	—	—	—	—	—	—
	\$56,801	\$54,105	\$63,001	\$43,769	—	—	—	—	—	—
35 – 39	763	504	256	2	1	—	—	—	—	—
	\$59,111	\$57,908	\$61,468	\$68,371	\$43,551	—	—	—	—	—
40 – 44	459	288	170	1	—	—	—	—	—	—
	\$59,252	\$57,581	\$62,210	\$37,671	—	—	—	—	—	—
45 – 49	325	224	97	3	1	—	—	—	—	—
	\$61,361	\$62,081	\$59,780	\$65,840	\$39,892	—	—	—	—	—
50 – 54	206	132	72	2	—	—	—	—	—	—
	\$60,875	\$62,210	\$58,548	\$56,579	—	—	—	—	—	—
55 – 59	149	98	48	2	1	—	—	—	—	—
	\$59,430	\$57,552	\$63,738	\$48,020	\$59,523	—	—	—	—	—
60 – 64	108	61	46	1	—	—	—	—	—	—
	\$62,825	\$65,413	\$59,779	\$45,099	—	—	—	—	—	—
65 – 69	36	22	14	—	—	—	—	—	—	—
	\$59,248	\$59,346	\$59,096	—	—	—	—	—	—	—
70 & over	3	—	3	—	—	—	—	—	—	—
	\$91,656	—	\$91,656	—	—	—	—	—	—	—
Total	4,027	2,925	1,087	12	3	—	—	—	—	—
	\$56,964	\$55,314	\$61,441	\$55,833	\$47,655	—	—	—	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Districts Tier I

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
25 – 29	—	—	—	—	—	—	—	—	—	—
30 – 34	5	—	3	2	—	—	—	—	—	—
35 – 39	37	—	1	33	3	—	—	—	—	—
40 – 44	48	—	2	15	25	6	—	—	—	—
45 – 49	44	—	1	17	15	10	1	—	—	—
50 – 54	34	—	1	8	15	3	6	1	—	—
55 – 59	27	—	—	6	6	6	6	3	—	—
60 – 64	14	—	—	4	5	2	3	—	—	—
65 – 69	2	—	—	1	—	1	—	—	—	—
70 & over	1	—	—	—	—	—	1	—	—	—
Total	212	—	8	86	69	28	17	4	—	—
	\$110,761	—	\$120,150	\$96,731	\$112,874	\$132,523	\$116,771	\$179,298	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Districts Tier IIA

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
25 – 29	—	—	—	—	—	—	—	—	—	—
30 – 34	3	—	2	1	—	—	—	—	—	—
	\$102,213	—	\$96,111	\$114,419	—	—	—	—	—	—
35 – 39	6	—	4	2	—	—	—	—	—	—
	\$91,575	—	\$93,277	\$88,171	—	—	—	—	—	—
40 – 44	5	1	4	—	—	—	—	—	—	—
	\$102,394	\$76,791	\$108,794	—	—	—	—	—	—	—
45 – 49	2	—	1	1	—	—	—	—	—	—
	\$94,399	—	\$59,153	\$129,644	—	—	—	—	—	—
50 – 54	2	—	1	1	—	—	—	—	—	—
	\$83,192	—	\$94,655	\$71,728	—	—	—	—	—	—
55 – 59	2	—	2	—	—	—	—	—	—	—
	\$154,878	—	\$154,878	—	—	—	—	—	—	—
60 – 64	—	—	—	—	—	—	—	—	—	—
65 – 69	—	—	—	—	—	—	—	—	—	—
70 & over	—	—	—	—	—	—	—	—	—	—
Total	20	1	14	5	—	—	—	—	—	—
	\$101,650	\$76,791	\$104,576	\$98,426	—	—	—	—	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Districts Tier IIB

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	10	10	—	—	—	—	—	—	—	—
	\$62,663	\$62,663	—	—	—	—	—	—	—	—
25 – 29	54	51	3	—	—	—	—	—	—	—
	\$66,968	\$66,301	\$78,292	—	—	—	—	—	—	—
30 – 34	41	25	16	—	—	—	—	—	—	—
	\$76,753	\$67,247	\$91,608	—	—	—	—	—	—	—
35 – 39	30	21	9	—	—	—	—	—	—	—
	\$70,385	\$64,959	\$83,046	—	—	—	—	—	—	—
40 – 44	17	10	7	—	—	—	—	—	—	—
	\$64,527	\$58,929	\$72,524	—	—	—	—	—	—	—
45 – 49	9	7	2	—	—	—	—	—	—	—
	\$88,408	\$89,085	\$86,038	—	—	—	—	—	—	—
50 – 54	7	4	3	—	—	—	—	—	—	—
	\$81,723	\$48,581	\$125,914	—	—	—	—	—	—	—
55 – 59	3	1	2	—	—	—	—	—	—	—
	\$77,083	\$52,072	\$89,588	—	—	—	—	—	—	—
60 – 64	4	3	1	—	—	—	—	—	—	—
	\$54,147	\$46,882	\$75,944	—	—	—	—	—	—	—
65 – 69	1	1	—	—	—	—	—	—	—	—
	\$53,764	\$53,764	—	—	—	—	—	—	—	—
70 & over	1	—	1	—	—	—	—	—	—	—
	\$86,449	—	\$86,449	—	—	—	—	—	—	—
Total	177	133	44	—						
	\$70,927	\$65,466	\$87,433	—						

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Districts Tier III

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
25 – 29	—	—	—	—	—	—	—	—	—	—
30 – 34	—	—	—	—	—	—	—	—	—	—
35 – 39	—	—	—	—	—	—	—	—	—	—
40 – 44	—	—	—	—	—	—	—	—	—	—
45 – 49	—	—	—	—	—	—	—	—	—	—
50 – 54	—	—	—	—	—	—	—	—	—	—
55 – 59	—	—	—	—	—	—	—	—	—	—
60 – 64	—	—	—	—	—	—	—	—	—	—
65 – 69	—	—	—	—	—	—	—	—	—	—
70 & over	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Safety Tier I

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
25 – 29	4	—	4	—	—	—	—	—	—	—
	\$94,461	—	\$94,461	—	—	—	—	—	—	—
30 – 34	78	—	30	48	—	—	—	—	—	—
	\$89,309	—	\$89,526	\$89,173	—	—	—	—	—	—
35 – 39	224	—	10	136	77	1	—	—	—	—
	\$91,486	—	\$81,398	\$89,603	\$95,952	\$104,492	—	—	—	—
40 – 44	283	1	5	82	139	56	—	—	—	—
	\$92,456	\$76,206	\$77,952	\$87,727	\$91,887	\$102,378	—	—	—	—
45 – 49	253	1	5	38	73	115	21	—	—	—
	\$95,193	\$55,354	\$88,259	\$85,506	\$90,563	\$100,812	\$101,598	—	—	—
50 – 54	116	—	3	15	23	51	18	6	—	—
	\$95,640	—	\$65,948	\$81,189	\$92,849	\$97,590	\$105,815	\$110,215	—	—
55 – 59	37	—	—	6	8	12	5	3	3	—
	\$90,559	—	—	\$73,873	\$91,085	\$91,664	\$88,251	\$90,674	\$121,834	—
60 – 64	15	—	1	—	2	2	6	2	1	1
	\$89,540	—	\$70,589	—	\$78,327	\$112,058	\$84,073	\$98,724	\$82,609	\$107,252
65 – 69	4	—	—	—	—	2	1	—	1	—
	\$72,381	—	—	—	—	\$64,156	\$85,176	—	\$76,038	—
70 & over	1	—	—	—	—	—	1	—	—	—
	\$56,655	—	—	—	—	—	\$56,655	—	—	—
Total	1,015	2	58	325	322	239	52	11	5	1
	\$92,828	\$65,780	\$85,812	\$87,908	\$92,524	\$99,835	\$98,572	\$102,796	\$104,830	\$107,252

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Safety Tier IIA

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
25 – 29	6	1	5	—	—	—	—	—	—	—
	\$82,880	\$76,798	\$84,096	—	—	—	—	—	—	—
30 – 34	30	—	29	1	—	—	—	—	—	—
	\$82,668	—	\$81,992	\$102,275	—	—	—	—	—	—
35 – 39	40	—	33	7	—	—	—	—	—	—
	\$79,028	—	\$80,275	\$73,150	—	—	—	—	—	—
40 – 44	8	1	7	—	—	—	—	—	—	—
	\$80,576	\$89,901	\$79,244	—	—	—	—	—	—	—
45 – 49	6	—	6	—	—	—	—	—	—	—
	\$84,845	—	\$84,845	—	—	—	—	—	—	—
50 – 54	3	—	3	—	—	—	—	—	—	—
	\$67,459	—	\$67,459	—	—	—	—	—	—	—
55 – 59	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
60 – 64	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
65 – 69	1	—	1	—	—	—	—	—	—	—
	\$113,239	—	\$113,239	—	—	—	—	—	—	—
70 & over	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
Total	94	2	84	8	—	—	—	—	—	—
	\$80,933	\$83,350	\$81,270	\$76,791	—	—	—	—	—	—

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of June 30, 2021 by Age, Years of Service, and Average Projected Compensation (continued)

Safety Tier IIB

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	74	74	—	—	—	—	—	—	—	—
	\$55,172	\$55,172	—	—	—	—	—	—	—	—
25 – 29	198	163	35	—	—	—	—	—	—	—
	\$60,771	\$58,157	\$72,942	—	—	—	—	—	—	—
30 – 34	175	92	81	2	—	—	—	—	—	—
	\$66,265	\$61,075	\$71,764	\$82,300	—	—	—	—	—	—
35 – 39	86	34	45	7	—	—	—	—	—	—
	\$65,429	\$61,162	\$68,309	\$67,636	—	—	—	—	—	—
40 – 44	21	7	13	1	—	—	—	—	—	—
	\$66,565	\$60,416	\$69,740	\$68,333	—	—	—	—	—	—
45 – 49	15	8	5	2	—	—	—	—	—	—
	\$68,026	\$64,961	\$69,575	\$76,418	—	—	—	—	—	—
50 – 54	3	3	—	—	—	—	—	—	—	—
	\$51,267	\$51,267	—	—	—	—	—	—	—	—
55 – 59	7	3	4	—	—	—	—	—	—	—
	\$85,853	\$80,161	\$90,123	—	—	—	—	—	—	—
60 – 64	2	—	2	—	—	—	—	—	—	—
	\$116,162	—	\$116,162	—	—	—	—	—	—	—
65 – 69	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
70 & over	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—
Total	581	384	185	12	—	—	—	—	—	—
	\$63,243	\$58,848	\$71,822	\$71,602	—	—	—	—	—	—

Section 3: Supplemental Information

Exhibit C: Reconciliation of Member Data

	Active Members	Inactive Vested Members ¹	Retired Members	Disabled Members	Beneficiaries	Total
Number as of June 30, 2020	9,326	3,143	6,559	883	1,225	21,136
• New members	729	99	N/A	N/A	126	954
• Terminations	(565)	565	N/A	N/A	N/A	0
• Contribution refunds	(191)	(152)	N/A	N/A	N/A	(343)
• Retirements	(238)	(92)	330	N/A	N/A	0
• New disabilities	(10)	(1)	(10)	21	N/A	0
• Return to work	37	(37)	0	0	N/A	0
• Died with or without beneficiary	(16)	(8)	(181)	(30)	(81)	(316)
• Data adjustments	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>(8)</u>	<u>(7)</u>
Number as of June 30, 2021	9,072	3,517	6,699	874	1,262	21,424

¹ Includes inactive members due a refund of member contributions.

Section 3: Supplemental Information

Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30, 2021	Year Ended June 30, 2020
Net assets at market value at the beginning of the year	\$4,438,794,794	\$4,345,780,060
Contribution income:		
• Employer contributions	\$280,812,319	\$288,293,446
• Employee contributions	41,602,345	43,477,770
• Less administrative expenses	<u>(6,060,675)</u>	<u>(5,523,229)</u>
Net contribution income	\$316,353,989	\$326,247,987
Investment income:		
• Interest, dividends, and other income	\$66,296,030	\$63,730,264
• Asset appreciation	1,038,614,396	98,537,566
• Less investment expenses	<u>(61,549,719)</u>	<u>(34,406,606)</u>
Net investment income	<u>\$1,043,360,707</u>	<u>\$127,861,224</u>
Total income available for benefits	\$1,359,714,696	\$454,109,211
Less benefit payments:		
• Retirement and survivor benefits	\$(355,196,758)	\$(338,894,982)
• Supplemental retirement benefits	(19,286,001)	(17,747,422)
• Refunds of member contributions	(6,513,551)	(4,451,963)
• Miscellaneous expenses	<u>0</u>	<u>(111)</u>
Net benefit payments	\$(380,996,310)	\$(361,094,478)
Change in net assets at market value	\$978,718,386	\$93,014,733
Net assets at market value at the end of the year	\$5,417,513,179	\$4,438,794,794

Note: Results may not add due to rounding.

Section 3: Supplemental Information

Exhibit E: Summary Statement of Plan Assets

	June 30, 2021	June 30, 2020
Cash equivalents	\$436,432,952	\$163,250,243
Capital assets	\$1,857,301	\$2,382,951
Accounts receivable:		
• Investments sold	\$33,460,069	\$137,112,878
• Interest and dividends	7,955,743	8,644,475
• Contributions and other receivables	<u>15,095,666</u>	<u>13,912,846</u>
Total accounts receivable	\$56,511,478	\$159,670,199
Investments:		
• Debt securities and bonds	\$1,199,785,267	\$1,403,561,154
• Equities	1,891,166,027	1,698,285,809
• Real estate investments	390,498,784	278,658,132
• Alternative investments	1,173,685,052	792,527,403
• Commodities	345,848,156	220,589,899
• Collateral held for securities lending	<u>181,519,384</u>	<u>184,159,900</u>
Total investments at market value	<u>\$5,182,502,670</u>	<u>\$4,577,782,296</u>
Total assets	\$5,677,304,401	\$4,903,085,689
Accounts payable:		
• Securities purchased	\$(77,247,942)	\$(275,979,493)
• Collateral held for securities lent	(181,519,384)	(184,159,900)
• Contributions and other liabilities	<u>(1,023,895)</u>	<u>(4,151,503)</u>
Total accounts payable	\$(259,791,221)	\$(464,290,896)
Net assets at market value	\$5,417,513,179	\$4,438,794,794
Net assets at actuarial value	\$4,988,448,771	\$4,635,029,604
Net assets at valuation value	\$4,806,026,107	\$4,508,548,272

Note: Results may not add due to rounding.

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Exhibit F: Summary of Reported Reserve Information

	June 30, 2021	June 30, 2020
Member Deposit Reserve – General & Courts	\$314,166,823	\$287,434,022
Member Deposit Reserve – Safety	158,711,480	143,396,605
Member Deposit Reserve – Special Districts	33,028,625	31,090,256
Employers Advance Reserve – General & Courts	534,215,289	475,973,601
Employers Advance Reserve – Safety	581,002,708	527,844,083
Employers Advance Reserve – Special Districts	54,311,593	48,621,285
Cost-of-Living Reserve – General & Courts	868,328,628	802,938,574
Cost-of-Living Reserve – Safety	619,640,596	571,879,238
Cost-of-Living Reserve – Special Districts	69,633,732	62,866,270
Retired Members – General, Courts & Special Districts	1,150,087,912	1,131,012,963
Retired Members – Safety	399,844,668	408,636,469
Supplemental Retiree Benefit Reserve (SRBR) – 0.5% COLA	23,054,053	33,209,640
Contingency Reserve ¹	0	(16,354,734)
Valuation Reserves (Valuation Value of Assets)	\$4,806,026,107	\$4,508,548,272
Supplemental Retiree Benefit Reserve (SRBR)	\$128,798,257	\$126,481,333
Contingency Reserve ²	53,624,406	0
COLA Contribution Reserve	0	0
Total Reserves (Actuarial Value of Assets)	\$4,988,448,771	\$4,635,029,604
Market Stabilization Reserve	\$429,064,409	\$(196,234,810)
Net Market Value of Assets	\$5,417,513,179	\$4,438,794,794

Note: Results may not add due to rounding.

¹ Because the Contingency Reserve is negative as of June 30, 2020, it is included as part of (i.e., as an offset to) the June 30, 2020 Valuation Value of Assets.

² Because the Contingency Reserve is positive as of June 30, 2021, it is excluded from the June 30, 2021 Valuation Value of Assets.

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Exhibit G: Development of the Fund through June 30, 2021

Year Ended June 30	Employer Contributions	Member Contributions	Administrative and Other Expenses	Net Investment Return ¹	Benefit Payments	Market Value of Assets at Year-End	Valuation Value of Assets at Year-End	Valuation Value as a Percent of Market Value
2012	\$189,837,352	\$18,719,762	\$0	\$17,681,865	\$222,140,484	\$2,800,024,038	\$2,960,506,633	105.7%
2013	211,677,478	20,282,751	0	315,415,541	242,629,555	3,104,770,253	3,120,631,727	100.5%
2014	220,393,167	25,810,310	0	482,632,857	257,495,061	3,576,111,526	3,342,121,678	93.5%
2015	215,476,956	30,324,848	4,886,637	81,931,170	273,864,680	3,625,093,183	3,529,785,691	97.4%
2016	234,713,690	33,278,504	5,224,452	(27,535,157)	288,738,174	3,571,587,594	3,685,447,112	103.2%
2017	241,112,434	34,649,054	5,243,309	426,606,857	305,817,454	3,962,895,176	3,913,072,636	98.7%
2018	258,894,487	36,143,110	5,116,557	267,658,596	321,612,528	4,198,862,285	4,163,475,848	99.2%
2019	242,424,569	36,827,443	4,766,651	214,244,104	341,811,689	4,345,780,060	4,291,572,784	98.8%
2020	288,293,446	43,477,770	5,523,340	127,861,224	361,094,367	4,438,794,794	4,508,548,272	101.6%
2021	280,812,319	41,602,345	6,060,675	1,043,360,707	380,996,310	5,417,513,179	4,806,026,107	88.7%

Note: Results may not add due to rounding.

¹ On a market basis, net of investment fees and administrative expenses prior to 2015. Starting in 2015, administrative expenses are included in the previous column.

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Exhibit H: Table of Amortization Bases

General County with Courts

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment ¹ (\$ in '000s)
Restart Amortization	December 31, 2005	\$1,137,894 ²	30	\$1,134,543	14.5	\$103,719
Actuarial Loss	June 30, 2012	36,175	18	29,021	9	3,880
Actuarial Loss	June 30, 2013	13,512	18	11,387	10	1,395
Actuarial Gain	June 30, 2014	(37,659)	18	(32,999)	11	(3,741)
Assumption Change	June 30, 2014	103,045	18	90,309	11	10,237
Actuarial Gain	June 30, 2015	(21,641)	18	(19,604)	12	(2,073)
Actuarial Gain	June 30, 2016	(2,590)	18	(2,401)	13	(239)
Actuarial Gain	June 30, 2017	(40,492)	18	(38,498)	14	(3,614)
Assumption Change	June 30, 2017	120,406	18	114,448	14	10,743
Actuarial Gain	June 30, 2018	(19,589)	18	(18,973)	15	(1,691)
Actuarial Loss	June 30, 2019	70,119	18	68,841	16	5,852
Actuarial Loss	June 30, 2020	24,813	18	24,612	17	2,003
Assumption Change	June 30, 2020	108,013	18	107,126	17	8,718
Actuarial Gain	June 30, 2021	(47,168)	18	(47,168)	18	(3,687)
Implementation of Alameda Decision	June 30, 2021	(17,062)	15	(17,062)	15	(1,521)
Subtotal				\$1,403,582		\$129,981

¹ As of middle of year.

² As of June 30, 2011.

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Exhibit H: Table of Amortization Bases (continued)

Type	Date Established	Districts		Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment' (\$ in '000s)
		Initial Amount (\$ in '000s)	Initial Period			
Restart Amortization	December 31, 2005	\$86,149 ²	30	\$85,892	14.5	\$7,852
Actuarial Loss	June 30, 2012	4,431	18	3,552	9	475
Actuarial Loss	June 30, 2013	1,620	18	1,357	10	166
Actuarial Loss	June 30, 2014	2,584	18	2,259	11	256
Assumption Change	June 30, 2014	7,390	18	6,476	11	734
Actuarial Gain	June 30, 2015	(31)	18	(20)	12	(2)
Actuarial Loss	June 30, 2016	5,060	18	4,708	13	468
Actuarial Loss	June 30, 2017	5,822	18	5,533	14	519
Assumption Change	June 30, 2017	11,343	18	10,768	14	1,011
Actuarial Loss	June 30, 2018	5,634	18	5,444	15	485
Actuarial Loss	June 30, 2019	14,365	18	14,101	16	1,199
Actuarial Loss	June 30, 2020	3,557	18	3,527	17	287
Assumption Change	June 30, 2020	10,306	18	10,225	17	832
Actuarial Loss	June 30, 2021	3,337	18	3,337	18	261
Implementation of Alameda Decision	June 30, 2021	(7,865)	15	(7,865)	15	(701)
Districts Subtotal (Not Including Declining Employers)				\$149,294		\$13,842

¹ As of middle of year.

² As of June 30, 2011.

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Exhibit H: Table of Amortization Bases (continued)

Districts (continued)

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment ¹ (\$ in '000s)
Declining Employer Restart Amortization (Berrenda Mesa)	June 30, 2019	\$4,147	18	\$3,896	16	\$406
Actuarial Loss (Berrenda Mesa)	June 30, 2020	556	18	535	17	54
Assumption Change (Berrenda Mesa)	June 30, 2020	267	18	258	17	26
Actuarial Gain (Berrenda Mesa)	June 30, 2021	(495)	18	(495)	18	(49)
Implementation of Alameda Decision (Berrenda Mesa)	June 30, 2021	1	15	1	15	0
Declining Employer Restart Amortization (Inyokern)	June 30, 2019	102	18	96	16	10
Actuarial Loss (Inyokern)	June 30, 2020	13	18	10	17	1
Assumption Change (Inyokern)	June 30, 2020	5	18	0	17	0
Actuarial Loss (Inyokern)	June 30, 2021	18	18	18	18	2
Implementation of Alameda Decision (Inyokern)	June 30, 2021	0	15	0	15	0
Declining Employer Subtotal				\$4,319		\$450
Subtotal				\$153,613		\$14,292

¹ As of middle of year.

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Exhibit H: Table of Amortization Bases (continued)

Safety County

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment ¹ (\$ in '000s)
Restart Amortization	December 31, 2005	\$606,032 ²	30	\$604,248	14.5	\$55,240
Actuarial Loss	June 30, 2012	37,591	18	30,141	9	4,030
Actuarial Loss	June 30, 2013	17,808	18	15,003	10	1,838
Actuarial Gain	June 30, 2014	(23,991)	18	(21,031)	11	(2,384)
Assumption Change	June 30, 2014	93,817	18	82,212	11	9,319
Actuarial Gain	June 30, 2015	(8,513)	18	(7,713)	12	(816)
Actuarial Gain	June 30, 2016	(4,514)	18	(4,209)	13	(418)
Actuarial Gain	June 30, 2017	(24,660)	18	(23,440)	14	(2,200)
Assumption Change	June 30, 2017	81,394	18	77,370	14	7,263
Actuarial Gain	June 30, 2018	(13,175)	18	(12,742)	15	(1,136)
Actuarial Loss	June 30, 2019	34,070	18	33,437	16	2,843
Actuarial Loss	June 30, 2020	23,024	18	22,836	17	1,859
Assumption Change	June 30, 2020	28,027	18	27,796	17	2,262
Actuarial Gain	June 30, 2021	(18,908)	18	(18,908)	18	(1,478)
Implementation of Alameda Decision	June 30, 2021	(3,996)	15	(3,996)	15	(356)
Subtotal				\$801,004		\$75,866

¹ As of middle of year.

² As of June 30, 2011.

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Exhibit H: Table of Amortization Bases (continued)

Total KCERA

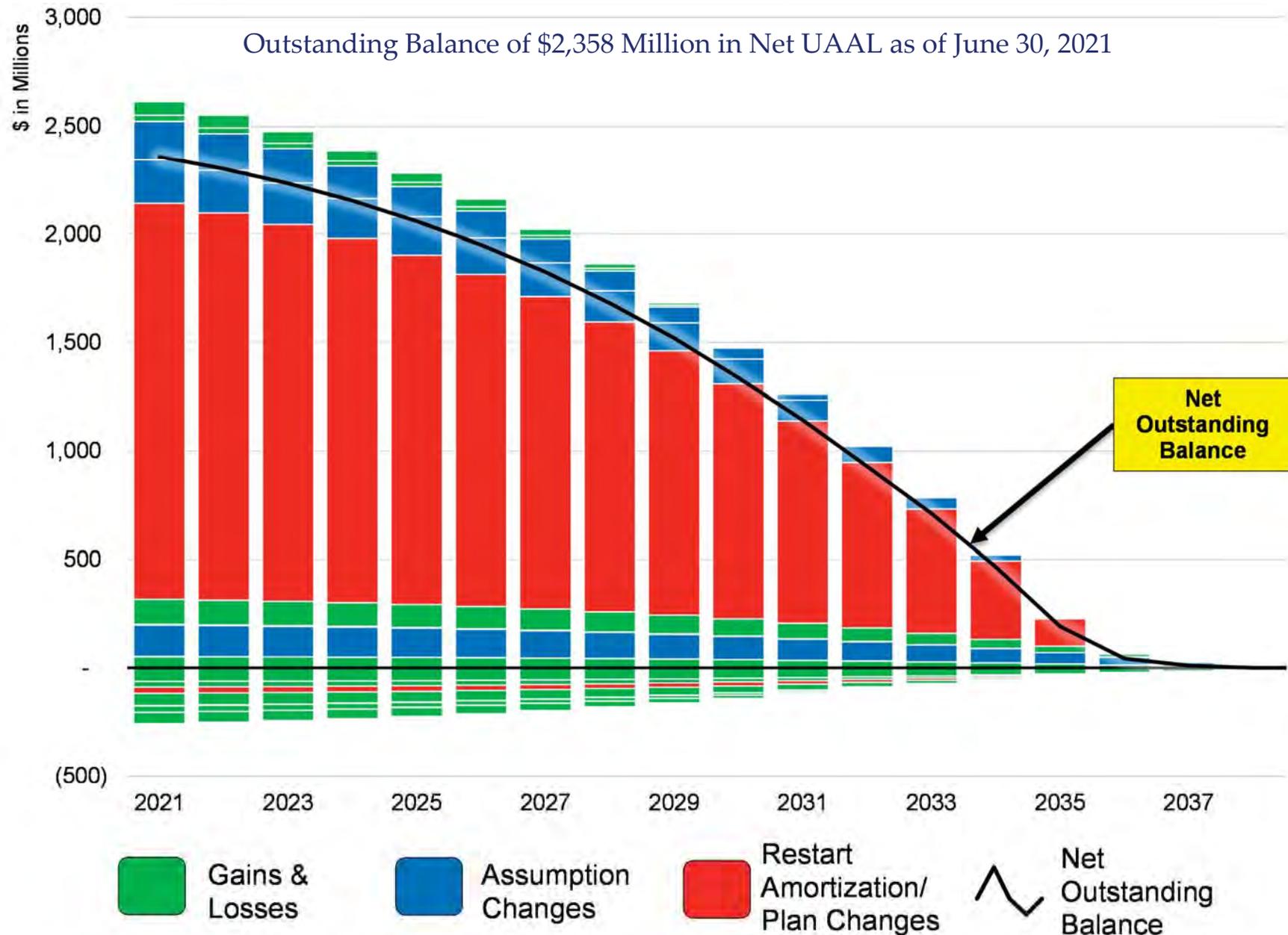
Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment ¹ (\$ in '000s)
Restart Amortization	December 31, 2005	\$1,830,075 ²	30	\$1,824,683	14.5	\$166,811
Actuarial Loss	June 30, 2012	78,197	18	62,714	9	8,385
Actuarial Loss	June 30, 2013	32,940	18	27,747	10	3,399
Actuarial Gain	June 30, 2014	(59,066)	18	(51,771)	11	(5,869)
Assumption Change	June 30, 2014	204,252	18	178,997	11	20,290
Actuarial Gain	June 30, 2015	(30,185)	18	(27,337)	12	(2,891)
Actuarial Gain	June 30, 2016	(2,044)	18	(1,902)	13	(189)
Actuarial Gain	June 30, 2017	(59,330)	18	(56,405)	14	(5,295)
Assumption Change	June 30, 2017	213,143	18	202,586	14	19,017
Actuarial Gain	June 30, 2018	(27,130)	18	(26,271)	15	(2,342)
Actuarial Loss	June 30, 2019	118,554	18	116,379	16	9,894
Declining Employer Restart (Berrenda)	June 30, 2019	4,147	18	3,896	16	406
Declining Employer Restart (Inyokern)	June 30, 2019	102	18	96	16	10
Actuarial Loss	June 30, 2020	51,394	18	50,975	17	4,149
Actuarial Loss (Berrenda)	June 30, 2020	556	18	535	17	54
Actuarial Loss (Inyokern)	June 30, 2020	13	18	10	17	1
Assumption Change	June 30, 2020	146,346	18	145,147	17	11,812
Assumption Change (Berrenda)	June 30, 2020	267	18	258	17	26
Assumption Change (Inyokern)	June 30, 2020	5	18	0	17	0
Actuarial Gain	June 30, 2021	(62,739)	18	(62,739)	18	(4,904)
Actuarial Gain (Berrenda)	June 30, 2021	(495)	18	(495)	18	(49)
Actuarial Loss (Inyokern)	June 30, 2021	18	18	18	18	2
Implementation of Alameda Decision	June 30, 2021	(28,923)	15	(28,923)	15	(2,578)
Implementation of Alameda Decision (Berrenda)	June 30, 2021	1	15	1	15	0
Implementation of Alameda Decision (Inyokern)	June 30, 2021	0	15	0	15	0
KCERA Total				\$2,358,199		\$220,139

¹ As of middle of year.

² As of June 30, 2011.

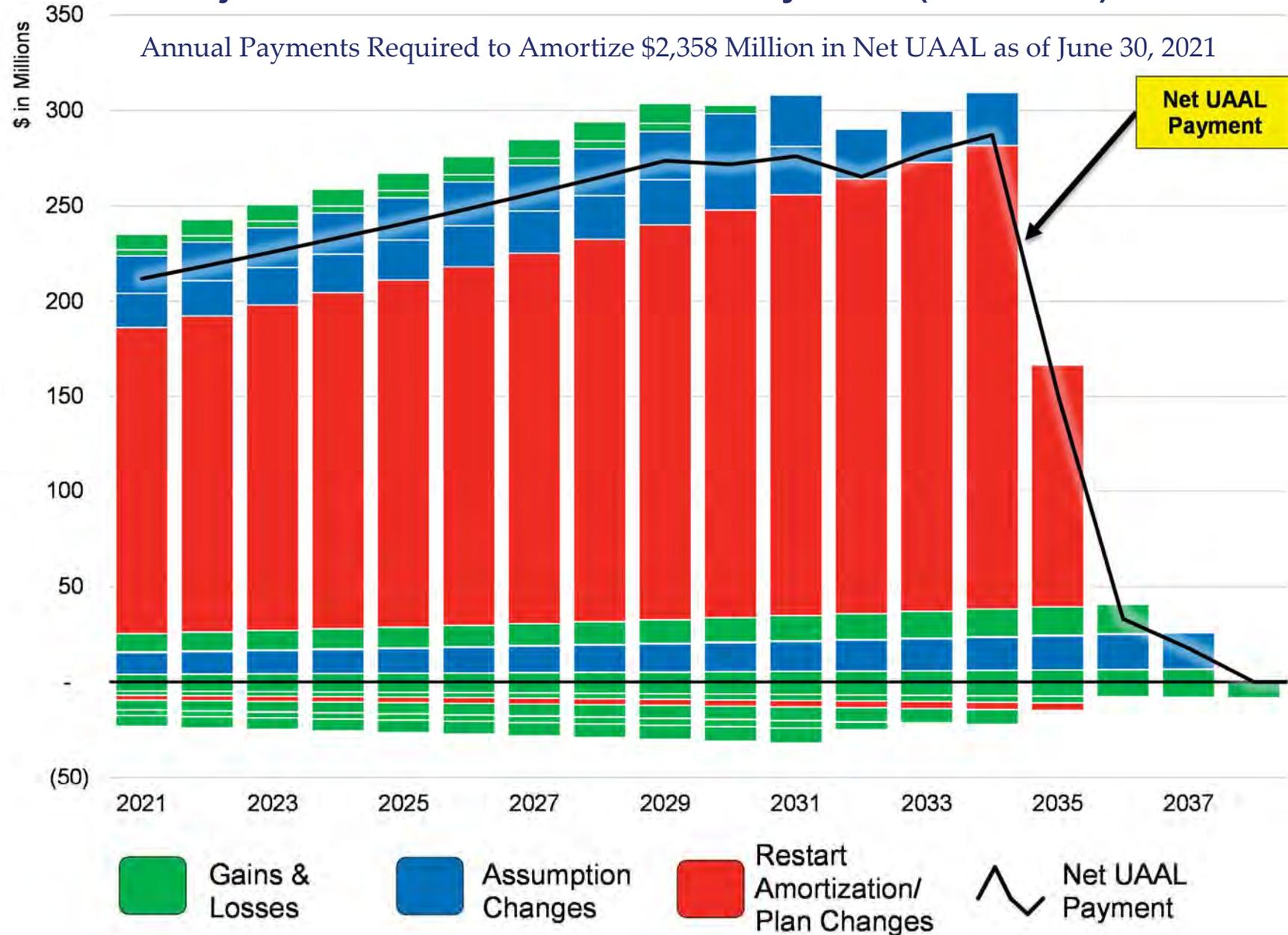
Section 3: Supplemental Information

Exhibit I: Projection of UAAL Balances and Payments



Section 3: Supplemental Information

Exhibit I: Projection of UAAL Balances and Payments (continued)



Section 3: Supplemental Information

Exhibit J: Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ul style="list-style-type: none">Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, andDiscounted according to an assumed rate (or rates) of return to reflect the time value of money.

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Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Association's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the plan.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Association's funding policy. The ADC consists of the employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

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Assumptions or Actuarial Assumptions:	<p>The estimates upon which the cost of the Association is calculated, including:</p> <p><u>Investment return</u> - the rate of investment yield that the Association will earn over the long-term future;</p> <p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age or service;</p> <p><u>Disability rates</u> - the probability of disability retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
Closed Amortization Period:	<p>A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.</p>
Decrements:	<p>Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.</p>
Defined Benefit Plan:	<p>A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.</p>
Defined Contribution Plan:	<p>A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.</p>
Employer Normal Cost:	<p>The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.</p>
Experience Study:	<p>A periodic review and analysis of the actual experience of the Association that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.</p>
Funded Ratio:	<p>The ratio of the Valuation Value of Assets (VVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the VVA.</p>
Investment Return:	<p>The rate of earnings of the plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.</p>

Section 3: Supplemental Information

Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized.
Payroll or Compensation:	Compensation Earnable and Pensionable Compensation expected to be paid to active members during the twelve months following the valuation date. Only Compensation Earnable and Pensionable Compensation that would possibly go into the determination of retirement benefits are included.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Valuation Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of non-valuation reserves.

Section 4: Actuarial Valuation Basis

Exhibit 1: Actuarial Assumptions and Methods

Rationale for Assumptions:	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the July 1, 2016 through June 30, 2019 Actuarial Experience Study dated August 3, 2020. Unless otherwise noted, all actuarial assumptions and methods shown below apply to members for all tiers. These assumptions were adopted by the Board.																										
Economic Assumptions																											
Net Investment Return:	7.25%; net of investment expenses. Based on the Actuarial Experience Study reference above, expected investment expenses represent about 0.40% of the Market Value of Assets.																										
Administrative Expenses:	0.90% of payroll allocated to both the employer and member based on the components of the total average contribution rate (before expenses) for the employer and member. This results in an administrative expense load as shown below: <table border="1" data-bbox="632 808 1472 971"> <thead> <tr> <th></th> <th>Average Contribution Rate Before Administrative Expense</th> <th>Weighting</th> <th>Total Loading</th> </tr> </thead> <tbody> <tr> <td>Employer</td> <td>48.31%</td> <td>87.81%</td> <td>0.79%</td> </tr> <tr> <td>Member</td> <td>6.71%</td> <td>12.19%</td> <td>0.11%</td> </tr> <tr> <td>Total</td> <td></td> <td>100.00%</td> <td>0.90%</td> </tr> </tbody> </table> <p>Under this approach, the employer Normal Cost rate is then increased by the same percent of payroll as the member rate with the remaining employer loading allocated to the employer UAAL rate. This is done to maintain a 50/50 sharing of Normal Cost for those in PEPRA Tiers. The table below shows this allocation.</p> <table border="1" data-bbox="632 1092 1472 1255"> <thead> <tr> <th colspan="2">Allocation of Administrative Expense Load as a % of Payroll</th> </tr> </thead> <tbody> <tr> <td>Addition to Employer Basic Normal Cost Rate</td> <td>0.11%</td> </tr> <tr> <td>Addition to Employer Basic UAAL Rate</td> <td>0.68%</td> </tr> <tr> <td>Addition to Member Basic Rate</td> <td>0.11%</td> </tr> <tr> <td>Total Addition to Contribution Rates</td> <td>0.90%</td> </tr> </tbody> </table> <p>The administrative expense load is added to the Basic rates for employers and members.</p>		Average Contribution Rate Before Administrative Expense	Weighting	Total Loading	Employer	48.31%	87.81%	0.79%	Member	6.71%	12.19%	0.11%	Total		100.00%	0.90%	Allocation of Administrative Expense Load as a % of Payroll		Addition to Employer Basic Normal Cost Rate	0.11%	Addition to Employer Basic UAAL Rate	0.68%	Addition to Member Basic Rate	0.11%	Total Addition to Contribution Rates	0.90%
	Average Contribution Rate Before Administrative Expense	Weighting	Total Loading																								
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Addition to Member Basic Rate	0.11%																										
Total Addition to Contribution Rates	0.90%																										
Member Contribution Crediting Rate:	7.25%, compounded semi-annually.																										

Section 4: Actuarial Valuation Basis

Consumer Price Index (CPI) and Cost of Living Adjustments (COLA):	CPI Increase of 2.75% per year. Retiree COLA increases due to CPI are assumed to be 2.50% per year.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.
Salary Increases:	The annual rate of compensation increase includes: inflation at 2.75%, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotion increases:

Merit and Promotion Increases		
Years of Service	Rate (%)	
	General	Safety
Less than 1	5.50	8.75
1 – 2	4.50	7.00
2 – 3	4.00	5.50
3 – 4	3.50	5.00
4 – 5	3.00	4.50
5 – 6	2.50	4.00
6 – 7	2.25	3.50
7 – 8	1.75	2.50
8 – 9	1.50	1.50
9 – 10	1.25	1.25
10 – 11	1.15	1.00
11 – 12	1.05	0.80
12 – 13	0.95	0.75
13 – 14	0.85	0.70
14 – 15	0.75	0.65
15 – 16	0.75	0.60
16 – 17	0.75	0.55
17 – 18	0.75	0.50
18 – 19	0.75	0.50
19 – 20	0.75	0.50
20 & Over	0.75	0.50

Section 4: Actuarial Valuation Basis

Demographic Assumptions:

Post-Retirement Mortality Rates:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Beneficiaries

- **General and Safety Members:** Pub-2010 General Contingent Survivor Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 10% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The Pub-2010 mortality tables and adjustments as shown above with generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

Section 4: Actuarial Valuation Basis

Pre-Retirement Mortality Rates:

- **General Members:** Pub-2010 General Employee Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
25	0.03	0.01	0.03	0.02
30	0.04	0.01	0.04	0.02
35	0.05	0.02	0.04	0.03
40	0.07	0.04	0.05	0.04
45	0.10	0.06	0.07	0.06
50	0.15	0.08	0.10	0.08
55	0.22	0.12	0.15	0.11
60	0.32	0.19	0.23	0.14
65	0.47	0.30	0.35	0.20

All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 80% male and 20% female.

Section 4: Actuarial Valuation Basis

Disability Incidence:

Age	Rate (%)	
	General	Safety
20	0.02	0.05
25	0.03	0.07
30	0.04	0.10
35	0.07	0.19
40	0.09	0.28
45	0.13	0.39
50	0.18	1.08
55	0.26	2.55
60	0.36	3.70
65	0.40	4.00
70	0.00	0.00

50% of General disabilities are assumed to be service connected (duty) disabilities and the other 50% are assumed to be non-service connected (ordinary) disabilities.

90% of Safety disabilities are assumed to be service connected (duty) disabilities and the other 10% are assumed to be non-service connected (ordinary) disabilities.

Section 4: Actuarial Valuation Basis

Termination:

Years of Service	Rate (%)	
	General	Safety
Less than 1	17.00	9.00
1 – 2	13.00	8.00
2 – 3	10.00	7.00
3 – 4	9.00	6.00
4 – 5	8.50	5.00
5 – 6	8.00	4.00
6 – 7	7.00	3.50
7 – 8	6.00	3.25
8 – 9	5.00	3.00
9 – 10	4.00	2.60
10 – 11	3.75	2.20
11 – 12	3.50	1.80
12 – 13	3.25	1.60
13 – 14	3.00	1.40
14 – 15	2.75	1.20
15 – 16	2.50	1.00
16 – 17	2.30	0.90
17 – 18	2.10	0.75
18 – 19	1.90	0.75
19 – 20	1.70	0.75
20 – 21	1.50	0.00
21 – 22	1.30	0.00
22 – 23	1.10	0.00
23 – 24	1.00	0.00
24 – 25	1.00	0.00
25 – 26	1.00	0.00
26 – 27	1.00	0.00
27 – 28	1.00	0.00
28 – 29	1.00	0.00
29 – 30	1.00	0.00
30 & Over	0.00	0.00

Refer to the next table that contains rates for electing a refund of contributions upon termination. No termination is assumed after a member is first assumed to retire.

Section 4: Actuarial Valuation Basis

Electing a Refund of Contributions upon Termination:

Years of Service	Rate (%)	
	General	Safety
Less than 5	100.00	100.00
5 – 6	36.00	44.00
6 – 7	34.00	40.00
7 – 8	32.00	38.00
8 – 9	30.00	32.00
9 – 10	28.00	30.00
10 – 11	26.00	26.00
11 – 12	25.00	25.00
12 – 13	24.00	21.00
13 – 14	23.00	18.00
14 – 15	22.00	15.00
15 – 16	21.00	12.00
16 – 17	18.00	10.00
17 – 18	16.00	8.00
18 – 19	14.00	6.00
19 – 20	13.00	4.00
20 – 21	12.00	0.00
21 – 22	11.00	0.00
22 – 23	10.00	0.00
23 – 24	8.00	0.00
24 – 25	6.00	0.00
25 – 26	4.00	0.00
26 – 27	2.00	0.00
27 & Over	0.00	0.00

Section 4: Actuarial Valuation Basis

Age	Rate (%)						
	General Tier I		General Tiers IIA and IIB	General Tier III	Safety Tier I		Safety Tiers IIA and IIB
	<25 Years of Service	>25 Years of Service			<25 Years of Service	>25 Years of Service	
45	0.00	0.00	0.00	0.00	5.00	5.00	0.00
46	0.00	0.00	0.00	0.00	5.00	5.00	0.00
47	0.00	0.00	0.00	0.00	5.00	5.00	0.00
48	0.00	0.00	0.00	0.00	5.00	5.00	0.00
49	0.00	0.00	0.00	0.00	25.00	25.00	0.00
50	10.00	10.00	5.00	0.00	10.00	30.00	3.00
51	6.00	6.00	3.00	0.00	8.00	24.00	3.00
52	6.00	12.00	3.00	3.00	8.00	24.00	3.00
53	6.00	12.00	3.00	3.00	8.00	24.00	5.00
54	6.00	12.00	3.50	3.50	12.00	24.00	11.00
55	6.00	12.00	4.00	4.00	14.00	28.00	13.00
56	6.00	14.00	4.50	4.50	14.00	28.00	12.00
57	6.00	16.00	5.00	5.00	8.00	28.00	12.00
58	9.00	18.00	6.50	6.50	8.00	28.00	12.00
59	16.00	24.00	11.00	11.00	14.00	28.00	12.00
60	20.00	35.00	12.00	12.00	25.00	28.00	12.00
61	16.00	28.00	13.00	13.00	25.00	50.00	12.00
62	20.00	35.00	20.00	20.00	25.00	50.00	25.00
63	20.00	30.00	20.00	20.00	25.00	50.00	25.00
64	20.00	30.00	20.00	20.00	25.00	50.00	25.00
65	35.00	35.00	35.00	35.00	100.00	100.00	100.00
66	35.00	35.00	35.00	35.00	100.00	100.00	100.00
67	35.00	35.00	35.00	35.00	100.00	100.00	100.00
68	35.00	35.00	35.00	35.00	100.00	100.00	100.00
69	40.00	40.00	40.00	40.00	100.00	100.00	100.00
70	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Retirement Age and Benefit for Deferred Vested Members:

For current and future deferred vested members, retirement age assumptions are as follows:

General Retirement Age: 57

Safety Retirement Age: 53

We assume that 45% of future General and 60% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocal members, we assume 4.00% and 3.75% compensation increases per annum for General and Safety members, respectively.

Section 4: Actuarial Valuation Basis

Future Benefit Accruals:	1.0 year of service per year of employment.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Definition of Active Members:	All active members of KCERA as of the valuation date.
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married:	For all active and inactive members, 70% of male members and 60% of female members are assumed to be married at pre-retirement death or retirement. There is no explicit assumption for children's benefits.
Age and Gender of Spouse:	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.
<u>Actuarial Funding Policy</u>	
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus the lesser of years of employment or years of benefit service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation, as if the current benefit formula for each individual has always been in effect (i.e., "replacement life within a tier").
Actuarial Value of Assets:	Market Value of Assets (MVA) less unrecognized returns in each of the last nine semi-annual accounting periods. Unrecognized returns are equal to the difference between the actual market return and the expected return on the market value, and are recognized semi-annually over a five-year period. The Actuarial Value of Assets (AVA) is limited by a 50% corridor; the AVA cannot be less than 50% of MVA, nor greater than 150% of MVA.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of the non-valuation reserves (excluding the Contingency Reserve if it is negative).

Section 4: Actuarial Valuation Basis

Amortization Policy:

The UAAL, (i.e., the difference between the Actuarial Accrued Liability and the Valuation Value of Assets), as of June 30, 2011 shall be amortized separately from any future changes in UAAL over a period of 24.5 years from June 30, 2011.

Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of June 30 will be amortized over a period of 18 years.

Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.

Unless an alternative amortization period is recommended by the Actuary and accepted by the Board based on the results of an actuarial analysis:

- a. With the exception noted in b., below, the change in UAAL as a result of any plan amendments will be amortized over a period of 15 years or less;
- b. the increase in UAAL resulting from a temporary retirement incentive, including the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), will be funded over a period of up to 5 years. For Golden Handshakes, the employer has the choice of two methods:
 - i. Payment in full for the UAAL attributable to the Golden Handshake in the first month of the fiscal year following the fiscal year in which the Golden Handshake was granted.
 - ii. Payment according to a five-year amortization period which will be invoiced (payable in 30 days) to the employer in the first month of the fiscal year following the fiscal year in which the Golden Handshake was granted. The amortization schedule will be based upon the valuation interest rate used in the most recently completed valuation at the time that the amortization schedule is created. The employer may complete payment of the Golden Handshake at any time during the five-year amortization period.

If the amortization method is used, then the outstanding balance will generally be recorded as a receivable asset to be included with the Actuarial Value of Assets. All Golden Handshakes provided by an employer during any fiscal year will be bundled together and will be invoiced in one transaction in the first month following the fiscal year in which the Golden Handshakes were granted.

UAAL shall be amortized over “closed” amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation.

UAAL shall be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase (i.e., wage inflation).

If an overfunding or “surplus” exists (i.e., the Valuation Value of Assets exceeds the Actuarial Accrued Liability, so that the total of all UAAL amortization layers becomes negative), such surplus and any subsequent surpluses will be amortized over an “open” amortization period of 30 years. Any prior UAAL amortization layers will be considered fully amortized, and any subsequent UAAL will be amortized over 18 years as the first of a new series of amortization layers.

These amortization policy components will apply separately to each of KCERA’s UAAL cost sharing groups.

Section 4: Actuarial Valuation Basis

Other Actuarial Methods

Employer Contributions:

Employer contributions consist of two components:

Normal Cost

The annual contribution rate that, if paid annually from a member's first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement-related benefits. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution rate is determined as a level percentage of the member's compensation.

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain level as a percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase along with expected payroll at the combined annual inflation and "across the board" salary increase rate of 3.25%. Effective with the June 30, 2012 valuation, the June 30, 2011 UAAL is being amortized over a 24.5-year declining period (14.5 years as of June 30, 2021). The change in UAAL that arises due to actuarial gains or losses or due to changes in actuarial assumptions or methods at each valuation is amortized over its own declining 18-year period. Any change in UAAL that arises due to plan amendments is amortized over its own declining 15-year period (with the exception of retirement incentives which are amortized over its own declining period of up to 5 years).

The amortization policy is described on the previous page.

The UAAL contribution rates have been adjusted to account for the one-year delay between the valuation date and the date that the contribution rates become effective.

The recommended employer contributions are provided in *Section 2, Subsection F*. The rates are shown for each tier/cost group and are separated into Normal Cost and UAAL components into each of these three benefit categories:

- The Basic benefits are the retirement benefits excluding all COLAs.
- The COLA benefits adopted prior to Ventura Settlement are referred to as the "2.0% COLA benefits".
- The COLA benefits provided under the Ventura settlement are referred to as the "0.5% COLA benefits".

Section 4: Actuarial Valuation Basis

Member Contributions:

The member contribution rates for all members are provided in *Section 4, Exhibit 3*.

General Tiers I and IIA and Safety Tiers I and IIA

Articles 6 and 6.8 of the 1937 Act define the methodology to be used in the calculation of member basic contribution rates for General and Safety members, respectively. The basic contribution rate is determined as that percentage of compensation which if paid annually from a member's first year of membership through the prescribed retirement age would accumulate to the amount necessary to fund a prescribed annuity.

The prescribed annuity is equal to:

- 1/100 of Final Average Salary per year of service at age 55 for General Tier I members
- 1/120 of Final Average Salary per year of service at age 60 for General Tier IIA members
- 1/100 of Final Average Salary per year of service at age 50 for Safety Tier I and Safety Tier IIA members

Safety Tier I members also pay a supplemental contribution rate such that the aggregate amount of the supplemental and basic contribution rates will provide an annuity equal to 3/200 of one year Final Average Salary per year of service at age 50.

Members in these non-CalPEPRA tiers do not contribute towards the cost-of-living benefits.

Effective July 11, 2015, San Joaquin Valley Unified Air Pollution Control District Tier I members pay 28% of the total Normal Cost rate. That percent increased to 39% effective 2016-2017 and 50% effective 2017-2018.

Effective July 8, 2017, San Joaquin Valley Unified Air Pollution Control District Tier IIA members pay 50% of the total Normal Cost rate.

General Tiers IIB and III and Safety Tier IIB

Pursuant to Section 7522.30(a) of the Government Code, General Tier IIB, General Tier III and Safety Tier IIB members are required to contribute at least 50% of the Normal Cost rate. In addition, there are certain additional requirements that would have to be met such as requiring the new employees to pay the contribution rate of "similarly situated employees", if it is greater. (reference: Section 7522.30(c)). We further understand that different rules may have to be applied for collectively bargained employees, non-represented, managerial or other supervisory employees. (reference: Section 7522.30(e)). In preparing the Normal Cost rates in this report, we have assumed that exactly 50% of the Normal Cost would be paid by the new members and we have taken into account in this valuation only the requirements of Section 7522.30(c), but not requirements of Section 7522.30(e). Also of note is that based on our discussions with KCERA, we have used the discretion made available by Section 31620.5(a) of AB 1380 to no longer round the member contribution rates to the nearest quarter of one percent as previously required by CalPEPRA. This is consistent with established practice for the non-CalPEPRA tiers and should allow for exactly one-half of the Normal Cost for the CalPEPRA tiers to be paid by the employees and one-half by the employers. In addition, Section 31620.5(b) of AB 1380 also provides that the "one percent" rule under Section 7022.30(d) does not apply. This section formerly limited the circumstances under which the member rate would change.

Member contributions are accumulated at an annual interest rate adopted annually by the Board.

Section 4: Actuarial Valuation Basis

For some employers, benefits are integrated with Social Security. In those cases, non-General Tier III members pay two-thirds of the full rate on the first \$350 of pay each month. (The General Tier III formula, as valued, is not integrated with Social Security.)

The tables on pages 36 through 40 summarize the specific member contribution rate arrangements for each employer as they have been reflected in this valuation. For valuation purposes, the member contribution levels that are assumed to be in place are those for the fiscal year that begins one year after the valuation date. Any future changes in member contribution rates after that would be reflected in future valuations in determining the allocation of the total costs payable between the employers and the members.

Transfers:

When employees transfer from one participating employer to another KCERA participating employer, recognition needs to be made of the employee's prior service within KCERA on an equitable basis. For each employee that transfers within KCERA the funding for the employee's benefits will be determined as follows:

The employee will be reported and funded as a vested terminated employee for the former participating employer with reciprocal benefits the same as any other vested terminated employee who moves to a reciprocal retirement system other than KCERA.

- The employee will be reported and funded as an active employee for the new participating employer but with reciprocal service credits for the prior service in KCERA for purposes of benefit eligibility and entry age. Benefit amounts will be funded only for the service provided to the new participating employer.
- Upon retirement from KCERA, the employee's total retirement benefit will be determined based on service with each KCERA participating employer and the employee's Final Average Salary.
- The entire liability for the retired employee's KCERA benefit payments will be allocated to the latest participating employer's cost group. The employee will be reported as a retired employee for the latest participating employer with the full KCERA retirement benefit amount.

Section 4: Actuarial Valuation Basis

Cost Sharing Adjustments:	<p>KCERA's Normal Cost is determined separately for each group of members that have the same benefit formula (on a prospective basis). The seven Normal Cost cost sharing groups are as follows:</p> <ul style="list-style-type: none">• General Tier I• General Tier IIA• General Tier IIB• General Tier III• Safety Tier I• Safety Tier IIA• Safety Tier IIB <p>KCERA's UAAL is determined separately for each cost sharing group depending on the assets for that cost group. The three UAAL cost sharing groups are as follows:</p> <ul style="list-style-type: none">• General County and Courts• General Districts• Safety
Internal Revenue Code Section 415:	<p>Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.</p> <p>A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.</p> <p>In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$230,000 for 2021. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.</p> <p>Benefits for members in the legacy tiers in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).</p> <p>Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.</p> <p>Contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.</p>
Changed Actuarial Assumptions and Methods:	<p>There have been no changes in actuarial assumptions or methods since the last valuation.</p>

Section 4: Actuarial Valuation Basis

Exhibit 2: Summary of Plan Provisions

This exhibit summarizes the major provisions of the Association included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	July 1 through June 30
Membership Eligibility:	All permanent employees of Kern County or participating Special Districts scheduled to work 50% or more of the required regular standard hours are eligible to become a member of the Retirement Association subject to classification below:
<i>General Tier I</i>	All General members hired by the County prior to October 27, 2007 (prior to July 5, 2008 for Prosecutors), hired by North of the River Sanitation District prior to October 29, 2007, hired by the Kern County Water Agency prior to January 1, 2010, hired by Berrenda Mesa Water District prior to January 12, 2010, hired by San Joaquin Valley Unified Air Pollution Control District prior to July 31, 2012, hired by West Side Mosquito Abatement District prior to November 15, 2012, hired by Kern Mosquito & Vector Control District prior to December 12, 2012, hired by Inyokern Community Services District prior to December 13, 2012, hired by Buttonwillow Recreation & Park District or East Kern Cemetery District prior to December 17, 2012, hired by West Side Cemetery District prior to December 18, 2012, hired by Shafter Recreation & Park District prior to December 19, 2012, or hired by the Courts prior to March 12, 2011.
<i>General Tier IIA</i>	All General members hired by the County on or after October 27, 2007, hired by North of the River Sanitation District on or after October 29, 2007, hired by the Kern County Water Agency on or after January 1, 2010, hired by Berrenda Mesa Water District on or after January 12, 2010, hired by San Joaquin Valley Unified Air Pollution Control District on or after July 31, 2012, hired by West Side Mosquito Abatement District on or after November 15, 2012, hired by Kern Mosquito & Vector Control District on or after December 12, 2012, hired by Inyokern Community Services District on or after December 13, 2012, hired by Buttonwillow Recreation & Park District or East Kern Cemetery District on or after December 17, 2012, hired by West Side Cemetery District on or after December 18, 2012, hired by Shafter Recreation & Park District on or after December 19, 2012, or hired by the Courts on or after March 12, 2011; and hired prior to January 1, 2013.
<i>General Tier IIB</i>	All General members hired by the County or districts (other than West Side Recreation & Park) on or after January 1, 2013.
<i>General Tier III</i>	All General members hired by West Side Recreation & Park on or after January 1, 2013.
<i>Safety Tier I</i>	All members employed in active law enforcement, active fire suppression, probation, detention or criminal investigation hired prior to March 27, 2012.
<i>Safety Tier IIA</i>	All members employed in active law enforcement, active fire suppression, probation, detention or criminal investigation hired on or after March 27, 2012 and prior to January 1, 2013.
<i>Safety Tier IIB</i>	All member employee in active law enforcement, active fire suppression, probation, detention or criminal investigation hired on or after January 1, 2013.

Section 4: Actuarial Valuation Basis

Final Compensation for Benefit Determination:		
<i>General Tiers I and IIA, Safety Tiers I and IIA</i>	Highest consecutive twelve months of compensation earnable (§31462.1) (FAS1).	
<i>General Tier IIB, General Tier III and Safety Tier IIB</i>	Highest consecutive thirty-six months of pensionable compensation (§7522.32 and §7522.34) (FAS3).	
Compensation Limit:		
<i>Non-General Tier III</i>	For members with membership dates on or after July 1, 1996, Compensation Earnable is limited to Internal Revenue Code Section 401(a)(17). The limit for the plan year beginning July 1, 2021 is \$290,000. The limit is indexed for inflation on an annual basis.	
<i>General Tier III</i>	Pensionable Compensation is limited to \$128,059 for 2021 (\$153,671, if not enrolled in Social Security). The limit is indexed for inflation on an annual basis.	
Service:		
Years of service (Yrs).		
Service Retirement Eligibility:		
<i>General Tiers I, IIA and IIB</i>	Age 50 with 10 years of service credit, or age 70 regardless of service credit, or after 30 years of service credit, regardless of age (§31672).	
<i>General Tier III</i>	Age 52 with 5 years of service (§7522.20(a)), or age 70 regardless of service credit.	
<i>Safety Tiers I, IIA and IIB</i>	Age 50 with 10 years of service credit, or age 70 regardless of service credit, or after 20 years of service credit, regardless of age (§31663.25).	
Benefit Formula:		
<i>General Tier I (§31676.17)</i>	Retirement Age	Benefit Formula⁽¹⁾
	50	$(2.00\% \times \text{FAS1} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(2.50\% \times \text{FAS1} - 1/3 \times 2.50\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$
	62 and over	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier I⁽²⁾ (§31676.14)</i>	Retirement Age	Benefit Formula
	50	$1.48\% \times \text{FAS1} \times \text{Yrs}$
	55	$1.95\% \times \text{FAS1} \times \text{Yrs}$
	60	$2.44\% \times \text{FAS1} \times \text{Yrs}$
	62 and over	$2.61\% \times \text{FAS1} \times \text{Yrs}$

Section 4: Actuarial Valuation Basis

<i>General Tier IIA (§31676.01)</i>	Retirement Age	Benefit Formula⁽¹⁾
	50	$(0.79\% \times \text{FAS1} - 1/3 \times 0.79\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(0.99\% \times \text{FAS1} - 1/3 \times 1.00\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(1.28\% \times \text{FAS1} - 1/3 \times 1.28\% \times \$350 \times 12) \times \text{Yrs}$
	62	$(1.39\% \times \text{FAS1} - 1/3 \times 1.39\% \times \$350 \times 12) \times \text{Yrs}$
	65 and over	$(1.62\% \times \text{FAS1} - 1/3 \times 1.62\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier IIB (§31676.01)</i>	Retirement Age	Benefit Formula⁽¹⁾
	50	$(0.79\% \times \text{FAS3} - 1/3 \times 0.79\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(0.99\% \times \text{FAS3} - 1/3 \times 1.00\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(1.28\% \times \text{FAS3} - 1/3 \times 1.28\% \times \$350 \times 12) \times \text{Yrs}$
	62	$(1.39\% \times \text{FAS3} - 1/3 \times 1.39\% \times \$350 \times 12) \times \text{Yrs}$
	65 and over	$(1.62\% \times \text{FAS3} - 1/3 \times 1.62\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier III (§7522.20(a))</i>	Retirement Age	Benefit Formula
	52	$1.00\% \times \text{FAS3} \times \text{Yrs}$
	55	$1.30\% \times \text{FAS3} \times \text{Yrs}$
	60	$1.80\% \times \text{FAS3} \times \text{Yrs}$
	62	$2.00\% \times \text{FAS3} \times \text{Yrs}$
	65	$2.30\% \times \text{FAS3} \times \text{Yrs}$
	67 and over	$2.50\% \times \text{FAS3} \times \text{Yrs}$
<i>Safety Tier I (§31664.1)</i>	Retirement Age	Benefit Formula
	50	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$
	60 and over	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$

⁽¹⁾ Benefits for some District Members are not integrated with Social Security.

⁽²⁾ Two General Districts, Berrenda Mesa and Inyokern, have adopted Section 31676.17 on a prospective basis only as of January 1, 2005, but have Section 31676.14 for service prior to January 1, 2005.

Section 4: Actuarial Valuation Basis

<i>Safety Tier IIA (§31664)</i>	Retirement Age	Benefit Formula
	50	$(2.00\% \times \text{FAS1} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(2.62\% \times \text{FAS1} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
<i>Safety Tier IIB (§31664)</i>	Retirement Age	Benefit Formula
	60 and over	$(2.62\% \times \text{FAS1} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
	50	$(2.00\% \times \text{FAS3} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(2.62\% \times \text{FAS3} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
	57 and over	$(2.62\% \times \text{FAS3} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
Maximum Benefit:		
<i>Non-General Tier III</i>	100% of final compensation (§31676.14, §31676.17, §31676.01, §31664.1, §31664).	
<i>General Tier III</i>	There is no final compensation limit on the maximum retirement benefit.	
Non-Service Connected Disability:		
<i>Eligibility</i>	Five years of service (§31720).	
<i>Benefit</i>	20% of Final Compensation plus 2% of Final Compensation for each full year of service in excess of five years, not to exceed 40% of Final Compensation (§31727.7). For all members, 100% of the Service Retirement benefit, if greater.	
Service Connected Disability:		
<i>Eligibility</i>	No age or service requirements (§31720).	
<i>Benefit</i>	50% of the Final Compensation or 100% of Service Retirement benefit, if greater (§31727.4).	

Section 4: Actuarial Valuation Basis

Pre-Retirement Death:	
<i>All Members</i>	
<i>Eligibility</i>	None.
<i>Basic lump sum benefit</i>	Refund of employee contributions with interest plus one month's eligible compensation for each year of service to a maximum of six months' compensation (§31781).
<i>Service Connected Death</i>	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787). In addition, Safety members are entitled to benefits under Sections 31787.5 and 31787.6.
<i>Vested Members</i>	
<i>Eligibility</i>	Five years of service.
<i>Basic benefit</i>	60% of the greater of Service Retirement or Non-Service Connected Disability Retirement benefit payable to surviving eligible spouse or eligible children (§31765.1, §31781.1), in lieu of above. Additionally, the spouse may choose a combined benefit of: <ul style="list-style-type: none"> • A lump sum payment of up to six months' compensation (see above), and • A monthly (60%) benefit reduced by actuarial equivalent of the lump sum payment (§31781.3).
Death After Retirement:	
<i>All Members</i>	
<i>Service Retirement or Non-Service Connected Disability Retirement</i>	Unless another option was selected at retirement, 60% of member's unmodified allowance continued to eligible spouse (§31760.1). An eligible spouse is a surviving spouse who was married to the member at least one year prior to the day of retirement (§31760.1), or, at least two years prior to the date of death and has attained age 55 on or prior to the date of death (§31760.2).
<i>Service Connected Disability</i>	Unless another option was selected at retirement, 100% of member's unmodified allowance continued to eligible spouse (§31786).
Withdrawal Benefits:	
<i>Less than Five Years of Service</i>	Refund of accumulated employee contributions with interest (§31628) or entitled to earned benefits commencing any time after eligible to retire (§31629.5) if eligible for benefits at a reciprocal system.
<i>Five or More Years of Service</i>	If contributions left on deposit, a member is entitled to earned benefits commencing at any time after eligible to retire (§31700). Service for eligibility includes service credited as an employee of a reciprocal system.
Post-retirement Cost-of-Living Benefits:	Future changes based on changes to the Consumer Price Index to a maximum of 2.50% per year. (§31870.4)
Supplemental Retiree Benefit Reserve:	The Association provides Supplemental Retiree Benefit Reserve benefits for eligible retirees. These benefits have been excluded from this valuation.

Section 4: Actuarial Valuation Basis

Member Contributions:	Please refer to <i>Section 4, Exhibit 3</i> for the specific rates. Members in General Tiers I and IIA (excluding San Joaquin Valley Unified Air Pollution Control District) and Safety Tiers I and IIA do not contribute towards the cost-of-living benefits.
<i>General Tier I (non-SJVAPCD)</i>	
<i>Basic</i>	Entry age based rates that provide for an average annuity at age 55 equal to 1/100 of FAS (\$31621.8).
<i>General Tier I (SJVAPCD)</i>	
<i>Basic</i>	Entry age based rates that provide for 50% of total Normal Cost Rate.
<i>General Tier IIA (non-SJVAPCD)</i>	
<i>Basic</i>	Entry age based rates that provide for an average annuity at age 60 equal to 1/120 of FAS (\$31621).
<i>General Tier IIA (SJVAPCD)</i>	
<i>Basic</i>	Entry age based rates that provide for 50% of total Normal Cost Rate.
<i>General Tiers IIB and III</i>	Non-entry age based rates that provide for 50% of total Normal Cost Rate.
<i>Safety Tier I</i>	
<i>Basic</i>	Entry age based rates that provide for an average annuity at age 50 equal to 1/100 of FAS (\$31639.25).
<i>Supplemental</i>	Entry age based rates that provide for an average annuity at age 50 equal to 1/200 of FAS (Resolution #2004-144).
<i>Safety “3” Tier I</i>	
<i>Basic and Supplemental</i>	At all entry ages, the member contribution rate for the above Safety Tier I members who enter the plan at age 27.
<i>Safety Tier IIA</i>	
<i>Basic</i>	Entry age based rates that provide for an average annuity at age 50 equal to 1/100 of FAS (\$31639.25).
<i>Safety “3” Tier IIA</i>	
<i>Basic</i>	At all entry ages, the member contribution rate for the above Safety Tier IIA members who enter the plan at age 27.
<i>Safety Tier IIB</i>	Non-entry age based rates that provide for 50% of total Normal Cost Rate.
Other Information:	Safety Tier I and Tier IIA members with 30 or more years of service are exempt from paying member contributions. Various other exemptions for member contributions are outlined on pages 36 through 40.

Section 4: Actuarial Valuation Basis

Changed Plan Provisions:

On July 30, 2020, the California Supreme Court issued a decision in the Alameda County Deputy Sheriff's Assn. et al., v. Alameda County Employees' Retirement Assn. litigation that clarified what should be considered compensation earnable for Legacy members and pensionable compensation for PEPRA members for that system and other similarly situated 1937 Act county employees retirement systems. See Item (1) on page 8 of this report for a discussion of the action taken by KCERA.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the Association should find the plan summary not in accordance with the actual provisions, the Association should alert the actuary so they can both be sure the proper provisions are valued.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates

General Tier I Members' (non-SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated		Non-Integrated
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation	All Compensation
16	4.35%	6.52%	6.52%
17	4.43%	6.65%	6.65%
18	4.51%	6.77%	6.77%
19	4.60%	6.90%	6.90%
20	4.68%	7.02%	7.02%
21	4.77%	7.15%	7.15%
22	4.86%	7.29%	7.29%
23	4.95%	7.42%	7.42%
24	5.04%	7.56%	7.56%
25	5.13%	7.70%	7.70%
26	5.23%	7.84%	7.84%
27	5.33%	7.99%	7.99%
28	5.42%	8.13%	8.13%
29	5.52%	8.28%	8.28%
30	5.63%	8.44%	8.44%
31	5.73%	8.59%	8.59%
32	5.83%	8.75%	8.75%
33	5.95%	8.92%	8.92%
34	6.05%	9.08%	9.08%
35	6.17%	9.25%	9.25%
36	6.29%	9.43%	9.43%
37	6.41%	9.61%	9.61%
38	6.53%	9.80%	9.80%
39	6.66%	9.99%	9.99%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier I Members' (non-SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated		Non-Integrated
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation	All Compensation
40	6.79%	10.19%	10.19%
41	6.93%	10.39%	10.39%
42	7.06%	10.59%	10.59%
43	7.19%	10.78%	10.78%
44	7.32%	10.98%	10.98%
45	7.45%	11.18%	11.18%
46	7.58%	11.37%	11.37%
47	7.70%	11.55%	11.55%
48	7.79%	11.69%	11.69%
49	7.88%	11.82%	11.82%
50	7.94%	11.91%	11.91%
51	7.98%	11.97%	11.97%
52	7.99%	11.99%	11.99%
53	7.99%	11.98%	11.98%
54 & Over	7.93%	11.90%	11.90%

Interest: 7.25% per annum
 COLA: None
 Administrative Expenses: 0.11% of payroll added to Basic rates
 Mortality: See Section 4, Exhibit 1
 Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit 1)
 Note: These rates are determined before any pickups by the employer, if any.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier I Members' (SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	All Compensation
16	9.28%
17	9.46%
18	9.63%
19	9.82%
20	9.99%
21	10.18%
22	10.38%
23	10.56%
24	10.76%
25	10.96%
26	11.16%
27	11.38%
28	11.58%
29	11.79%
30	12.02%
31	12.24%
32	12.47%
33	12.71%
34	12.94%
35	13.18%
36	13.44%
37	13.70%
38	13.97%
39	14.24%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier I Members' (SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	All Compensation
40	14.53%
41	14.81%
42	15.10%
43	15.37%
44	15.66%
45	15.94%
46	16.21%
47	16.47%
48	16.67%
49	16.86%
50	16.99%
51	17.07%
52	17.10%
53	17.09%
54 & Over	16.97%

The General Tier I (SJVAPCD) member contribution rate is 50% of the total Normal Cost rate. The rates shown above also include an administrative expense load of 0.11% of payroll.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier IIA Members' (non-SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated		Non-Integrated
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation	All Compensation
16	3.15%	4.72%	4.72%
17	3.21%	4.81%	4.81%
18	3.27%	4.90%	4.90%
19	3.33%	4.99%	4.99%
20	3.39%	5.08%	5.08%
21	3.45%	5.18%	5.18%
22	3.51%	5.27%	5.27%
23	3.58%	5.37%	5.37%
24	3.65%	5.47%	5.47%
25	3.71%	5.57%	5.57%
26	3.78%	5.67%	5.67%
27	3.85%	5.78%	5.78%
28	3.93%	5.89%	5.89%
29	3.99%	5.99%	5.99%
30	4.07%	6.10%	6.10%
31	4.15%	6.22%	6.22%
32	4.22%	6.33%	6.33%
33	4.30%	6.45%	6.45%
34	4.38%	6.57%	6.57%
35	4.46%	6.69%	6.69%
36	4.54%	6.81%	6.81%
37	4.63%	6.94%	6.94%
38	4.71%	7.07%	7.07%
39	4.80%	7.20%	7.20%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier IIA Members' (non-SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated		Non-Integrated
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation	All Compensation
40	4.89%	7.33%	7.33%
41	4.98%	7.47%	7.47%
42	5.07%	7.61%	7.61%
43	5.17%	7.76%	7.76%
44	5.27%	7.91%	7.91%
45	5.38%	8.07%	8.07%
46	5.49%	8.23%	8.23%
47	5.59%	8.39%	8.39%
48	5.69%	8.54%	8.54%
49	5.80%	8.70%	8.70%
50	5.91%	8.86%	8.86%
51	6.00%	9.00%	9.00%
52	6.09%	9.14%	9.14%
53	6.17%	9.25%	9.25%
54	6.24%	9.36%	9.36%
55	6.29%	9.43%	9.43%
56	6.32%	9.48%	9.48%
57	6.33%	9.49%	9.49%
58	6.33%	9.49%	9.49%
59 & Over	6.28%	9.42%	9.42%

Interest: 7.25% per annum
 COLA: None
 Administrative Expenses: 0.11% of payroll added to Basic rates
 Mortality: See Section 4, Exhibit 1
 Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit 1)
 Note: These rates are determined before any pickups by the employer, if any.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier IIA Members' (SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	All Compensation
16	4.58%
17	4.67%
18	4.75%
19	4.84%
20	4.93%
21	5.02%
22	5.11%
23	5.21%
24	5.31%
25	5.40%
26	5.50%
27	5.61%
28	5.71%
29	5.81%
30	5.92%
31	6.03%
32	6.14%
33	6.26%
34	6.37%
35	6.49%
36	6.60%
37	6.73%
38	6.86%
39	6.98%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier IIA Members' (SJVAPCD) Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Entry Age	All Compensation
40	7.11%
41	7.24%
42	7.38%
43	7.52%
44	7.67%
45	7.83%
46	7.98%
47	8.14%
48	8.28%
49	8.44%
50	8.59%
51	8.73%
52	8.86%
53	8.97%
54	9.08%
55	9.14%
56	9.19%
57	9.20%
58	9.20%
59 & Over	9.13%

The General Tier IIA (SJVAPCD) member contribution rate is 50% of the total Normal Cost rate. The rates shown above also include an administrative expense load of 0.11% of payroll.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

General Tier IIB Members' Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

All Members	Integrated		Non-Integrated
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation	All Compensation
Basic	3.33%	5.00%	5.00%
2% COLA	0.70%	1.05%	1.05%
0.5% COLA	<u>0.22%</u>	<u>0.33%</u>	<u>0.33%</u>
Total	4.25%	6.38%	6.38%

The General Tier IIB member contribution rate is 50% of the total Normal Cost rate. The rates shown above also include an administrative expense load of 0.11% of payroll.

General Tier III Members' Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

All Members	All Compensation ¹
Basic	5.84%
2% COLA	1.20%
0.5% COLA	<u>0.37%</u>
Total	7.41%

The General Tier III member contribution rate is 50% of the total Normal Cost rate. The rates shown above also include an administrative expense load of 0.11% of payroll.

¹ It is our understanding that in the determination of pension benefits under the General Tier III formula, the compensation that can be taken into account for 2021 is \$128,059 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2021 (reference: Section 7522.10(d)).

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety Tier I Members' (Excluding "Safety 3" Members) Contribution Rates from the June 30, 2021 Actuarial Valuation (Expressed as a Percentage of Monthly Compensation)

Integrated		
Entry Age	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
16	7.31%	10.96%
17	7.46%	11.19%
18	7.61%	11.42%
19	7.77%	11.66%
20	7.93%	11.90%
21	8.10%	12.15%
22	8.27%	12.40%
23	8.44%	12.66%
24	8.61%	12.92%
25	8.79%	13.19%
26	8.98%	13.47%
27	9.17%	13.75%
28	9.37%	14.05%
29	9.57%	14.35%
30	9.77%	14.66%
31	9.99%	14.98%
32	10.21%	15.32%
33	10.44%	15.66%
34	10.67%	16.01%
35	10.91%	16.37%
36	11.16%	16.74%
37	11.42%	17.13%
38	11.69%	17.53%
39	11.96%	17.94%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety Tier I Members' (Excluding "Safety 3" Members) Contribution Rates from the June 30, 2021 Actuarial Valuation (Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated	
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
40	12.23%	18.34%
41	12.49%	18.74%
42	12.68%	19.02%
43	12.77%	19.16%
44	12.83%	19.25%
45	12.86%	19.29%
46	12.86%	19.29%
47	12.83%	19.25%
48	12.69%	19.04%
49 & Over	12.42%	18.63%

Interest: 7.25% per annum
 COLA: None
 Administrative Expenses: 0.11% of payroll added to Basic rates
 Mortality: See *Section 4, Exhibit 1*
 Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See *Section 4, Exhibit 1*)
 Note: These rates are determined before any pickups by the employer, if any.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety 3'' Safety Tier I Members' Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Integrated		
Entry Age	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
Every	9.17%	13.75%

Interest:	7.25% per annum
COLA:	None
Administrative Expense:	0.11% of payroll added to Basic rates
Mortality:	See <i>Section 4, Exhibit 1</i>
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See <i>Section 4, Exhibit 1</i>)

Note: Beginning at various dates throughout 2007, certain Safety bargaining units converted to a new schedule of contribution rates, referred to as "Safety 3" contribution rates. For employees falling under this category and hired after the appropriate date (which varies by bargaining unit), the contribution rate will be a flat percentage of pay regardless of entry age. Based on the most recent Actuarial Experience Study, the contribution rates shown above are based on an entry age of 27. This is expected to provide for the same value of contributions that would be made based on the specific entry age based rates shown on the previous two pages. These rates are determined before any pickups by the employer.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety Tier IIA Members' (Excluding "Safety 3" Members) Contribution Rates from the June 30, 2021 Actuarial Valuation (Expressed as a Percentage of Monthly Compensation)

Entry Age	Integrated	
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
16	4.89%	7.34%
17	5.00%	7.50%
18	5.10%	7.65%
19	5.21%	7.81%
20	5.31%	7.97%
21	5.42%	8.13%
22	5.53%	8.30%
23	5.65%	8.47%
24	5.77%	8.65%
25	5.89%	8.83%
26	6.01%	9.02%
27	6.14%	9.21%
28	6.27%	9.40%
29	6.40%	9.60%
30	6.54%	9.81%
31	6.69%	10.03%
32	6.83%	10.25%
33	6.99%	10.48%
34	7.14%	10.71%
35	7.30%	10.95%
36	7.47%	11.20%
37	7.63%	11.45%
38	7.82%	11.73%
39	8.00%	12.00%

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety Tier IIA Members' (Excluding "Safety 3" Members) Contribution Rates from the June 30, 2021 Actuarial Valuation (Expressed as a Percentage of Monthly Compensation)

Integrated		
Entry Age	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
40	8.17%	12.26%
41	8.35%	12.53%
42	8.48%	12.72%
43	8.54%	12.81%
44	8.58%	12.87%
45	8.60%	12.90%
46	8.59%	12.89%
47	8.58%	12.87%
48	8.49%	12.73%
49 & Over	8.31%	12.46%

Interest: 7.25% per annum

COLA: None

Administrative Expenses: 0.11% of payroll added to Basic rates

Mortality: See *Section 4, Exhibit 1*

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See *Section 4, Exhibit 1*)

Note: These rates are determined before any pickups by the employer, if any.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

“Safety 3” Safety Tier IIA Members' Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

Integrated		
Entry Age	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
Every	6.14%	9.21%

Interest:	7.25% per annum
COLA:	None
Administrative Expense:	0.11% of payroll added to Basic rates
Mortality:	See <i>Section 4, Exhibit 1</i>
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See <i>Section 4, Exhibit 1</i>)

Note: Beginning at various dates throughout 2007, certain Safety bargaining units converted to a new schedule of contribution rates, referred to as “Safety 3” contribution rates. For employees falling under this category and hired after the appropriate date (which varies by bargaining unit), the contribution rate will be a flat percentage of pay regardless of entry age. Based on the most recent Actuarial Experience Study, the contribution rates shown above are based on an entry age of 27. This is expected to provide for the same value of contributions that would be made based on the specific entry age based rates shown on the previous two pages. These rates are determined before any pickups by the employer.

Section 4: Actuarial Valuation Basis

Exhibit 3: Member Contribution Rates (continued)

Safety Tier IIB Members' Contribution Rates from the June 30, 2021 Actuarial Valuation
(Expressed as a Percentage of Monthly Compensation)

All Members	Integrated	
	First \$350 of Monthly Compensation	Over \$350 of Monthly Compensation
Basic	6.65%	9.97%
2% COLA	1.64%	2.46%
0.5% COLA	<u>0.53%</u>	<u>0.79%</u>
Total	8.82%	13.22%

The Safety Tier IIB member contribution rate is 50% of the total Normal Cost rate. The rates shown above also include an administrative expense load of 0.11% of payroll.

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Kern County Employees' Retirement Association

Supplemental Retiree Benefit Reserve (SRBR) Actuarial Valuation and Review

As of June 30, 2021



This report has been prepared at the request of the Board of Retirement to assist in administering the Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Retirement and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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December 2, 2021

Board of Retirement
Kern County Employees' Retirement Association
11125 River Run Boulevard
Bakersfield, California 93311

Dear Board Members:

We are pleased to submit this Supplemental Retiree Benefit Reserve (SRBR) Actuarial Valuation and Review as of June 30, 2021. It summarizes the actuarial data used in the SRBR valuation, analyzes the preceding year's experience, and determines the funding status of the SRBR benefits.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement Association. The census information and financial information on which our calculations were based was prepared by the staff of the Association. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Molly Calcagno, ASA, MAAA and Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Association.

We look forward to reviewing this report with you and to answering any questions.

Sincerely,

Segal

A handwritten signature in black ink, appearing to read "Paul Angelo", written over a horizontal line.

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President and Actuary

A handwritten signature in blue ink, appearing to read "Molly Calcagno", written over a horizontal line.

Molly Calcagno, ASA, MAAA, EA
Actuary

ST/jl

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal to present a valuation of the Kern County Employees' Retirement Association ("KCERA" or "the Association") Supplemental Retiree Benefit Reserve (SRBR) benefits as of June 30, 2021. The valuation was performed to determine the funding status of the SRBR benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of current plan assets to cover the estimated cost of settling the plan's accrued benefit obligations.

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; and changes in plan provisions or applicable law.

The funded status information presented in this report is based on:

- The benefit provisions of the SRBR, as administered by the Board of Retirement;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of June 30, 2021, provided by KCERA;
- The SRBR Reserve value as of June 30, 2021, provided by KCERA;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board of Retirement for the June 30, 2021 valuation;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. adopted by the Board of Retirement for the June 30, 2021 valuation; and
- The SRBR policy adopted by the Board of Retirement.

Note that the investment return assumption of 7.25% used in this report was determined without taking into consideration any impact of the 50/50 excess earnings allocation between the retirement and SRBR asset pools. More details regarding this can be found in the actuarial valuation for funding purposes.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association's liabilities associated with the SRBR benefits. Our calculations are based upon member data and financial information provided to us by the Association's staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

Section 1: Actuarial Valuation Summary

Valuation Highlights

1. Under the Board's SRBR policy, the SRBR funding status is calculated by comparing the SRBR Reserve excluding the court ordered Allocated SRBR Reserve (i.e., the 0.5% COLA Reserve), to the current actuarial funding target, which is the present value of all projected future SRBR benefit payments for all KCERA's current plan members.
2. Additional or increased SRBR benefits may be adopted if the Present Value of SRBR Benefits (PVB) is more than 120% funded in the last two consecutive valuations. In addition, the SRBR policy also describes certain conditions that should be considered prior to adopting additional or increased SRBR benefits. These conditions include the funding status of the SRBR benefits, the potential impact of any deferred investment gains or losses not yet recognized in the asset smoothing method and any recent or potential changes in actuarial assumptions.
3. The funding status of the SRBR benefits increased from 151.1% as of June 30, 2020 to 157.7% as of June 30, 2021 prior to reflecting any deferred investment gains or losses. The funding status of the SRBR benefits is 171.3% as of June 30, 2021 after reflecting any deferred investment gains or losses as of the same date.
4. The increase in the funding status for the SRBR benefits was due to the passage of time (i.e., expected changes in the funding status); an investment gain because the rate of return on the available SRBR (after smoothing) during 2020-2021 was about 7.5%, which is greater than the 7.25% assumption (based on the June 30, 2020 valuation); lower inflation as compared to expected; and other liability gains.
5. In the June 30, 2020 valuation, we assumed that the Consumer Price Index (CPI) would increase by 2.75% from 2019 to 2020, based on our long-term assumption for inflation used in that valuation. The actual increase in the CPI from 2019 to 2020 was 1.6%. Because the CPI increased by less than 2.5% (the maximum COLA possible), COLA bank balances were drawn down to supplement COLAs when available. Current SRBR Tier 3 benefits mostly stayed the same because CPI increases in recent years were lower than the COLA increases for most retirees. However, future projected increases in SRBR Tier 3 benefits for current retirees are expected to occur later than previously expected. This led to the part of the increase in the funding ratio that was due to low inflation, as described above.

Section 1: Actuarial Valuation Summary

6. The following table compares the reserves and liabilities for the SRBR benefits as of June 30, 2020 and of June 30, 2021:

	June 30, 2021	June 30, 2020
1 Available SRBR Reserves		
a. Total SRBR	\$151,852,000	\$159,691,000
b. 0.5% COLA Account	<u>23,054,000</u>	<u>33,210,000</u>
c. Available SRBR Reserve (1a – 1b)	\$128,798,000	\$126,481,000
2 Present Value of SRBR Benefits (PVB)		
a. Approved Benefits	\$80,509,000	\$82,278,000
b. Future Benefits	<u>1,146,000</u>	<u>1,406,000</u>
c. Total (2a + 2b)	\$81,655,000	\$83,684,000
3 PVB minus Reserves (2c) – (1c)	-\$47,143,000	-\$42,797,000
4 Funding Ratio (1c) ÷ (2c)	157.7%	151.1%

7. As of the June 30, 2021 valuation, the net deferred investment gains were 7.9% of the market value of assets. The Board's SRBR policy requires that the funding status be more than 120% in two consecutive valuations prior to implementing any benefit increases, taking into account the current status of deferred investment gains and losses not yet recognized under the asset smoothing method. Consistent with this requirement, we have increased the available SRBR Reserve by this amount to account for these gains. The results before and after reflecting the deferred investment gains are as follows:

	June 30, 2021 After Reflecting Deferred Gains	June 30, 2021 Before Reflecting Deferred Gains
1 Available SRBR Reserves	\$139,876,000	\$128,798,000
2 Present Value of SRBR Benefits (PVB)	<u>81,655,000</u>	<u>81,655,000</u>
3 PVB minus Reserves (2) – (1)	-\$58,221,000	-\$47,143,000
4 Funding Ratio (1) ÷ (2)	171.3%	157.7%

8. The Actuarial Standards Board approved Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment, which was first effective with KCERA's June 30, 2019 SRBR actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Examples of key risks listed that are particularly relevant to KCERA's SRBR are asset/liability mismatch risk, investment risk, and longevity risk.

Section 1: Actuarial Valuation Summary

The actuary's initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative.

Because the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan. We were engaged to perform a detailed analysis of the potential range of the impact of risk relative to the SRBR's future financial condition based on the June 30, 2018 actuarial valuation. That analysis can be found in our separate risk assessment report dated September 4, 2019.

We have also included a discussion of key risks that may affect the Association in *Section 2, Subsection D*.

Section 1: Actuarial Valuation Summary

Summary of SRBR Valuation Results

		Death Benefit	SRBR1	SRBR2	SRBR3	SRBR4	Total
Present Value of SRBR Benefits (PVB):	• Active members	\$2,961,000	\$936,000	\$0	\$0	\$8,876,000	\$12,773,000
	• Inactive vested members	722,000	617,000	0	0	2,581,000	3,920,000
	• Retirees and Beneficiaries	<u>13,088,000</u>	<u>23,557,000</u>	<u>1,901,000</u>	<u>6,153,000</u>	<u>20,263,000</u>	<u>64,962,000</u>
	• Total	\$16,771,000	\$25,110,000	\$1,901,000	\$6,153,000	\$31,720,000	\$81,655,000
Available SRBR Reserves:	• Total SRBR						\$151,852,000
	• Additional 0.5% COLA Account						<u>23,054,000</u>
	• Available SRBR Before Reflecting Deferred Investment Gains/Losses						\$128,798,000
	• Available SRBR After Reflecting Deferred Investment Gains/Losses						139,876,000
Funding Ratio:	• SRBR Benefits Before Reflecting Deferred Investment Gains/Losses						157.7%
	• SRBR Benefits After Reflecting Deferred Investment Gains/Losses						171.3%

Section 1: Actuarial Valuation Summary

Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report (as well as the plan summary included in our funding valuation report) to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by KCERA. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the Market Value of Assets as of the measurement date, as provided by KCERA. The Association uses a “Valuation Value of Assets” that differs from market value to gradually reflect six-month changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.
Models	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

The actuarial valuation is prepared at the request of the Association. Segal is not responsible for the use or misuse of its report, particularly by any other party.

An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:

- Differences between actual experience and anticipated experience;
 - Changes in actuarial assumptions or methods; and
 - Changes in statutory provisions.
-

If the Association is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Association should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the plan.

Section 2: Actuarial Valuation Results

A. Introduction

Additional benefits may be provided to KCERA active and retired members under the plan provisions adopted by the County as provided under article 5.5 of the County Employees Retirement Association Law of 1937 (CERL). These are the Supplemental Retiree Benefit Reserve (SRBR) benefits.

Article 5.5 governs the crediting of interest to reserves and the allocation of Undistributed Earnings. Undistributed Earnings are the amounts that remain after earnings have been used to credit interest to the plan's reserves. They are generally thought of as earnings in excess of those assumed to be earned under the actuarial valuation assumptions.

Under the provisions of Article 5.5, and in accordance with the Board's Interest Crediting Policy, if Undistributed Earnings remain, then 50% of those Earnings are allocated to the SRBR and the remaining 50% are allocated as additional interest credits to all other reserve funds excluding the Contingency Reserve and the SRBR.

A summary of the benefits provided by the SRBR is displayed in *Section 3, Exhibit 2*. Note that, in addition to the benefits summarized in *Section 3, Exhibit 2*, the KCERA Board has set aside a portion of the SRBR reserve to help pay for an additional 0.5% COLA adopted under the Ventura Settlement. The assets and liabilities related to this additional 0.5% COLA are included in the regular valuation and are therefore excluded from this SRBR valuation.

Section 2: Actuarial Valuation Results

B. Demographic Data

The table below provides a summary of the number of members eligible for Approved Benefits as of June 30, 2021. It also contains information on the monthly SRBR benefits in pay status as of June 30, 2021.

Each of the various SRBR benefits and their eligibilities are described in *Section 3, Exhibit 2*.

Table of Coverage

Members Eligible for Approved Benefits as of June 30, 2021		Death Benefits	SRBR1	SRBR2	SRBR3	SRBR4
1	Active members	9,072	226	—	—	6,626
2	Inactive vested members	3,517	133	—	—	2,870
3	Retirees and Beneficiaries	7,573	6,415	234	226	8,818
4	Total	20,162	6,774	234	226	18,314
5	Total monthly benefits in pay status as of June 30, 2021		\$208,300	\$33,100	\$75,500	\$171,700
6	Average monthly benefits in pay status as of June 30, 2021		\$32	\$141	\$334	\$19

Section 2: Actuarial Valuation Results

C. Funding Status

Undistributed Earnings are the only source of funding for the SRBR Benefits. By their very nature, Undistributed Earnings are produced on an inconsistent basis and cannot be relied upon on to appear in any single period.

The actuarial assumptions and methods used to determine the Present Value of SRBR Benefits (PVB) are shown in *Section 3, Exhibit 1*. These are the same assumptions and methods used in the regular June 30, 2021 KCERA valuation.

KCERA's funding target for the SRBR is based on the PVB. They include all Tier 1, Tier 2, Tier 4 and Death Benefits, as well as all current and projected future Tier 3 benefits.

The table below shows the funding status of the SRBR benefits before reflecting deferred investment gains or losses.

Funding Status of SRBR Benefits before Reflecting Deferred Investment Gains or Losses

	June 30, 2021	June 30, 2020
1 Available SRBR Reserves before Reflecting Deferred Investment Gains or Losses		
a. Total SRBR	\$151,852,000	\$159,691,000
b. 0.5% COLA Account	<u>23,054,000</u>	<u>33,210,000</u>
c. Available SRBR Reserve (1a – 1b)	\$128,798,000	\$126,481,000
2 Present Value of SRBR Benefits (PVB)		
a. Death Benefits	\$16,771,000	\$16,480,000
b. SRBR1	25,110,000	25,992,000
c. SRBR2	1,901,000	2,304,000
d. SRBR3	6,153,000	7,205,000
e. SRBR4	<u>31,720,000</u>	<u>31,703,000</u>
f. Total	\$81,655,000	\$83,684,000
3 PVB minus Reserves (2f) – (1c)	-\$47,143,000	-\$42,797,000
4 Funding Ratio before Reflecting Deferred Investment Gains or Losses (1c) ÷ (2f)	157.7%	151.1%

Section 2: Actuarial Valuation Results

The Board's SRBR policy requires that the funding status be more than 120% in two consecutive valuations, *taking into account the current status of deferred investment gains and losses not yet recognized under the asset smoothing method* and any recent or potential changes in actuarial assumptions, prior to implementing any benefit increases.

The table below shows the funding status of the SRBR benefits after reflecting deferred investment gains or losses.

Funding Status of SRBR Benefits after Reflecting Deferred Investment Gains or Losses

	June 30, 2021	June 30, 2020
1 Available SRBR Reserves after Reflecting Deferred Investment Gains or Losses	\$139,876,000	\$120,891,000
2 Present Value of SRBR Benefits (PVB)		
a. Death Benefits	\$16,771,000	\$16,480,000
b. SRBR1	25,110,000	25,992,000
c. SRBR2	1,901,000	2,304,000
d. SRBR3	6,153,000	7,205,000
e. SRBR4	<u>31,720,000</u>	<u>31,703,000</u>
f. Total	\$81,655,000	\$83,684,000
3 PVB minus Reserves (2f) – (1)	-\$58,221,000	-\$37,207,000
4 Funding Ratio after Reflecting Deferred Investment Gains or Losses (1) ÷ (2f)	171.3%	144.5%

Section 2: Actuarial Valuation Results

The funding status of the SRBR benefits as measured by the funding ratio increased from 151.1% as of June 30, 2020 to 157.7% as of June 30, 2021 prior to reflecting any deferred investment gains or losses.

The following table details the changes in the funding ratio from the prior year's valuation to the current year's valuation.

The increase in the funding status for the SRBR benefits was due to the passage of time (i.e., expected changes in the funding status); an investment gain because the rate of return on the available SRBR (after smoothing) during 2020-2021 was about 7.5%, which is greater than the 7.25% assumption (based on the June 30, 2020 valuation); lower inflation as compared to expected; and other liability gains.

Reconciliation of Funding Ratio for SRBR Benefits

1	Funding Ratio as of June 30, 2020	151.1%
2	Changes due to:	
a.	Passage of Time (Expected Changes)	4.4%
b.	Investment Gain	0.3%
c.	Inflation Gain	0.5%
d.	Other Liability Gain	<u>1.4%</u>
f.	Total	6.6%
3	Funding Ratio as of June 30, 2021	157.7%

Note: Results are prior to reflecting any deferred investment gains or losses as of each valuation date.

Section 2: Actuarial Valuation Results

D. Risk Assessment

Because the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

Our separate risk assessment report dated September 4, 2019 contains a detailed analysis of the potential range of future measurements, including measurements specific to the SRBR. This section provides descriptions and basic assessments of the primary risks that are likely to have an ongoing influence on the plan's financial condition, as well as a reference to historical trends and maturity measures.

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

The most significant asset/liability mismatch risk to the plan is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any changes in the expected experience of asset growth rates.

Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.

- Investment Risk (the risk that investment returns will be different than expected)

The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial condition of the plan, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets, however investment experience can still have a sizable impact.

- Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This

Section 2: Actuarial Valuation Results

risk can be reduced by using tables appropriate for the plan (public experience tables) that are weighted by benefit levels, and by using generational mortality projections.

- Other Risks

In addition to longevity, the valuation includes a variety of other assumptions that are unlikely to match future experience exactly. One example is projected salary scales over time. As salary is central to the determination of benefits paid in retirement, deviations from the projected salary scales could have a material impact on the benefits anticipated for each member. Examples of demographic assumptions include retirement, termination and disability assumptions, and will likely vary in significance for different groups (for example, disability assumptions are typically more significant for safety groups).

For the evaluation of historical trends and maturity measures, please see *Section 2, Subsection J* of the June 30, 2021 Actuarial Valuation and Review for KCERA.

Section 3: Actuarial Valuation Basis

Exhibit 1: Actuarial Assumptions and Methods

Actuarial Assumptions:	The same actuarial assumptions used in the KCERA June 30, 2021 Actuarial Valuation and Review.
Actuarial Cost Method:	Not applicable, because only the Present Value of SRBR Benefits (PVB) is determined in this report.
Actuarial Value of Assets:	Supplemental Retiree Benefit Reserve value as of valuation date.
Changed Actuarial Assumptions and Methods:	There have been no changes in actuarial assumptions or methods since the last valuation.

Section 3: Actuarial Valuation Basis

Exhibit 2: Summary of Plan Provisions

This exhibit summarizes the major provisions of the plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	July 1 through June 30
Benefits Provided:	The SRBR currently provides five categories of benefits:
<i>Tier 1</i>	\$35.50 per month payable to retirees who were hired on or before July 1, 1994. Upon the death of the retired member, 60% of the Tier 1 SRBR benefit continues to the retired member's beneficiary.
<i>Tier 2</i>	Three additional monthly stipends payable to retirees: <ul style="list-style-type: none">• \$1.372 per year of service for members who retired prior to 1985. This was granted July 1, 1994.• \$5.470 per year of service for members who retired prior to 1985. This was granted July 1, 1996.• \$10.276 per year of service for members who retired prior to 1981. This was granted July 1, 1997. Upon the death of the retired member, 60% of the Tier 2 SRBR benefit continues to the retired member's beneficiary.
<i>Tier 3</i>	Additional benefits to maintain 82% purchasing power protection. Upon death, this benefit continues to be paid to the retired member's beneficiary based on the applicable continuation percentage under the member's form of payment elected at retirement. There is a cap on the maximum annual inflation used in the calculation of the SRBR Tier 3 benefits of 4%.
<i>Tier 4</i>	\$21 per month granted starting July 1, 2018, payable to retirees who were hired prior to July 1, 2018. Upon the death of the retired member, 60% of the Tier 2 SRBR benefit continues to the retired member's beneficiary.
<i>Death Benefit</i>	An additional one-time post-retirement death benefit of \$5,000 is paid to a retired member's beneficiary upon the death of the retired member.
Changed Plan Provisions:	There have been no changes in plan provisions since the last valuation.

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Kern County Employees'
Retirement Association

Actuarial Experience Study

**Analysis of Actuarial Experience
During the Period
July 1, 2016 through June 30, 2019**

August 3, 2020

Board of Retirement
Kern County Employees' Retirement Association
11125 River Run Blvd.
Bakersfield, CA 93311

RE: Review of Actuarial Assumptions for the June 30, 2020 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience for the Kern County Employees' Retirement Association. This study utilizes the census data for the period July 1, 2016 to June 30, 2019 and provides the proposed actuarial assumptions, both economic and demographic, to be used in the June 30, 2020 valuation.

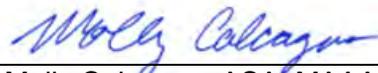
This study was prepared under the supervision of Tammy F. Dixon, FSA, MAAA, FCA, EA, who is a member of the American Academy of Actuaries and who meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,



Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President and Actuary



Molly Calcagno, ASA, MAAA, EA
Actuary

JAC/jl

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I. Introduction, Summary, and Recommendations

To project the cost and liabilities of a pension plan, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the projected experience, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are modified, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that year's experience is treated as temporary and that, over the long run, experience will return to what was originally assumed. For example, it is impossible to determine when and to what extent the economy will rebound after the current crisis caused by the COVID-19 pandemic.¹ Changing assumptions reflects a basic change in thinking about the future, and has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying the promised benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the economic and demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from July 1, 2016 through June 30, 2019. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations" and ASOP No. 35 "Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations." These Standards of Practice provide guidance for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected future experience, we are recommending various changes in the current actuarial assumptions.

Please note that the investment return assumption recommended in this report has been developed without taking into consideration the impact of the 50/50 allocation of future "excess earnings" between the retirement and Supplemental Retiree Benefit Reserve (SRBR) asset pools.

¹ An analysis of the ongoing impact of the COVID-19 pandemic is beyond the scope of the current experience study.

We are recommending changes in the assumptions for: inflation, merit and promotion salary increases, retirement from active employment, percent of members married at retirement, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, pre-retirement mortality, healthy life post-retirement healthy, disabled life post-retirement mortality, beneficiary mortality, termination (refunds and deferred vested retirements), disability incidence (service and non-service).

Our recommendations for the major actuarial assumption categories are as follows:

Pg #	Actuarial Assumption Categories	Recommendation
12	Inflation: Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary.	Reduce the inflation assumption from 3.00% to 2.75% per annum as discussed in Section (III)(A).
14	Investment Return: The estimated average future net rate of return on current and future assets of the Association as of the valuation date. This rate is used to discount liabilities.	Maintain the current investment return assumption at 7.25% as discussed in Section (III)(B).
21	Individual Salary Increases: Increases in the salary of a member between the date of the valuation to the date of separation from active service. This assumption has three components: <ul style="list-style-type: none"> • Inflationary salary increases • Real “across the board” salary increases • Merit and promotion increases 	Reduce the current inflationary salary increase assumption from 3.00% to 2.75% and maintain the current real “across the board” salary increase assumption at 0.50%. This means that the combined inflationary and real “across the board” salary increases will decrease from 3.50% to 3.25%. We recommend adjusting the merit and promotion rates of salary increase as developed in Section III(C) to reflect past experience. Future merit and promotion salary increases are higher in some service categories and lower in other service categories under the proposed assumptions. The recommended salary increases (after taking into account a 0.25% reduction in the inflation assumption) anticipate slightly higher salary increases overall for General members and slightly lower salary increases overall for Safety members.
27	Administrative Expenses: Fees for administration, legal, accounting, and actuarial services, and other functions carried out by the Association.	Maintain the explicit administrative expense load at 0.90% of projected payroll as discussed in Section (III)(D).

Pg #	Actuarial Assumption Categories	Recommendation
28	<p>Retirement Rates: The probability of retirement at each age at which participants are eligible to retire.</p> <p>Other Retirement Related Assumptions including:</p> <ul style="list-style-type: none"> • Percent married and spousal age differences for members not yet retired • Retirement age for deferred vested members • Future reciprocal members and reciprocal salary increases 	<p>For active members, adjust the current retirement rates to those developed in Section (IV)(A). For Tier I members, we are recommending separate sets of age-based retirement assumptions for those with less than 25 years of service and for those with 25 or more years of service.</p> <p>For active and deferred vested members, reduce the current percent married at retirement assumption from 75% to 70% for males and maintain the assumption at 60% for females. Maintain the spouse age difference assumption that male retirees are three years older than their spouses and female retirees are two years younger than their spouses.</p> <p>For deferred vested members, maintain the General and Safety deferred vested retirement assumption at age 57 and 53, respectively.</p> <p>Reduce the current proportion of future deferred vested members expected to be covered by a reciprocal system from 50% to 45% for General members and increase the assumption from 55% to 60% for Safety members. In addition, maintain the reciprocal salary increase assumption at 4.00% for General members and decrease the assumption from 4.00% to 3.75% for Safety members.</p>

Pg #	Actuarial Assumption Categories	Recommendation
37	<p>Mortality Rates: The probability of dying at each age. Mortality rates are used to project life expectancies.</p>	<p><u>For pre-retirement mortality:</u> Current base table: Headcount-Weighted RP-2014 Employee Mortality Table times 80%. Recommended base table for General Members: Pub-2010 General Employee Amount-Weighted Mortality Table. Recommended base table for Safety Members: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table.</p> <p><u>For healthy General retirees:</u> Current base table: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males and set forward two years for females. Recommended base table: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table with rates increased by 15% for females.</p> <p><u>For healthy Safety retirees:</u> Current base table: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year. Recommended base table: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table.</p> <p><u>For all beneficiaries:</u> Current base table: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, set forward one year for males and set forward two years for females. Recommended base table: Pub-2010 Contingent Survivor Amount-Weighted Mortality Table with rates increased by 10%.</p> <p><u>For disabled General retirees:</u> Current base table: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward seven years for males and set forward eight years for females. Recommended base table: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with rates decreased by 5%.</p> <p><u>For disabled Safety retirees:</u> Current: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years. Recommended base table: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table with rates increased by 5%.</p> <p><u>All current tables</u> are projected generationally with the two-dimensional mortality improvement scale MP-2016. <u>All recommended tables</u> are projected generationally with the two-dimensional mortality improvement scale MP-2019.</p> <p><u>For member contribution rates, optional forms and reserves:</u> change the mortality rates to those developed in Section (IV)(B).</p>
51	<p>Termination Rates: The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.</p>	<p>Adjust the termination rates to those developed in Section IV(D) to reflect a higher incidence of termination overall. In addition, a slightly lower proportion of members is expected to elect a refund of member contributions with a higher proportion electing instead to receive a deferred vested benefit under the recommended assumptions.</p>
59	<p>Disability Incidence Rates: The probability of becoming disabled at each age.</p>	<p>Adjust the disability rates to those developed in Section IV(E) to reflect slightly lower incidence of disability for General and Safety members.</p>

We have estimated the impact of all the recommended economic and demographic assumptions as if they were applied to the June 30, 2019 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes (as recommended in Section III of this report) and the recommended demographic assumption changes (as recommended in Section IV of this report).

The cost associated with the administrative expense load has continued to be allocated to both the employer and the member based on the components of the total contribution rate (before administrative expenses) for the employer and the member.²

Cost Impact of the Recommended Assumptions Based on June 30, 2019 Actuarial Valuation

Impact on Employer Contribution Rates	
Increase due to changes in economic assumptions	0.27%
Increase due to changes in demographic assumptions	<u>1.94%</u>
Total increase in average employer rate	2.21%
Total estimated increase in annual dollar amount (\$000s) ³	\$12,815
Impact on Member Contribution Rates	
Decrease due to changes in economic assumptions	-0.05%
Increase due to changes in demographic assumptions	<u>0.07%</u>
Total increase in average member rate	0.02%
Total estimated increase in annual dollar amount (\$000s) ³	\$44
Impact on UAAL and Funded Percentage	
Increase in UAAL	\$137 million
Change in Funded Percentage	From 64.80% to 63.49%

Of the various demographic assumption changes, the cost increase is from the change in the mortality assumptions, offset somewhat by the other demographic assumption changes.

Section II provides some background on the basic principles and methodology used for the experience study and for the review of the economic and demographic actuarial assumptions. A detailed discussion of each assumption and reasons for the proposed changes are found in Section III for the economic assumptions and Section IV for the demographic assumptions. The cost impact of the proposed changes is detailed in Section V.

² The actual allocation of contribution rates for administrative expenses will be determined in each actuarial valuation to reflect the relative proportion of employer and member contributions.

³ Based on June 30, 2019 projected annual payroll as determined under each set of assumptions.

II. Background and Methodology

We analyzed both economic and demographic (“non-economic”) assumptions. The primary economic assumptions reviewed are inflation, investment return, administrative expenses, and salary increases. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., termination from service, disability retirement, service retirement, and death before and after retirement. In addition to decrements, other demographic assumptions reviewed in this study include the percentage of members with an eligible spouse or domestic partner, spousal age difference, percent of members assumed to go on to work for a reciprocal system and reciprocal salary increase.

Economic Assumptions

Economic assumptions consist of:

- **Inflation:** Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees and drives increases in the allowances of retired members.
- **Investment Return:** Expected long-term rate of return on the Association’s investments after investment expenses. This assumption has a significant impact on contribution rates.
- **Salary Increases:** In addition to inflationary increases, it is assumed that salaries will also grow by real “across the board” pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers. These are commonly referred to as merit and promotion increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any real “across the board” pay increases that are assumed.

The setting of these economic assumptions is described in Section III.

Demographic Assumptions

In order to determine the probability of an event occurring, we examine the “decrements” and “exposures” of that event. For example, taking termination from service, we compare the number of employees who actually terminate in a certain age and/or service category (i.e., the number of “decrements”) with those who could have terminated (i.e., the number of “exposures”). For example, if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them left during the year, we would say the probability of termination in that age group is $50 \div 500$ or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credibility to the probability of termination developed for that age category, especially if it is out of line with the pattern shown for the other age groups. Similarly, if we are considering the death

decrement, there may be a large number of exposures in, say, the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the later years.

III. Economic Assumptions

A. Inflation

Unless an investment grows at least as fast as prices increase, investors will experience a reduction in the inflation-adjusted value of their investment. There may be times when “riskless” investments return more or less than inflation, but over the long term, investment market forces will generally require an issuer of fixed income securities to maintain a minimum return which protects investors from inflation.

The inflation assumption is long term in nature, so our analysis begins with a review of historical information. Following is an analysis of 15 and 30 year moving averages of historical inflation rates:

Historical Consumer Price Index – 1930 to 2019⁴
(U.S. City Average - All Urban Consumers)

	25 th Percentile	Median	75 th Percentile
15-year moving averages	2.4%	3.3%	4.4%
30-year moving averages	2.9%	3.7%	4.8%

The average inflation rates have continued to decline gradually over the last several years due to the relatively low inflationary environment over the past two decades. Also, the later 15-year averages during the period are lower because they do not include the high inflation years of the mid-1970s and early 1980s.

Based on information found in the Public Plans Data website, which is produced in partnership with the National Association of State Retirement Administrators (NASRA), the median inflation assumption used by 174 large public retirement funds in their 2018 fiscal year valuations was 2.65%.⁵ In California, CalSTRS and thirteen other 1937 Act CERL systems use an inflation assumption of 2.75%, one 1937 Act CERL system uses an inflation assumption of 2.90%, and two 1937 Act CERL systems use an inflation assumption of 2.50%. CalPERS has lowered their inflation assumption from 2.75% to 2.50% over a three-year period. KCERA and three other 1937 Act CERL systems use an inflation assumption of 3.00%.

KCERA’s investment consultant, Verus, anticipates an annual inflation rate of 1.90%, while the average inflation assumption provided by Verus and six other investment advisory firms retained by Segal’s California public sector clients was 2.33%. Note that, in general, investment consultants use a time horizon for this assumption that is shorter than the time horizon we use for the actuarial valuation.⁶

⁴ Source: Bureau of Labor Statistics – Based on CPI for All Items in U.S. city average, all urban consumers, not seasonally adjusted (Series ID: CUUR0000SA0).

⁵ Among 188 large public retirement funds, the inflation assumption was not available for 14 of the public retirement funds in the survey data.

⁶ The time horizon used by the seven investment consultants in our review generally ranges from 10 years to 30 years, and Verus uses a 10-year horizon.

To find a forecast of inflation based on a longer time horizon, we referred to the Social Security Administration's (SSA) 2020 report on the financial status of the Social Security program.⁷ The projected average increase in the Consumer Price Index (CPI) over the next 75 years under the intermediate cost assumptions used in that report was 2.40%. The SSA report also includes alternative projections using lower and higher inflation assumptions of 1.80% and 3.00%, respectively.

We also compared the yields on the thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds.⁸ As of April 2020, the difference in yields is about 1.39% which provides a measure of market expectations of inflation.

Based on all of the above information, we recommend that the current 3.00% annual inflation assumption be reduced to 2.75% for the June 30, 2020 actuarial valuation.

The setting of the inflation assumption using the information outlined above is a somewhat subjective process, and Segal does not apply a specific weight to each of the metrics in determining our recommended inflation assumption. Based on a consideration of all these metrics, since 2018 we have been recommending the same 2.75% inflation assumption in our experience for our California based public retirement system clients.

Retiree Cost-of-Living Increases

In our last experience study as of June 30, 2017, consistent with the 3.00% annual inflation assumption adopted by the Board, the Board maintained the 2.50% retiree cost-of-living adjustment for all General and Safety tiers.

We recommend that the current retiree cost-of-living assumption of 2.50% per year be continued in the June 30, 2020 valuation for all tiers.

In developing the COLA assumption, we also considered the results of a stochastic approach that would attempt to account for the possible impact of low inflation that could occur before COLA banks are able to be established for the member. Although the results of this type of analysis might justify the use of a lower COLA assumption, we are not recommending that at this time. The reasons for this conclusion include the following:

- The results of the stochastic modeling are significantly dependent on assuming that lower levels of inflation will persist in the early years of the projections. If this is not assumed, then the stochastic modeling will produce results similar to our proposed COLA assumptions.
- Using a lower long-term COLA assumption based on a stochastic analysis would mean that an actuarial loss would occur even when the inflation assumption of 2.75% is met in a year. We question the reasonableness of this result.

We do not see the stochastic possibility of COLAs averaging less than those predicted by the assumed rate of inflation as a reliable source of cost savings that should be anticipated in our COLA assumptions. Therefore, we continue to recommend setting the COLA assumptions consistent with the long-term annual inflation assumption, as we have in prior years.

⁷ Source: Social Security Administration: The 2020 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds

⁸ Source: Board of Governors of the Federal Reserve System.

B. Investment Return

The investment return assumption is comprised of two primary components, inflation and real rate of investment return, with adjustments for investment expenses and risk.

Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Theory has it that as an investor takes a greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional return is expected to vary by asset class and empirical data supports that expectation. For that reason, the real rate of return assumptions are developed by asset class. Therefore, the real rate of return assumption for a retirement association's portfolio will vary with the Board's asset allocation among asset classes.

The Association's current target asset allocation and the assumed real rate of return assumptions by asset class is shown in the following table. The first column of real rate of return assumptions are determined by reducing Verus' total or "nominal" 2020 return assumptions by their assumed 1.90% inflation rate. The second column of returns (except for Private Real Estate, Midstream, Capital Efficiency Alpha Pool, Hedge Fund, Private Equity and Private Credit) represents the average of a sample of real rate of return assumptions, where each firm's nominal returns have been reduced by that firm's assumed inflation rate. The sample includes the expected annual real rate of return provided to us by Verus and six other investment advisory firms retained by Segal's public sector clients. We believe these averages are a reasonable forecast of long-term future market returns in excess of inflation.

KCERA's Target Asset Allocation and Assumed Arithmetic Real Rate of Return Assumptions by Asset Class and for the Portfolio

Asset Class	Percentage of Portfolio	Verus' Assumed Real Rate of Return ⁹	Average Assumed Real Rate of Return from a Sample of Consultants to Segal's California Public Sector Clients ¹⁰
Global Equity	37.0%	5.80%	6.51%
Core Fixed Income	14.0%	1.10%	1.09%
High Yield Corporate Credit	6.0%	2.10%	3.38%
Emerging Market Debt Blend	4.0%	3.80%	3.41%
Commodities	4.0%	3.00%	3.08%
Core Real Estate	5.0%	5.40%	4.59%
Private Real Estate	5.0%	9.50%	9.50% ¹¹
Midstream	5.0%	8.20%	8.20% ¹¹
Capital Efficiency Alpha Pool	5.0%	2.40%	2.40% ¹¹
Hedge Fund	10.0%	2.40%	2.40% ¹¹
Private Equity	5.0%	9.40%	9.40% ¹¹
Private Credit	5.0%	5.60%	5.60% ¹¹
Cash	-5.0%	0.00%	0.00%
Total	100.0%	4.96%	5.25%

The above are representative of “indexed” returns and do not include any additional returns (“alpha”) from active management. This is consistent with the ASOP No. 27, Section 3.6.3.d, which states:

“Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy unless the actuary has reason to believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the long term.”

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients have each provided us with their expected real rates of return for each asset class, over various future periods of time. However, in general, the returns available from investment consultants are projected over time periods that are much shorter than the durations of a retirement plan's liabilities.
2. Using a sample average of expected real rate of returns allows the Association's investment return assumption to reflect a broader range of capital market information and should help reduce year to year volatility in the investment return assumption.

⁹ Derived by reducing Verus' nominal rate of return assumptions by their assumed 1.90% inflation rate.

¹⁰ These are based on the projected arithmetic returns provided by Verus and six other investment advisory firms serving the county retirement association of Kern and 16 other city and county retirement systems in California. These return assumptions are gross of any applicable investment expenses.

¹¹ For these asset classes, Verus' assumption is applied in lieu of the average because there is a larger disparity in returns for these asset classes among the firms surveyed and using Verus' assumption should more closely reflect the underlying investments made specifically for KCERA.

- Therefore, we recommend that the 5.25% portfolio real rate of return be used to determine the Association’s investment return assumption. This is 0.43% higher than the return that was used three years ago in the review to prepare the recommended investment return assumption for the June 30, 2017 valuation. The difference is due to changes in the Association’s target asset allocation (+0.58%), changes in the real rate of return assumptions provided to us by the investment advisory firms (-0.13%) and the interaction effect between these changes (-0.02%).

Investment Expenses

For funding purposes, the real rate of return assumption for the portfolio needs to be adjusted for investment expenses expected to be paid from investment income.

The current assumption for investment expenses is 0.35% of the market value of assets. The following table provides the investment expenses in relation to the market value of assets for the three years ending June 30, 2019.

Investment Expenses¹² as a Percentage of Market Value of Assets (Dollars in 000’s)

Year Ending June 30	Market Value of Assets ¹³	Investment Expenses	Investment %
2014	\$3,576,112	\$11,634	0.33%
2015	3,625,093	13,608	0.38
2016	3,571,587	13,175	0.37
Prior Three-Year Average			0.36
2017	3,962,895	13,356	0.34
2018	4,198,862	18,839	0.45
2019	4,345,780	13,765	0.32
Current Three-Year Average			0.37
Six-Year Average			0.36
Current Assumption			0.35
Proposed Assumption			0.40

Based on this experience, we have increased the future expense assumption component from 0.35% to 0.40%.

Note related to investment expenses paid to active managers – As cited above, under Section 3.6.3.d of ASOP No. 27, the effect of an active investment management strategy should be considered “net of investment expenses” when determining whether “the actuary has reason to believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the long term.”

¹² Net of securities lending expenses and incentive fees. Because we do not assume any additional net return for this program, we effectively assume that any securities lending expenses will be offset by related income.

¹³ As of end of plan year.

We have not performed a detailed analysis to measure how much of the investment expenses paid to active managers might have been offset by additional returns (“alpha”) earned by that active management. If necessary, we will work with the KCERA’s staff to determine whether future studies might potentially exclude the level of investment expenses for active managers that are expected to be offset by investment returns. For now, we will continue to use the current methodology that any “alpha” that may be identified would be treated as an increase in the risk adjustment and corresponding confidence level. For example, 0.25% of alpha would increase the confidence level by 3% (see discussions that follow on definitions of risk adjustment and confidence level).

Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. The Association’s asset allocation determines this portfolio risk, since risk levels are driven by the variability of returns for the various asset classes and the correlation of returns among those asset classes. This portfolio risk is incorporated into the real rate of return assumption through a risk adjustment.

The purpose of the risk adjustment (as measured by the corresponding confidence level) is to increase the likelihood of achieving the actuarial investment return assumption in the long term.¹⁴ This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

The 5.25% expected real rate of return developed earlier in this report was based on expected mean or average arithmetic returns. In our model, the confidence level associated with a particular risk adjustment represents the relative likelihood that future investment earnings would equal or exceed the assumed earnings over a 15-year period on an expected value basis.¹⁵ The 15-year time horizon represents an approximation of the “duration” of the fund’s liabilities, where the duration of a liability represents the sensitivity of that liability to interest rate variations. Note that, based on the investment return assumptions recently adopted by systems that have been analyzed under this model, we observe a confidence level generally in the range of 50% to 55%.

Three years ago, the Board adopted an investment return assumption of 7.25%. That return implied a risk adjustment of 0.22%, reflecting a confidence level of 53% that the actual average return over 15 years would not fall below the assumed return, assuming that the distribution of returns over that period follows the normal statistical distribution.¹⁶

If we use the same 53% confidence level from our last study to set this year’s risk adjustment and the current long-term portfolio standard deviation of 11.0% provided by Verus, the corresponding risk adjustment would be 0.21%. Together with the other investment return components, this would result in an investment return assumption of 7.39%, which is higher than the current assumption of 7.25%. However, as detailed below, our analysis also

¹⁴ This type of risk adjustment is referred to in the Actuarial Standards of Practice as a “margin for adverse deviation.”

¹⁵ If a retirement system uses the expected arithmetic average return as the discount rate in the funding valuation, that retirement system is expected to have no surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.

¹⁶ Based on an annual portfolio return standard deviation of 11.70% provided by Verus in 2017. Strictly speaking, future compounded long-term investment returns will tend to follow a log-normal distribution. However, we believe the normal distribution assumption is reasonable for purposes of setting this type of risk adjustment.

considered the general downward trend in the investment return assumption for public retirement systems, as well as the opportunity to use the increase in the portfolio real rate of return to increase the confidence level. For those reasons, we evaluated the effect on the confidence level of alternative investment return assumptions. In particular, a net investment return assumption of 7.25%, together with the other investment return components, would produce a risk adjustment of 0.35%, which corresponds to a confidence level of 55%. We believe this analysis supports maintaining the current assumption at 7.25%.

The table below shows KCERA’s investment return assumptions and, for the years when this analysis was performed, the risk adjustments and corresponding confidence levels compared to the values for prior studies.

Historical Investment Return Assumptions, Risk Adjustments and Confidence Levels based on Assumptions Adopted by the Board

Year Ending June 30	Investment Return ¹⁷	Risk Adjustment	Corresponding Confidence Level
2011 - 2013	7.75%	(0.04%)	49%
2014 - 2016	7.50%	0.23%	53%
2017 - 2019	7.25%	0.22%	53%
2020 (Recommended)	7.25%	0.35%	55%

As we have discussed in prior experience studies, the risk adjustment model and associated confidence level is most useful as a means for comparing how the Association has positioned itself relative to risk over periods of time.¹⁸ The use of a 55% confidence level under Segal’s model should be considered in context with other factors, including:

- As noted above, the confidence level is more of a relative measure than an absolute measure, and so can be reevaluated and reset for future comparisons.
- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Verus. The standard deviation is a statistical measure of the future volatility of the portfolio and so is itself based on assumptions about future portfolio volatility and can be considered somewhat of a “soft” number.
- A confidence level of 55% is within the range of about 50% to 55% that corresponds to the risk adjustments used by most of Segal’s other California public retirement system clients.
- We have not taken into account any additional returns (“alpha”) that might be earned on active management. This means that if active management generates enough alpha to cover its related expenses, this would increase returns. This aspect of Segal’s model is further evaluated below.
- As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the later section on “Comparison with Other Public Retirement Systems.”

¹⁷ The investment returns starting in 2014 are gross of administrative expenses.

¹⁸ In particular, it would not be appropriate to use this type of risk adjustment as a measure of determining an investment return rate that is “risk-free.”

Taking into account the factors above, our recommendation is to maintain the net investment return assumption at 7.25%. As noted above, this return implies a 0.35% risk adjustment and reflects a confidence level of 55%.

Recommended Investment Return Assumption

The following table summarizes the components of the investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study.

Calculation of Investment Return Assumption

Assumption Component	June 30, 2020 Recommended Value	June 30, 2017 Adopted Value
Inflation	2.75%	3.00%
Plus Portfolio Real Rate of Return	5.25%	4.82%
Minus Expense Adjustment	(0.40%)	(0.35%)
Minus Risk Adjustment	(0.35%)	(0.22%)
Total	7.25%	7.25%
Confidence Level	55%	53%

Based on this analysis, we recommend that the investment return assumption be maintained at 7.25% per annum.

Effect of Gain Sharing Provisions

The recommended investment return assumption has been developed without taking into consideration any impact of the 50/50 excess earnings allocation between the retirement and Supplemental Retiree Benefit Reserve (SRBR) asset pools. This is based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% allocation of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than is used for interest crediting. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption.

ASOP No. 4 “Measuring Pension Obligations and Determining Pension Plan Costs or Contributions” was revised and adopted in December 2013. The revised ASOP states that some plan provisions, including gain sharing provisions, “may create pension obligations that are difficult to appropriately measure using traditional valuation procedures.” ASOP No. 4 now mentions that “for such plan provisions, the actuary should consider using alternative valuation procedures, such as stochastic modeling...to reflect the impact of variations in experience from year to year.”

Accordingly, we performed stochastic modeling in December 2015 to estimate the impact of the 50% allocation of future excess earnings to the SRBR. The results of our model indicated that the 50/50 allocation of future excess earnings would have about the same impact as an “outflow” (i.e., assets not available to fund the benefits included in this valuation) that would average approximately 0.3% of assets over time. This was done by comparing the future impact

on the employer's contribution rate over a 15-year period with and without the 50% allocation of excess earnings to the SRBR.

We recommend that we continue to develop our recommended investment return assumption and the resultant member and employer contribution rates without considering the 50% allocation of excess earnings to the SRBR. In addition, we will continue to disclose in the annual actuarial valuation reports the potential increase in actuarial liabilities and employer contributions by re-measuring the liabilities and contributions under an investment return assumption that is reduced by 0.3% to anticipate the 50% allocation of future excess earnings to the SRBR.

Comparison with Alternative Model used to Review Investment Return Assumption

Since our appointment as actuary for KCERA in 2008, we have consistently reviewed investment return assumptions based on our model that incorporates expected arithmetic real returns for the different asset classes and for the entire portfolio as one component of that model.¹⁹ The use of "forward looking expected arithmetic returns" is one of the approaches discussed for use in the Selection of Economic Assumptions for measuring Pension Obligations under ASOP No. 27.

Besides using forward looking expected arithmetic returns, ASOP No. 27 also discussed setting investment return assumptions using an alternative "forward looking expected geometric returns" approach.²⁰ Even though expected geometric returns are lower than expected arithmetic returns, those California public retirement systems that have set investment return assumptions using this alternative approach have in practice adopted investment return assumptions that are comparable to those adopted by the Board for KCERA. This is because under the model used by those retirement systems, their investment return assumptions are not reduced to anticipate future investment expenses.²¹

For comparison, we evaluated the recommended 7.25% assumption based on the expected geometric return for the entire portfolio, and gross of the investment expenses. Under that model, over a 15-year period, there is a 56% likelihood that future average geometric returns will meet or exceed 7.25%.²²

Comparing with Other Public Retirement Systems

One final test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide.

¹⁹ Again, as discussed in the footnote to "Risk Adjustment", if a retirement system uses the expected arithmetic average return as the discount rate in the funding valuation, that retirement system is expected to have no surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.

²⁰ If a retirement system uses the expected geometric average return as the discount rate in the funding valuation, that retirement system is expected to have an asset value that generally converges to the median accumulated value as the time horizon lengthens assuming all actuarial assumptions are met in the future.

²¹ This means that if the model were to be applied to KCERA, the expected geometric return would not be adjusted for the approximately 0.40% investment expenses paid by KCERA.

²² We performed this stochastic simulation using the capital market assumptions included in the 2019 survey prepared by Horizon Actuarial Services. That simulation was performed using 10,000 trial outcomes of future market returns, using assumptions from 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2019 survey that included responses from 34 investment advisors.

We note that an investment return of 7.00% or lower is becoming more common among California public sector retirement systems. In particular, of the twenty 1937 Act CERL systems, twelve use a 7.00% investment return assumption, one uses 6.75% and one uses 6.50%. The remaining six 1937 Act CERL systems (including KCERA) currently use a 7.25% earnings assumption. Furthermore, both CalPERS and CalSTRS currently use a 7.00% earnings assumption, while the San Jose and San Diego City retirement systems use investment return assumptions of 6.75% and 6.50%, respectively.

The following table compares KCERA’s recommended net investment return assumption against those of the 188 large public retirement funds in their 2018 fiscal year valuations based on information found in the Public Plans Data website, which is produced in partnership with NASRA:²³

Assumption	KCERA	Public Plans Data ²⁴		
		Low	Median	High
Net Investment Return	7.25%	4.50%	7.25%	8.00%

The detailed survey results show that more than 80% of the systems have an investment return assumption in the range of 6.75% to 7.50%. Also, about one-third of the systems have reduced their investment return assumption during the year. State systems outside of California tend to change their economic assumptions less frequently and so may lag behind emerging practices in this area.

In summary, we believe that both the risk adjustment model and other considerations support maintaining the current earnings assumption. The recommended assumption of 7.25% provides for a risk margin within the risk adjustment model and is consistent with KCERA’s current practice relative to other public systems.

²³ Among 188 large public retirement funds, the investment return assumption was not available for 6 of the public retirement funds in the survey data.

²⁴ Public Plans Data website – Produced in partnership with the National Association of State Retirement Administrators (NASRA)

C. Salary Increase

Salary increases impact plan costs in two ways: (i) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (ii) by increasing total active member payroll which in turn generates lower UAAL contribution rates as a percent of payroll. These two impacts are discussed separately as follows:

As an employee progresses through his or her career, increases in pay are expected to come from three sources:

1. **Inflation:** Unless pay grows at least as fast as consumer prices grow, employees will experience a reduction in their standard of living. There may be times when pay increases lag or exceed inflation, but over the long term, labor market forces may require an employer to maintain its employees' standards of living.

As discussed earlier in this report, we are recommending that the assumed rate of inflation be reduced from 3.00% to 2.75% per annum. This inflation component is used as part of the salary increase assumption.

2. **Real "Across the Board" Pay Increases:** These increases are typically termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees "across the board". The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real "across the board" pay increases have averaged about 0.4% – 0.7% annually during the last ten to twenty years.

We also referred to the annual report on the financial status of the Social Security program published in April 2020. In that report, real "across the board" pay increases are forecast to be 1.1% per year under the intermediate assumptions.

The real pay increase assumption is generally considered a more "macroeconomic" assumption that is not necessarily based on individual plan experience. However, recent salary experience with public systems in California as well as anecdotal discussions with plans and plan sponsors indicate lower future real wage growth expectations for public sector employees. We note that for KCERA's active members, the actual average inflation plus "across the board" increase (i.e., wage inflation) over the three year period ending June 30, 2019 was 0.62% for General and Safety members combined, which is lower than the change in CPI of 3.22% during that same period:

Valuation Date	Actual Average Increase ²⁵	Actual Change in CPI ²⁶
June 30, 2017	0.29%	2.79%
June 30, 2018	0.51%	3.81%
June 30, 2019	1.04%	3.07%
Three Year Average	0.62%	3.22%

²⁵ Reflects the increase in average salary for members at the beginning of the year versus those at the end of the year. It does not reflect the average salary increases received by members who worked the full year.

²⁶ Based on the change in the annual average CPI for the Los Angeles-Long Beach-Anaheim Area compared to the prior year. Prior to June 30, 2018, this was based on the change in the annual average CPI for Los Angeles- Riverside-Orange County Area.

Considering these factors, we recommend maintaining the real “across the board” salary increase assumption at 0.50%. This means that the combined inflation and “across the board” salary increase assumption will decrease from 3.50% to 3.25%.

3. **Merit and Promotion Increases:** As the name implies, these increases come from an employee’s career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For KCERA, there are service-specific merit and promotion increases.

The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real “across the board” pay increases. Increases are measured separately for General and Safety members. This is accomplished by:

- a. Measuring each continuing member’s actual salary increase over each year of the experience period on a salary-weighted basis, with higher weights assigned to experience from members with larger salaries;
- b. Excluding any members with increases of more than 50% or a decrease of more than 25% during any particular year;
- c. Categorizing these increases according to member demographics;
- d. Removing the wage inflation component from these increases (assumed to be equal to the increase in the members’ average salary during the year);
- e. Averaging these annual increases over the experience period; and
- f. Modifying current assumptions to reflect some portion of these measured increases reflective of their “credibility.”

To be consistent with the other economic assumptions, these merit and promotion assumptions should be used in combination with the 3.25% assumed inflation and real “across the board” increases recommended in this study.

Due to the high variability of the actual salary increases, we have analyzed this assumption using data for the past six years. We believe that when the experience from the current and prior studies is combined, it provides a more reasonable representation of potential future merit and promotion salary increases over the long term.

The following table shows the General members' actual average merit and promotion increases by years of service over the three-year period from July 1, 2016 through June 30, 2019 along with the actual average increases based on combining the current three-year period with the three-year period from the prior experience study. The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e. wage inflation, estimated as the increase in average salaries) for each year during the experience period (0.90% on average for the most recent three-year period).

General

Years of Service	Rate (%)			
	Current Assumptions	Actual Average Increase (Last 3 Years)	Actual Average Increase (Last 6 Years)	Proposed Assumption
Less than 1	5.50	5.06	4.73	5.50
1 – 2	4.00	6.62	6.86	4.50
2 – 3	3.50	6.43	6.46	4.00
3 – 4	3.00	5.47	5.49	3.50
4 – 5	2.50	4.36	4.52	3.00
5 – 6	2.25	3.87	3.88	2.50
6 – 7	2.00	2.96	3.01	2.25
7 – 8	1.50	2.80	2.77	1.75
8 – 9	1.25	2.22	2.28	1.50
9 – 10	1.00	2.72	2.66	1.25
10 – 11	0.90	2.49	2.63	1.15
11 – 12	0.80	1.98	2.08	1.05
12 – 13	0.70	1.84	1.85	0.95
13 – 14	0.60	1.41	1.58	0.85
14 – 15	0.50	2.30	2.21	0.75
15 – 16	0.50	2.28	2.16	0.75
16 – 17	0.50	1.10	1.65	0.75
17 – 18	0.50	1.31	1.30	0.75
18 – 19	0.50	1.26	1.40	0.75
19 – 20	0.50	1.30	1.67	0.75
20 & Over	0.50	1.14	1.44	0.75

The following table shows the Safety members' actual average merit and promotion increases by years of service over the three-year period from July 1, 2016 through June 30, 2019 along with the actual average increases based on combining the current three-year period with the three-year period from the prior experience study. The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e. wage inflation, estimated as the increase in average salaries) for each year during the experience period (0.48% on average for the most recent three-year period).

Safety

Years of Service	Rate (%)			
	Current Assumptions	Actual Average Increase (Last 3 Years)	Actual Average Increase (Last 6 Years)	Proposed Assumption
Less than 1	9.00	6.98	8.40	8.75
1 – 2	6.50	7.32	7.39	7.00
2 – 3	5.50	5.38	5.73	5.50
3 – 4	4.25	5.38	5.50	5.00
4 – 5	3.75	4.86	5.25	4.50
5 – 6	3.25	4.66	4.61	4.00
6 – 7	3.00	3.99	3.78	3.50
7 – 8	2.50	2.87	2.35	2.50
8 – 9	1.75	1.29	1.05	1.50
9 – 10	1.50	1.56	1.29	1.25
10 – 11	1.25	0.92	0.73	1.00
11 – 12	1.00	0.72	0.44	0.80
12 – 13	0.90	0.87	0.39	0.75
13 – 14	0.85	0.42	0.32	0.70
14 – 15	0.80	0.55	0.52	0.65
15 – 16	0.75	0.91	0.63	0.60
16 – 17	0.70	0.72	0.40	0.55
17 – 18	0.65	0.92	0.63	0.50
18 – 19	0.60	0.44	-0.17	0.50
19 – 20	0.55	0.96	0.40	0.50
20 & Over	0.50	0.70	0.30	0.50

Chart 1 that follows later in the section compares actual experience with the current and proposed rates of actual merit and promotion increases for General members. Also shown is the actual merit and promotion increases based on an average of both the current and previous three-year experience periods.

Chart 2 compares actual experience with the current and proposed rates of actual merit and promotion increases for Safety members. Also shown is the actual merit and promotion increases based on an average of both the current and previous three-year experience periods.

Based on this experience, we are proposing changes in the merit and promotion salary increases for both General and Safety members, with increases for almost all service categories for General members and with increases for some service categories and decreases for other service categories for Safety members. Overall, *merit and promotion* salary increases are assumed to be higher for General members and slightly lower for Safety members. The overall salary increase assumptions will increase slightly for General members and decrease for Safety members after taking into account the lower *inflation* component of the salary increase assumption.

Active Member Payroll

Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real “across the board” pay increases. The merit and promotion increases are not an influence, because this average pay is not specific to an individual.

Under the Board’s current practice, the UAAL contribution rate is developed by assuming that the total payroll for all active members will increase annually over the amortization periods at the same assumed rates of inflation plus real “across the board” salary increase assumptions as are used to project the member’s future benefits.

We recommend that the active member payroll increase assumption be decreased from 3.50% to 3.25% annually, consistent with the combined inflation plus real “across the board” salary increase assumptions.

Chart 1: Merit and Promotion Salary Increase Rates
General Members

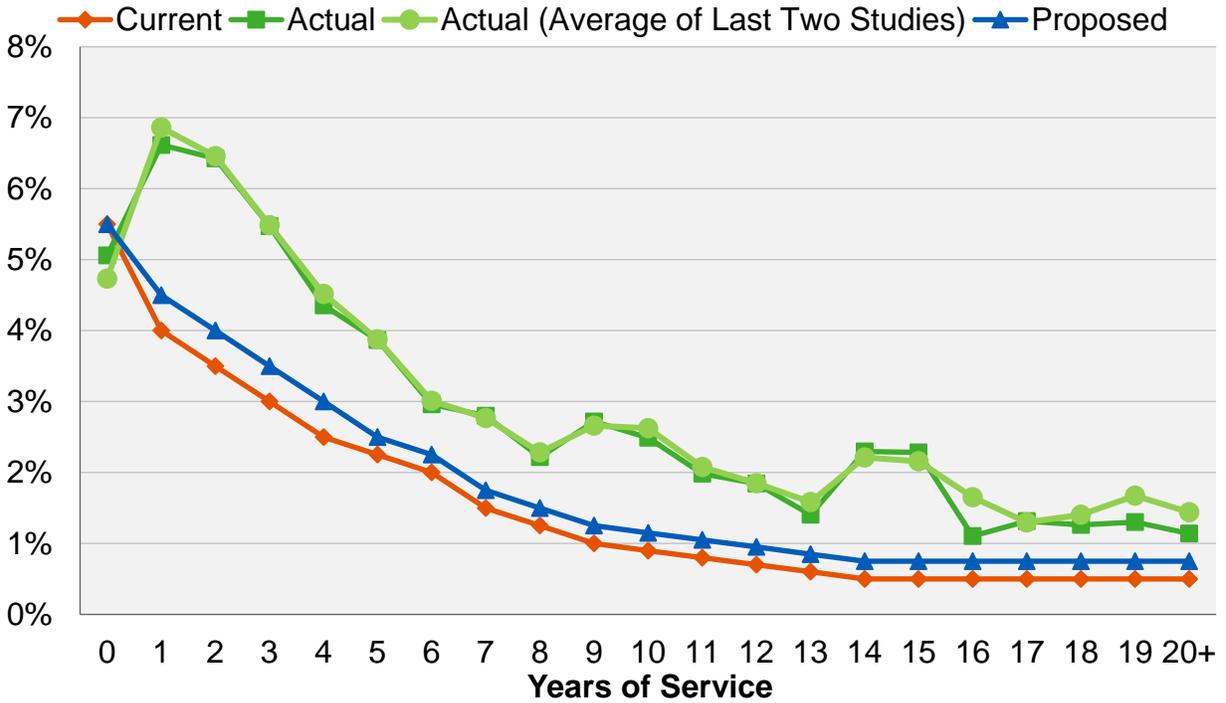
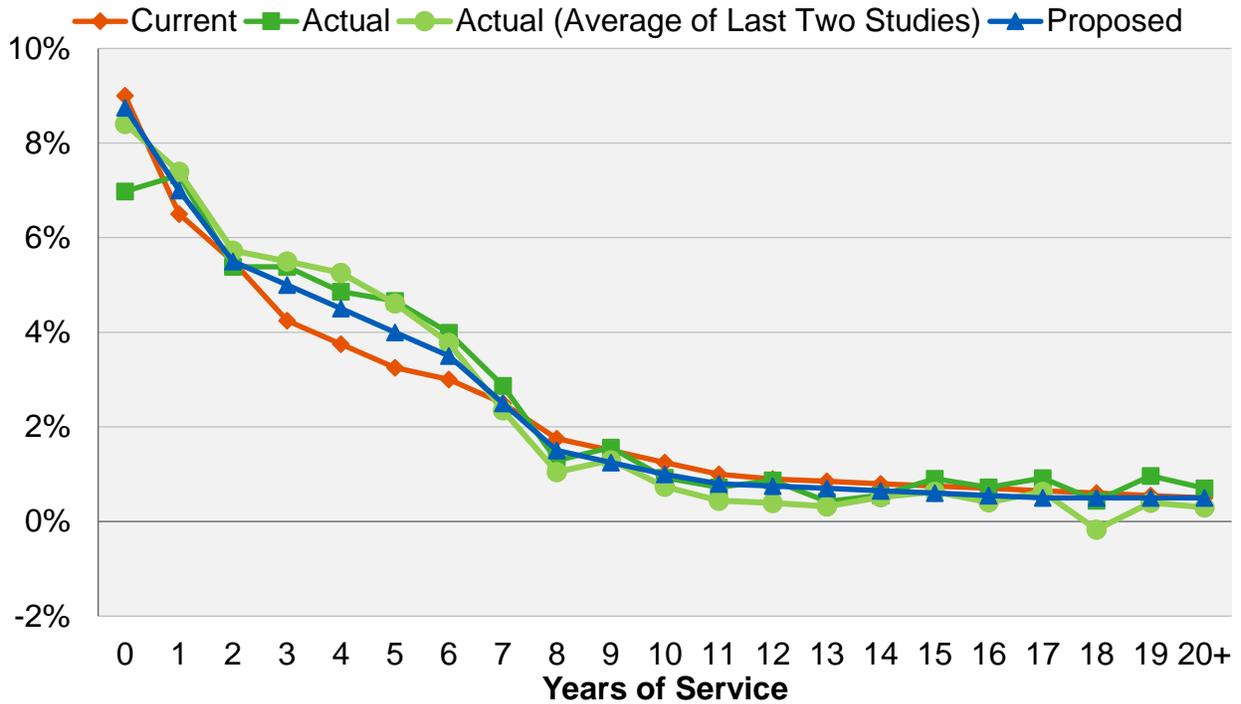


Chart 2: Merit and Promotion Salary Increase Rates
Safety Members



D. Administrative Expenses

Like benefit payments made to members, expenses incurred in connection with the plan's operation are paid from KCERA's assets. These expenses include fees for administrative, legal, accounting, and actuarial services, as well as routine costs for printings, mailings, computer-related activities, and other functions carried out by the plan. They do not include investment-related expenses.

The current administrative expense assumption is 0.90% of projected payroll. The following table provides the administrative expenses in relation to the projected payroll for each of the six years ending June 30, 2019.

**Administrative Expenses as a Percentage of
Projected Payroll (Dollars in 000's)**

Year Ending June 30	Projected Payroll	Administrative Expenses	Administrative %
2014	\$533,851	\$4,860	0.91%
2015	531,598	4,887	0.92
2016	537,540	5,224	0.97
Prior Three-Year Average			0.93
2017	546,671	5,243	0.96
2018	576,729	5,116	0.89
2019	579,072	4,804	0.83
Current Three-Year Average			0.89
Six-Year Average			0.91
Current Assumption			0.90
Proposed Assumption			0.90

Based on this experience, we recommend maintaining the current administrative expense assumption of 0.90%. This expense will be allocated to the employer and member based on the total average contribution rates in the upcoming June 30, 2020 actuarial valuation, as determined before including the administrative expenses.

IV. Demographic Assumptions

A. Retirement Rates

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

Currently, the assumed retirement rates are a function of only member's age. With this year's experience study, we have also analyzed recent years' retirement experience both as a function of age and years of service in relation to the probability of retirement. Our review concludes that the retirement rates correlate both with age and with years of service for General Tier I and Safety Tier I members.

As a result of this observation, we recommend that retirement rates be structured as a function of both age and years of service for General Tier I and Safety Tier I. The new structure of retirement assumptions will apply different sets of age-based retirement assumptions for those with less than 25 years of service and for those with more than 25 years of service. For General Tier II, General Tier III, and Safety Tier II, we continue to recommend that retirement rates be structured as a function of only age until more data on actual retirement experience is available to review the retirement rates based on both age and service.

The table on the following page shows the observed service retirement rates for General Tier I members based on the actual experience over the past three years. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. This same methodology is followed throughout this report and was described in Section II. Also shown are the current assumed rates and the rates we propose.

General Tier I

Age	Rate of Retirement (%)				
	All Service	Less than 25 Years of Service		25 or More Years of Service	
	Current Rate	Actual Rate	Proposed Rate	Actual Rate	Proposed Rate
50	6.00	10.33	10.00	7.14	10.00
51	6.00	6.33	6.00	5.45	6.00
52	6.00	10.00	6.00	8.57	12.00
53	6.00	5.08	6.00	13.64	12.00
54	8.00	4.78	6.00	10.00	12.00
55	10.00	5.35	6.00	11.81	12.00
56	12.00	5.78	6.00	15.00	14.00
57	14.00	6.36	6.00	14.84	16.00
58	15.00	8.53	9.00	21.62	18.00
59	19.00	14.21	16.00	26.19	24.00
60	23.00	20.00	20.00	45.45	35.00
61	23.00	12.41	16.00	29.73	28.00
62	25.00	17.02	20.00	45.16	35.00
63	25.00	21.54	20.00	22.22	30.00
64	25.00	18.18	20.00	40.00	30.00
65	32.00	34.82	35.00	31.82	35.00
66	35.00	39.47	35.00	42.86	35.00
67	35.00	28.57	35.00	10.00	35.00
68	40.00	30.00	35.00	40.00	35.00
69	40.00	40.00	40.00	40.00	40.00
70 & Over	100.00	33.85	100.00	20.00	100.00

As shown above, we are recommending decreases in most of the retirement rates for General Tier I members with less than 25 years of service and recommending increases in most of the retirement rates for General Tier I members with 25 or more years of service.

Chart 3 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Tier I members with less than 25 years of service.

Chart 4 compares actual experience with the current and proposed rates of retirement for General Tier I members with 25 or more years of service.

The following table shows the observed retirement rates for Safety Tier I members over the past three years. Also shown are the current rates assumed and the rates we propose:

Safety Tier I

	Rate of Retirement (%)				
	All Service	Less than 25 Years of Service		25 or More Years of Service	
Age	Current Rate	Actual Rate	Proposed Rate	Actual Rate	Proposed Rate
45	2.00	11.63	5.00	N/A	5.00
46	2.00	0.00	5.00	0.00	5.00
47	2.00	12.20	5.00	9.09	5.00
48	3.00	9.76	5.00	0.00	5.00
49	9.00	27.27	25.00	21.05	25.00
50	20.00	9.23	10.00	26.32	30.00
51	15.00	8.00	8.00	25.00	24.00
52	18.00	7.69	8.00	34.78	24.00
53	18.00	9.09	8.00	30.43	24.00
54	20.00	11.11	12.00	22.73	24.00
55	24.00	16.00	14.00	14.29	28.00
56	24.00	12.50	14.00	14.29	28.00
57	24.00	8.33	8.00	23.53	28.00
58	30.00	8.33	8.00	37.50	28.00
59	20.00	12.50	14.00	40.00	28.00
60	20.00	25.00	25.00	20.00	28.00
61	20.00	30.00	25.00	50.00	50.00
62	40.00	0.00	25.00	20.00	50.00
63	40.00	25.00	25.00	50.00	50.00
64	40.00	0.00	25.00	N/A	50.00
65 & Over	100.00	11.11	100.00	60.00	100.00

As shown above, we are recommending decreases in most of the retirement rates for Safety Tier I members with less than 25 years of service and recommending increases in most of the retirement rates for Safety Tier I members with 25 or more years of service.

Chart 5 compares actual experience with the current and proposed rates of retirement for Safety Tier I members with less than 25 years of service.

Chart 6 compares actual experience with the current and proposed rates of retirement for Safety Tier I members with 25 or more years of service.

For General Tier II, General Tier III, and Safety Tier II, we do not have credible experience from the past three years to propose new retirement rates based either only on age, or on age and service. As a result, we have not changed the current age-based assumption structure for Tier II members.

However, we have based our recommended rates for General Tier II, General Tier III, and Safety Tier II on a combination of the current Tier II assumptions and the actual retirement experience that occurred for General and Safety Tier I members.

The following are the current and proposed rates of retirement for General Tier II, General Tier III, and Safety Tier II members:

General Tier II, General Tier III, and Safety Tier II

Age	Rate of Retirement (%)					
	Current General Tier IIA and IIB	Proposed General Tier IIA and IIB	Current General Tier III	Proposed General Tier III	Current Safety Tier IIA and IIB	Proposed Safety Tier IIA and IIB
50	3.00	5.00	0.00	0.00	6.00	3.00
51	3.00	3.00	0.00	0.00	6.00	3.00
52	3.00	3.00	3.00	3.00	6.00	3.00
53	3.00	3.00	3.00	3.00	8.00	5.00
54	3.50	3.50	3.50	3.50	18.00	11.00
55	5.50	4.00	5.50	4.00	22.00	13.00
56	6.50	4.50	6.50	4.50	20.00	12.00
57	7.50	5.00	7.50	5.00	20.00	12.00
58	9.50	6.50	9.50	6.50	20.00	12.00
59	11.50	11.00	11.50	11.00	20.00	12.00
60	13.50	12.00	13.50	12.00	20.00	12.00
61	15.50	13.00	15.50	13.00	20.00	12.00
62	25.00	20.00	25.00	20.00	40.00	25.00
63	25.00	20.00	25.00	20.00	40.00	25.00
64	25.00	20.00	25.00	20.00	40.00	25.00
65	32.00	35.00	32.00	35.00	100.00	100.00
66	35.00	35.00	35.00	35.00	100.00	100.00
67	35.00	35.00	35.00	35.00	100.00	100.00
68	40.00	35.00	40.00	35.00	100.00	100.00
69	40.00	40.00	40.00	40.00	100.00	100.00
70 & Over	100.00	100.00	100.00	100.00	100.00	100.00

Chart 7 compares the current rates with the proposed rates of retirement for General Tier II members.

Chart 8 compares the current rates with the proposed rates of retirement for General Tier III members.

Chart 9 compares the current rates with the proposed rates of retirement for Safety Tier II members.

Deferred Vested Members

In prior valuations, deferred vested General and Safety members were assumed to retire at age 57 and 53, respectively. The average age at retirement over the prior three years was 56.7 for General and 52.0 for Safety.

We recommend maintaining the General and Safety deferred vested retirement assumption at age 57 and 53, respectively.

Reciprocity

Under the current assumptions, it is assumed that 50% of General and 55% of Safety future deferred vested members would be covered under a reciprocal retirement system. For those covered under a reciprocal retirement system, both General and Safety members are assumed to receive 4.00% annual salary increases from termination until their date of retirement. As of June 30, 2019, about 45% of the total General deferred vested and 57% of the total Safety deferred vested members went on to be covered by a reciprocal retirement system.

We recommend decreasing the reciprocal assumption to 45% for General members and increasing the assumption to 60% for Safety members. This recommendation takes into account the experience of all deferred vested members as of June 30, 2019 instead of just new deferred vested members during the three-year period. This is because there is a lag between a member's date of termination and the time that it is known if they have reciprocity with a reciprocal retirement system.

In addition, we recommend 4.00% and 3.75% annual salary increase assumptions for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from KCERA to the expected date of retirement for deferred vested members covered by a reciprocal retirement system. These assumptions are based on the ultimate 0.75% and 0.50% merit and promotion salary increase assumptions for General and Safety members, respectively, together with the 2.75% inflation and 0.50% real "across the board" salary increase assumptions that are recommended earlier in Section III of this report.

Survivor Continuance under the Unmodified Option

In prior valuations, it was assumed that all members would select the unmodified option at retirement. Actual experience for recent new retirees shows that around 90% select the unmodified option. **Therefore, we recommend maintaining the assumption that all members will elect the unmodified option at retirement.**

It was also assumed that 75% of all active and inactive male members and 60% of all active and inactive female members would be married or have an eligible domestic partner entitled to the automatic continuance benefit when they select the unmodified option upon retirement. We reviewed experience for new retirees during the three-year period and determined the actual percentage of these new retirees that had an eligible spouse or eligible domestic partner and selected the unmodified option at the time of retirement. The results of that analysis are shown below.

New Retirees – Actual Percent with Eligible Spouse or Domestic Partner and Selected Unmodified Option		
Year Ending June 30	Male	Female
2017	68%	52%
2018	62%	56%
2019	72%	57%
Total	67%	55%

According to experience of members who retired during the last three years, about 67% of all male members and 55% of all female members who selected the unmodified option were married or had a domestic partner at retirement. **We recommend decreasing the assumption from 75% to 70% for male members and maintaining the assumption at 60% for female members.**

Since the value of the survivor's automatic continuance benefit is dependent on the survivor's age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience for members who retired during the current three-year period and studies done for other retirement systems, **we recommend the following:**

1. Since most the survivors are actually the opposite sex, even with the inclusion of domestic partners, **we will continue to assume that the survivor's sex is the opposite of the member.**
2. **We recommend the current assumptions for the age of the survivors for all active and inactive members (shown below) be maintained.** These assumptions will continue to be monitored in future experience studies.

	Spouse's Age as Compared to Member's Age	
	Male	Female
Current Assumption	3 years older	2 years younger
Actual KCERA Experience	3.3 years older	1.3 years younger
Proposed Assumption	3 years older	2 years younger

Chart 3: Retirement Rates
General Tier I Members with Less than 25 Years of Service

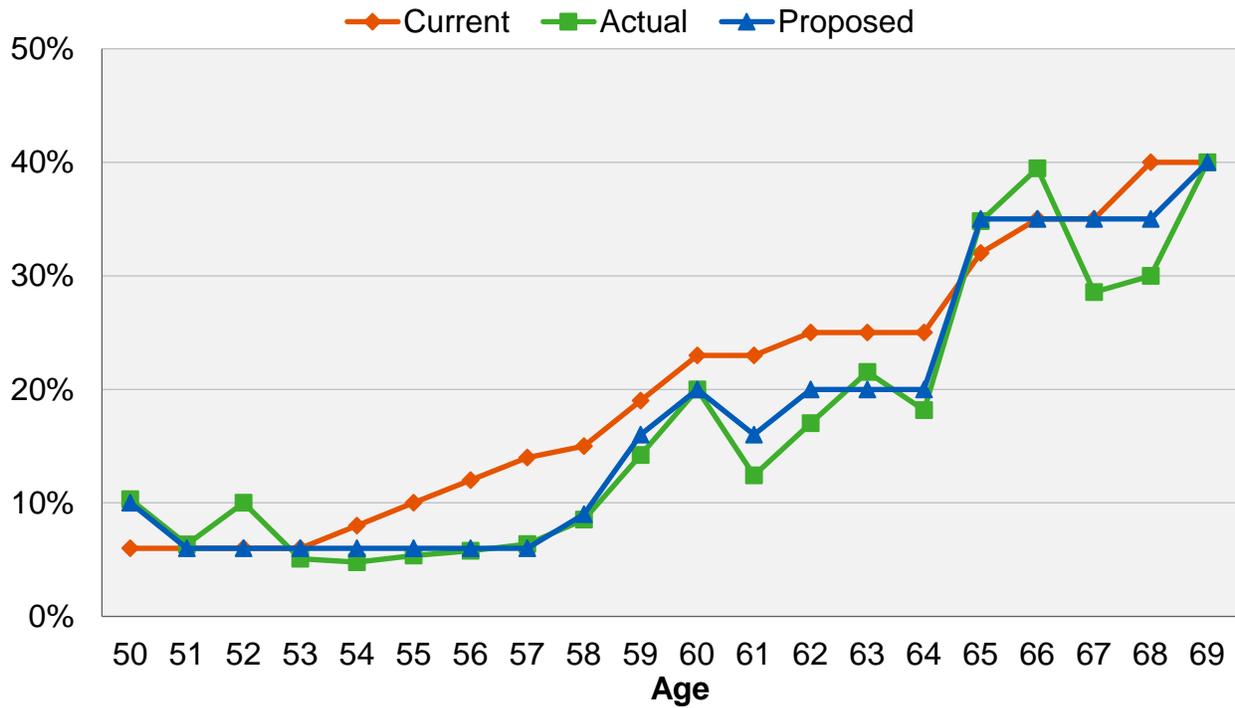


Chart 4: Retirement Rates
General Tier I Members with More than 25 Years of Service

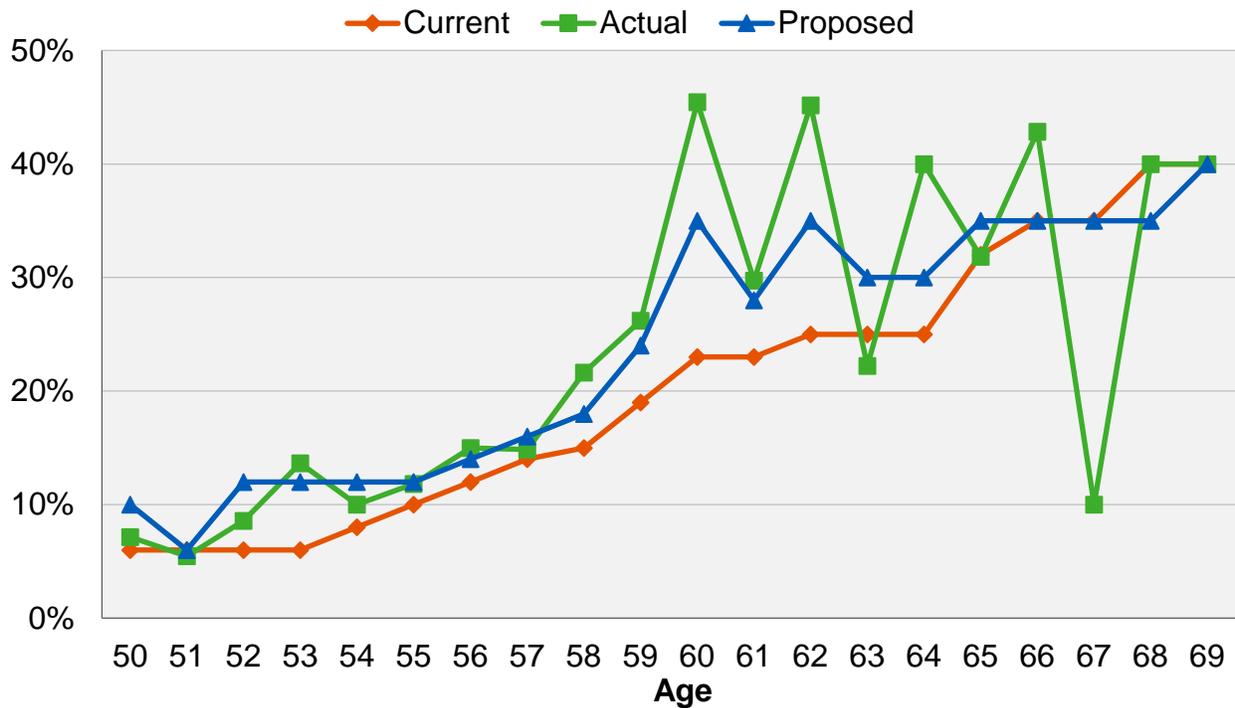


Chart 5: Retirement Rates
Safety Tier I Members with Less than 25 Years of Service

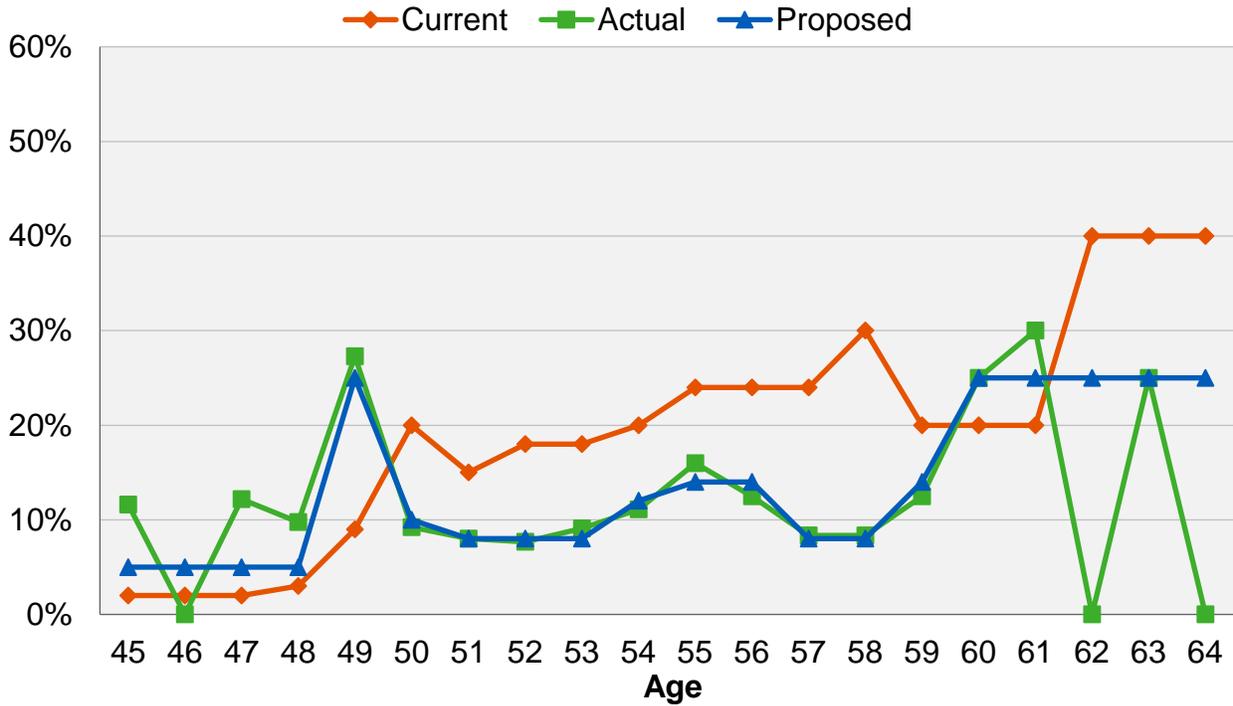


Chart 6: Retirement Rates
Safety Tier I Members with More than 25 Years of Service

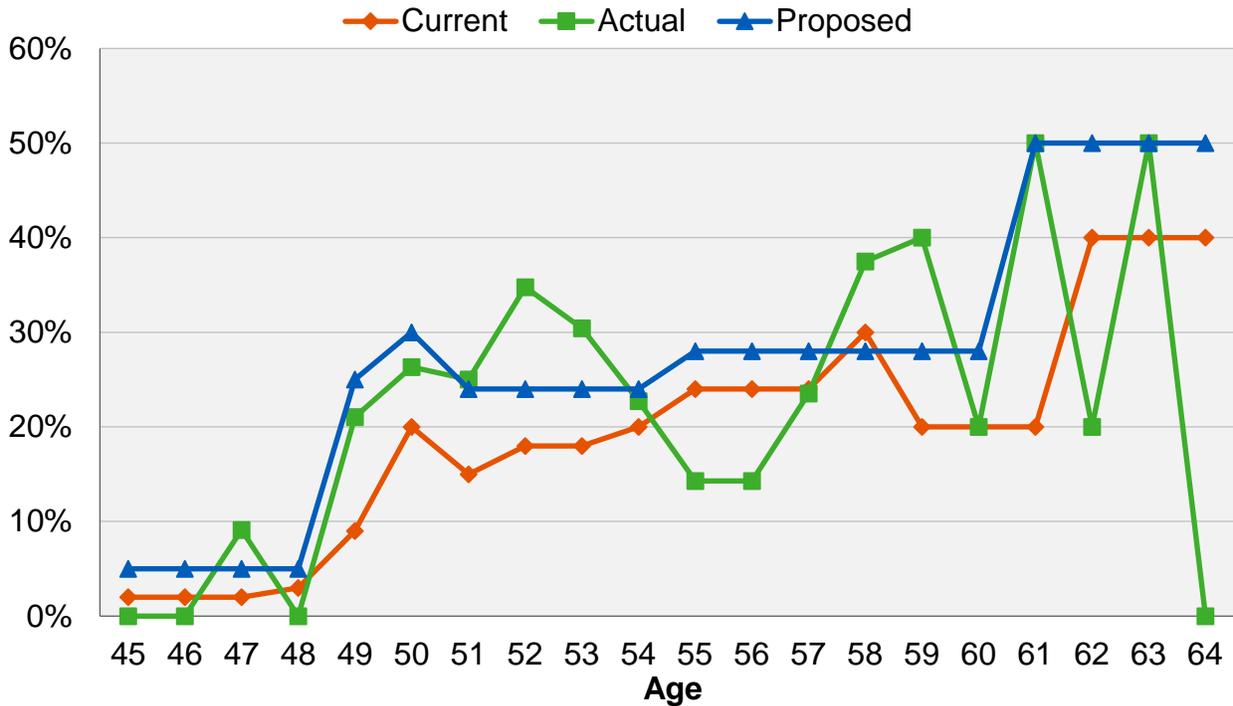


Chart 7: Retirement Rates
General Tier II Members

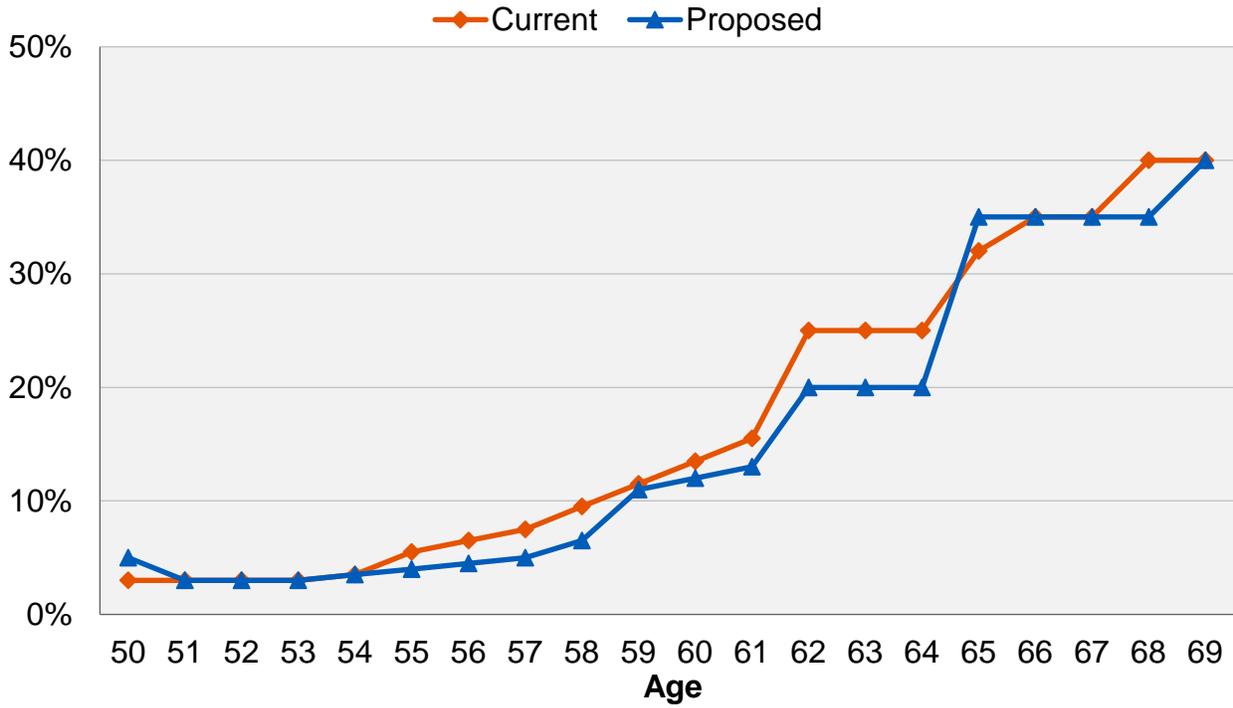


Chart 8: Retirement Rates
General Tier III Members

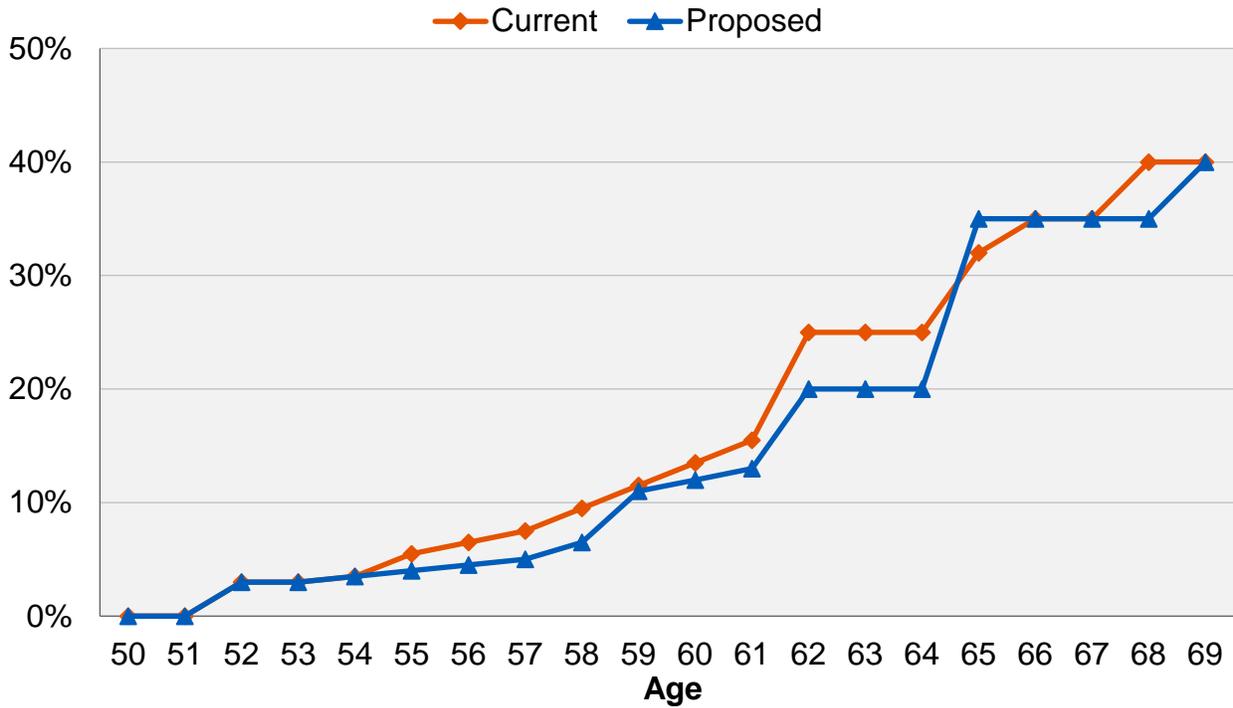
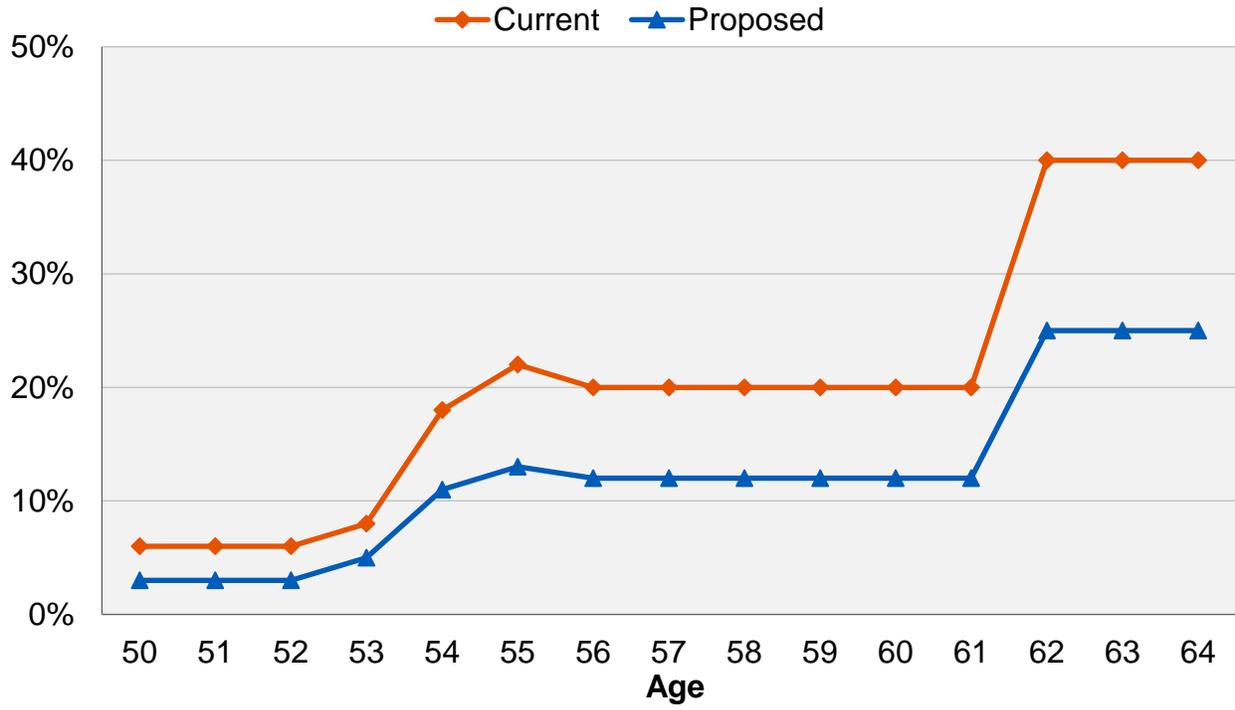


Chart 9: Retirement Rates
Safety Tier II Members



B. Mortality Rates - Healthy

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement mortality rates project what proportion of members will die before retirement. For General members, the table currently being used for post-service retirement mortality rates is the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) set forward one year for males and set forward two years for females, projected generationally with the two-dimensional mortality improvement scale MP-2016. For Safety members, the table currently being used for post-service retirement mortality rates is the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) with ages set back one year for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2016. Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

When we conducted the last experience study, we alerted the Board that we may recommend a switch from a Headcount-Weighted to a Benefit-Weighted table once the Society of Actuaries (SOA) provided mortality tables based on public sector experience comparable to the RP-2014 mortality tables developed using data collected from private and multi-employer pension plans.

The Retirement Plans Experience Committee (RPEC) of the SOA recently published the Pub-2010 Public Retirement Plans Mortality tables (Pub-2010). For the first time, the published mortality tables are based exclusively on public sector pension plan experience in the United States. Within the Pub-2010 family of mortality tables, there are separate tables by job categories of General, Safety and Teachers. Included with the mortality tables is the analysis prepared by RPEC that continues to observe that benefit amounts for healthy retirees and salary for employees are the most significant predictors of mortality differences within the job categories. Therefore, Pub-2010 includes mortality rates developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits.

The Pub-2010 study shows that benefit (or salary for employees) is a significant predictor of mortality difference. Therefore, the Pub-2010 family of mortality tables also includes mortality rates based on population with above-median benefit amount (or salary for employees), below-median benefit amount (or salary for employees) and total population within each job category. The median benefit amounts used to determine the above-median and below-median mortality rates as shown in the Pub-2010 report for General and Safety are as follows:

Median Benefit Amounts (\$) by Gender, Job Category, and Status				
Job Category	Males		Females	
	Employees	Retirees	Employees	Retirees
General	45,800	21,200	34,700	11,900
Safety	72,200	36,900	61,800	29,200

Note: Values shown as of 2010.

When we adjust the above amounts by a reasonable measure of U.S. price inflation from 2010 to 2019 for a total increase of around 30%, the benefit amounts (or salaries) paid to KCERA’s Safety members were generally greater than the adjusted median amounts shown above.

Therefore, we recommend that the median version of the mortality tables for General and the above-median version of the mortality tables for Safety.

We continue to recommend that the mortality improvement scale be applied generationally where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. The “generational” approach is the emerging practice within the actuarial profession.

A generational mortality table provides dynamic projections of mortality experience for each cohort of retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the Plan over time as participants’ life expectancies are projected to increase.

We understand that RPEC intends to publish annual updates to their mortality improvement scales. Improvement scale MP-2019 is the latest improvement scale available. We recommend that the Board adopt the Benefit-Weighted Pub-2010 mortality table (adjusted for KCERA experience) for General members and the Benefit-Weighted Above-Median Pub-2010 mortality table (adjusted for KCERA experience) for Safety members, and project the mortality improvement generationally using the MP-2019 mortality improvement scale.

In order to reflect more KCERA experience in our analysis, we have used experience for a nine-year period by using data from the current (from July 1, 2016 through June 30, 2019) and the last two (from July 1, 2013 to June 30, 2016 and from July 1, 2010 to June 30, 2013) experience study periods in order to analyze this assumption.

Even with the use of nine years of experience, based on standard statistical theory the data is only partially credible especially under the recommended benefit-weighted basis when dispersion of retirees’ benefit amounts is taken into account. In 2008 the SOA published an article recommending that mortality assumptions include an adjustment for credibility. Under this approach, the number of deaths needed for full credibility for a headcount-weighted mortality table is just over 1,000, where full credibility means a 90% confidence that the actual experience will be within 5% of the expected value. Therefore, in our recommended assumptions, we have only partially adjusted the Pub-2010 mortality tables to fit KCERA’s experience. In future experience studies, more data will be available which may further increase the credibility of the KCERA experience.

Pre-Retirement Mortality

For General and Safety members, the table currently being used for pre-retirement mortality rates is the Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females) times 80%, projected generationally with the two-dimensional scale MP-2016.

For General members, we recommend changing the pre-retirement mortality to follow the Pub-2010 General Employee Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

For Safety members, we recommend changing the pre-retirement mortality to follow the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Based on actual experience during the three-year experience study period, we also recommend maintaining the current assumption for pre-retirement mortality of 100% non-service connected for both General and Safety members.²⁷

Post-Retirement Mortality (Service Retirements)

Among all retired members, the actual deaths weighted by benefit amounts under the current assumptions for the last nine years are shown in the table below. We also show the deaths weighted by benefit amount under the proposed assumptions. We continue to recommend the use of a generational mortality table, which incorporates a more explicit assumption for future mortality improvement. Accordingly, the goal is to start with a mortality table that closely matches the current experience (without a margin for future mortality improvement), and then reflect mortality improvement by projecting lower mortality rates in future years.

The proposed mortality table also reflects current experience to the extent that the experience is credible based on standard statistical theory. For KCERA, the volume of General member data makes it relatively credible. In contrast, there is much less Safety data, so it is given substantially less credibility. The proposed mortality tables (as shown in the table below) after adjustments for partial credibility have actual to expected ratios of 107% for both General and Safety members. In future years the ratio should remain around 107% for both General and Safety members as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the last nine years are as follows:

	General Members – Healthy (\$ in millions)			Safety Members – Healthy (\$ in millions)		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	14.47	11.72	11.40	8.39	6.90	6.31
Female	12.70	11.37	10.11	0.48	0.31	0.40
Total	27.17	23.09	21.51	8.87	7.21	6.71
Actual / Expected	85%		107%	81%		107%

Notes: (1) Experience shown above is weighted by annual benefit amounts for deceased members instead of by headcounts.

(2) Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.

²⁷ While it is possible that COVID-19 deaths for members in certain industries may be considered service connected, we do not recommend a change in our assumption to reflect this possible short-term increase in service connected deaths.

For General members, we recommend updating the current table to the Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019. The recommended mortality table has an actual to expected ratio of 107%.²⁸

For Safety members, we recommend updating the current table to the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019. The recommended mortality table has an actual to expected ratio to 107%.

For informational purposes only, we have also provided in the table below the actual and expected deaths computed without weighting these by benefit amounts. This is similar to how actual and expected death ratios were developed based on the prior headcount approach.

Gender	General Members – Healthy			Safety Members – Healthy		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	412	381	334	143	150	114
Female	620	625	519	10	7	9
Total	1,032	1,006	853	153	157	123
Actual / Expected	97%		118%	102%		128%

Notes: (1) Experience shown above is weighted by headcounts for deceased members instead of by annual benefit amounts.
(2) The proposed expected deaths are based on the Pub-2010 Amount-Weighted Above-Median Mortality Tables.

Chart 10 that follows later in this section compares actual to expected deaths on a benefit-weighted basis for General members under the current and proposed assumptions over the past nine years.

Chart 11 compares actual to expected deaths on a benefit-weighted basis for Safety members under the current and proposed assumptions over the past nine years.

Chart 12 compares actual to expected deaths on a headcount-weighted basis for General members under the current and proposed assumptions over the past nine years provided for informational purposes only.

Chart 13 compares actual to expected deaths on a headcount-weighted basis for Safety members under the current and proposed assumptions over the past nine years provided for informational purposes only.

Chart 14 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for General members on a benefit-weighted basis. Life expectancies under the

²⁸ If we use the benchmark Pub-2010 General table without any adjustment, the proposed actual to expected ratio would be 114%.

proposed generational mortality rates are based on age as of 2020. In practice, assumed life expectancies will increase as a result of the mortality improvement scale.

Chart 15 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for Safety members on a benefit-weighted basis.

Beneficiaries Mortality

In studying the mortality for all beneficiaries in our prior experience study, we reviewed the actual deaths compared to the expected deaths and recommended the same mortality tables for General retirees and all beneficiaries. However, Pub-2010 has separate mortality tables for healthy retirees and contingent annuitants.

The Pub-2010 Contingent Survivors Table is developed based only on contingent survivor data after the death of the retirees. This is consistent with the mortality experience that we have available for beneficiaries. The Pub-2010 contingent survivor mortality rates are comparable to KCERA's actual mortality experience for beneficiaries.

For all beneficiaries, we recommend changing the mortality assumption to follow the Pub-2010 Contingent Survivor Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 10%, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Mortality Table for Member Contributions, Optional Forms of Payment and Reserves

There are administrative reasons why a generational mortality table is more difficult to implement for determining member contributions for legacy tiers (i.e., General Tier I, General Tier IIA, Safety Tier I and Safety Tier IIA), optional forms of payment and reserves. For determining member contributions, one emerging practice is to approximate the use of a generational mortality table by the use of a static table with projection of the mortality improvement from the measurement year over a period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation for determining member contributions for employees in the Tier I.

For General members, we recommend that the mortality table used for determining contributions for General members be updated to a blended table based on the Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 30% male and 70% female.

For Safety members, we recommend that the mortality table used for determining contributions for Safety members be updated to a blended table based on the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 80% male and 20% female.

For optional forms of payment and reserves, we would apply a similar methodology. However, the projection of the mortality improvement would be from the measurement year over a period that is close to the duration of the benefit payments for active members retiring in the next three

years. The recommended tables along with the mortality rates will be provided in a separate letter at a later date, similar to prior years.

For General and Safety service retirements, we recommend using the corresponding base tables and adjustments described within this section, projected 20 years with the two-dimensional mortality improvement scale MP-2019 along with weighting based on actual gender distributions for each group.

For all beneficiaries, we recommend using the corresponding base tables and adjustments described within this section, projected 20 years with the two-dimensional mortality improvement scale MP-2019 along with weighting based on the inverse of the actual gender distributions for each group.

For General and Safety disability retirements, we recommend using the corresponding base tables and adjustments described within the following section, projected 20 years with the two-dimensional mortality improvement scale MP-2019 along with weighting based on actual gender distributions for each group.

Chart 10: Post-Retirement Benefit-Weighted Deaths (In Millions)
 Non-Disabled General Members (July 1, 2010 through June 30, 2019)

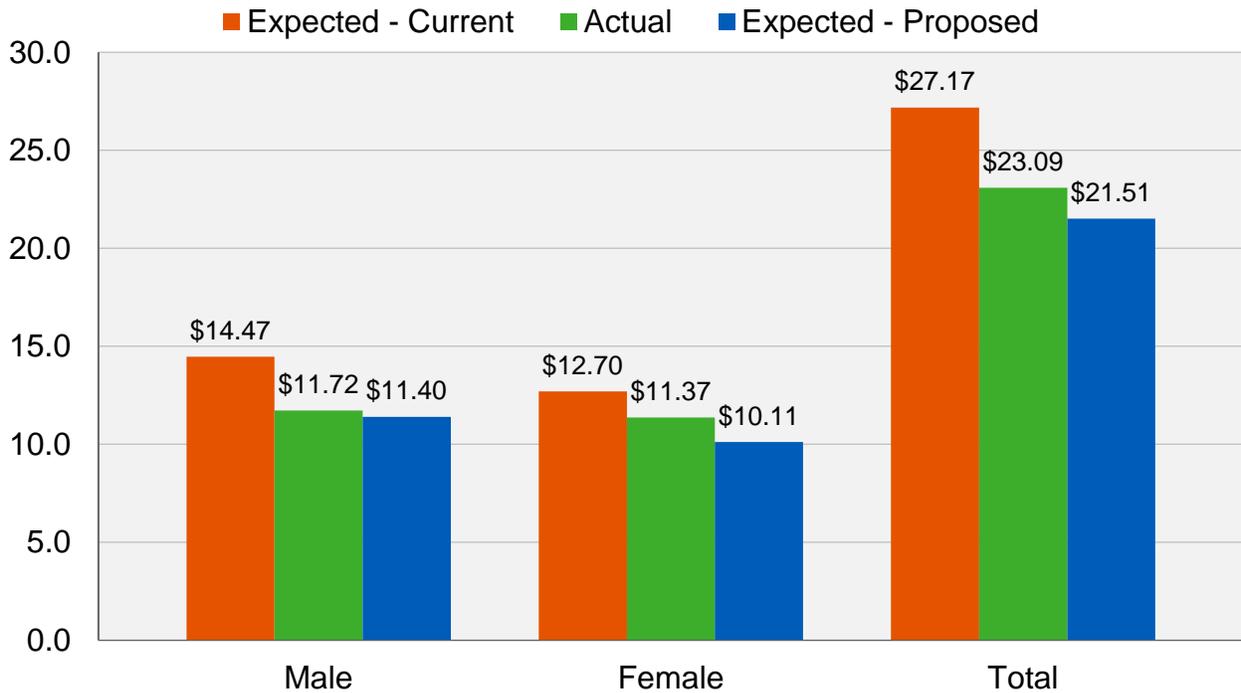


Chart 11: Post-Retirement Benefit-Weighted Deaths (In Millions)
 Non-Disabled Safety Members (July 1, 2010 through June 30, 2019)

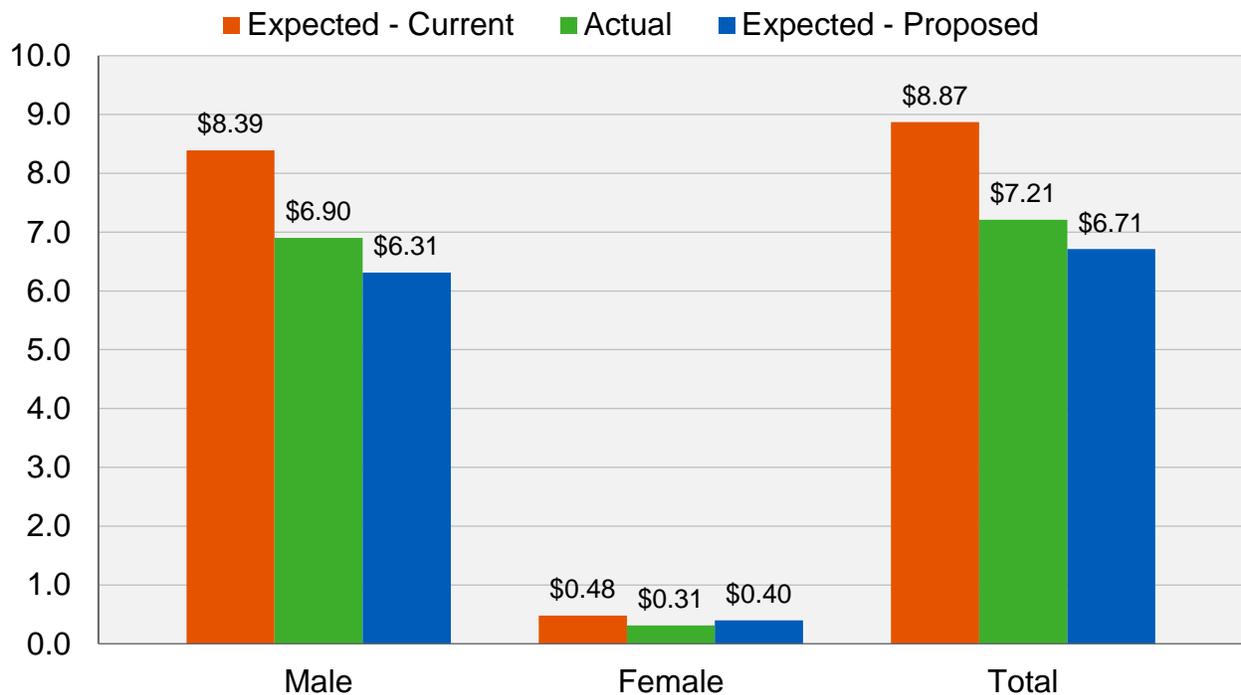


Chart 12: Post-Retirement Headcount-Weighted Deaths
 Non-Disabled General Members (July 1, 2010 through June 30, 2019)
 Provided for Informational Purposes Only

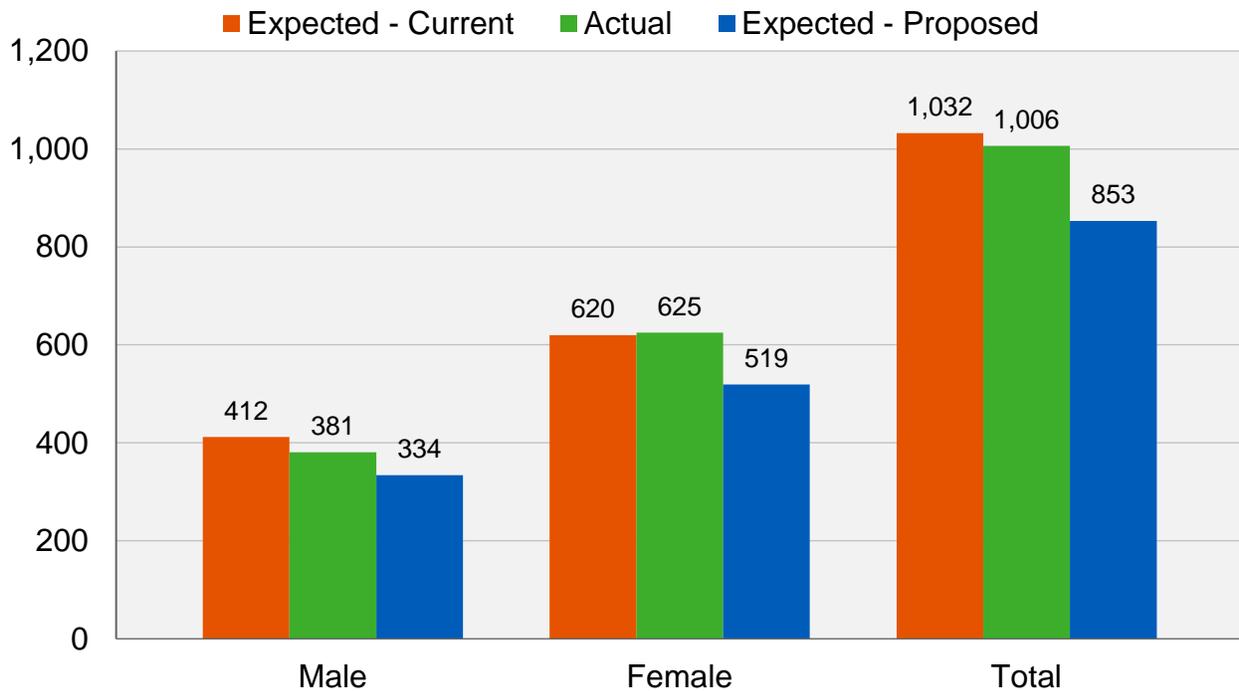


Chart 13: Post-Retirement Headcount-Weighted Deaths
 Non-Disabled Safety Members (July 1, 2010 through June 30, 2019)
 Provided for Informational Purposes Only

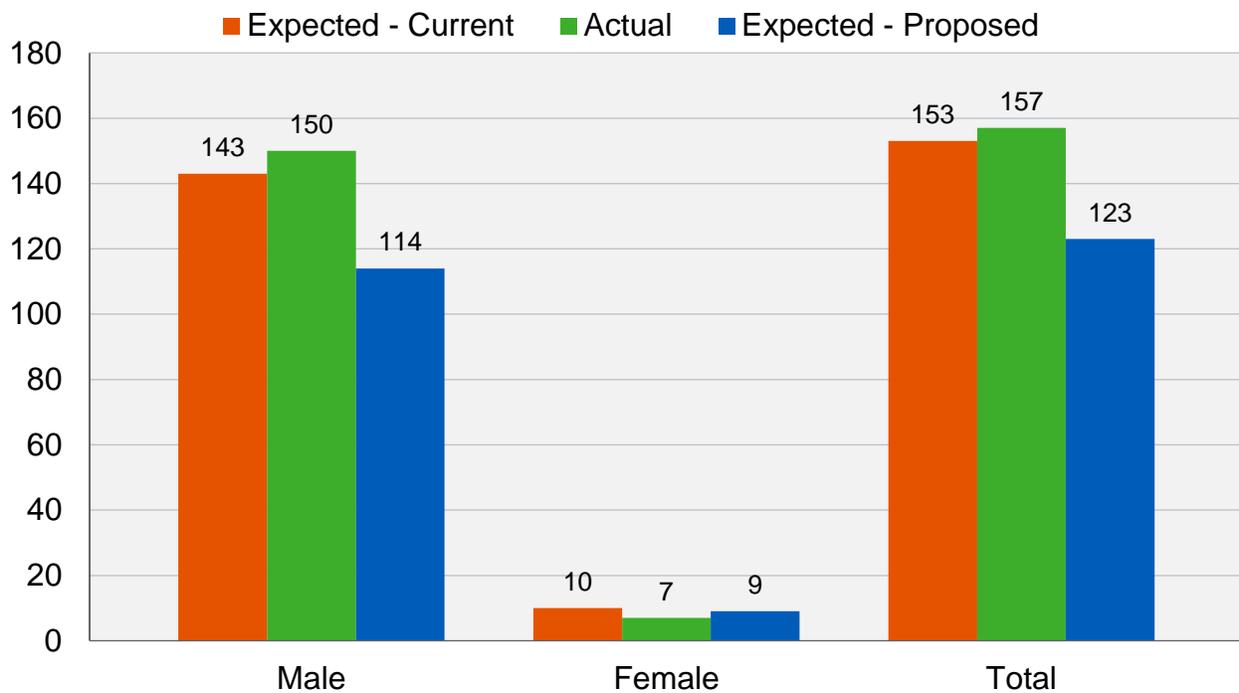


Chart 14: Benefit-Weighted Life Expectancies
Non-Disabled General Members

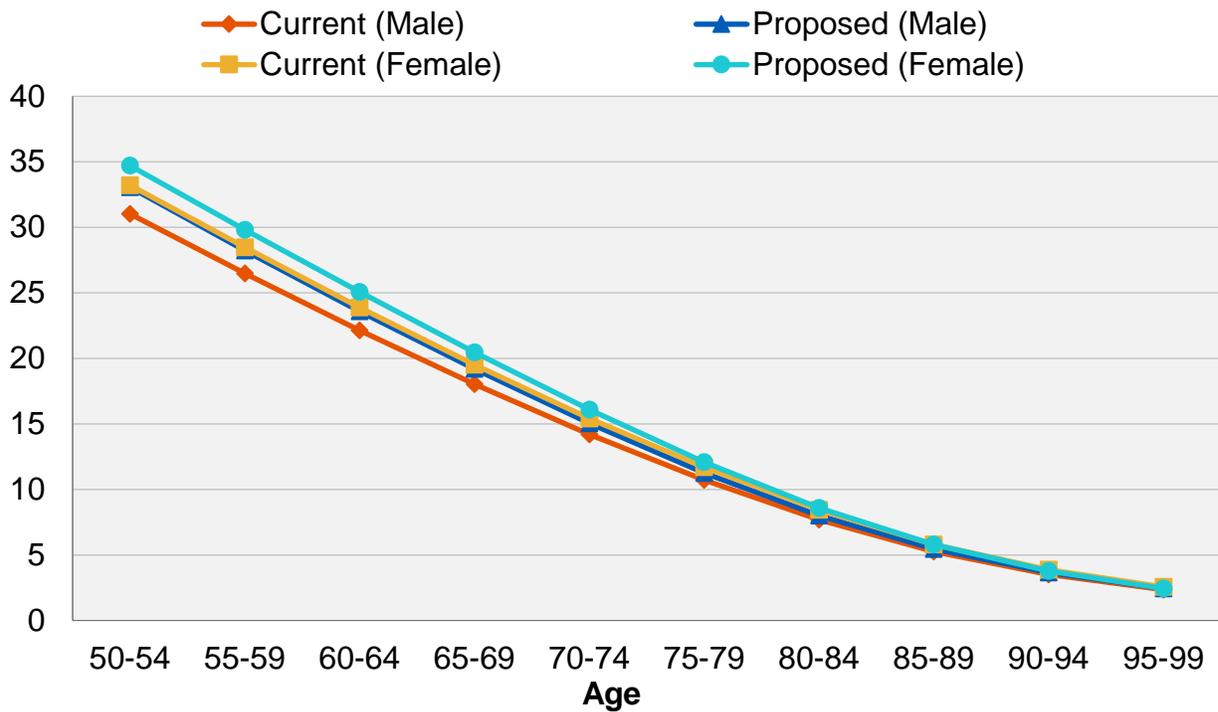
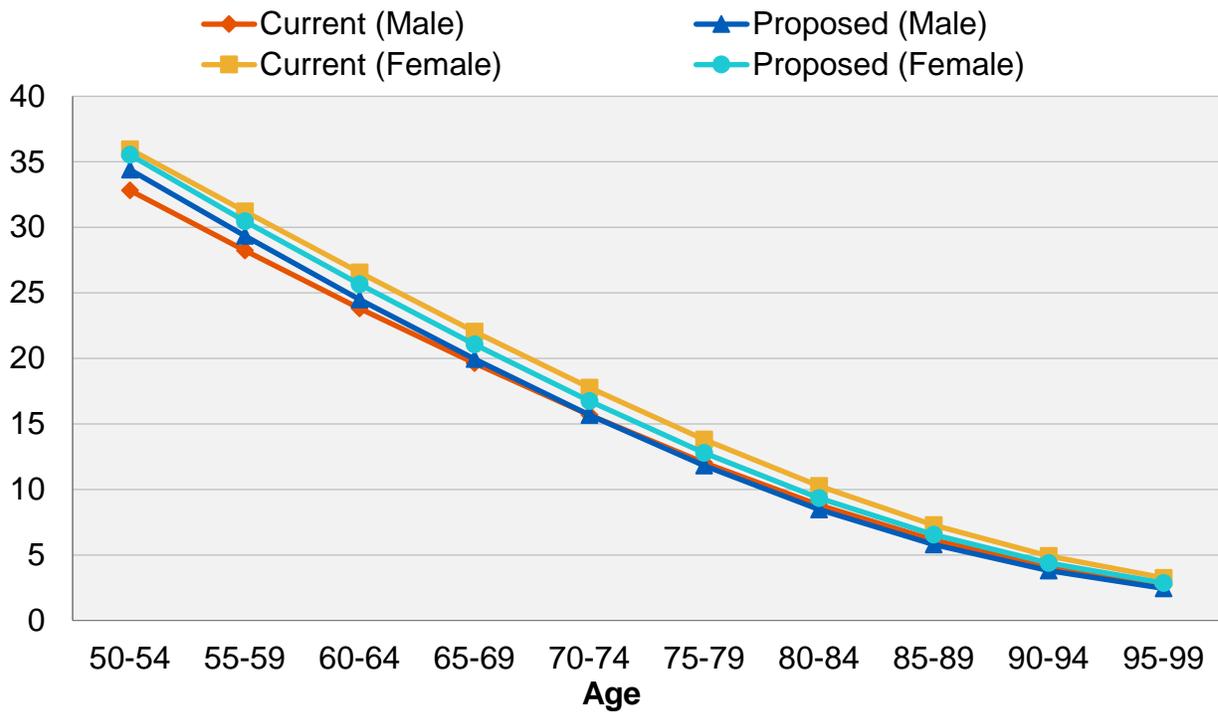


Chart 15: Benefit-Weighted Life Expectancies
Non-Disabled Safety Members



C. Mortality Rates - Disabled

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used. For General members, the table currently being used is the Headcount-Weighted RP-2014 Healthy Annuitant Table (separate tables for males and females) projected generationally with the two-dimensional mortality improvement scale MP-2016, set forward seven years for males and set forward eight years for females. For Safety members, the table currently being used is the Headcount-Weighted RP-2014 Healthy Annuitant Table (separate tables for males and females) projected generationally with the two-dimensional mortality improvement scale MP-2016, set forward three years for males and females.

Similar to mortality rates for service retirees, the proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For KCERA, there is far less data for disabled retirees, so it is given little credibility. The proposed mortality tables (as shown in the table below) after adjustments for partial credibility have actual to expected ratios of 87% and 112% for General and Safety, respectively. In future years the ratio should remain around 87% and 112% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the last nine years are as follows:

Gender	General Members – Disabled (\$ in millions)			Safety Members – Disabled (\$ in millions)		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	1.45	1.19	1.32	3.37	2.90	2.63
Female	1.55	1.27	1.50	0.21	0.25	0.18
Total	3.00	2.46	2.82	3.58	3.15	2.81
Actual / Expected	82%		87%	88%		112%

Notes: (1) Experience shown above is weighted by annual benefit amounts for deceased members instead of by headcounts.
(2) Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.

The Pub-2010 family of mortality tables provides separate disabled retiree mortality tables for Non-Safety disabled retirees and Safety disabled retirees.

For General disabled members, we recommend updating the current table to the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5%, projected generationally with the two-dimensional mortality improvement scale MP-2019. The recommended mortality table has an actual to expected ratio of 87%.

For Safety disabled members, we recommend updating the current table to the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 5%, projected generationally with the two-dimensional

mortality improvement scale MP-2019. The recommended mortality table has an actual to expected ratio of 112%.

For informational purposes only, we have also provided in the table below the actual and expected deaths computed without weighting these by benefit amounts. This is similar to how actual and expected death ratios were developed based on the prior headcount approach.

Gender	General Members – Disabled			Safety Members – Disabled		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	63	56	56	78	77	62
Female	80	74	77	7	8	6
Total	143	130	133	84	85	68
Actual / Expected	91%		98%	101%		126%

Notes: (1) Experience shown above is weighted by headcounts for deceased members instead of by annual benefit amounts.
 (2) The proposed expected deaths are based on the Pub-2010 Amount-Weighted Above-Median Mortality Tables.

Chart 16 compares actual to expected deaths on a benefit-weighted basis for disabled General members under the current and proposed assumptions over the past nine years.

Chart 17 compares actual to expected deaths on a benefit-weighted basis for disabled Safety members under the current and proposed assumptions over the past nine years.

Chart 18 compares actual to expected deaths on a headcount-weighted basis for disabled General members under the current and proposed assumptions over the past nine years provided for informational purposes only.

Chart 19 compares actual to expected deaths on a headcount-weighted basis for disabled Safety members under the current and proposed assumptions over the past nine years provided for informational purposes only.

Chart 20 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled General members on a benefit-weighted basis. Life expectancies under the proposed generational mortality rates are based on age as of 2020. In practice, life expectancies will be assumed to increase based on applying the mortality improvement scale.

Chart 21 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled Safety members on a benefit-weighted basis.

Chart 16: Post-Retirement Benefit-Weighted Deaths (In Millions)
 Disabled General Members (July 1, 2010 through June 30, 2019)

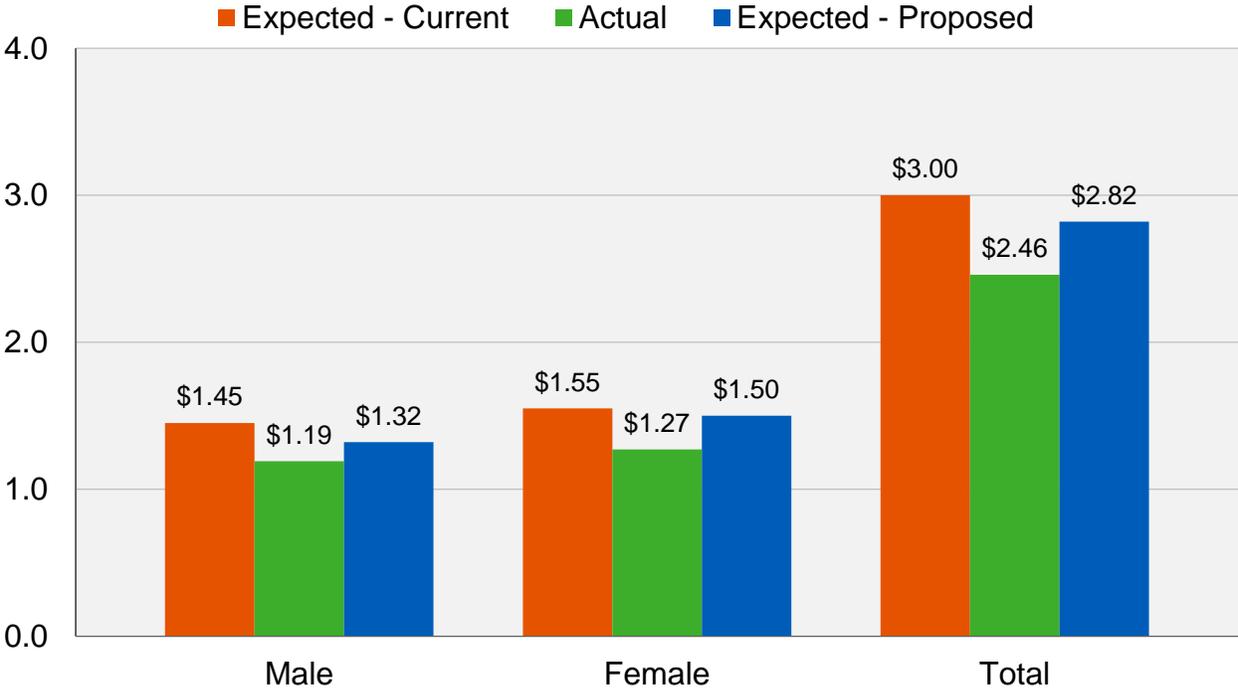


Chart 17: Post-Retirement Benefit-Weighted Deaths (In Millions)
 Disabled Safety Members (July 1, 2010 through June 30, 2019)

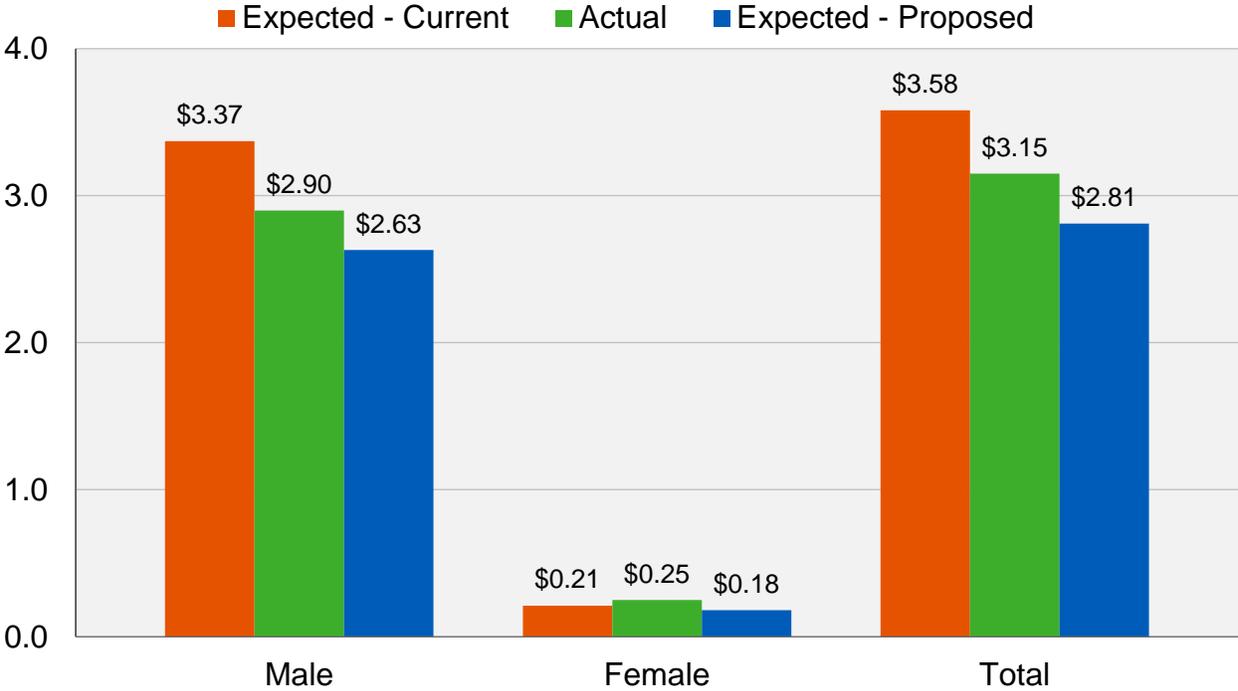


Chart 18: Post-Retirement Headcount-Weighted Deaths
 Disabled General Members (July 1, 2010 through June 30, 2019)
 Provided for Informational Purposes Only

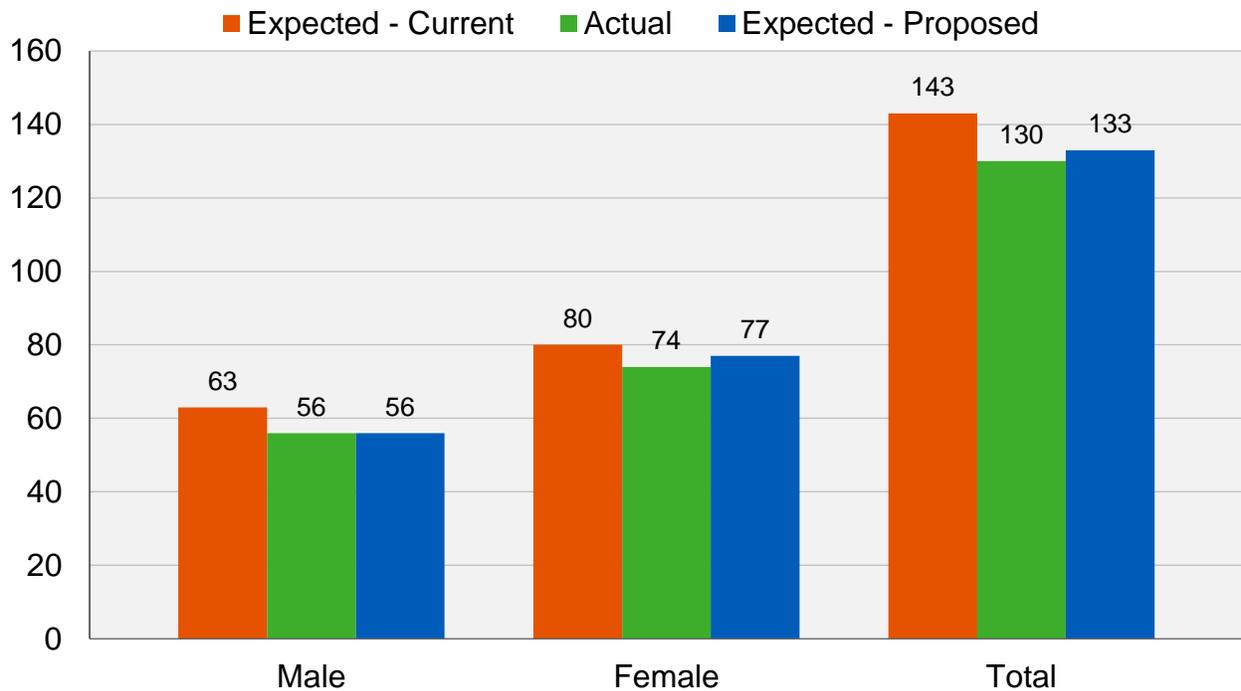


Chart 19: Post-Retirement Headcount-Weighted Deaths
 Disabled Safety Members (July 1, 2010 through June 30, 2019)
 Provided for Informational Purposes Only

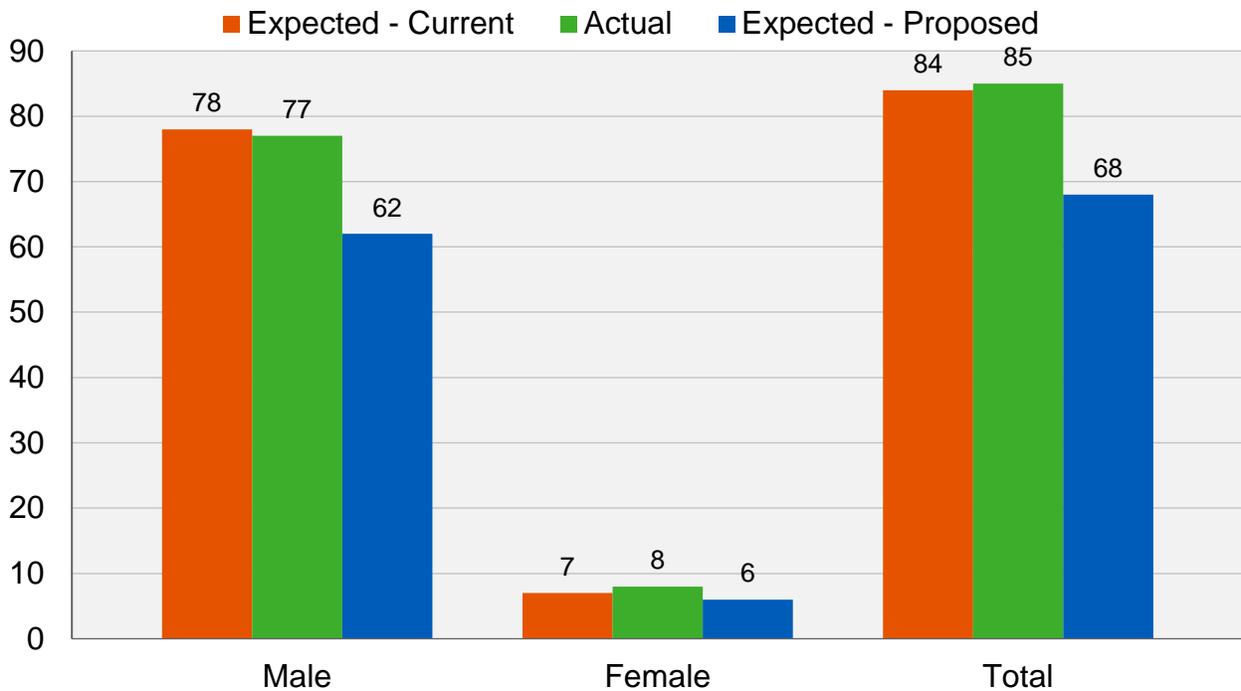


Chart 20: Benefit-Weighted Life Expectancies
Disabled General Members

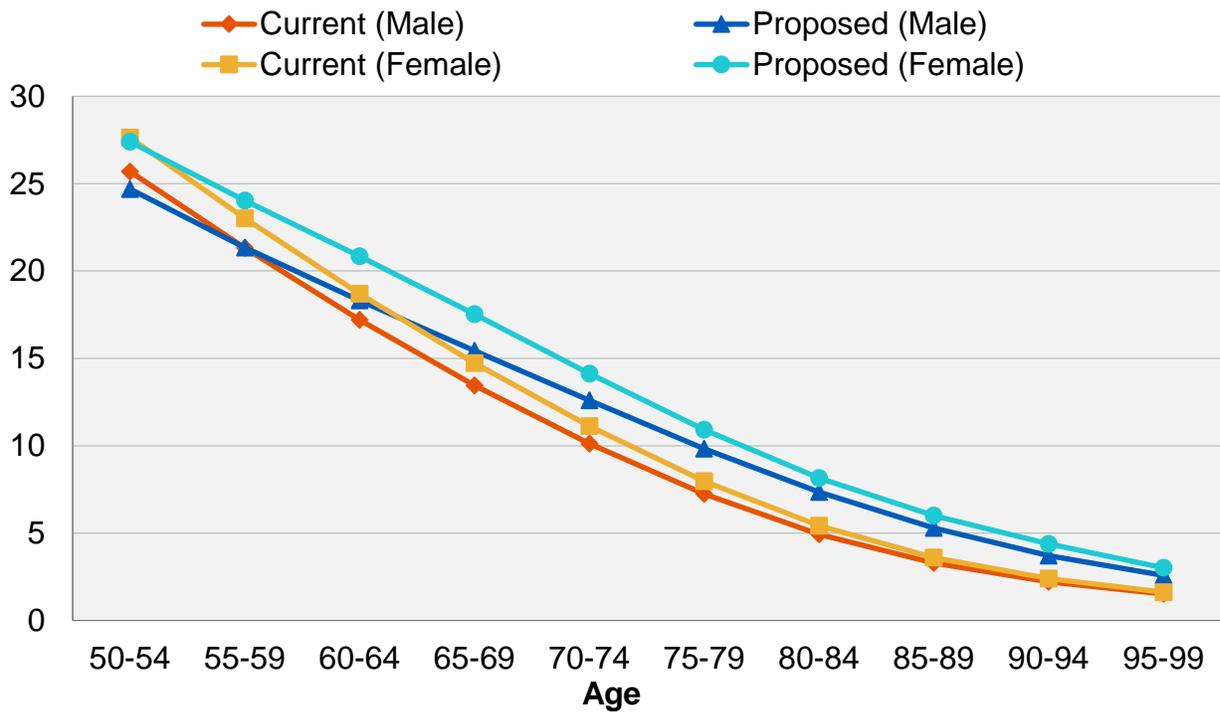
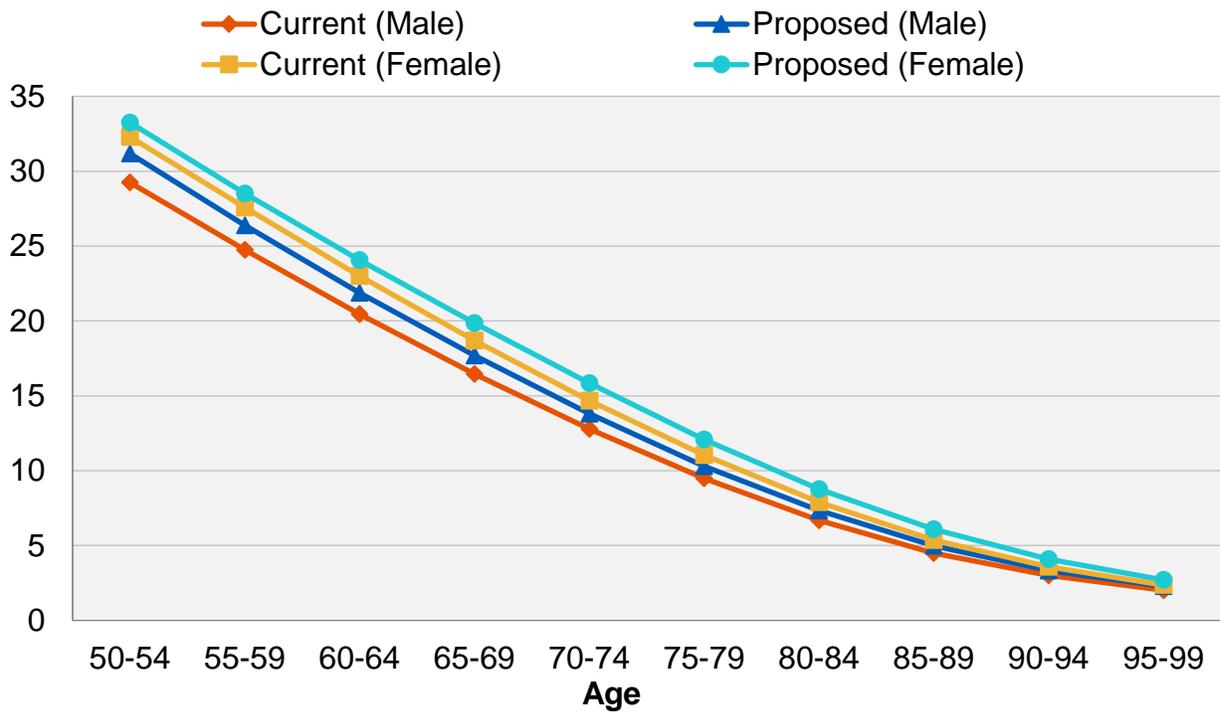


Chart 21: Benefit-Weighted Life Expectancies
Disabled Safety Members



D. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is an overall assumed incidence of total termination based on the plan membership, and years of service, combined with an assumption as to whether the terminated vested member will choose a deferred vested benefit or a refund of contributions. The latter assumption is also based on plan membership and years of service. With this study, we continue to recommend that this same assumption structure be used.

The termination experience over the last six years for General and Safety members is shown by years of service in the following tables. We have included six years of experience, rather than only the three years of the current experience period, in order to improve the credibility of KCERA's termination experience. Please note that we have excluded any members that were eligible for retirement. We also show the current and proposed assumptions.

Rates of Termination – General

Years of Service	Termination Rate (%)		
	Current Rate	Observed Rate	Proposed Rate
Less than 1	17.00	16.74	17.00
1 – 2	13.00	12.56	13.00
2 – 3	10.00	10.85	10.00
3 – 4	9.00	8.94	9.00
4 – 5	7.50	9.03	8.50
5 – 6	6.50	7.94	8.00
6 – 7	5.50	7.05	7.00
7 – 8	5.00	5.87	6.00
8 – 9	4.50	5.77	5.00
9 – 10	4.00	4.00	4.00
10 – 11	3.25	4.16	3.75
11 – 12	3.00	4.00	3.50
12 – 13	2.80	5.18	3.25
13 – 14	2.60	2.30	3.00
14 – 15	2.40	2.38	2.75
15 – 16	2.30	3.13	2.50
16 – 17	2.20	2.95	2.30
17 – 18	2.10	2.11	2.10
18 – 19	1.90	0.98	1.90
19 – 20	1.70	2.76	1.70
20 – 21	1.50	2.75	1.50
21 – 22	1.30	2.48	1.30
22 – 23	1.10	2.86	1.10
23 – 24	1.00	0.83	1.00
24 – 25	1.00	1.35	1.00
25 – 26	1.00	3.39	1.00
26 – 27	1.00	4.65	1.00
27 – 28	1.00	4.35	1.00
28 – 29	1.00	0.00	1.00
29 – 30	1.00	0.00	1.00
30 & Over	0.00	N/A	0.00

Rates of Termination – Safety

Years of Service	Termination Rate (%)		
	Current Rate	Observed Rate	Proposed Rate
Less than 1	8.00	9.03	9.00
1 – 2	6.00	8.49	8.00
2 – 3	4.50	7.63	7.00
3 – 4	4.00	6.44	6.00
4 – 5	3.50	6.24	5.00
5 – 6	3.00	3.77	4.00
6 – 7	2.50	3.01	3.50
7 – 8	2.20	4.07	3.25
8 – 9	2.10	3.43	3.00
9 – 10	2.00	3.54	2.60
10 – 11	1.90	2.37	2.20
11 – 12	1.80	1.71	1.80
12 – 13	1.60	0.46	1.60
13 – 14	1.40	1.63	1.40
14 – 15	1.20	1.67	1.20
15 – 16	1.00	1.58	1.00
16 – 17	0.90	0.49	0.90
17 – 18	0.75	0.88	0.75
18 – 19	0.75	0.37	0.75
19 – 20	0.75	0.58	0.75
20 & Over	0.00	N/A	0.00

Based upon the recent experience, we recommend the termination rates for most service categories for both General and Safety members be increased as shown above. It is important to note that not every service category has enough exposures and/or decrements such that the results in that category are statistically credible. This is mainly the case at the highest service categories since most members in those categories are eligible to retire and so have been excluded from our review of this experience. It is also the case in the tables that follow due to the even more limited experience regarding actual terminations.

The next two tables show the refund election experience over the last six years for General and Safety members.

Rates of Electing a Refund of Contributions upon Termination – General

Years of Service*	Rates of Electing a Refund of Contributions upon Termination (%)		
	Current Rate	Observed Rate	Proposed Rate
5 – 6	45.00	31.91	36.00
6 – 7	42.00	34.38	34.00
7 – 8	40.00	20.37	32.00
8 – 9	36.00	23.64	30.00
9 – 10	32.00	20.90	28.00
10 – 11	30.00	21.28	26.00
11 – 12	28.00	17.07	25.00
12 – 13	26.00	20.93	24.00
13 – 14	24.00	18.75	23.00
14 – 15	22.00	25.00	22.00
15 – 16	20.00	21.05	21.00
16 – 17	18.00	0.00	18.00
17 – 18	16.00	11.11	16.00
18 – 19	14.00	33.33	14.00
19 – 20	13.00	14.29	13.00
20 – 21	12.00	0.00	12.00
21 – 22	11.00	0.00	11.00
22 – 23	10.00	0.00	10.00
23 – 24	8.00	0.00	8.00
24 – 25	6.00	0.00	6.00
25 – 26	4.00	0.00	4.00
26 – 27	2.00	0.00	2.00
27 & Over	0.00	0.00	0.00

* All members with less than 5 years of service are assumed to elect a refund of contributions

Rates of Electing a Refund of Contributions upon Termination – Safety

Years of Service*	Rates of Electing a Refund of Contributions upon Termination (%)		
	Current Rate	Observed Rate	Proposed Rate
5 – 6	50.00	35.00	44.00
6 – 7	46.00	25.00	40.00
7 – 8	44.00	36.36	38.00
8 – 9	36.00	26.32	32.00
9 – 10	32.00	21.05	30.00
10 – 11	28.00	16.67	26.00
11 – 12	25.00	0.00	25.00
12 – 13	21.00	0.00	21.00
13 – 14	18.00	0.00	18.00
14 – 15	15.00	14.29	15.00
15 – 16	12.00	28.57	12.00
16 – 17	10.00	0.00	10.00
17 – 18	8.00	0.00	8.00
18 – 19	6.00	0.00	6.00
19 – 20	4.00	0.00	4.00
20 & Over	0.00	N/A	0.00

* All members with less than 5 years of service are assumed to elect a refund of contributions

Chart 22 compares actual to expected terminations over the past six years for both the current and proposed assumptions.

Chart 23 shows the actual termination rates over the past six years compared to the current and proposed assumptions for General members.

Chart 24 shows the same information as Chart 22, but for Safety members.

Chart 25 shows the actual rates of electing a refund of contributions compared to the current and proposed assumptions for General members.

Chart 26 shows the same information as Chart 24, but for Safety members.

For both General and Safety members, the overall actual rates for electing a refund of contributions are comparable to the current assumptions for the past six years but there are differences in certain service bands. **For General members, we recommend decreasing the rates of electing a refund of contributions between 5 and 13 years of service and increasing the rate of electing a refund of contributions at 15 years of service, as shown**

above. For Safety members, we recommend decreasing the rates of electing a refund of contributions between 5 and 10 years of service, as shown above.

We also continue to recommend that termination rates are zero at any age where members are assumed to retire. In other words, at those ages, members will either retire in accordance with the retirement rate assumptions or continue working, rather than terminate and defer their benefit.

Chart 22: Actual Number of Terminations Compared to Expected

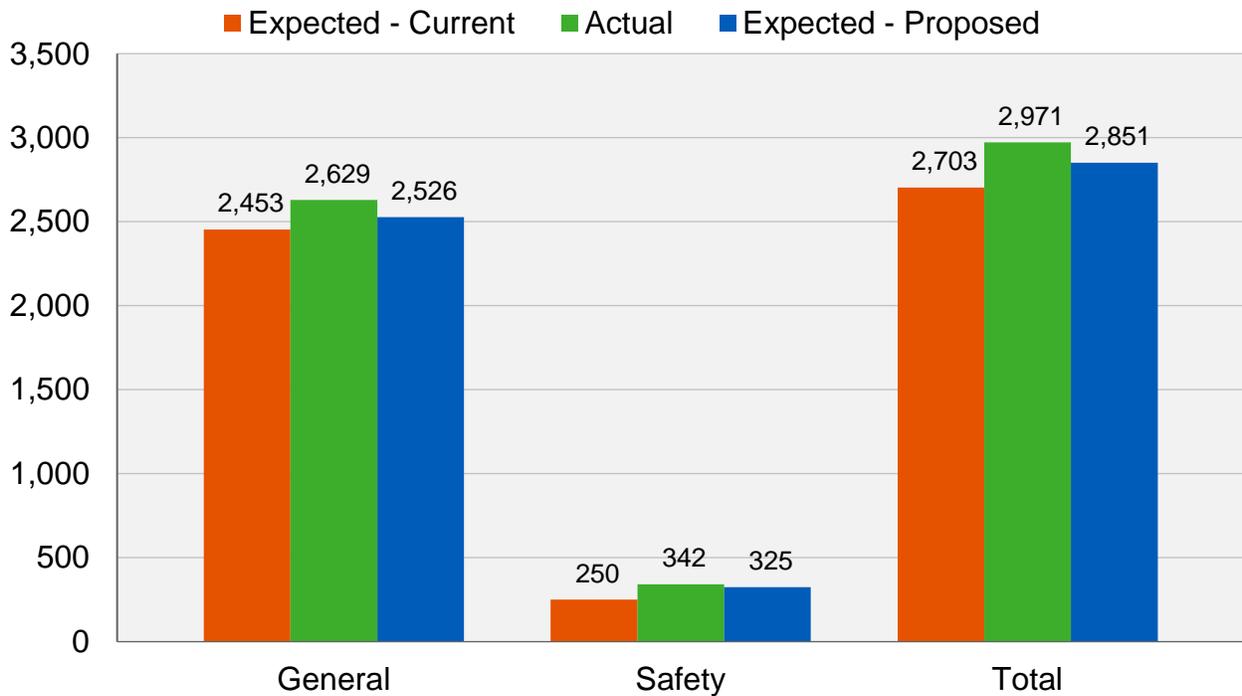


Chart 23: Termination Rates – General Members

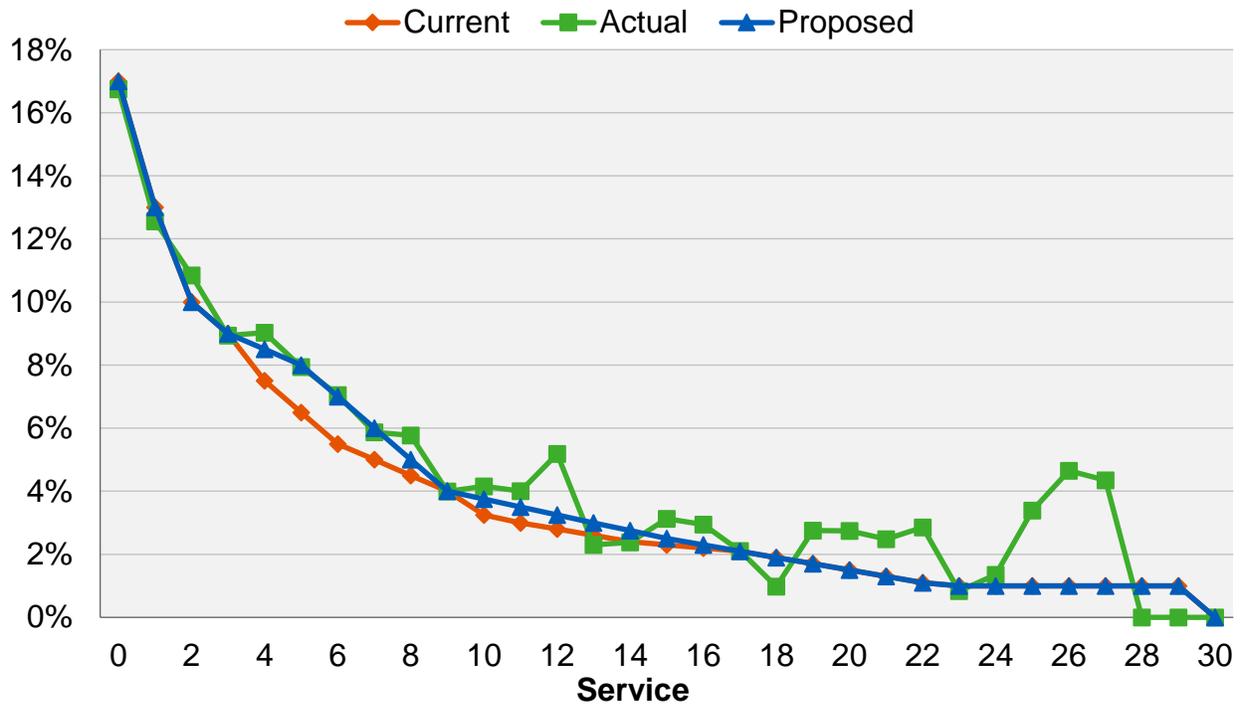


Chart 24: Termination Rates – Safety Members

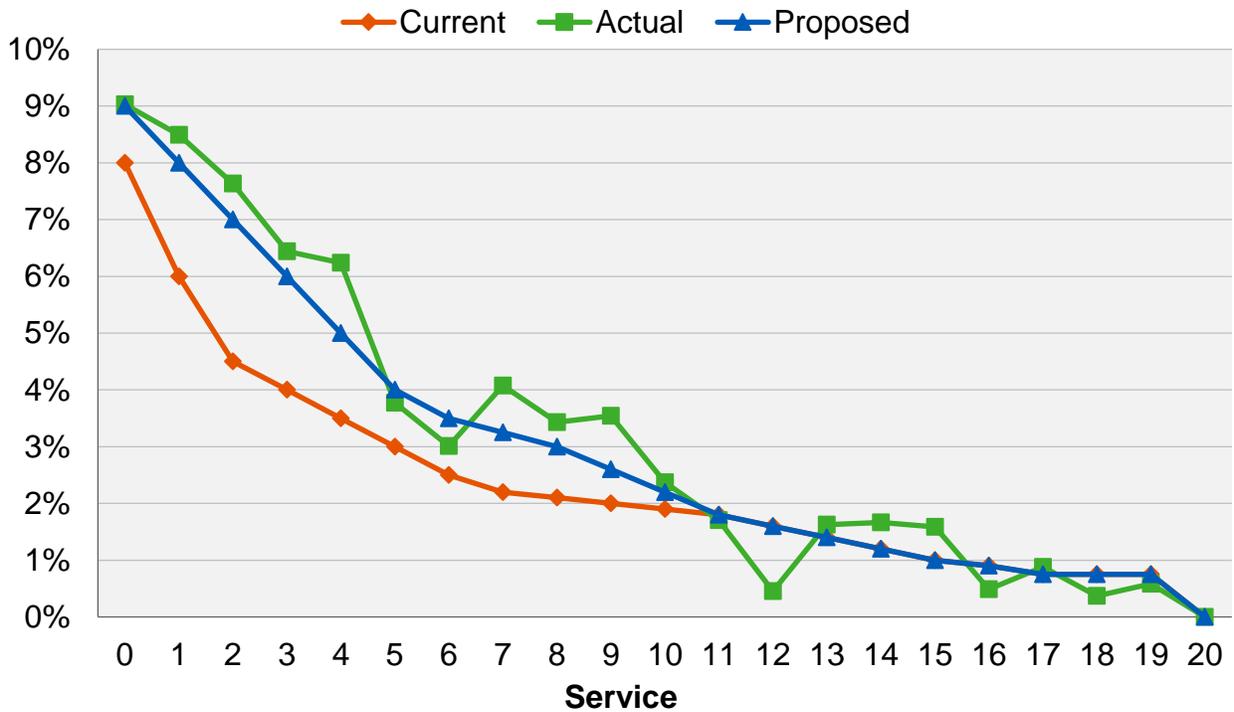


Chart 25: Rates of Electing a Refund – General Members

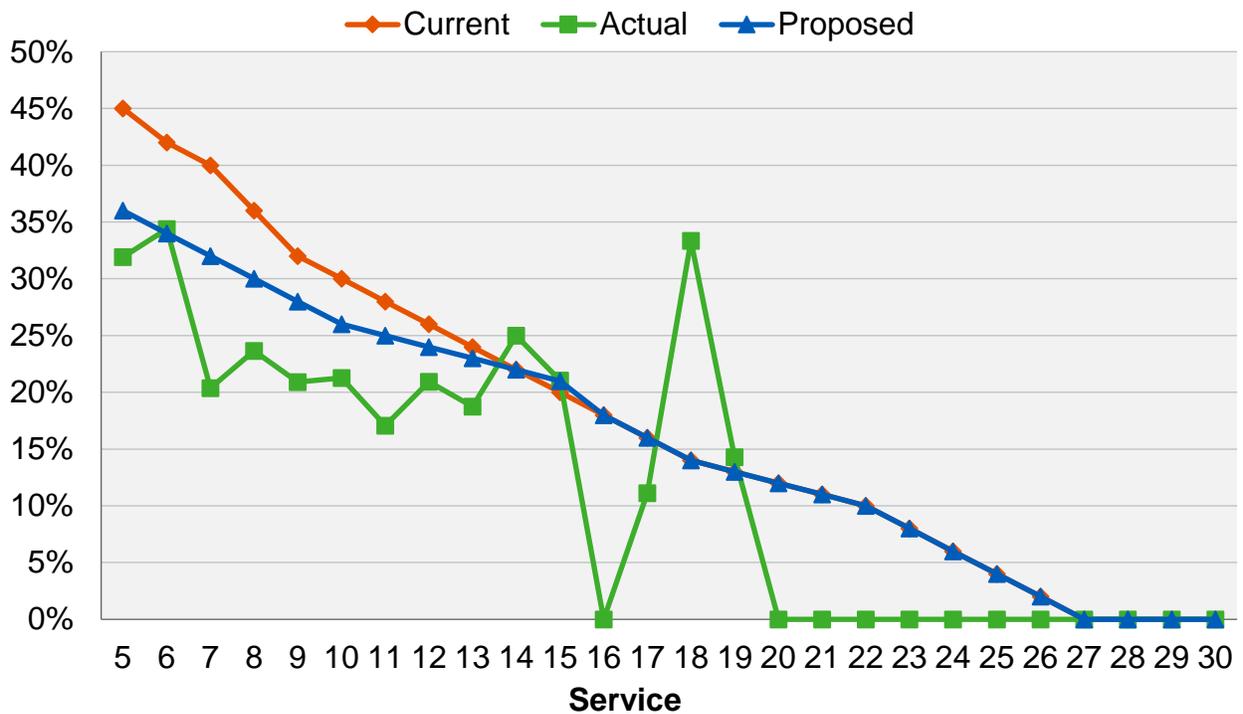
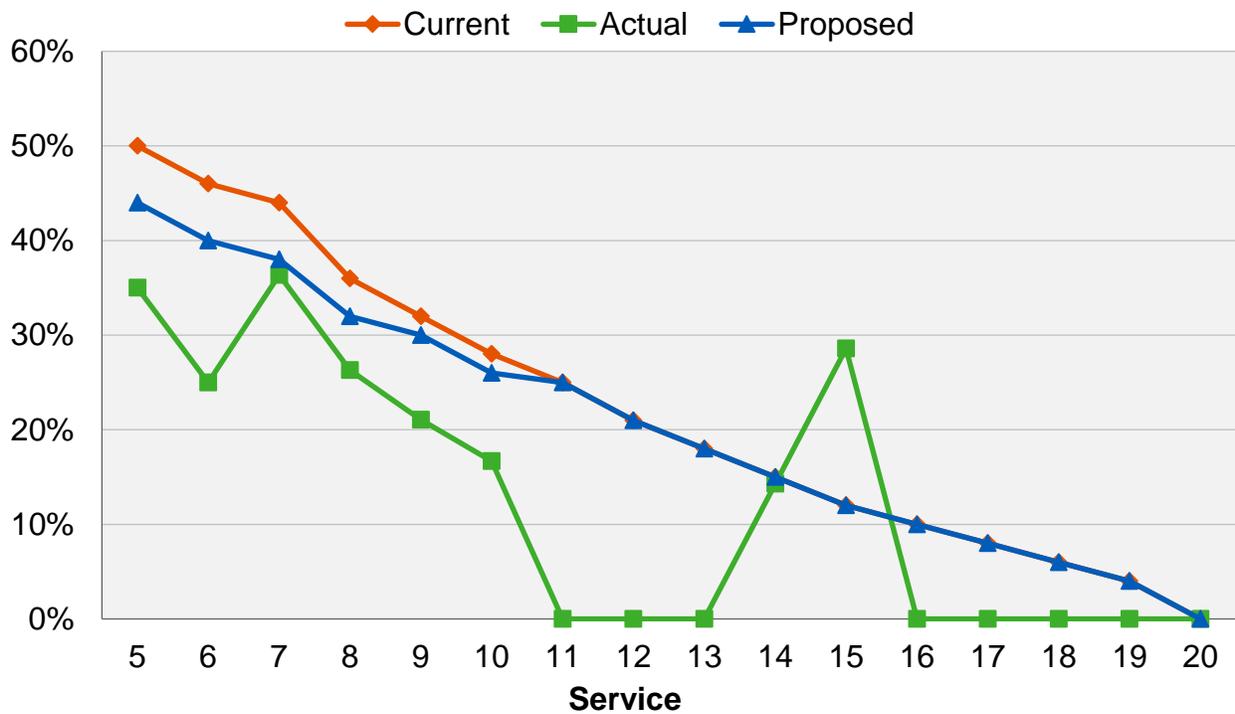


Chart 26: Rates of Electing a Refund – Safety Members



E. Disability Incidence Rates

When a member becomes disabled, he or she may be entitled to at least a 50% of pay pension (service connected disability), or a pension that depends upon the member’s years of service (non-service connected disability).

The following summarizes the actual incidence of combined service and non-service connected disabilities over the past three years compared to the current and proposed assumptions for both service connected and non-service connected disability incidence:

Rates of Disability Incidence

Disability Incidence Rate (%)						
General				Safety		
Age	Current Rate	Observed Rate	Proposed Rate	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.02	0.00	0.02	0.05	0.00	0.05
25 – 29	0.03	0.00	0.03	0.08	0.00	0.08
30 – 34	0.05	0.00	0.05	0.15	0.09	0.12
35 – 39	0.10	0.00	0.08	0.30	0.18	0.24
40 – 44	0.12	0.04	0.10	0.40	0.10	0.30
45 – 49	0.20	0.00	0.15	0.50	0.40	0.45
50 – 54	0.25	0.17	0.20	1.50	0.00	1.50
55 – 59	0.30	0.17	0.30	3.25	3.65	3.25
60 – 64	0.40	0.44	0.40	4.00	1.35	4.00
65 – 69	0.40	0.22	0.40	0.00	0.00	0.00
70 – 74	0.00	0.00	0.00	0.00	0.00	0.00

Chart 27 compares the actual number of non-service connected and service connected disabilities over the past three years to that expected under both the current and proposed assumptions.

Chart 28 shows actual disability incidence rates, compared to the assumed and proposed rates for General members. Since 56% of disabled General members received a service connected disability, **we recommend maintaining the current assumption that 50% of disabilities will receive a service connected disability retirement. The remaining 50% of disabled General members are assumed to receive a non-service connected disability.**

Chart 29 graphs the same information as Chart 28, but for Safety members. Since 87% of disabled Safety members received a service connected disability, **we recommend maintaining the current assumption that 90% of disabilities will receive a service connected disability retirement. The remaining 10% of disabled Safety members are assumed to receive a non-service connected disability.**

Chart 27: Actual Number of Service and Non-service Disability Retirements Compared to Expected

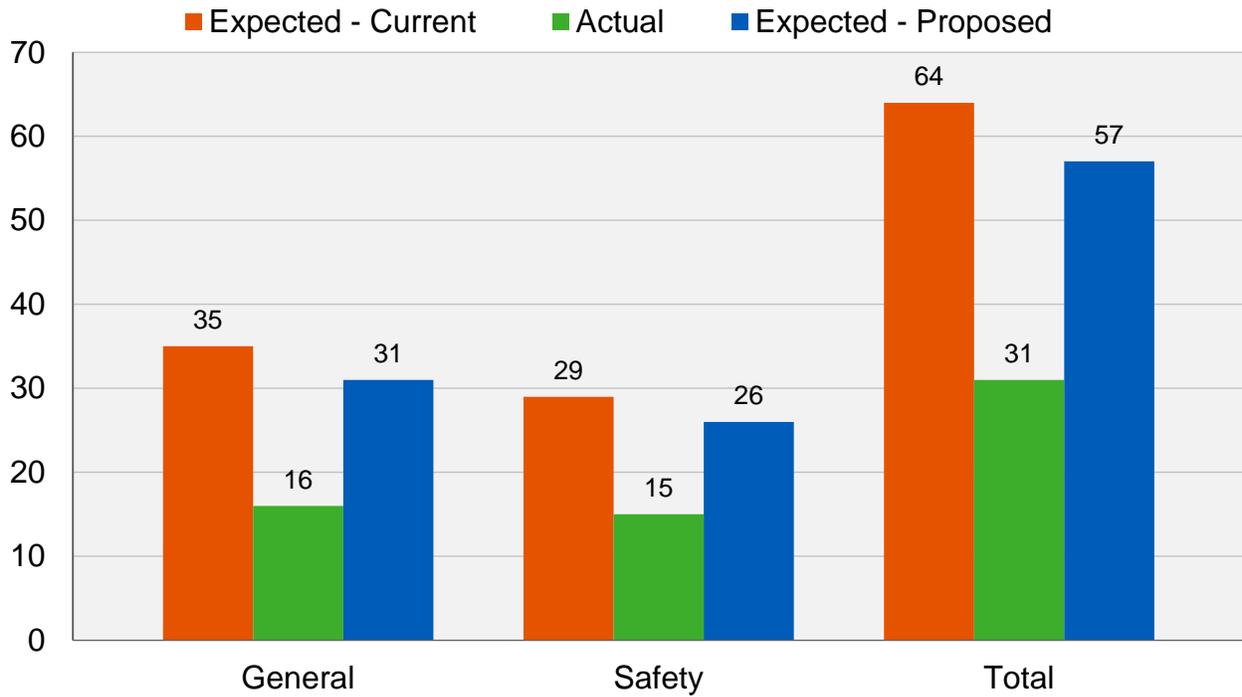


Chart 28: Disability Incidence Rates
General Members

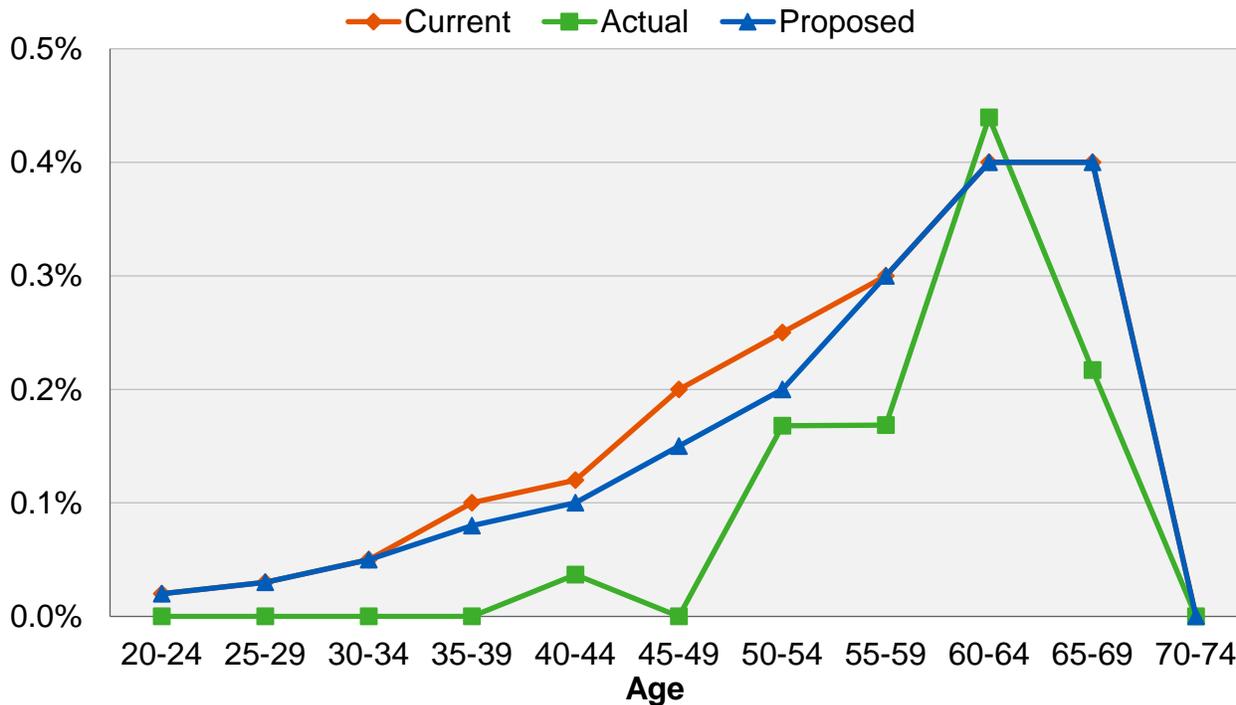
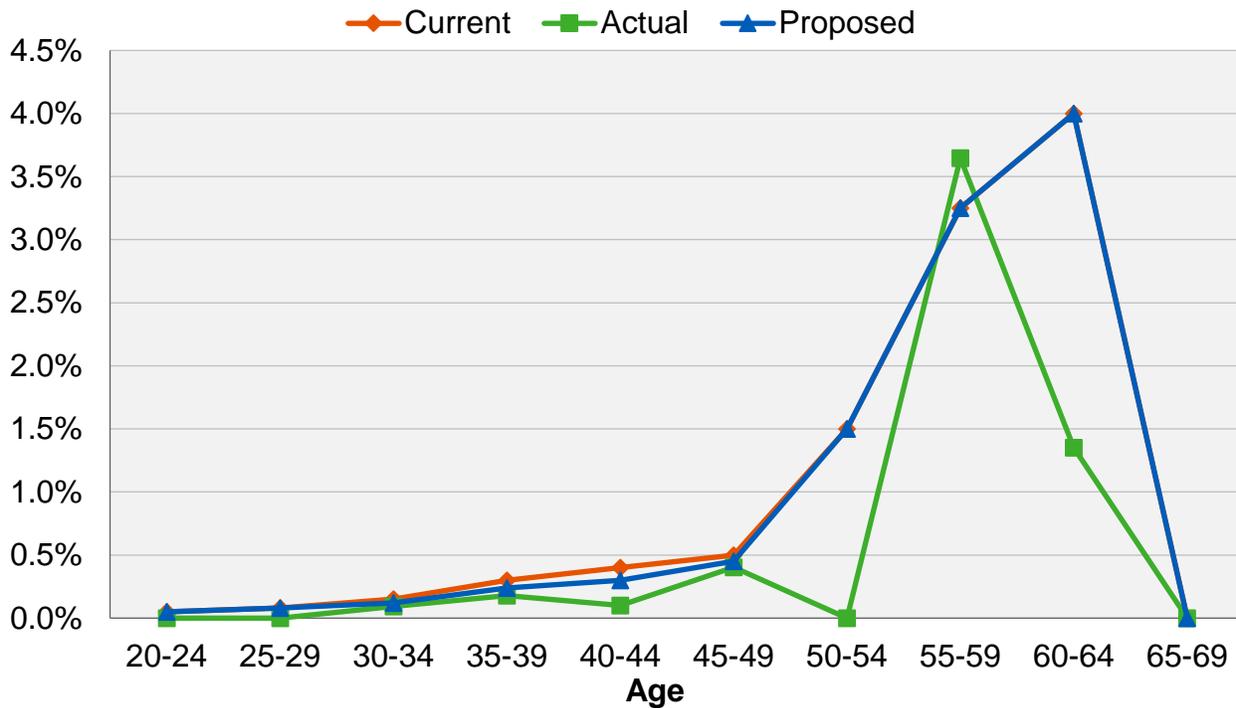


Chart 29: Disability Incidence Rates
Safety Members



V. Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the June 30, 2019 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes (as recommended in Section III of this report) and the recommended demographic assumption changes (as recommended in Section IV of this report).

The cost associated with the administrative expense load has continued to be allocated to both the employer and the member based on the components of the total contribution rate (before administrative expenses) for the employer and the member.²⁹

Cost Impact of the Recommended Assumptions Based on June 30, 2019 Actuarial Valuation

Impact on Employer Contribution Rates	
Increase due to changes in economic assumptions	0.27%
Increase due to changes in demographic assumptions	<u>1.94%</u>
Total increase in average employer rate	2.21%
Total estimated increase in annual dollar amount (\$000s) ³⁰	\$12,815
Impact on Member Contribution Rates	
Decrease due to changes in economic assumptions	-0.05%
Increase due to changes in demographic assumptions	<u>0.07%</u>
Total increase in average member rate	0.02%
Total estimated increase in annual dollar amount (\$000s) ³⁰	\$44
Impact on UAAL and Funded Percentage	
Increase in UAAL	\$137 million
Change in Funded Percentage	From 64.80% to 63.49%

Of the various demographic assumption changes, the cost increase is from the change in the mortality assumptions, offset somewhat by the other demographic assumption changes.

²⁹ The actual allocation of contribution rates for administrative expenses will be determined in each actuarial valuation to reflect the relative proportion of employer and member contributions.

³⁰ Based on June 30, 2019 projected annual payroll as determined under each set of assumptions.

We have also analyzed in the tables below the average employer and member contribution rate impacts for each cost group due to the recommended assumption changes as if they were applied to the June 30, 2019 actuarial valuation.

Employer Contribution Rate Increases/(Decreases) (% of Payroll) (Estimated Annual Dollar amounts in Thousands)				
	Normal Cost	UAAL	Total	Annual Amount³¹
General County without Courts	-0.07%	2.50%	2.43%	\$9,356
Courts	0.02%	2.50%	2.52%	785
County Safety	-1.11%	2.47%	1.36%	1,670
District Category I	0.00%	2.72%	2.72%	162
District Category II	-0.12%	2.72%	2.60%	58
District Category III	0.02%	2.72%	2.74%	712
District Category V	-0.06%	2.72%	2.66%	32
District Category VI	0.11%	2.72%	2.83%	12
Declining Employers	0.00%	17.39%	17.39%	28
Combined	-0.30%	2.51%	2.21%	\$12,815

³¹ Based on June 30, 2019 projected annual payroll as determined under each set of assumptions.

Average Member Contribution Rate Increases/(Decreases) (% of Payroll) (Estimated Annual Dollar Amounts in Thousands)		
	Total	Annual Amount ³¹
County General Tier I without Courts	0.16%	\$232
County General Tier IIA without Courts	0.25%	163
County General Tier IIB without Courts	-0.02%	-61
Courts Tier I	0.00%	-3
Courts Tier IIA	0.23%	6
Courts Tier IIB	-0.02%	-4
County Safety Tier I	0.00%	-18
County Safety Tier IIA	0.02%	0
County Safety Tier IIB	-1.00%	-284
District Category I Tier I	0.09%	4
District Category I Tier IIA	0.28%	2
District Category I Tier IIB	-0.02%	0
District Category II Tier I	0.18%	3
District Category II Tier IIB	-0.02%	-1
District Category II Tier III	0.01%	0
District Category III Tier I (Buttonwillow)	0.28%	-4
District Category III Tier I (SJVAPCD)	0.05%	10
District Category III Tier IIA (Buttonwillow)	-0.02%	0
District Category III Tier IIA (SJVAPCD)	0.00%	0
District Category III Tier IIB	-0.02%	-2
District Category V Tier I	0.04%	0
District Category V Tier IIA	0.27%	1
District Category V Tier IIB	-0.02%	0
District Category VI Tier I	0.00%	0
District Category VI Tier IIB	-0.02%	0
Declining Employers Tier I	0.00%	0
Declining Employers Tier IIB	-0.02%	0
Combined	0.02%	\$44

Appendix A: Current Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.25%, net of investment expenses.
Administrative Expenses:	0.90% of payroll allocated to both the employer and member based on the components of the total contribution rate (before expenses) for the employer and member.
Employee Contribution Crediting Rate:	7.25%, compounded semi-annually.
Consumer Price Index:	Increase of 3.00% per year; retiree COLA increases due to CPI are limited to maximum of 2.50% per year.
Payroll Growth:	Inflation of 3.00% per year plus “across the board” real salary increases of 0.50% per year.
Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 3.00% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 3.00% per year from the valuation date.

Salary Increases

Inflation: 3.00% per year; plus “across the board” real salary increases of 0.50% per year; plus the following merit and promotion increases.

Annual Rate of Compensation Increase

Years of Service	Rate (%)	
	General	Safety
Less than 1	5.50	9.00
1 – 2	4.00	6.50
2 – 3	3.50	5.50
3 – 4	3.00	4.25
4 – 5	2.50	3.75
5 – 6	2.25	3.25
6 – 7	2.00	3.00
7 – 8	1.50	2.50
8 – 9	1.25	1.75
9 – 10	1.00	1.50
10 – 11	0.90	1.25
11 – 12	0.80	1.00
12 – 13	0.70	0.90
13 – 14	0.60	0.85
14 – 15	0.50	0.80
15 – 16	0.50	0.75
16 – 17	0.50	0.70
17 – 18	0.50	0.65
18 – 19	0.50	0.60
19 – 20	0.50	0.55
20 & Over	0.50	0.50

Demographic Assumptions

Mortality Rates – Healthy

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males and set forward two years for females, projected generationally with the two-dimensional MP-2016 projection scale.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year for males and females, projected generationally with the two-dimensional MP-2016 projection scale.

Mortality Rates – Disabled

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward seven years for males and set forward eight years for females, projected generationally with the two-dimensional MP-2016 projection scale.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years for males and females, projected generationally with the two-dimensional MP-2016 projection scale.

Mortality Rates – Beneficiaries

- **Beneficiaries:** Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

Mortality Rates - Member Contribution Rates

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males and set forward two years for females, projected to 2034 with the two-dimensional MP-2016 projection scale, weighted 30% male and 70% female.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year for males and females, projected to 2034 with the two-dimensional MP-2016 projection scale, weighted 80% male and 20% female.

Mortality Rates – Pre-Retirement

- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Mortality Table times 80%, projected generationally with the two-dimensional MP-2016 projection scale.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
25	0.05	0.02	0.05	0.02
30	0.05	0.02	0.05	0.02
35	0.05	0.03	0.05	0.03
40	0.06	0.04	0.06	0.04
45	0.10	0.07	0.10	0.07
50	0.17	0.11	0.17	0.11
55	0.27	0.17	0.27	0.17
60	0.45	0.24	0.45	0.24
65	0.78	0.36	0.78	0.36

All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.

Disability Incidence Rates

Age	Rate (%)	
	General*	Safety**
20	0.02	0.05
25	0.03	0.07
30	0.04	0.12
35	0.08	0.24
40	0.11	0.36
45	0.17	0.46
50	0.23	1.10
55	0.28	2.55
60	0.36	3.70
65	0.40	4.00
70	0.00	0.00

* 50% of General disabilities are assumed to be service connected (duty) disabilities and the other 50% are assumed to be non-service connected (ordinary) disabilities.

** 90% of Safety disabilities are assumed to be service connected (duty) disabilities and the other 10% are assumed to be non-service connected (ordinary) disabilities.

Termination Rates*

Years of Service	Rate (%)	
	General	Safety
Less than 1	17.00	8.00
1 – 2	13.00	6.00
2 – 3	10.00	4.50
3 – 4	9.00	4.00
4 – 5	7.50	3.50
5 – 6	6.50	3.00
6 – 7	5.50	2.50
7 – 8	5.00	2.20
8 – 9	4.50	2.10
9 – 10	4.00	2.00
10 – 11	3.25	1.90
11 – 12	3.00	1.80
12 – 13	2.80	1.60
13 – 14	2.60	1.40
14 – 15	2.40	1.20
15 – 16	2.30	1.00
16 – 17	2.20	0.90
17 – 18	2.10	0.75
18 – 19	1.90	0.75
19 – 20	1.70	0.75
20 – 21	1.50	0.00
21 – 22	1.30	0.00
22 – 23	1.10	0.00
23 – 24	1.00	0.00
24 – 25	1.00	0.00
25 – 26	1.00	0.00
26 – 27	1.00	0.00
27 – 28	1.00	0.00
28 – 29	1.00	0.00
29 – 30	1.00	0.00
30 & Over	0.00	0.00

* Refer to the next table that contains rates for electing a refund of contributions upon termination. No termination is assumed after a member is first assumed to retire.

Electing a Refund of Contributions upon Termination

Years of Service	Rate (%)	
	General	Safety
Less than 5	100.00	100.00
5 – 6	45.00	50.00
6 – 7	42.00	46.00
7 – 8	40.00	44.00
8 – 9	36.00	36.00
9 – 10	32.00	32.00
10 – 11	30.00	28.00
11 – 12	28.00	25.00
12 – 13	26.00	21.00
13 – 14	24.00	18.00
14 – 15	22.00	15.00
15 – 16	20.00	12.00
16 – 17	18.00	10.00
17 – 18	16.00	8.00
18 – 19	14.00	6.00
19 – 20	13.00	4.00
20 – 21	12.00	0.00
21 – 22	11.00	0.00
22 – 23	10.00	0.00
23 – 24	8.00	0.00
24 – 25	6.00	0.00
25 – 26	4.00	0.00
26 – 27	2.00	0.00
27 & Over	0.00	0.00

Retirement Rates

Age	Rate (%)				
	General Tier I	General Tier IIA and IIB	General Tier III	Safety Tier I	Safety Tier IIA and IIB
45	0.00	0.00	0.00	2.00	0.00
46	0.00	0.00	0.00	2.00	0.00
47	0.00	0.00	0.00	2.00	0.00
48	0.00	0.00	0.00	3.00	0.00
49	0.00	0.00	0.00	9.00	0.00
50	6.00	3.00	0.00	20.00	6.00
51	6.00	3.00	0.00	15.00	6.00
52	6.00	3.00	3.00	18.00	6.00
53	6.00	3.00	3.00	18.00	8.00
54	8.00	3.50	3.50	20.00	18.00
55	10.00	5.50	5.50	24.00	22.00
56	12.00	6.50	6.50	24.00	20.00
57	14.00	7.50	7.50	24.00	20.00
58	15.00	9.50	9.50	30.00	20.00
59	19.00	11.50	11.50	20.00	20.00
60	23.00	13.50	13.50	20.00	20.00
61	23.00	15.50	15.50	20.00	20.00
62	25.00	25.00	25.00	40.00	40.00
63	25.00	25.00	25.00	40.00	40.00
64	25.00	25.00	25.00	40.00	40.00
65	32.00	32.00	32.00	100.00	100.00
66	35.00	35.00	35.00	100.00	100.00
67	35.00	35.00	35.00	100.00	100.00
68	40.00	40.00	40.00	100.00	100.00
69	40.00	40.00	40.00	100.00	100.00
70	100.00	100.00	100.00	100.00	100.00

Retirement Age and Benefit for Deferred Vested Members	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p style="padding-left: 40px;">General Age: 57 Safety Age: 53</p> <p>We assume that 50% of future General and 55% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocal members, we assume 4.00% compensation increases per annum for General and Safety members.</p>
Future Benefit Accruals	1.0 year of service per year of employment.
Unknown Data for Members	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Definition of Active Members	All active members of KCERA as of the valuation date.
Form of Payment	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married	For all active and inactive members, 75% of male members and 60% of female members are assumed to be married at pre-retirement death or retirement.
Age and Gender of Spouse	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.

Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.25%, net of investment expenses.
Administrative Expenses:	0.90% of payroll allocated to both the employer and member based on the components of the total contribution rate (before expenses) for the employer and member.
Employee Contribution Crediting Rate:	7.25%, compounded semi-annually.
Consumer Price Index:	Increase of 2.75% per year; retiree COLA increases due to CPI are limited to maximum of 2.50% per year.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year.
Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Salary Increases

Inflation: 2.75% per year; plus “across the board” real salary increases of 0.50% per year; plus the following merit and promotion increases.

Annual Rate of Compensation Increase

Years of Service	Rate (%)	
	General	Safety
Less than 1	5.50	8.75
1 – 2	4.50	7.00
2 – 3	4.00	5.50
3 – 4	3.50	5.00
4 – 5	3.00	4.50
5 – 6	2.50	4.00
6 – 7	2.25	3.50
7 – 8	1.75	2.50
8 – 9	1.50	1.50
9 – 10	1.25	1.25
10 – 11	1.15	1.00
11 – 12	1.05	0.80
12 – 13	0.95	0.75
13 – 14	0.85	0.70
14 – 15	0.75	0.65
15 – 16	0.75	0.60
16 – 17	0.75	0.55
17 – 18	0.75	0.50
18 – 19	0.75	0.50
19 – 20	0.75	0.50
20 & Over	0.75	0.50

Demographic Assumptions

Mortality Rates – Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Mortality Rates – Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Mortality Rates – Beneficiaries

- **Beneficiaries:** Pub-2010 General Contingent Survivor Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 10% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Mortality Rates - Member Contribution Rates

- General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates increased by 15% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 80% male and 20% female.

Mortality Rates – Pre-Retirement

- **General Members:** Pub-2010 General Employee Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019.

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
25	0.03	0.01	0.03	0.02
30	0.04	0.01	0.04	0.02
35	0.05	0.02	0.04	0.03
40	0.07	0.04	0.05	0.04
45	0.10	0.06	0.07	0.06
50	0.15	0.08	0.10	0.08
55	0.22	0.12	0.15	0.11
60	0.32	0.19	0.23	0.14
65	0.47	0.30	0.35	0.20

All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

Disability Incidence Rates

Age	Rate (%)	
	General*	Safety**
20	0.02	0.05
25	0.03	0.07
30	0.04	0.10
35	0.07	0.19
40	0.09	0.28
45	0.13	0.39
50	0.18	1.08
55	0.26	2.55
60	0.36	3.70
65	0.40	4.00
70	0.00	0.00

* 50% of General disabilities are assumed to be service connected (duty) disabilities and the other 50% are assumed to be non-service connected (ordinary) disabilities.

** 90% of Safety disabilities are assumed to be service connected (duty) disabilities and the other 10% are assumed to be non-service connected (ordinary) disabilities.

Termination Rates*

Years of Service	Rate (%)	
	General	Safety
Less than 1	17.00	9.00
1 – 2	13.00	8.00
2 – 3	10.00	7.00
3 – 4	9.00	6.00
4 – 5	8.50	5.00
5 – 6	8.00	4.00
6 – 7	7.00	3.50
7 – 8	6.00	3.25
8 – 9	5.00	3.00
9 – 10	4.00	2.60
10 – 11	3.75	2.20
11 – 12	3.50	1.80
12 – 13	3.25	1.60
13 – 14	3.00	1.40
14 – 15	2.75	1.20
15 – 16	2.50	1.00
16 – 17	2.30	0.90
17 – 18	2.10	0.75
18 – 19	1.90	0.75
19 – 20	1.70	0.75
20 – 21	1.50	0.00
21 – 22	1.30	0.00
22 – 23	1.10	0.00
23 – 24	1.00	0.00
24 – 25	1.00	0.00
25 – 26	1.00	0.00
26 – 27	1.00	0.00
27 – 28	1.00	0.00
28 – 29	1.00	0.00
29 – 30	1.00	0.00
30 & Over	0.00	0.00

* Refer to the next table that contains rates for electing a refund of contributions upon termination. No termination is assumed after a member is first assumed to retire.

Electing a Refund of Contributions upon Termination

Years of Service	Rate (%)	
	General	Safety
Less than 5	100.00	100.00
5 – 6	36.00	44.00
6 – 7	34.00	40.00
7 – 8	32.00	38.00
8 – 9	30.00	32.00
9 – 10	28.00	30.00
10 – 11	26.00	26.00
11 – 12	25.00	25.00
12 – 13	24.00	21.00
13 – 14	23.00	18.00
14 – 15	22.00	15.00
15 – 16	21.00	12.00
16 – 17	18.00	10.00
17 – 18	16.00	8.00
18 – 19	14.00	6.00
19 – 20	13.00	4.00
20 – 21	12.00	0.00
21 – 22	11.00	0.00
22 – 23	10.00	0.00
23 – 24	8.00	0.00
24 – 25	6.00	0.00
25 – 26	4.00	0.00
26 – 27	2.00	0.00
27 & Over	0.00	0.00

Retirement Rates

Age	Rate (%)						
	General Tier I		General Tiers IIA and IIB	General Tier III	Safety Tier I		Safety Tier IIA and IIB
	<25 Years of Service	>25 Years of Service			<25 Years of Service	>25 Years of Service	
45	0.00	0.00	0.00	0.00	5.00	5.00	0.00
46	0.00	0.00	0.00	0.00	5.00	5.00	0.00
47	0.00	0.00	0.00	0.00	5.00	5.00	0.00
48	0.00	0.00	0.00	0.00	5.00	5.00	0.00
49	0.00	0.00	0.00	0.00	25.00	25.00	0.00
50	10.00	10.00	5.00	0.00	10.00	30.00	3.00
51	6.00	6.00	3.00	0.00	8.00	24.00	3.00
52	6.00	12.00	3.00	3.00	8.00	24.00	3.00
53	6.00	12.00	3.00	3.00	8.00	24.00	5.00
54	6.00	12.00	3.50	3.50	12.00	24.00	11.00
55	6.00	12.00	4.00	4.00	14.00	28.00	13.00
56	6.00	14.00	4.50	4.50	14.00	28.00	12.00
57	6.00	16.00	5.00	5.00	8.00	28.00	12.00
58	9.00	18.00	6.50	6.50	8.00	28.00	12.00
59	16.00	24.00	11.00	11.00	14.00	28.00	12.00
60	20.00	35.00	12.00	12.00	25.00	28.00	12.00
61	16.00	28.00	13.00	13.00	25.00	50.00	12.00
62	20.00	35.00	20.00	20.00	25.00	50.00	25.00
63	20.00	30.00	20.00	20.00	25.00	50.00	25.00
64	20.00	30.00	20.00	20.00	25.00	50.00	25.00
65	35.00	35.00	35.00	35.00	100.00	100.00	100.00
66	35.00	35.00	35.00	35.00	100.00	100.00	100.00
67	35.00	35.00	35.00	35.00	100.00	100.00	100.00
68	35.00	35.00	35.00	35.00	100.00	100.00	100.00
69	40.00	40.00	40.00	40.00	100.00	100.00	100.00
70	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Retirement Age and Benefit for Deferred Vested Members	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p style="padding-left: 40px;">General Age: 57</p> <p style="padding-left: 40px;">Safety Age: 53</p> <p>We assume that 45% of future General and 60% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocal members, we assume 4.00% and 3.75% compensation increases per annum for General and Safety members, respectively.</p>
Future Benefit Accruals	1.0 year of service per year of employment.
Unknown Data for Members	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Definition of Active Members	All active members of KCERA as of the valuation date.
Form of Payment	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married	For all active and inactive members, 70% of male members and 60% of female members are assumed to be married at pre-retirement death or retirement.
Age and Gender of Spouse	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.



Kern County Employees' Retirement Association

**Risk Assessment Including Review of
Funded Status of the Pension Plan as
of June 30, 2018**

Prepared by

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September 4, 2019

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Section 1: Introduction and Executive Summary

Introduction

The results included in our June 30, 2018 funding valuation report for the pension plan were prepared based on a fixed set of economic and non-economic actuarial assumptions under the premise that future experience of the Kern County Employees' Retirement Association (KCERA) would be consistent with those assumptions. While those assumptions are reviewed every three years (with the assumptions from the last triennial experience study adopted by the Board of Retirement for use starting with the June 30, 2017 valuation), there is a risk that emerging results may differ significantly as actual experience is fluid and may not substantially match current assumptions.

The purpose of this report is to assist the Board of Retirement, participating employers and members and other stakeholders to better understand and assess the risk profile of the system, as well as the particular risks inherent in using a fixed set of actuarial assumptions in preparing the results in our June 30, 2018 funding valuation for KCERA.

New Actuarial Standard of Practice on Risk Assessment

The Actuarial Standards Board has approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment when performing a funding valuation. While ASOP 51 will be effective with KCERA's June 30, 2019 actuarial valuation, KCERA has elected early implementation of the new Standard starting with the June 30, 2018 valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition." Examples of key risks listed that are particularly relevant to KCERA are asset/liability mismatch risk, investment risk, and longevity and other demographic risks. The Standard also requires an actuary to consider if there is any ongoing contribution risk to the plan; however it does not require the actuary to evaluate the particular ability or willingness of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's risk assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed risk assessment would be significantly beneficial for the intended user in order to examine particular financial risks. When making that recommendation, the actuary will take into account such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions. This report incorporates a more detailed risk assessment as agreed upon with KCERA.

Plan Risk Assessment

In Section 2, we start by discussing some of the historical factors that have caused changes in KCERA's funded status and employer contribution rates. It is important to understand how the combination of decisions and experience have led to the current financial status of the plan. We follow this with a discussion of the most significant risk factors going forward. Even though we have not included a numerical analysis of all the risk factors, we have been directed by KCERA to illustrate the impact on the funded status and employer contribution rates using relevant economic scenario tests. These tests illustrate the effect of future investment returns on the portfolio coming in different from the current 7.25% annual investment return assumption used in the June 30, 2018 valuation.

We have also included a projection of future results based on stochastic modeling of future investment returns. Stochastic modeling is useful for evaluating the distribution of future results based on random variations in actual investment returns each year across thousands of scenarios. This enables the association to assess potential probabilities of future outcomes which can help inform financial preparation and even future decision making.

The Standard also requires disclosure of plan maturity measures and other historical information that are significant to understanding the risks associated with the pension plan and this information is included in this report.

Supplemental Retiree Benefit Reserve

Section 3 shows, under the operation of the plan design elements found in Article 5.5 of the Statute, no “excess earnings” have been allocated from the system’s total investment portfolio to the Supplemental Retiree Benefit Reserve (SRBR) over the past 10 years. We also show the change in the funded ratio of the SRBR on a Present Value of Future Benefits (PVB) basis over the past 10 years. Based on our understanding of the statute which authorizes the SRBR, the investment return assumption used in the funding valuation has been developed without considering the impact of any future excess earnings allocations to the SRBR. However, for informational purposes, we have included in this report the same disclosure of the expected future effect of such allocations that we have previously included in our funding valuation report. We also show, specific to the SRBR, scenario tests under different market return variations as well as stochastic modeling of future returns.

Executive Summary

Historical Funded Status and Employer Contribution Rates

The following table provides a summary of financial changes to the plan over the last 10 valuations. The unfunded actuarial accrued liability (UAAL)¹ and employer contribution rates² increased primarily as a result of the strengthening of the actuarial assumptions used in preparing the valuations and unfavorable investment experience that were offset to some degree by favorable non-investment experience.

¹ For instance, the UAAL increased by \$213 million and \$204 million in the June 30, 2017 and June 30, 2014 valuations, respectively, as a result of the two immediately preceding experience studies.

² For instance, the increase in the employer’s total rate (normal cost plus UAAL) was 3.88% in the June 30, 2017 valuation and 4.26% in the June 30, 2014 valuation, as a result of the two immediately preceding experience studies.

Valuation Date	Market Value Basis ³		Valuation Value Basis ³		Aggregate Employer Contribution Rate (% of Payroll)
	Funded Status	UAAL	Funded Status	UAAL	
June 30, 2009	45%	\$2,305 M	66%	\$1,425 M	36%
June 30, 2018	64%	\$2,328 M	65%	\$2,235 M	46% ⁴

In the 10 valuations from June 30, 2009 to 2018, the assets available in the SRBR has stayed relatively flat from \$128.5 million to \$127.7 million. During this 10-year period, no excess earnings were allocated to the SRBR. The funded ratio of SRBR benefits on a Present Value of Future Benefits (PVB) basis was about 144% in the June 30, 2009 valuation and 147% in the June 30, 2018 valuation.⁵

³ Excludes non-valuation reserves (such as the SRBR).

⁴ The employer contribution is about 48% before reflecting the three-year phase-in of the UAAL employer cost impact due to assumption changes in the June 30, 2017 valuation.

⁵ During the past 10 years, the Board took two actions to increase benefits paid from the SRBR. In 2015, the Death Benefit was increased and in 2018 there was an increase in the Tier 3 purchasing power threshold from 80% to 82% along with the creation of a new Tier 4 benefit.

Future Funded Status and Employer Contribution Rates

In this report, we highlight key factors that may affect the financial profile of the plan going forward. As investment experience in the past 10 years has had a significant impact on the funded status and employer contribution rates, we have also provided deterministic projections (using select scenarios for illustration) under hypothetical favorable and unfavorable future market experience so that the impact of market performance can be better understood.

The total employer contribution rate is almost 46% of total payroll in the June 30, 2018 valuation. Using a deterministic projection that assumes KCERA earns a favorable market return of 14.5% in 2018/2019, there would be an increase in the total employer contribution rate to slightly over 46% of payroll in the June 30, 2019 valuation. This would be followed by a decrease in the total employer contribution to 43% of payroll⁶ over the next five years through the June 30, 2024 valuation when all the investment gains are fully recognized at the end of the 5-year asset smoothing period. Alternatively, an unfavorable market return of 0% in 2018/2019 would bring an increase in the total employer contribution rate to 48% of payroll in the 2019 valuation and would stay at that level through the 2024 valuation.

Furthermore, under either favorable or unfavorable hypothetical market return scenarios for 2018/2019, at the end of 18 years the system would be expected to reach full funding and the total employer contribution rate would be expected to approach about 9% of payroll⁷. That 9% of payroll is the employer normal cost rate after (1) KCERA's UAAL layers as of June 30, 2018 are paid off over periods ranging from 12 to 18 years and (2) any new UAALs resulting from the hypothetical market experience in 2018/2019 are paid off over 18 years, all pursuant to the Board's actuarial funding policy. This means that the Board's funding policy is very effective in achieving the general policy goal of achieving the long-term full funding of the costs of the benefits paid by KCERA.

Under these same deterministic projections scenarios, the funded ratio of the SRBR on a PVB basis is projected to increase over time.

⁶ The employer contribution rate would decrease to about 37% of payroll in the June 30, 2022 valuation due to the impact of the COLA Contribution Reserve. It would then increase back to 43% of payroll by the June 30, 2024 valuation.

⁷ Assuming no further assumption changes, method changes or experience that differs significantly from assumptions.

Using stochastic projections that model market return over the next 20 years by using expected return, standard deviation and other information about KCERA's asset portfolio, there is a 50% chance that the employer contribution rates would be between 34% and 53% of payroll at the end of 10 years and between 8% and 26% of payroll at the end of 20 years.

Plan Maturity Measures

During the past 10 valuations, the system has become more mature as evidenced by an increase in the ratio of members in pay status (retirees and beneficiaries) to active members and by an increase in the ratios of plan assets and liabilities to active member payroll. We expect these trends to continue going forward. This is significant for understanding the volatility of both historical and future employer contribution rates because any increase in UAAL due to unfavorable investment or non-investment experience for a relatively larger group of non-active and active members would have to be amortized and funded over the payroll of a relatively smaller group of active members. Put another way, as a plan grows more mature, its contribution rate becomes more sensitive to investment volatility and liability changes. As KCERA continues to mature with time, its risk profile will continue to evolve in this way and contributions will grow more sensitive to plan experience.

Section 2: Key Plan Risks on Funded Status, Unfunded Actuarial Accrued Liabilities, and Employer Contribution Rates

Evaluation of Historical Trends

Funded Status and UAAL

One common measure of KCERA's financial status is the funded ratio. This ratio compares the actuarial⁸, valuation⁹ and market value of assets to the actuarial accrued liabilities (AAL)¹⁰ of KCERA. The overall level of funding of KCERA on a valuation value of assets basis has stayed relatively flat as a result unfavorable investment experience. The strengthening of the economic and non-economic assumptions especially in the two triennial experience studies recommending assumptions used in the June 30, 2014 and 2017 valuations also had an impact. The funding ratios and UAAL for the past 10 valuations from June 30, 2009 to 2018 measured using both valuation and market value of assets bases are provided in Chart 1. Note that both the valuation and the market value of assets shown in this chart exclude non-valuation reserves such as the SRBR.

The factors that caused the changes in the UAAL for the past 10 valuations from June 30, 2009 to 2018 are detailed in Chart 2. The unfavorable investment experience during these 10 years has had by far the most impact on the UAAL for KCERA. The results in Chart 2 reflect the changes in the investment return assumption from 7.75% to

⁸ The actuarial value of assets is equal to the market value of assets excluding unrecognized returns from the last few years. Unrecognized returns are based on the difference between actual and expected returns on a market value basis and are recognized semi-annually over a five-year period.

⁹ The valuation value of assets is equal to the actuarial value of assets less any non-valuation reserves.

¹⁰ For the actives, the actuarial accrued liability is the value of the accumulated normal costs allocated to the years before the valuation date. For the pensioners, beneficiaries and deferred vested members, the actuarial accrued liability is the single sum present value of the lifetime benefit expected to be paid to those members.

7.50% in the June 30, 2014 valuation and from 7.50% to 7.25% in the June 30, 2017 valuation. These reductions together with the changes in the mortality tables and other assumptions from the two triennial experience studies recommending assumptions used in the June 30, 2014 and 2017 valuations have had the second most impact on the UAAL for KCERA¹¹.

Chart 2 also shows that the unfavorable investment experience was offset to some extent by favorable non-investment experience. The non-investment experience included smaller salary increases received by active members and smaller cost-of-living-adjustment (COLA) increases received by retirees and beneficiaries than those expected under the actuarial assumptions.

Finally, prior to 2017, Chart 2 shows some negative amortization (total contributions do not fully cover normal cost plus interest on the unfunded liability) under the longer amortization periods used in these years. Current amortization policy does not entail negative amortization going forward.

It is important to note that KCERA has taken significant strides in risk management and resulting long-term plan sustainability. This includes strengthening of assumptions, particularly the expected return discount rate, and adopting a funding policy that eliminates negative amortization and promotes intergenerational equity. These changes may result in higher contributions in the short term, but in the medium to longer term avoid both deferring contributions and allowing unmanaged growth in the unfunded liability. We believe these actions are essential for KCERA's fiscal health going forward.

¹¹ For instance, the UAAL increased by \$213 million and \$204 million in the June 30, 2017 and June 30, 2014 valuations, respectively, as a result of the two immediately preceding experience studies.

Chart 1

Funded Ratio (Percentages) and Dollar UAAL (\$ Millions)
 In June 30, 2009 to 2018 Valuations
 (Assets Exclude Non-valuation Reserves)

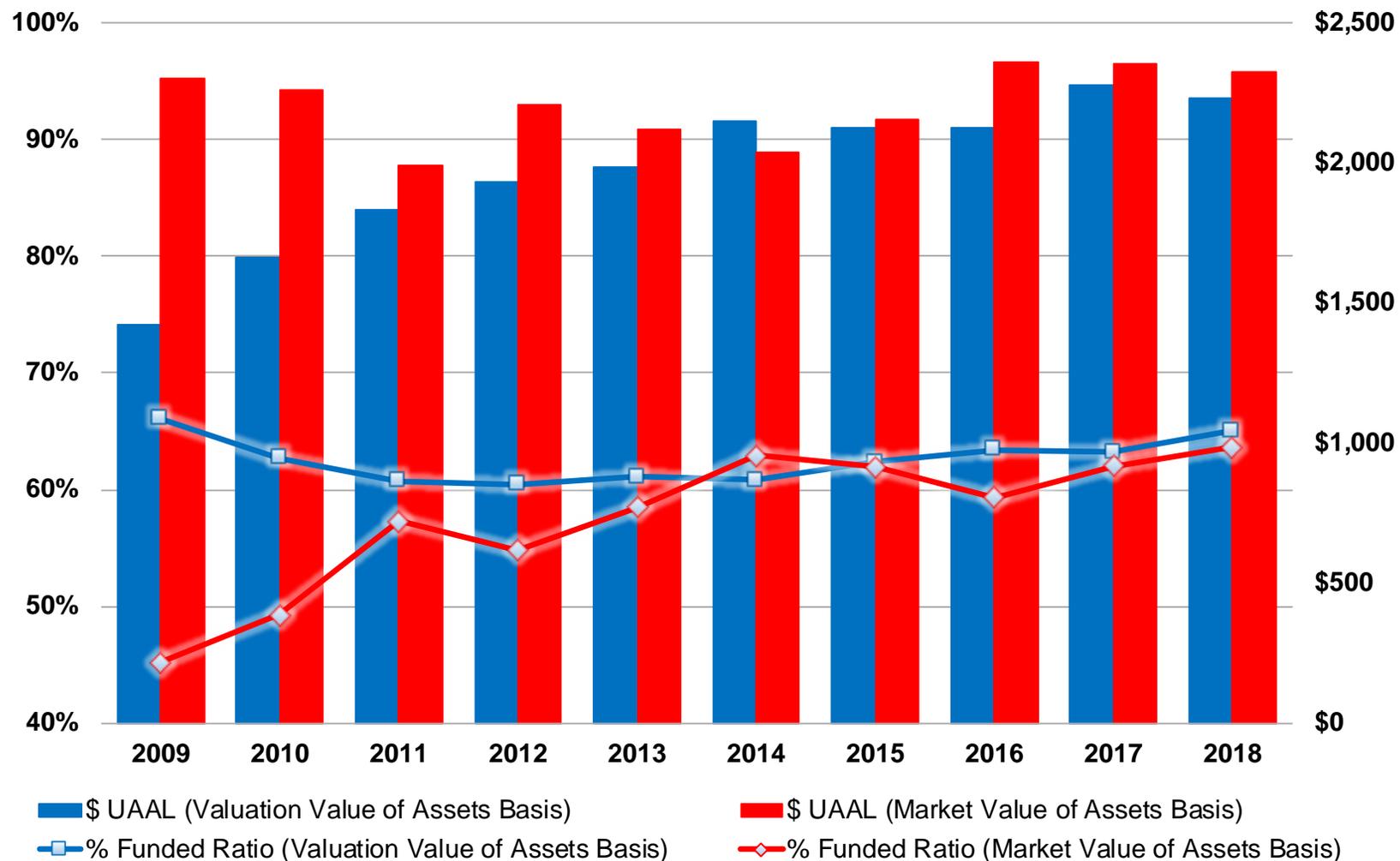
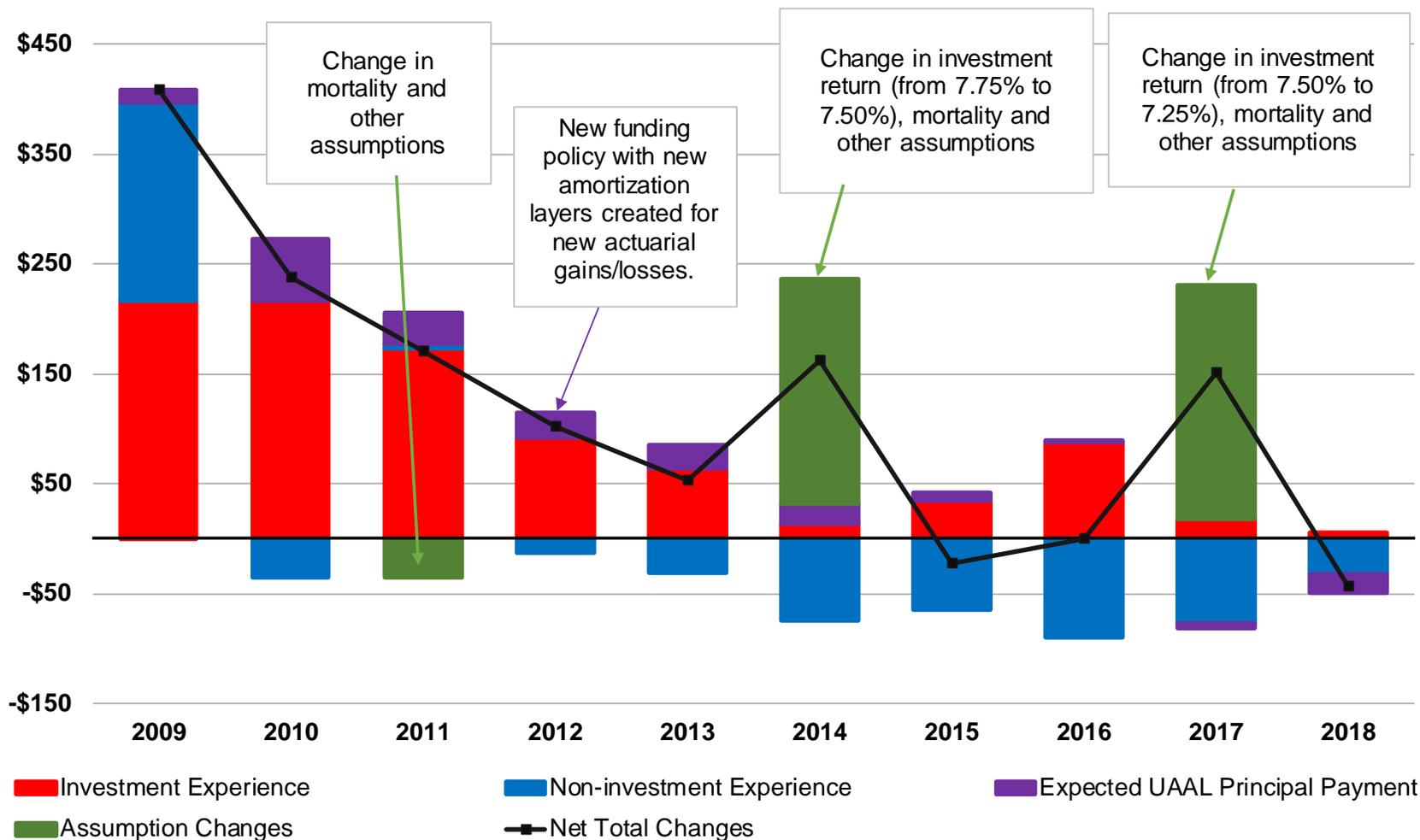


Chart 2

Factors that Changed UAAL in June 30, 2009 to 2018 Valuations (\$ Millions)



Note: The primary source of investment losses starting in the June 30, 2009 valuation is the Great Recession, which was recognized in the Actuarial and Valuation Value of Assets over a period of years. Non-investment loss shown for 2009 was due to including additional pay information in the valuation for the first time.

Employer Contribution Rates

The total (normal cost¹² plus UAAL payment) employer contribution rates determined in the June 30, 2009 to 2018 valuations are provided in Chart 3 and the factors that caused the changes in the total employer aggregate rates¹³ are provided in Chart 4.

The employer's aggregate normal cost rates in Chart 3 have decreased over the last 10 years. The employer's aggregate normal cost rates decreased mainly due to plan changes under the Public Employees' Pension Reform Act of 2013 (PEPRA) as new members have been enrolled in the lower cost PEPRA benefit tiers starting on January 1, 2013. The employer normal cost rates also decreased due to changes in contribution "pickups" where the employers are now paying for a smaller portion of the member contribution rates as compared to previous arrangements.

Chart 4 shows that unfavorable investment experience in 2008/2009, which was recognized over a period of years beginning with the June 30, 2009 valuation under KCERA's asset smoothing policy, had the most impact on increasing the UAAL contribution rates for the employers. The next greatest impact was from the changes in the investment return (from 7.75% to 7.50% in the June 30, 2014 valuation, from 7.50% to 7.25% in the June 30, 2017 valuation), mortality tables and other assumptions from the two triennial experience studies performed before those two valuations¹⁴.

¹² The normal cost is the amount of contributions required to fund the level cost of the member's projected retirement benefit allocated to the current year of service.

¹³ There are separate contribution rates determined in the valuation for the General County, District and Safety membership groups and for the different benefit tiers. The aggregate rates have been calculated based on an average of those rates weighted by the payrolls of the active members reported in those valuations.

¹⁴ For instance, the increase in the employer's total rate (normal cost plus UAAL) was 4.26% in the June 30, 2014 valuation and 3.88% in the June 30, 2017 valuation, as a result of the two experience studies.

Chart 3

Employer Contribution Rates in June 30, 2009 to 2018 Valuations (% of Payroll)

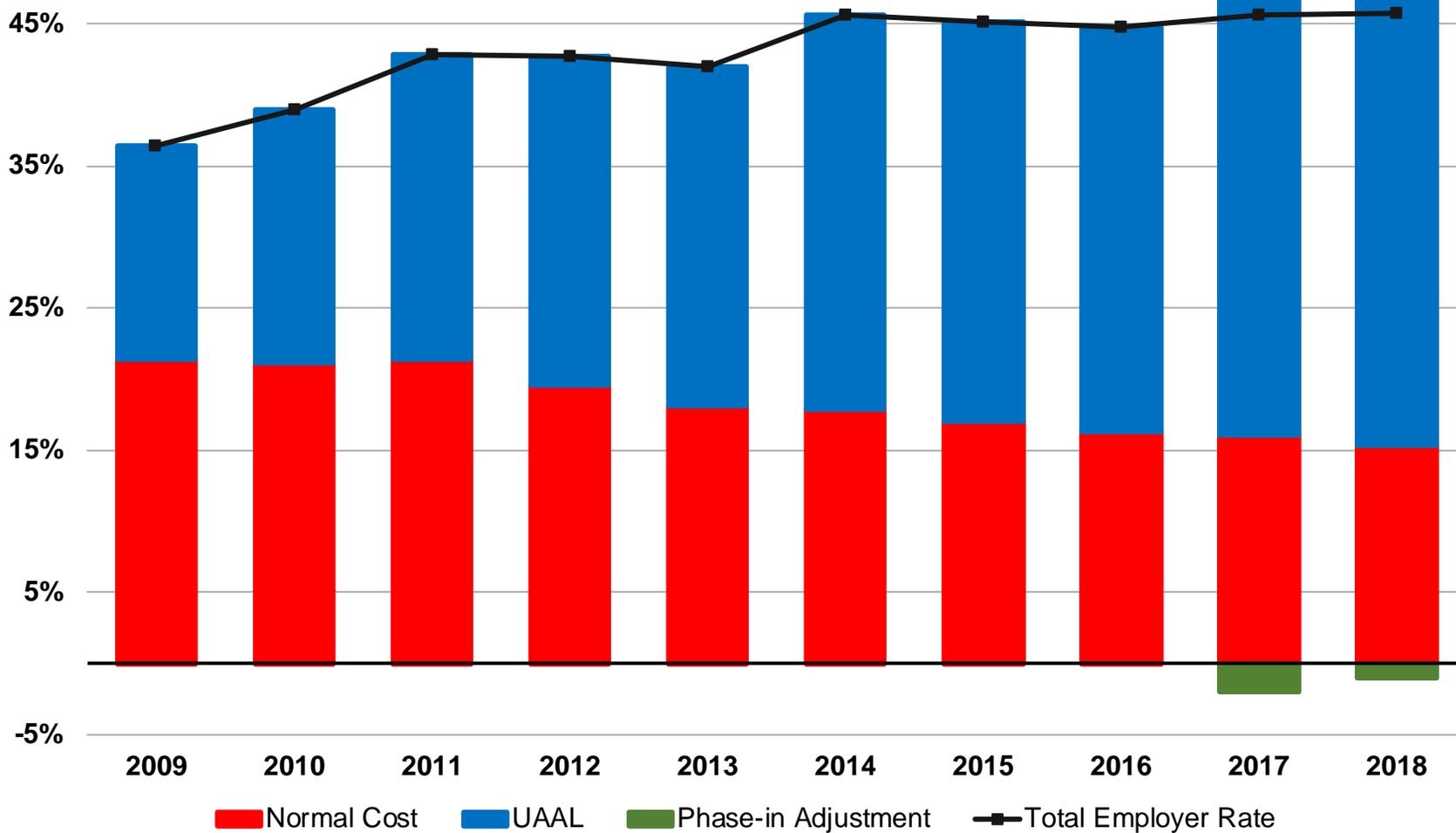
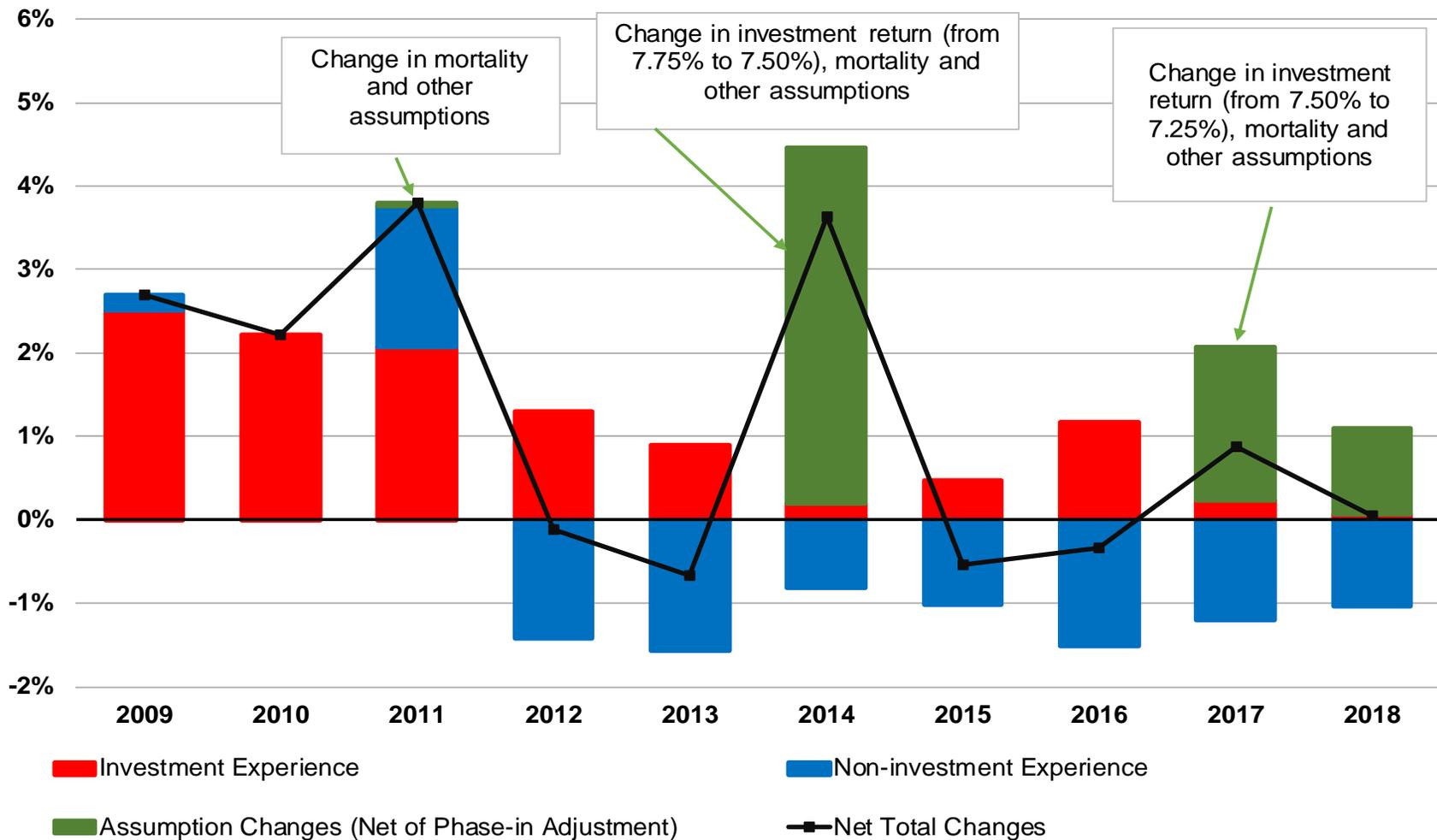


Chart 4

Factors that Affected Employer Contribution Rates in June 30, 2009 to 2018 Valuations (% of Payroll)



Note: The primary source of investment losses starting in the June 30, 2009 is the Great Recession, which was recognized in the Actuarial and Valuation Value of Assets over a period of years.

Assessment of Primary Risk Factors Going Forward

As discussed in the Evaluation of Historical Trends section, in the 2009 to 2018 valuations the funded ratios and the employer contribution rates have changed mainly as a result of investment experience and changes in actuarial assumptions.

In general, we anticipate the following risk factors will have an ongoing influence on those financial metrics in our future valuations:

- Asset/liability mismatch risk – the potential that changes in plan experience do not affect asset and liability values in the same way, causing them to diverge.

The most significant asset/liability mismatch risk to KCERA is investment risk, as defined below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, those changes are essentially independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions or other market conditions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from the experience of the asset values. As an example, we estimate that the total (employer and employee) contribution rate would increase by roughly 3% of payroll for a 0.25% reduction in both the investment return assumption and the price inflation assumption .

Asset/liability mismatch can also be caused by longevity and other demographic assumption risks, which affect liabilities but have no impact on asset levels. These risks are also discussed below.

It may be informative to use the Asset Volatility and Liability Volatility Ratio and associated contribution rate impacts provided in the following Plan Maturity Measures section when discussing with the employers the effect of unfavorable or favorable actuarial experience on the assets and the liabilities of KCERA .

- Investment risk – the potential that future market returns will be different from the current expected 7.25% annual return assumption.

The investment return assumption is a long-term, constant assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. We have included deterministic scenario tests later in this section so that KCERA can better understand the risk associated with earning either more or less than the assumed rate.

The Board has a policy of reviewing the investment return and the other actuarial assumptions every three years. As part of that review we provide the estimated impact of all recommended assumption changes. If the Board is interested in further understanding the sensitivity of plan liabilities and costs to changes in key assumptions like the 7.25% investment return assumption, future risk reports could include a sensitivity analysis for select changes to particular assumptions.

- Longevity and other demographic risks – the potential that mortality or other demographic experience will be different than expected.

Aside from updates to the mortality tables to anticipate continued improvement in life expectancy for the system's members, there were no major changes in the other non-economic assumptions in the last experience study. As can be observed from Charts 2 and 4, there was some impact on the UAAL and employer contribution rates due to favorable non-investment related experience relative to the assumptions used in the last 10 valuations. This experience was mainly due to actuarial gains associated with salary increases received by active members and COLA increases received by retirees and beneficiaries less than expected. In the last triennial experience study recommending assumptions for the June 30, 2017 valuation, we alerted the Board that it should consider a new benefit weighted mortality basis when choosing the next mortality table, pending the availability of mortality experience from the Society of Actuaries (SOA) that included data from public sector retirement plans. In January 2019, the SOA published the public sector mortality tables. While it is premature to estimate the impact of applying those new mortality tables on employer and employee contribution rates until we perform the next triennial experience study

recommending assumptions for the June 30, 2020 valuation, the Board should be aware that there might be some increase in liabilities and contribution rates.

- Plan design considerations – potential SRBR excess earnings allocations and the impact on the net investment return available for the pension plan.

As we have previously disclosed in the funding valuation report, the 7.25% investment return assumption used in the valuation for the Pension Plan has been developed without considering the impact of any future 50/50 excess earnings allocation to the SRBR. This is based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than is used for interest crediting. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption of 7.25%.

Using a stochastic projection approach (an aggregation of many potential scenarios), we estimated that the 50/50 allocation of future excess earnings would have about the same impact as an outflow (i.e., assets not available to fund the benefits in the Pension Plan) that would average approximately 0.3% of assets over time. For informational purposes only, when we applied the results of our stochastic model to the June 30, 2018 valuation, we estimated such an annual outflow would increase the Actuarial Accrued Liability in that valuation (using a 7.25% investment return assumption) by \$238 million and would increase the employer's UAAL contribution rate by about 4.2% of payroll.

- Contribution risk – ASOP 51 does not require the actuary to evaluate particular ability or willingness of the plan sponsor or other contributing entity to make contributions to the plan when due. However, it does require the actuary to consider the potential for actual contributions deviating from expected in the future. KCERA employers have a well-established practice of making the Actuarially Determined Contributions (ADC) determined in the annual actuarial valuation, based on the Board of Retirement's Actuarial Funding Policy. As a result, in practice KCERA has essentially no contribution risk.

Furthermore, when ADCs determined in accordance with the KCERA's Actuarial Funding Policy are made in the future by the employers (and contributions required by the statute are made by the employees), it is anticipated that the system would have enough assets to provide all future benefits promised to the current members enrolled in the system, if all of the actuarial assumptions used in the valuation are met.

The ASOP also lists interest rate risk as an example of a potential risk to consider. However, the valuation of KCERA's liabilities is not linked directly to market interest rates so the resulting interest rate risk exposure is minimal.

Scenario Tests: Deterministic Projections

Since the funded ratio, UAAL and the employer contribution rates have fluctuated as a result of deviation in investment experience in the last 10 valuations, we have examined the risk for KCERA associated with earnings either higher or lower than the assumed rate of 7.25% in future valuations using projections under a deterministic approach.

To measure such risk, we have included a scenario test to study the change in unfunded liabilities and contribution rates if KCERA were to earn market return higher or lower than 7.25% in the next year following the June 30, 2018 valuation. In Charts 5, 6 and 7 respectively, we show the aggregate employer contribution rates¹⁵, funded ratios, and UAAL respectively assuming that the portfolio’s market return in 2018/2019 will be as follows: Scenario 1: 14.50%, Scenario 2: 7.25% (baseline) or Scenario 3: 0%. The following table summarizes the resulting contribution rate changes (relative to the June 30, 2018 valuation aggregate employer contribution rate of approximately 46%) in the immediate next valuation as well as in June 30, 2024¹⁶ valuation where all of the investment gains and losses are fully recognized in the (smoothed) actuarial value of assets.

Contribution Rate Change	2018/2019 Single Year Investment Return		
	14.50%	7.25% (baseline)	0%
June 30, 2019	+0% of payroll	+1% of payroll	+2% of payroll
June 30, 2024	-3% of payroll	-2% of payroll	+3% of payroll

Furthermore, under either favorable or unfavorable hypothetical market return scenarios for 2018/2019, the total employer contribution rate would be expected to approach about 9% of payroll at the end of 18 years. That 9% of payroll is the employer normal cost rate after KCERA’s UAAL layers as of June 30, 2018 are paid off over periods

¹⁵ The employer contribution rates shown are after any applicable reductions from the COLA Contribution Reserve.

¹⁶ Since the investment gains are recognized over ten six-month periods, the 2018/2019 investment gains/losses will be completely recognized by June 30, 2024.

ranging from 12 to 18 years and any new UAALs resulting from the hypothetical market experience in 2018/2019 are paid off over 18 years pursuant to the Board's actuarial funding policy. This means that the Board's funding policy is very effective in achieving the general policy goal of achieving the long-term full funding of the costs of the benefits paid by KCERA.

While we have not assigned a probability on the 2018/2019 market return coming in at these rates, the Board and other stakeholders monitoring KCERA should still be able to prorate and estimate the funded status and employer contribution rates for the June 30, 2019 and next several valuations as the actual investment experience for the 2018/2019 year becomes available. Additionally, comparable experience in upcoming future years is likely to have a similar impact on the system absent any significant plan or assumption changes.

The above scenario test illustrates the impact on KCERA of very short-term investment risk. We have included another scenario test that illustrates the impact of investment risk over the longer term. For this scenario test, we have assumed lower annual returns of 6.5% for the ten-year period beginning June 30, 2018. After that, annual returns are assumed to be 7.7%¹⁷. This illustrates the impact of lower returns in the short to medium-term, with higher returns over the long-term.

In Charts 8, 9 and 10 respectively, we show the aggregate employer contribution rates, funded ratios, and UAAL respectively under this scenario. The charts also include the baseline scenario where the current assumption of 7.25% is earned each and every year. The results mostly show increases in the employer contribution rate of around 1% to 4% of payroll under the 6.5% for 10 years, 7.7% thereafter scenario as compared to the baseline scenario. Consistent with the short-term scenario test above, the total employer contribution rate is still expected to approach about 9% of payroll at the end of 18 years after the UAAL is paid off.

¹⁷ These returns were developed based on capital market assumptions from the survey prepared by Horizon Actuarial Services. The 10- and 20-year capital market assumptions from that survey were used to develop the assumed returns shown above. More detail on these assumptions can be found in the Appendix.

Chart 11 shows a comparison of the projected Actuarial Accrued Liability (AAL) and the Valuation Value of Assets over a 30-year period under the baseline scenario with 7.25% returns each year. The difference in these values is the UAAL which is shown on Chart 7. The ratio of these two values is the funded ratio shown on Chart 6.

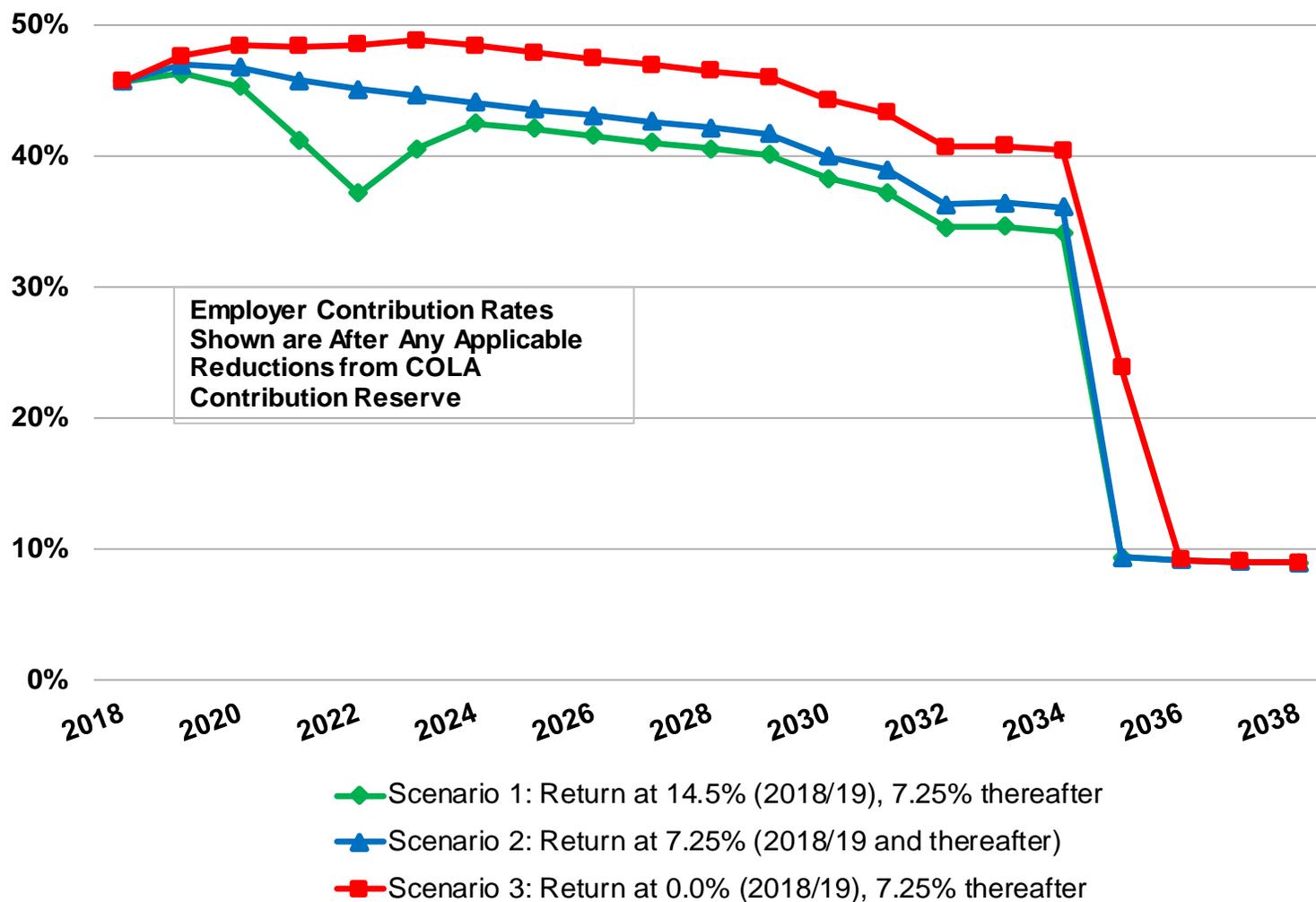
The percentage of the AAL associated with members in the PEPRA tiers increases over time as all future new hires enter the PEPRA tiers. By the end of the 30-year period the AAL associated with members in the PEPRA tiers is almost 50% of the total AAL.

A comparison of projected future contributions versus benefit payments is shown in Chart 12. This type of cashflow comparison shows that currently benefit payments slightly exceed contributions. However, this difference grows over time and becomes very significant once the UAAL is expected to be paid off and the contribution drops to only Normal Cost. This means that contributions will not be sufficient to fully cover the benefit payments and additional interest or dividend income will be needed to cover the difference. Otherwise, plan investments may need to be liquidated in order to meet benefit payments.

Chart 5

Projected Employer Contribution Rates

Under Three Hypothetical Market Return Scenarios for 2018/2019 (% of Payroll)



Note: Only the Normal Cost is paid starting in the June 30, 2035 valuation for Scenario 1 and Scenario 2 (June 30, 2036 for Scenario 3).

Chart 6

Projected Funded Ratios (on Valuation Value of Assets Basis)
Under Three Hypothetical Market Return Scenarios for 2018/2019

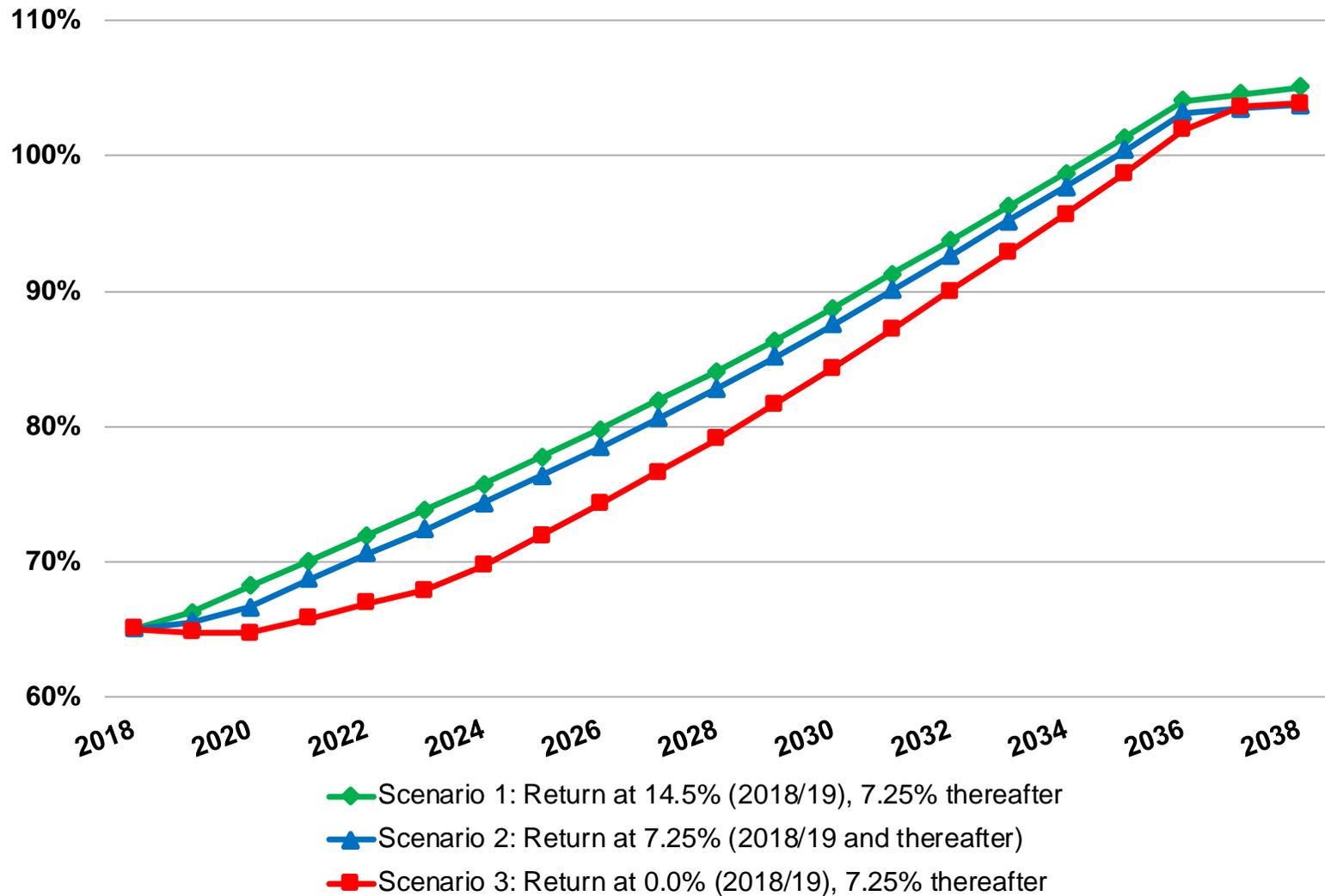


Chart 7

Projected UAAL (on Valuation Value of Assets Basis)

Under Three Hypothetical Market Return Scenarios for 2018/2019 (\$ Millions)

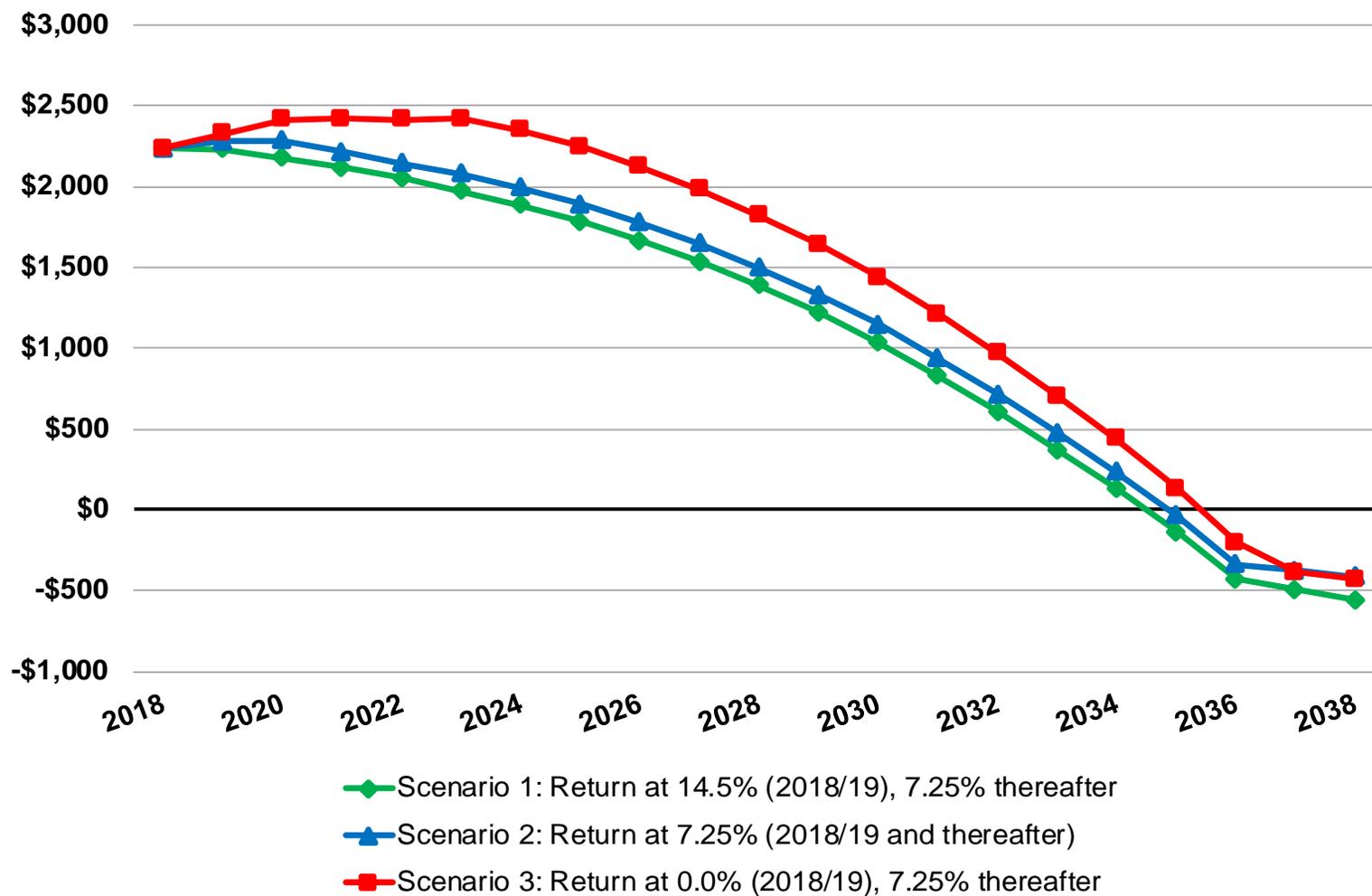
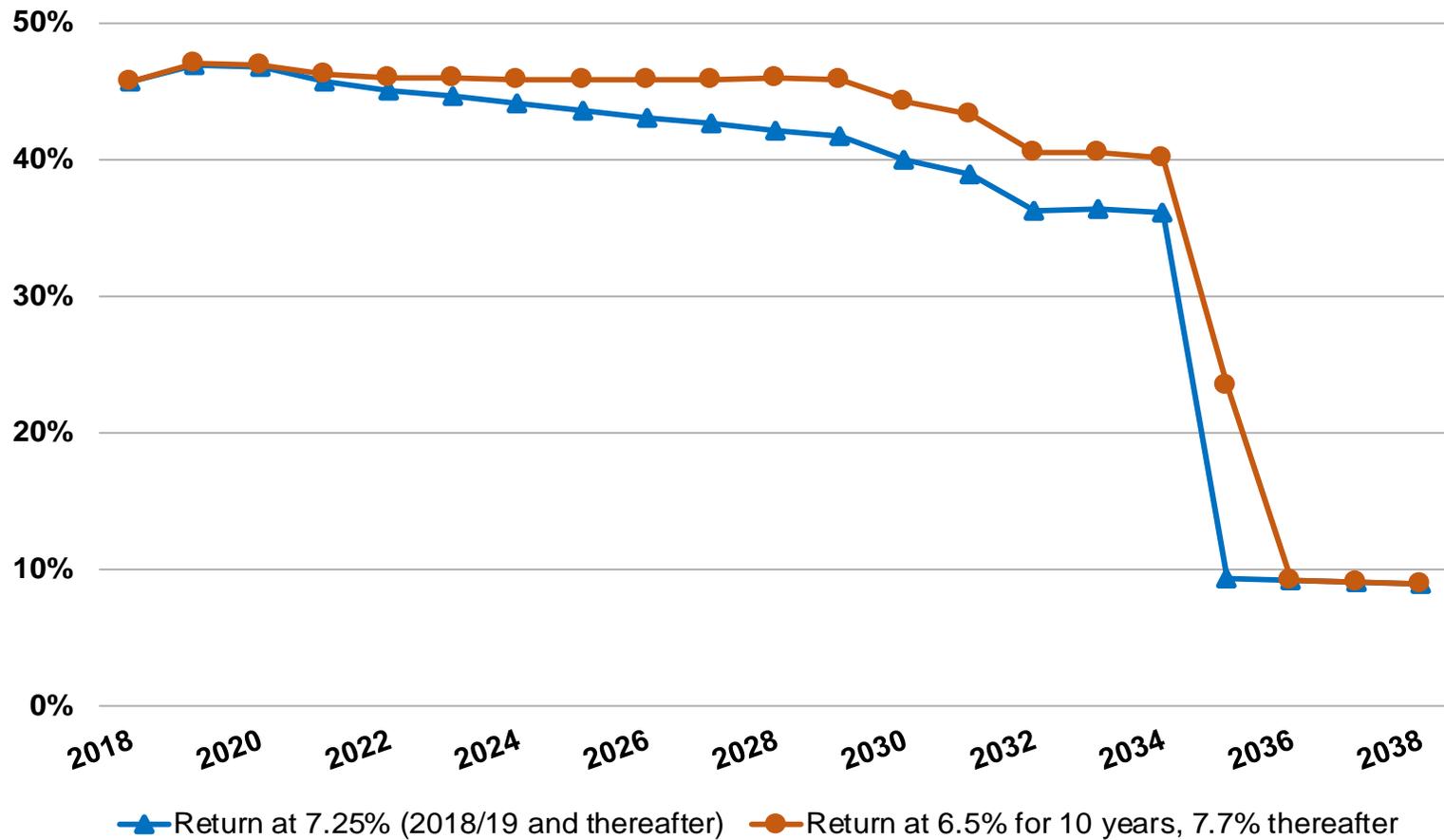


Chart 8

Projected Employer Contribution Rates

Under Hypothetical Longer Term Market Return Scenario (% of Payroll)



Note: The plan is paying the Normal Cost only starting in the June 30, 2035 valuation for Scenario 1 and June 30, 2036 valuation for Scenario 2.

Chart 9

Projected Funded Ratios (on Valuation Value of Assets Basis)
Under Hypothetical Longer Term Market Return Scenario

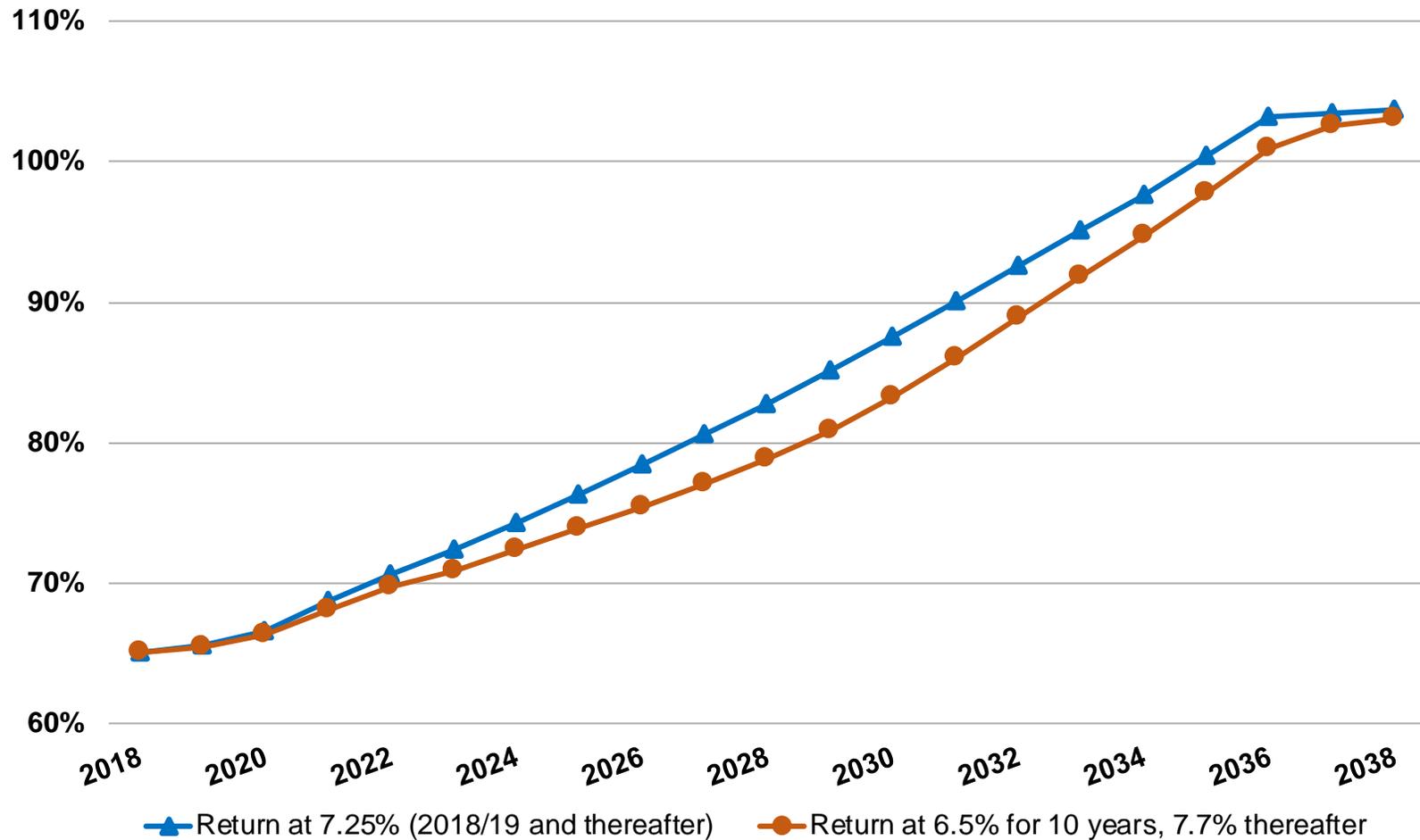


Chart 10

Projected UAAL (on Valuation Value of Assets Basis)
Under Hypothetical Longer Term Market Return Scenario (\$ Millions)

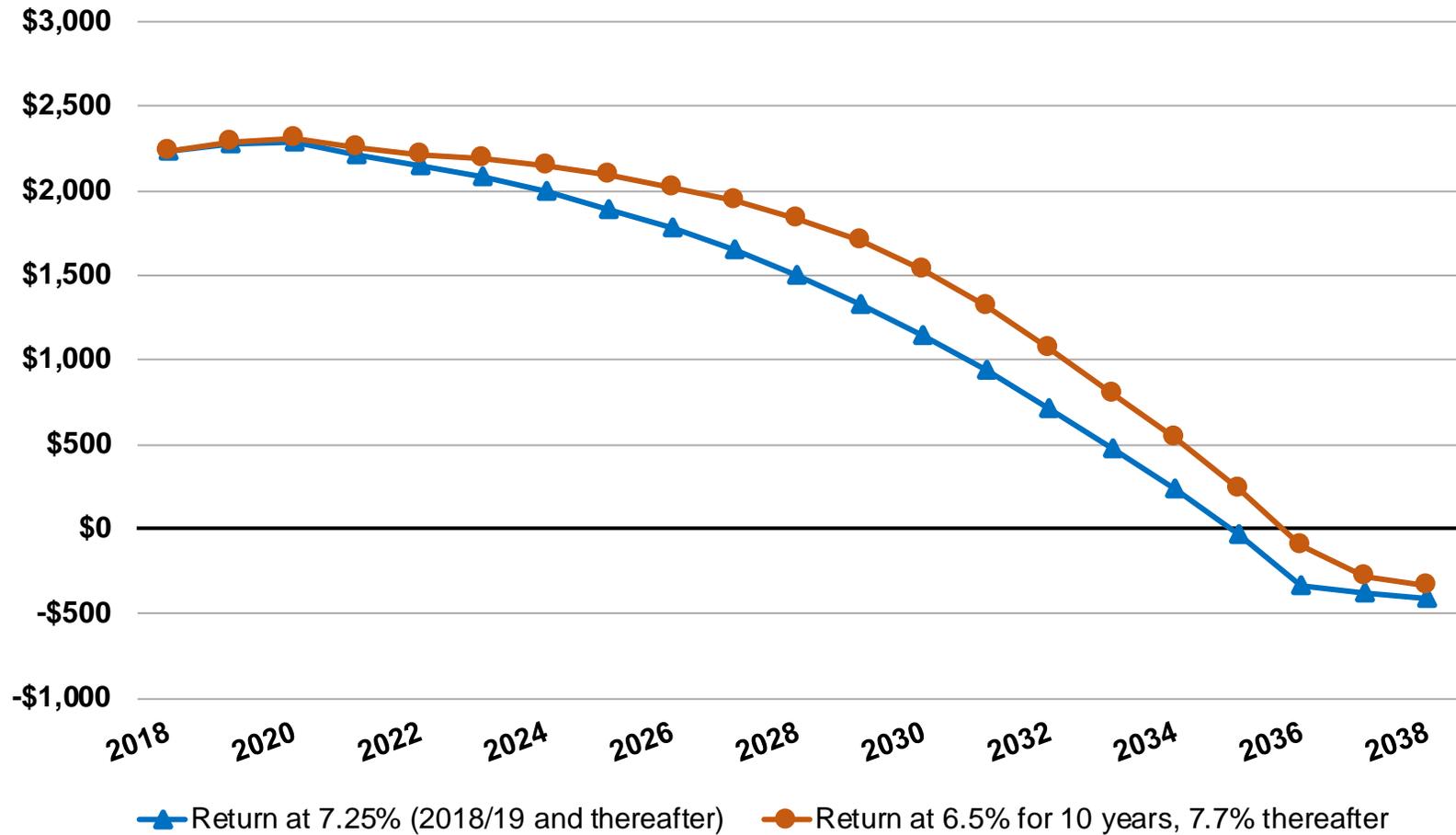


Chart 11

Projected Valuation Value of Assets and Actuarial Accrued Liability (\$ Millions)

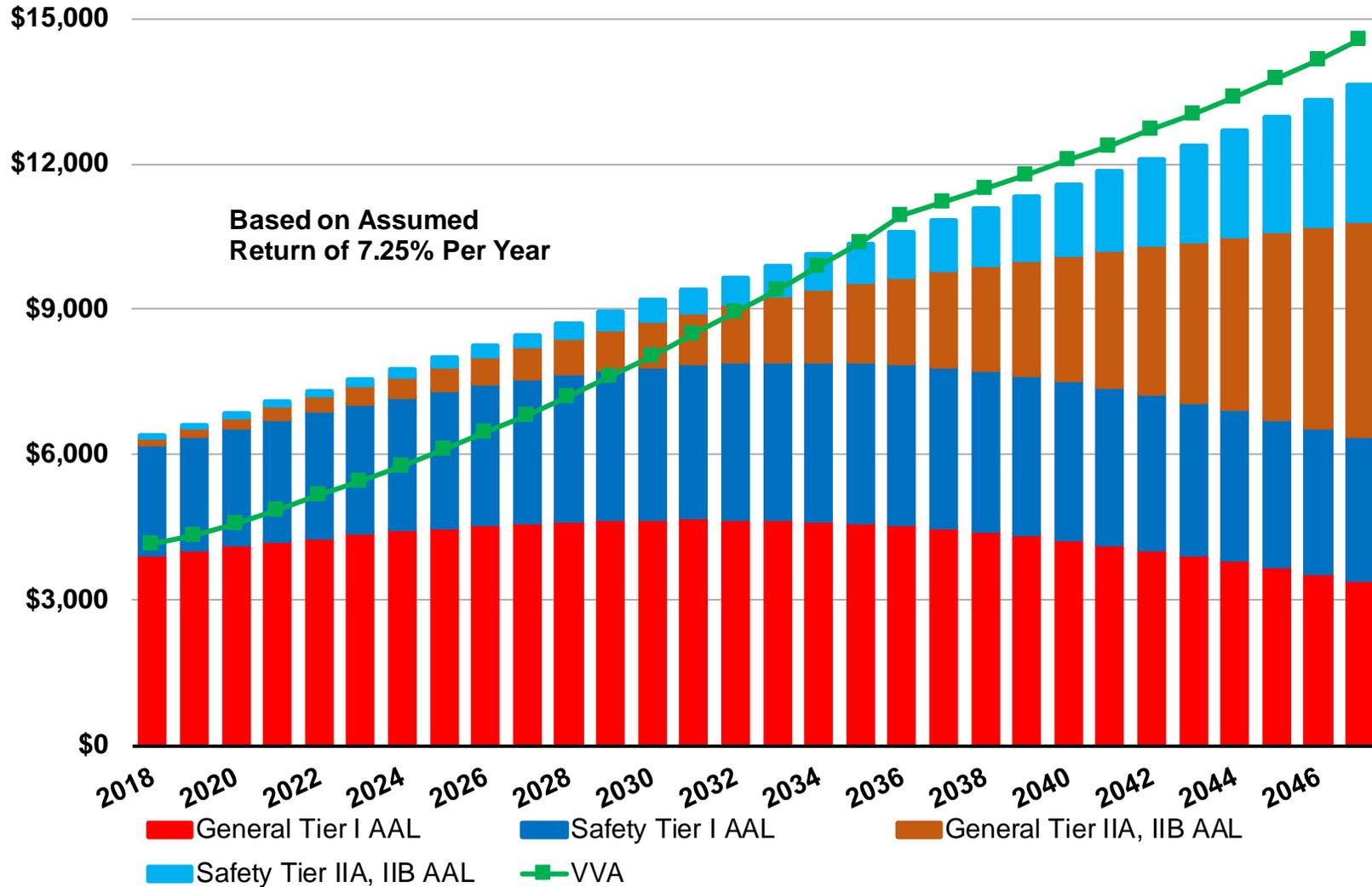
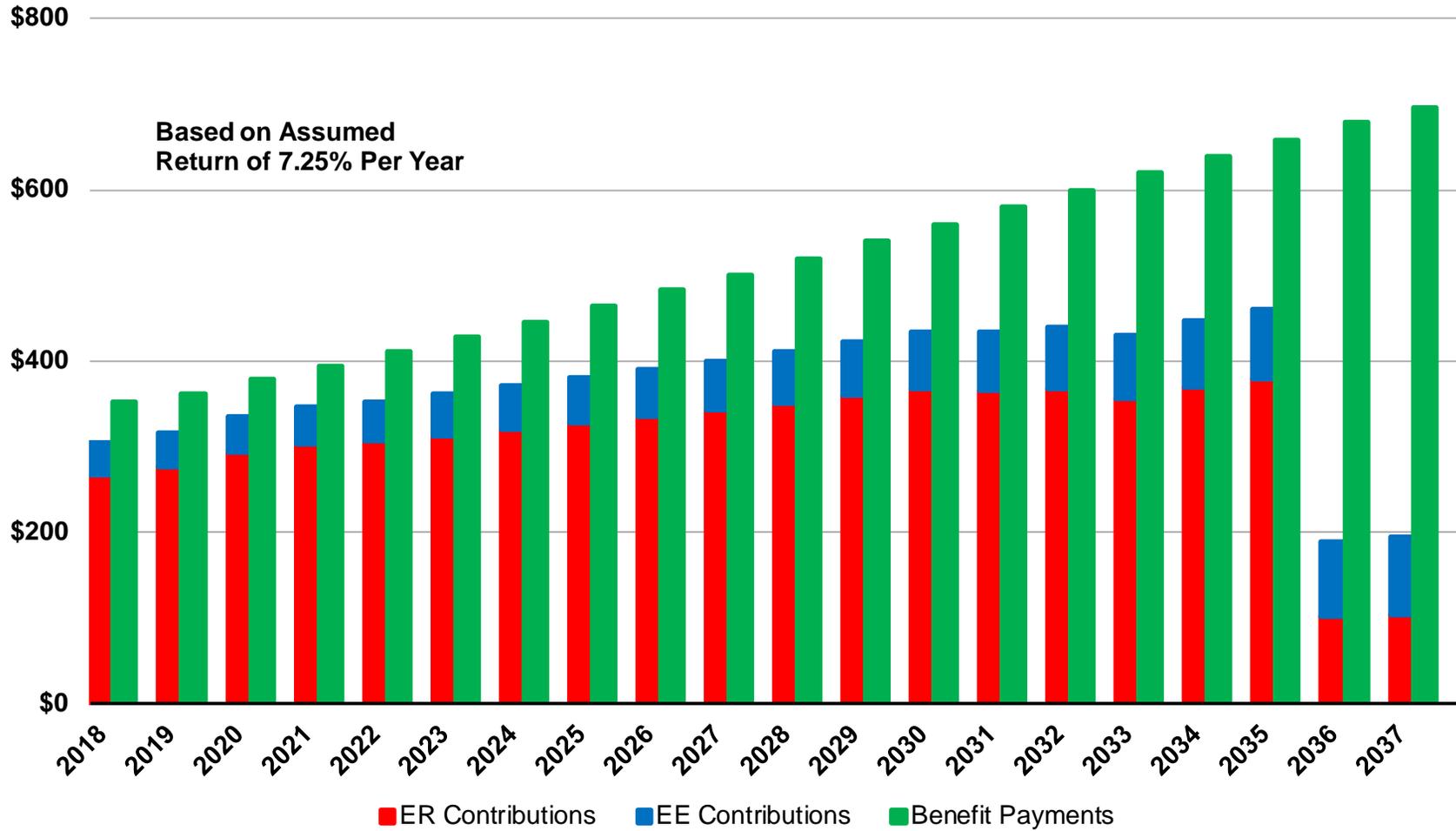


Chart 12

Comparison of Projected Contributions versus Benefit Payments (\$ Millions)



Note: The plan is paying the Normal Cost only starting with the June 30, 2035 valuation.

Scenario Tests: Stochastic Projections

Based on our discussions with KCERA, we have been directed to supplement the Scenario Tests by another analysis that shows the range of possible changes in funded status and contribution rates under a statistical distribution of potential market returns for 20 years following the June 30, 2018 valuation. We have accomplished this stochastic modeling of future market returns by using the expected return, standard deviation and other information about KCERA’s asset portfolio as provided in the Appendix of this report.

In Chart 13, we summarize the cumulative compounded rate of return of KCERA’s investment portfolio over the next 20 years based on performing 10,000 trial outcomes of future market returns. The projected employer contribution rates for those trials are provided in Chart 14. The funded ratios, UAAL and the resultant employer contribution dollar amounts are provided in Charts 15, 16 and 17, respectively.

At the end of 20 years, there is a 50% chance¹⁸ that the annual return of KCERA’s investment portfolio would average between 5.6% and 8.8%, the funded ratio would be between 85% and 110% and the corresponding UAAL would be between \$1.7 billion and a surplus (or a negative UAAL) of \$1.1 billion

The funded ratio is about 65% the June 30, 2018 valuation. There is a 5% chance KCERA would be fully funded at the end of 10 years and a 44% chance KCERA would be fully funded at the end of 20 years. The probabilities that the funded ratio would fall below 40%, 50% or 60% at any point in the next 20 years are as follows:

	Funded Ratio		
	Below 40%	Below 50%	Below 60%
Probability	<0.1%	0.4%	4.6%

¹⁸ This is based on the 25th to the 75th percentile results.

At the end of 10 years (i.e., the June 30, 2028 valuation), there is a 50% chance that the employer contribution rates would be between 34% and 53% of payroll. At the end of 20 years (i.e., the June 30, 2038 valuation), there is a 50% chance that the employer contribution rates would be between 8% and 26% of payroll. 8% of payroll is about the level of the employer normal cost rate (after any applicable transfers from the CCR). Note that we have not offset the normal cost by any available actuarial surplus.¹⁹

The total employer contribution rate is about 46% payroll in the June 30, 2018 valuation. The probabilities that the total employer contribution rate would increase at least by 5%, 10% or 15% of payroll at any point in the next 20 years are as follows:

	Total Employer Rate Increases by at least		
	5% of Payroll (to 51% of Payroll)	10% of Payroll (To 56% of Payroll)	15% of Payroll (To 61% of Payroll)
Probability	19%	11%	6%

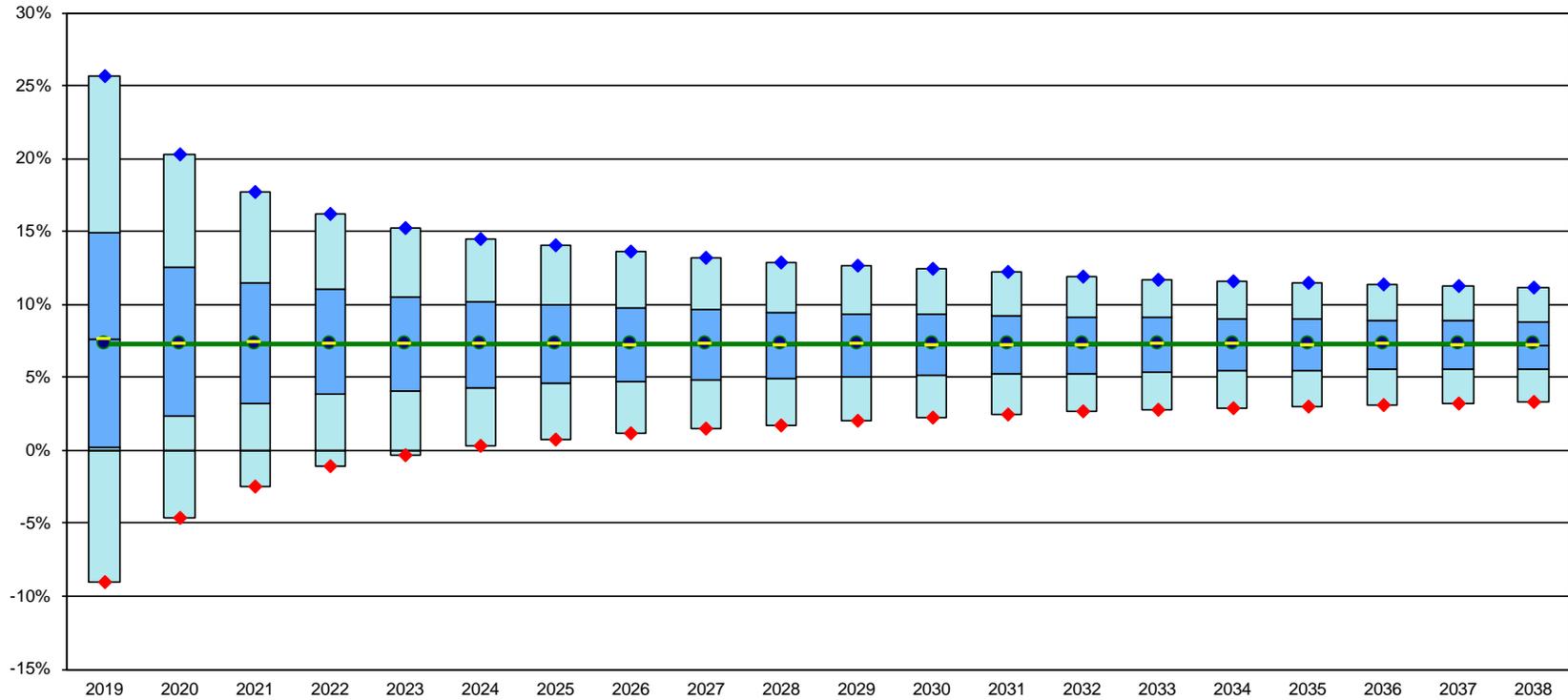
Finally, the probabilities that the total employer contribution rate would spike by 3%, 5% or 7% of payroll in any single year during the next 20 years are as follows:

	Total Employer Rate Spike in a Single Year by		
	3% of Payroll	5% of Payroll	7% of Payroll
Probability	9.8%	2.4%	0.4%

¹⁹ Under PEPR, the system has an actuarial surplus when the funded ratio is at or over 120% and certain other conditions are met. For the purposes of these projections, we have assumed that those other conditions have not been met and therefore we did not amortize such actuarial surplus over a rolling (non-decreasing) 30-year period as described under the Board’s funding policy.

Chart 13

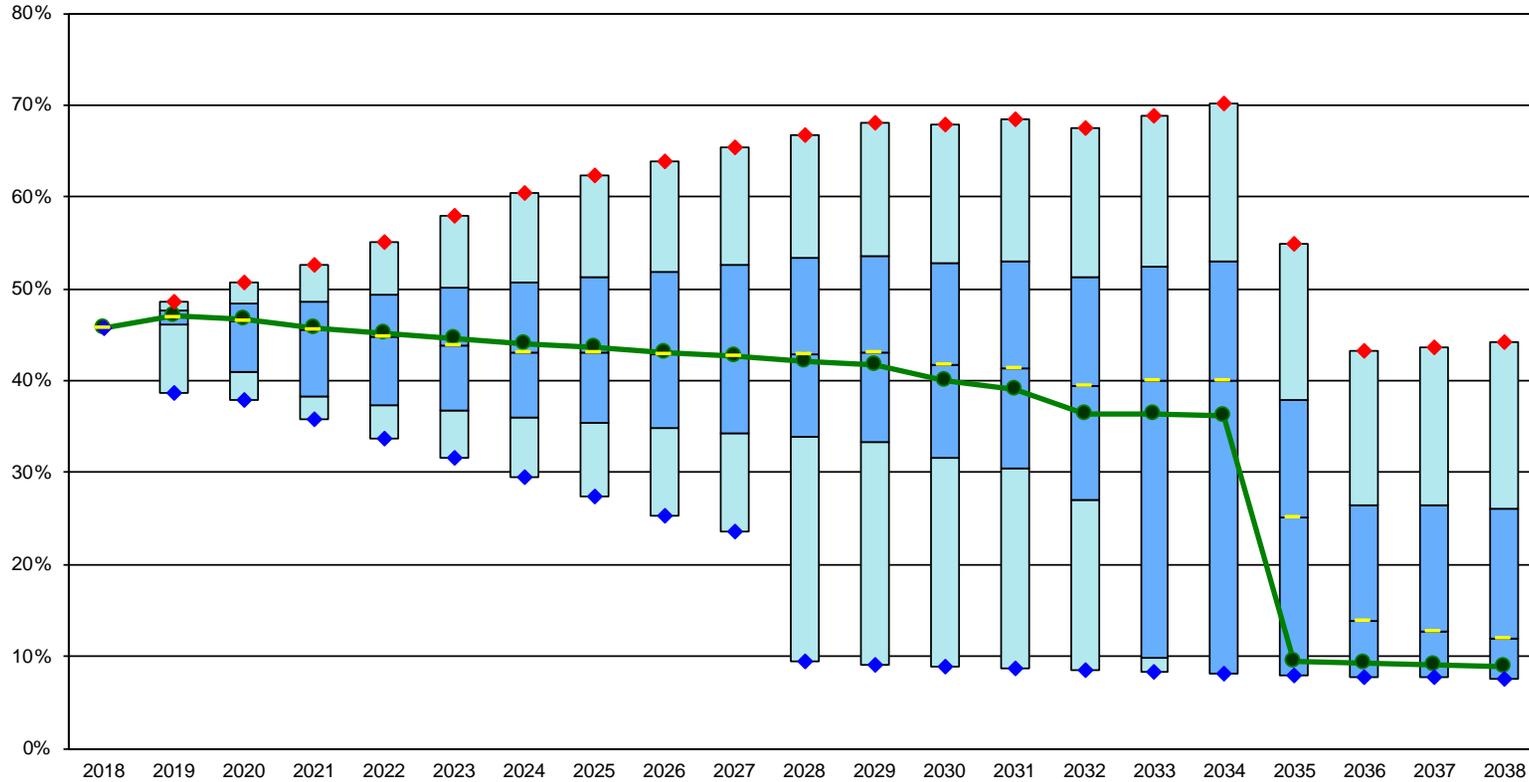
Projected Cumulative Investment Return for Plan Years Ending June 30



◆ 95th	25.7%	20.2%	17.7%	16.2%	15.2%	14.5%	14.0%	13.6%	13.2%	12.9%	12.6%	12.4%	12.2%	11.9%	11.7%	11.6%	11.4%	11.4%	11.3%	11.2%
— 75th	14.9%	12.5%	11.5%	11.0%	10.5%	10.2%	10.0%	9.8%	9.6%	9.5%	9.4%	9.3%	9.2%	9.2%	9.1%	9.0%	9.0%	8.9%	8.9%	8.8%
— 50th	7.7%	7.3%	7.4%	7.3%	7.3%	7.3%	7.3%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%
— 25th	0.2%	2.4%	3.3%	3.8%	4.1%	4.3%	4.5%	4.7%	4.8%	4.9%	5.1%	5.2%	5.2%	5.3%	5.4%	5.5%	5.5%	5.6%	5.6%	5.6%
◆ 5th	-9.1%	-4.6%	-2.4%	-1.1%	-0.3%	0.3%	0.7%	1.1%	1.5%	1.7%	2.0%	2.2%	2.4%	2.6%	2.7%	2.9%	3.0%	3.1%	3.2%	3.3%
●	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%	7.25%
●	Recommended investment return assumption																			

Chart 14

Projected Employer Contribution Rates (after transfer from COLA Contribution Reserve)

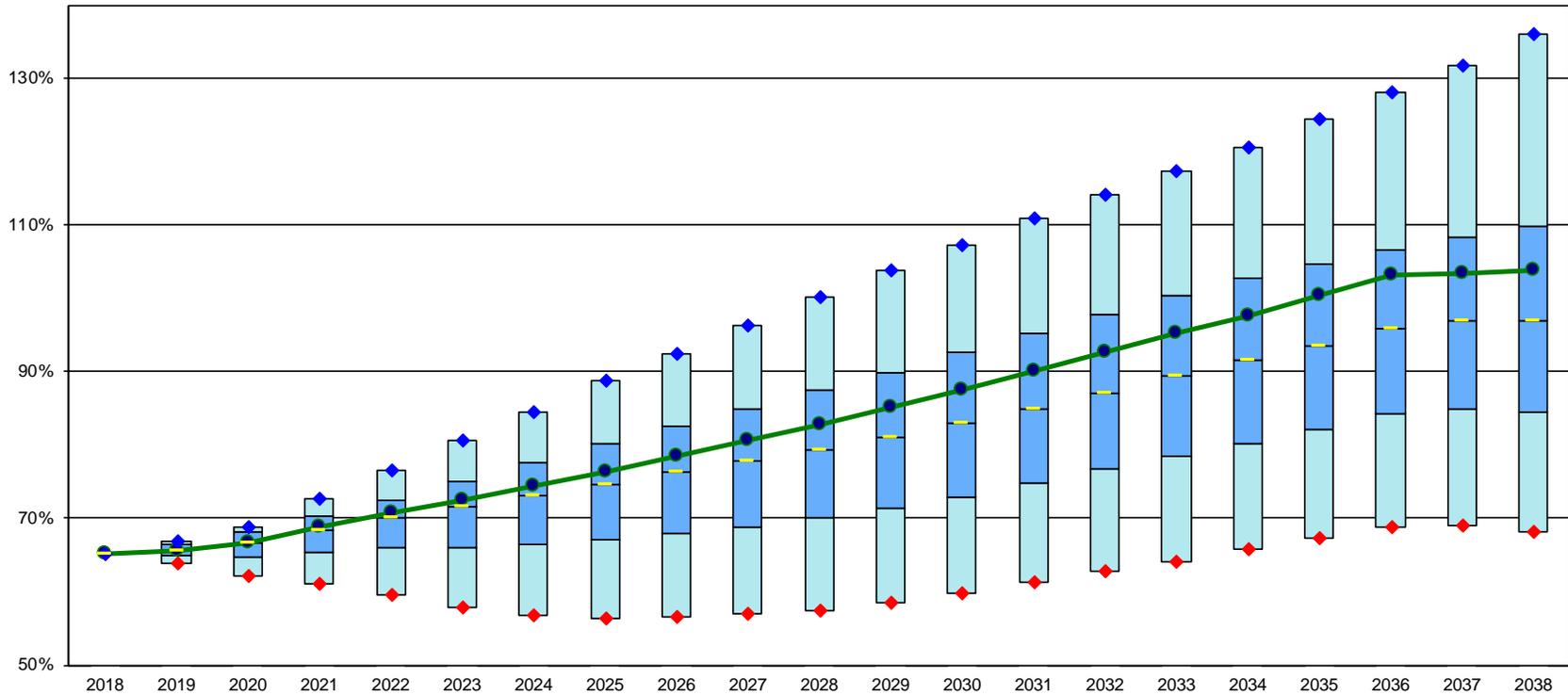


◆ 95th	45.7%	38.7%	37.9%	35.8%	33.7%	31.6%	29.5%	27.4%	25.4%	23.5%	9.4%	9.2%	8.9%	8.7%	8.5%	8.3%	8.1%	7.9%	7.8%	7.7%	7.6%
— 75th	45.7%	46.2%	41.0%	38.2%	37.3%	36.8%	36.1%	35.4%	34.9%	34.3%	33.9%	33.4%	31.5%	30.4%	27.1%	9.8%	8.1%	7.9%	7.8%	7.7%	7.6%
— 50th	45.7%	46.9%	46.6%	45.6%	44.8%	43.9%	43.1%	43.0%	42.8%	42.8%	42.9%	43.0%	41.7%	41.3%	39.4%	40.0%	40.0%	25.1%	13.8%	12.7%	11.8%
— 25th	45.7%	47.6%	48.4%	48.7%	49.3%	50.1%	50.7%	51.2%	51.8%	52.6%	53.3%	53.6%	52.8%	52.9%	51.3%	52.4%	53.0%	38.0%	26.5%	26.4%	26.2%
◆ 5th	45.7%	48.6%	50.8%	52.6%	55.1%	57.9%	60.3%	62.3%	63.8%	65.4%	66.7%	68.1%	67.9%	68.5%	67.4%	68.9%	70.2%	54.9%	43.3%	43.6%	44.2%
●	45.7%	47.0%	46.7%	45.8%	45.1%	44.6%	44.1%	43.6%	43.1%	42.6%	42.2%	41.7%	40.0%	39.0%	36.3%	36.5%	36.1%	9.4%	9.2%	9.1%	9.0%

● Baseline deterministic projection with current 7.25% investment return assumption

Chart 15

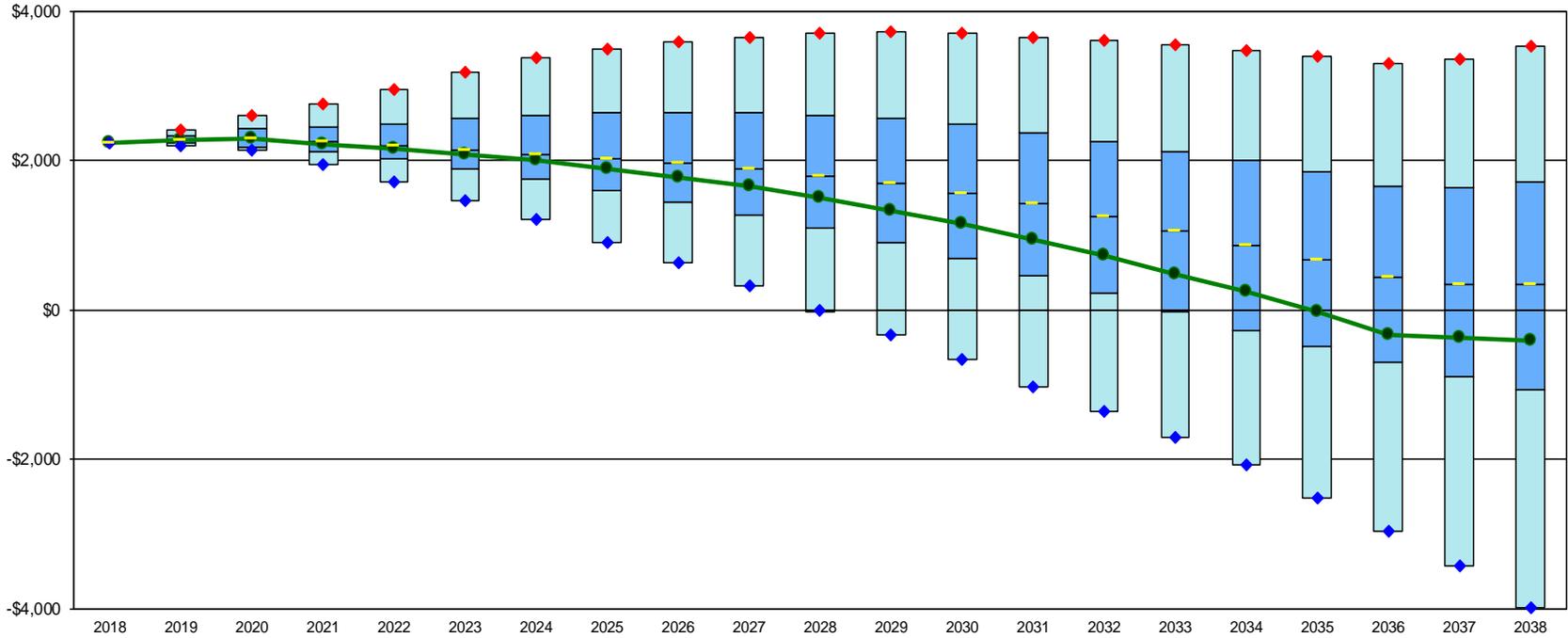
Projected Funded Ratios (on Valuation Value of Assets Basis)



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
◆ 95th	65.1%	66.9%	68.8%	72.6%	76.5%	80.7%	84.6%	88.7%	92.4%	96.3%	100.1%	103.9%	107.3%	111.0%	114.0%	117.2%	120.6%	124.4%	128.0%	131.7%	136.0%
● 75th	65.1%	66.4%	68.1%	70.2%	72.4%	75.0%	77.6%	80.1%	82.5%	85.0%	87.4%	89.9%	92.6%	95.2%	97.7%	100.4%	102.7%	104.7%	106.7%	108.3%	109.8%
— 50th	65.1%	65.6%	66.7%	68.3%	70.0%	71.6%	73.2%	74.7%	76.2%	77.8%	79.4%	81.1%	83.0%	85.0%	87.1%	89.3%	91.5%	93.6%	95.8%	96.9%	97.0%
● 25th	65.1%	64.8%	64.7%	65.4%	65.9%	66.1%	66.5%	67.1%	67.9%	68.8%	70.1%	71.3%	72.9%	74.8%	76.7%	78.6%	80.2%	82.2%	84.3%	85.0%	84.5%
◆ 5th	65.1%	63.8%	62.1%	61.1%	59.5%	57.7%	56.7%	56.3%	56.6%	57.0%	57.5%	58.4%	59.8%	61.3%	62.7%	64.1%	65.7%	67.3%	68.9%	69.1%	68.1%
● Baseline deterministic projection with current 7.25% investment return assumption	65.1%	65.6%	66.6%	68.7%	70.6%	72.4%	74.4%	76.4%	78.4%	80.6%	82.8%	85.1%	87.5%	90.1%	92.6%	95.2%	97.7%	100.4%	103.2%	103.5%	103.7%

Chart 16

Projected UAAL (on Valuation Value of Asset Basis) (\$ Millions)

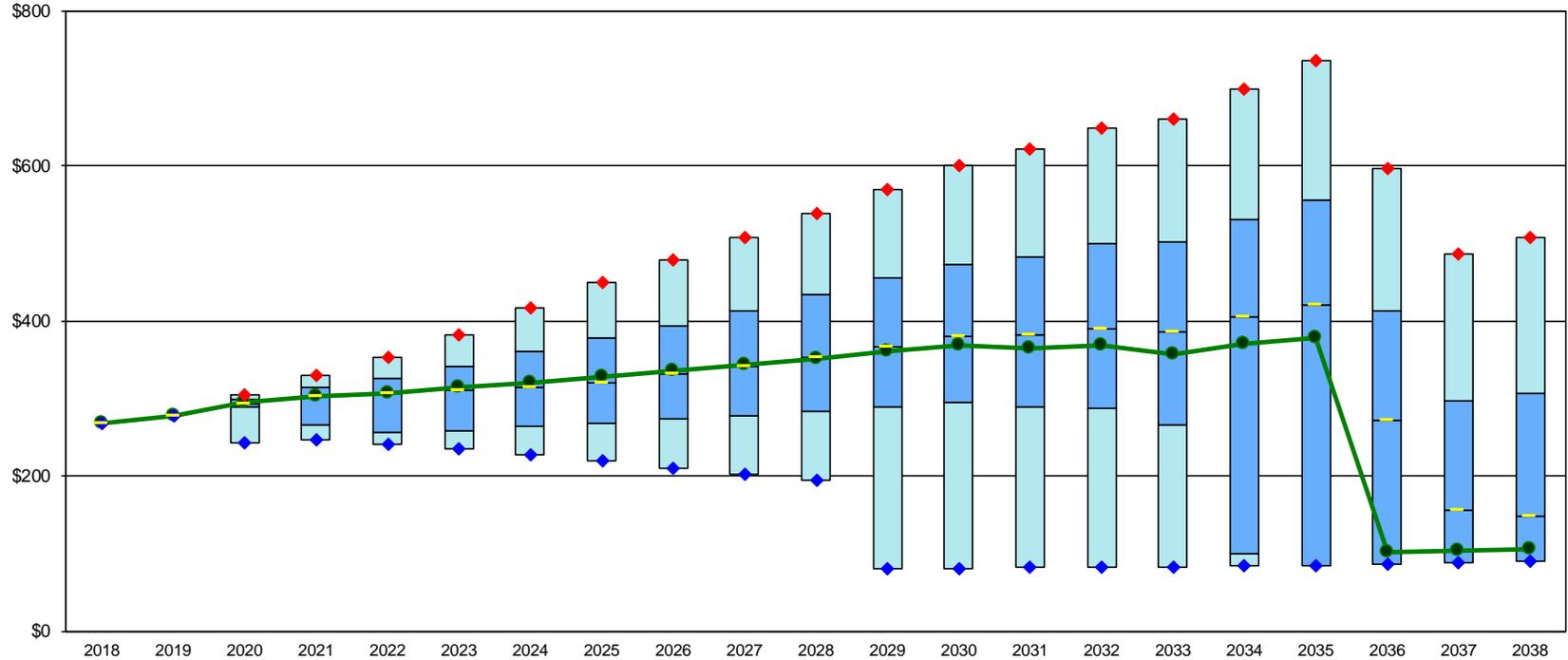


◆ 95th	2,235	2,189	2,139	1,941	1,718	1,458	1,198	906	624	312	(9)	(347)	(669)	(1,032)	(1,354)	(1,704)	(2,083)	(2,522)	(2,963)	(3,434)	(3,988)
▬ 75th	2,235	2,225	2,183	2,108	2,014	1,886	1,741	1,594	1,442	1,272	1,095	900	684	452	217	(35)	(271)	(489)	(706)	(900)	(1,081)
▬ 50th	2,235	2,277	2,281	2,242	2,194	2,140	2,086	2,027	1,956	1,884	1,792	1,693	1,557	1,413	1,248	1,053	864	665	444	335	329
▬ 25th	2,235	2,327	2,416	2,446	2,489	2,555	2,601	2,630	2,640	2,644	2,604	2,564	2,486	2,376	2,252	2,120	2,003	1,843	1,661	1,627	1,720
◆ 5th	2,235	2,398	2,597	2,756	2,956	3,186	3,365	3,494	3,577	3,640	3,701	3,717	3,691	3,647	3,595	3,547	3,469	3,385	3,298	3,351	3,531
●	2,235	2,280	2,286	2,214	2,146	2,080	1,993	1,892	1,777	1,646	1,498	1,331	1,144	935	715	476	234	(38)	(338)	(375)	(414)

● Baseline deterministic projection with current 7.25% investment return assumption

Chart 17

Projected Employer Contributions in millions
(after transfer from COLA Contribution Reserve)



◆ 95th	267	276	242	246	240	234	227	219	210	202	194	80	81	81	82	83	84	85	86	87	89
— 75th	267	276	289	265	256	259	264	268	273	278	283	289	295	288	287	265	99	85	86	87	89
--- 50th	267	276	294	302	306	311	315	321	330	341	352	366	379	381	390	386	405	419	272	155	148
— 25th	267	276	298	314	326	342	360	377	394	413	434	454	473	482	500	502	531	556	412	298	307
◆ 5th	267	276	304	329	353	382	416	448	479	508	539	569	601	621	648	660	698	735	596	487	507
●	267	276	294	303	307	313	321	328	335	343	351	360	368	365	368	356	369	378	102	103	105

● Baseline deterministic projection with current 7.25% investment return assumption

Plan Maturity Measures that Affect Primary Risks

The annual actuarial valuation considers the number and demographic characteristics of covered members, including active members and members in pay status (retirees and beneficiaries). In the past 10 valuations from June 30, 2009 to 2018, KCERA has become more mature, indicated by the continued increase in the ratio of members in pay status to active members seen in Chart 18. This ratio excludes vested terminated members who have relatively small liabilities. The increase in this ratio is significant because any increase in UAAL due to unfavorable future investment and non-investment experience for a relatively larger group of non-active members would have to be amortized and funded using the payroll of a relatively smaller group of active members. It's important to note that virtually all pension plans are becoming more mature, so as a local reference and comparison we have included average data that CalPERS makes publically available. KCERA has historically been more mature than CalPERS plans on average.

Besides the ratio of members in pay status to active members, another indicator of a more mature retirement plan is relatively large amounts of assets and/or liabilities compared to active member payroll and increasing volatility in the level of required contributions. The Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total payroll, provides an indication of contribution sensitivity to changes in the current level of assets and is detailed in Chart 19. The Liability Volatility Ratio (LVR), which is equal to the actuarial accrued liability divided by payroll, provides an indication of the contribution sensitivity to changes in the current level of liability and is detailed in Chart 20. Over time, the AVR should approach the LVR as when a plan is fully funded the assets will equal the liabilities. As such, the LVR also indicates the long-term contribution sensitivity to the asset volatility as the plan approaches full funding.

In particular, the following table shows KCERA’s 2018 AVR and LVR for the total plan, General employee groups, and Safety employee groups. It is informative to note that the AVR and LVR ratios for KCERA’s Safety groups are significantly higher than for General employees. This means that both investment volatility and assumption changes will have a greater impact on the contribution rates of Safety groups than General employees.

Employee Group	2018			
	AVR	10% Loss Compares to	LVR	10% Change Compares to
General	6.0	60% of payroll	9.2	92% of payroll
Safety	11.0	110% of payroll	16.4	164% of payroll
Combined	7.2	72% of payroll	11.0	110% of payroll

Chart 18

Ratios Members in Pay-Status (Retirees and Beneficiaries) to Active Members Ratio In June 30, 2009 to 2018 Valuations

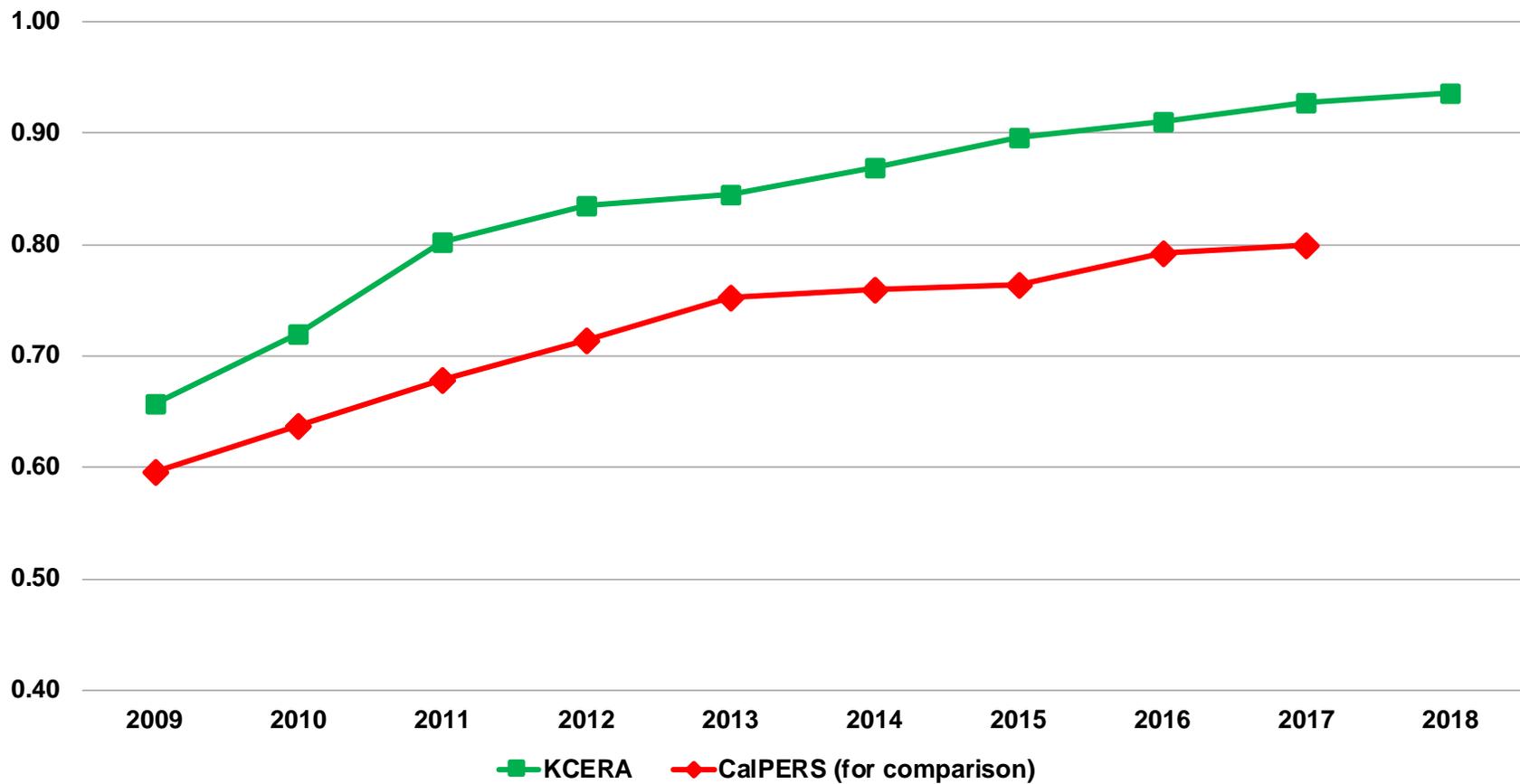


Chart 19

Asset Volatility Ratio in June 30, 2009 to 2018 Valuations

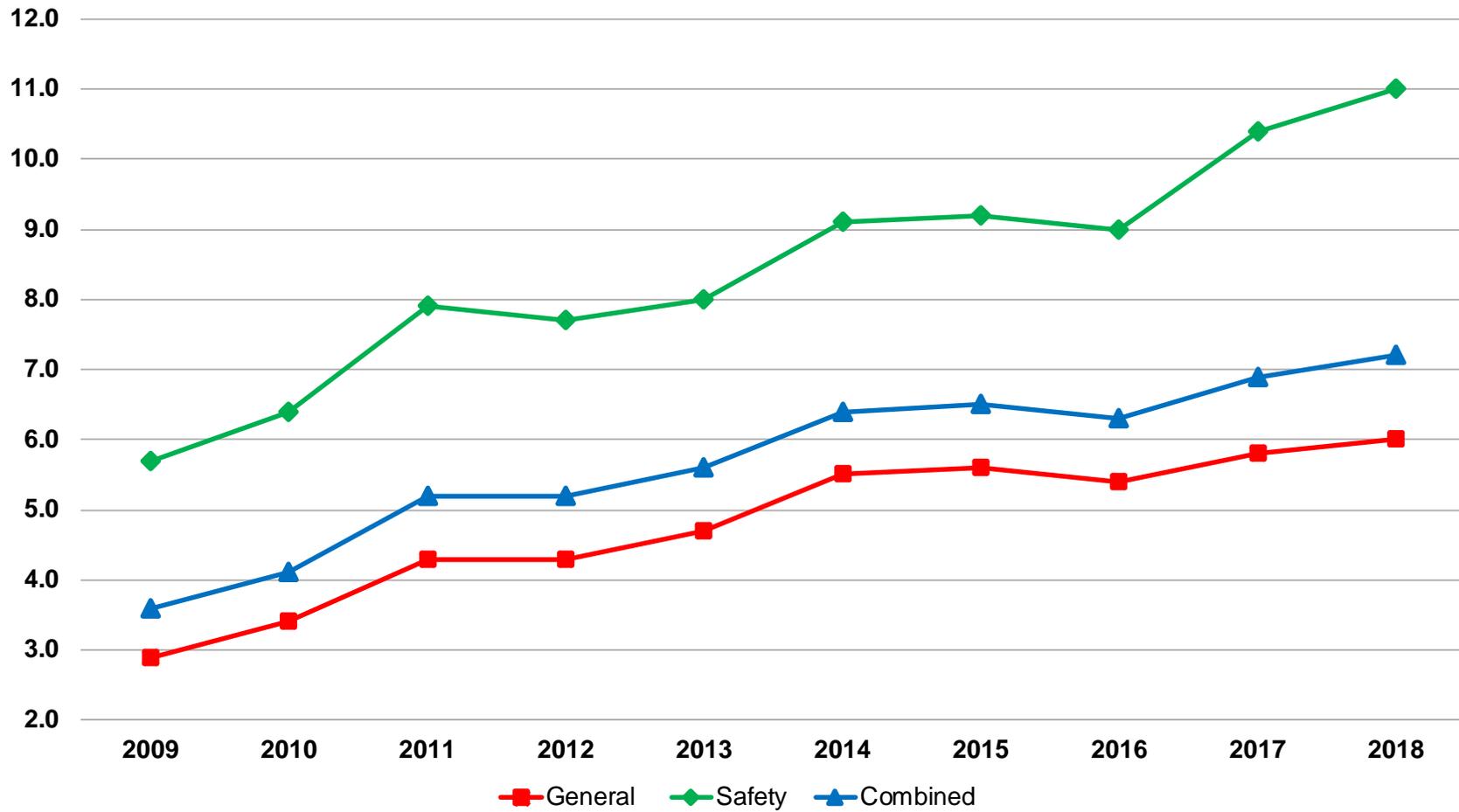
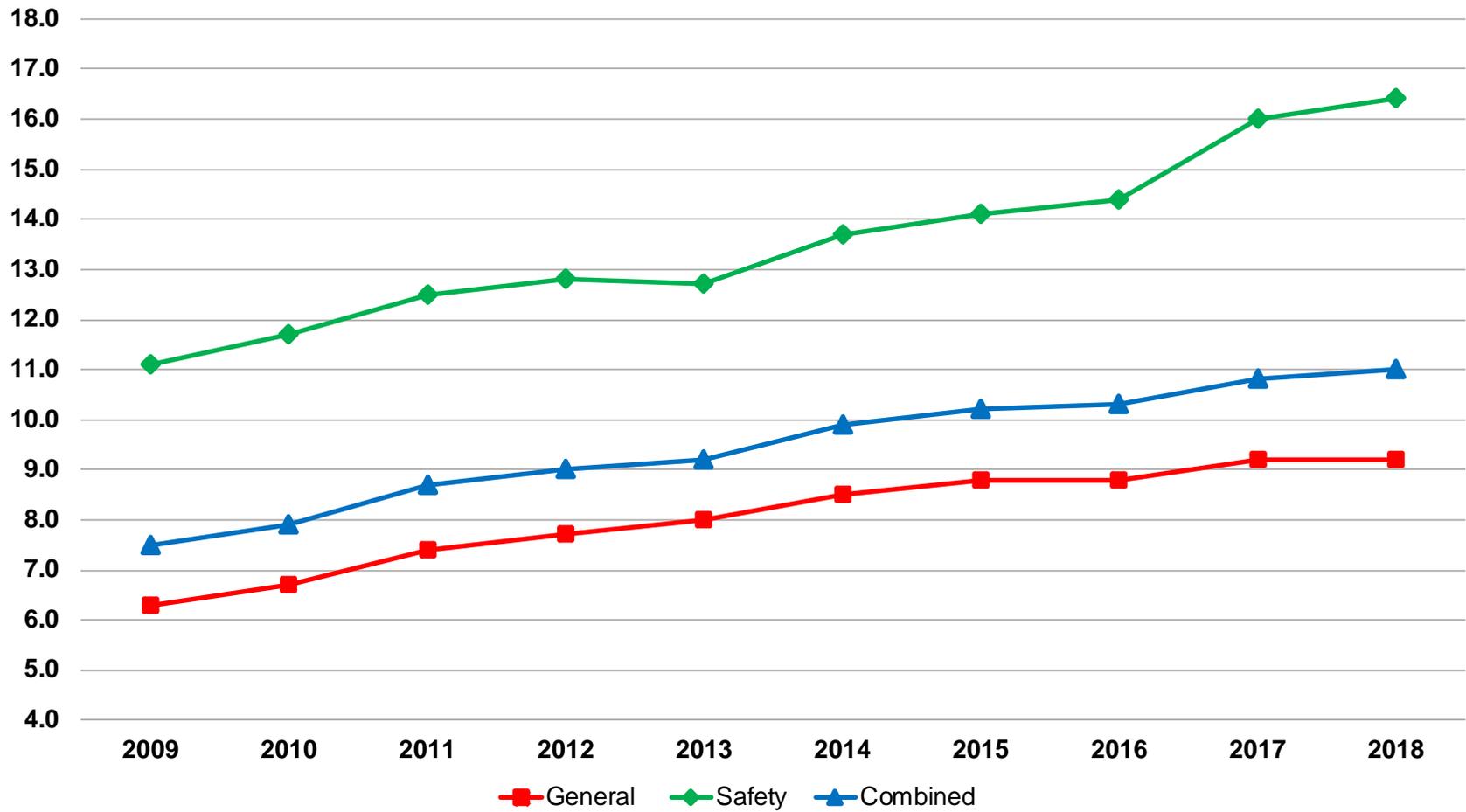


Chart 20

Liability Volatility Ratio in June 30, 2009 to 2018 Valuations



Section 3: Supplemental Retiree Benefit Reserve

Evaluation of Historical Trends

As part of the plan design adopted under Article 5.5 of the Statute, excess earnings²⁰ are allocated from the system's total investment portfolio to the SRBR. As a result, besides paying benefits from the pension plan, KCERA also provides benefits using assets available in the SRBR. In most recent actuarial valuation for the SRBR as of June 30, 2018, there was \$127.7 million in assets available at the Board's discretion to provide non-vested pension benefits²¹.

Chart 21 shows that in the 10 valuations from June 30, 2009 to 2018, the assets available in the SRBR has stayed relatively flat from about \$128.5 million to about \$127.7 million. During this 10-year period, no excess earnings were allocated to the SRBR. The funded ratio on a PVB basis was about 144% in the June 30, 2009 valuation and 147% in the June 30, 2018 valuation.²²

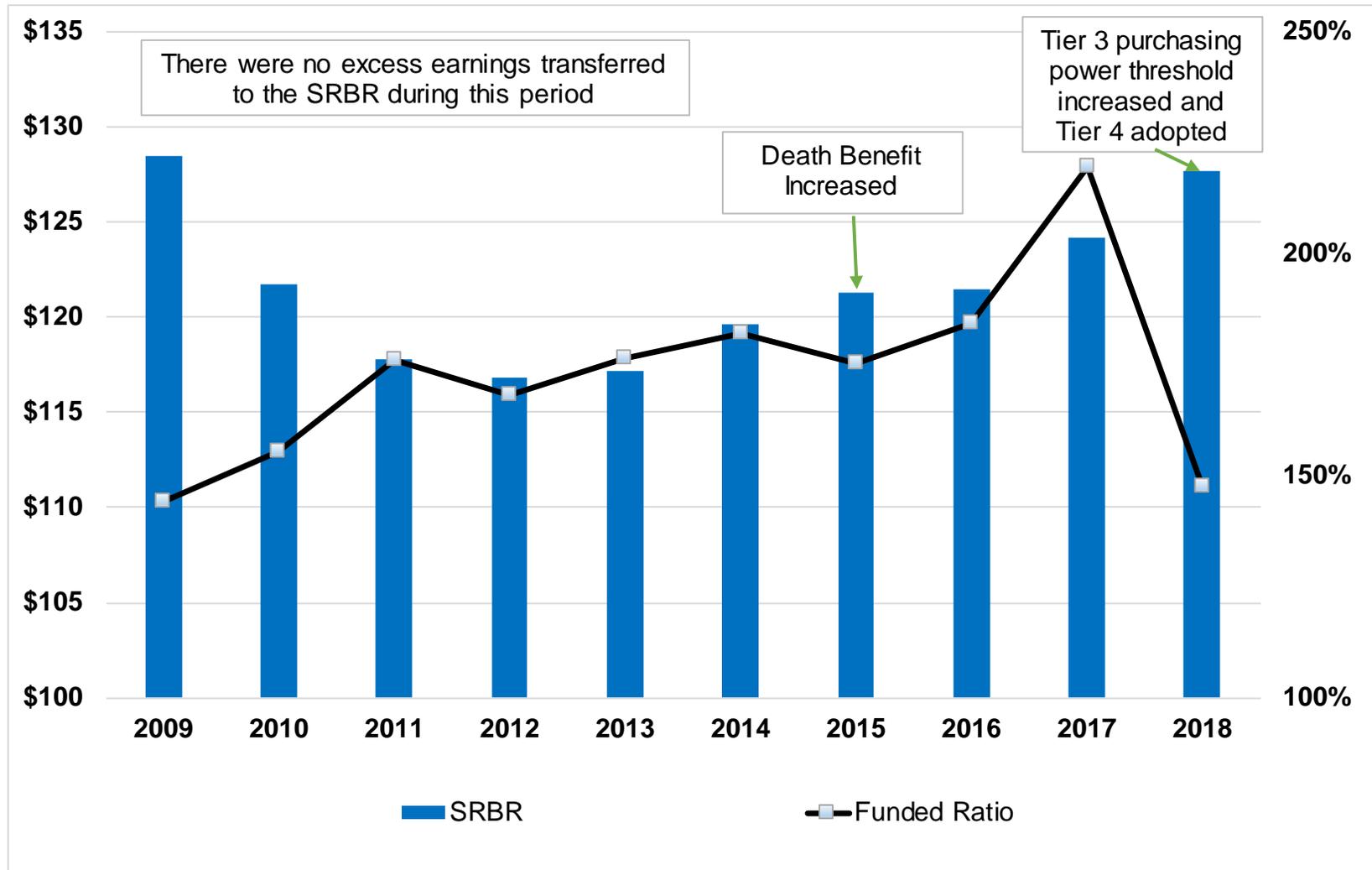
²⁰ In general under the Board's interest crediting policy, earnings at one-half of the assumed annual valuation rate is credited every 6 months to reserves for the pension plan and the SRBR. Any remaining earnings (excess earnings) is allocated on a 50/50 basis between the pension plan and the SRBR.

²¹ The non-vested pension benefits include plan supplemental benefits, a purchasing power protection benefit and a lump sum death benefit.

²² During the past 10 years, the Board took two actions to increase benefits paid from the SRBR. In 2015, the Death Benefit was increased and in 2018 there was an increase in the Tier 3 purchasing power threshold from 80% to 82% along with the creation of a new Tier 4 benefit.

Chart 21

SRBR Assets (\$ million) and Periods Benefits Can be Paid
In June 30, 2009 to 2018 Valuations



Assessment of Primary Risk Factors Going Forward

SRBR Funded Ratio

We also provided in Charts 22 and 23 the projection of the SRBR funded ratios under each of the hypothetical deterministic market return scenarios described earlier. Of note is that it is only under Scenario 1 (assuming 14.50% market return in 2018/2019), where excess earnings in the amount of \$2 million during 2022/2023 would be added to the SRBR.

As the SRBR is currently overfunded on a PVB basis, all of the hypothetical deterministic market return scenarios show a projected increase in funded ratio over time. Note that for purposes of these projections we have assumed no future changes in SRBR benefit provisions.

We also supplemented the scenario tests with stochastic analysis that shows the range of possible changes in the funded status of the SRBR. This modeling is based on all of the assumptions described earlier that were used in modeling for the pension plan and again for purposes of illustration assumes no future changes in benefit provisions.

In Chart 24, we summarize the projected funded ratios for the SRBR over the next 20 years based on performing 10,000 trial outcomes of future market returns. At end of 20 years, there is a 50% chance that the funded ratio would be between 736% and 4,685%. The probabilities that the funded ratio of the SRBR would fall below 120% or 100% any point in the next 20 years are as follows:

	Funded Ratio	
	Below 120%	Below 100%
Probability	3.6%	1.2%

Chart 22

Projected Funded Ratios for SRBR

Under Three Hypothetical Market Return Scenarios for 2018/2019

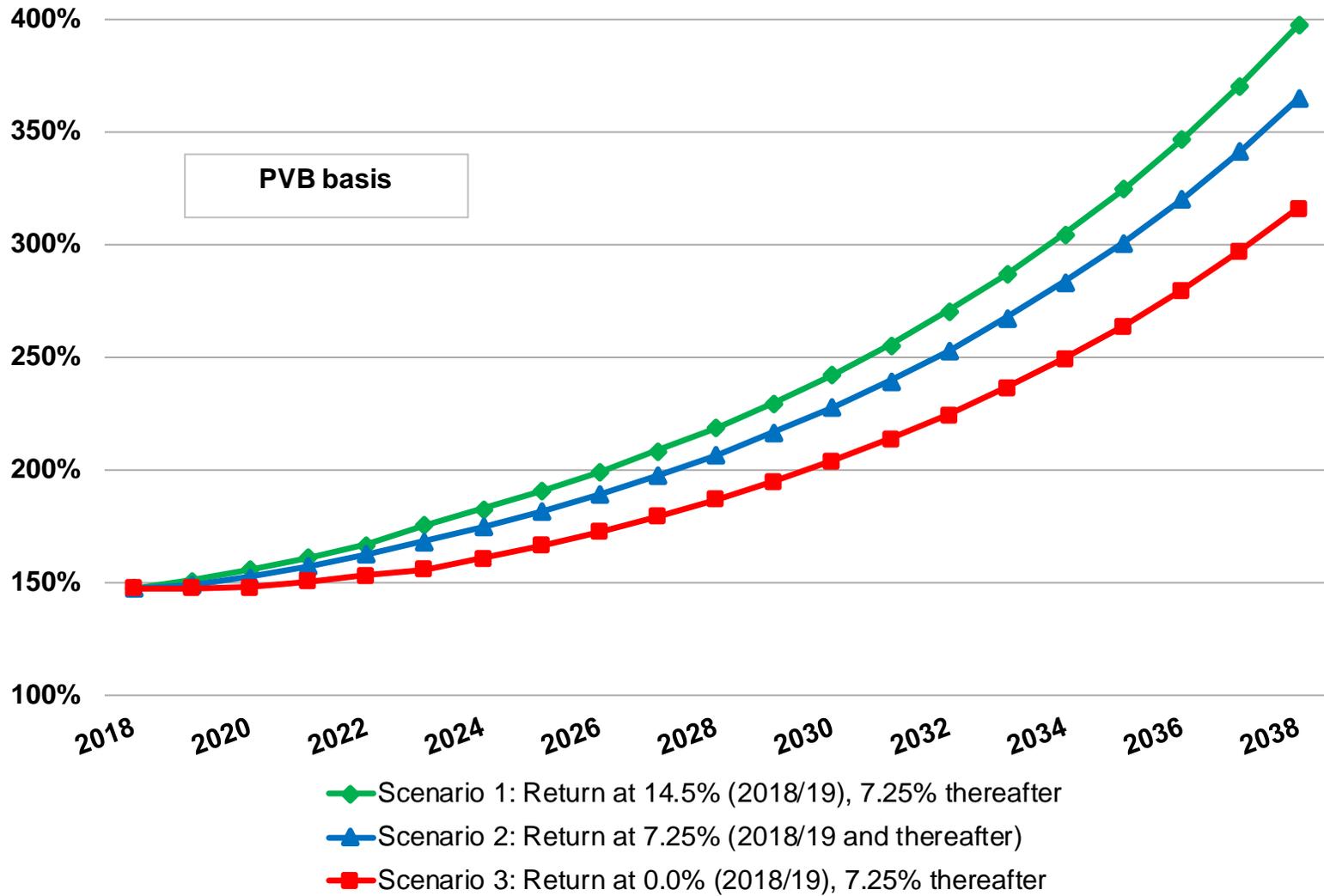


Chart 23

Projected Funded Ratios for SRBR

Under Hypothetical Longer Term Market Return Scenario

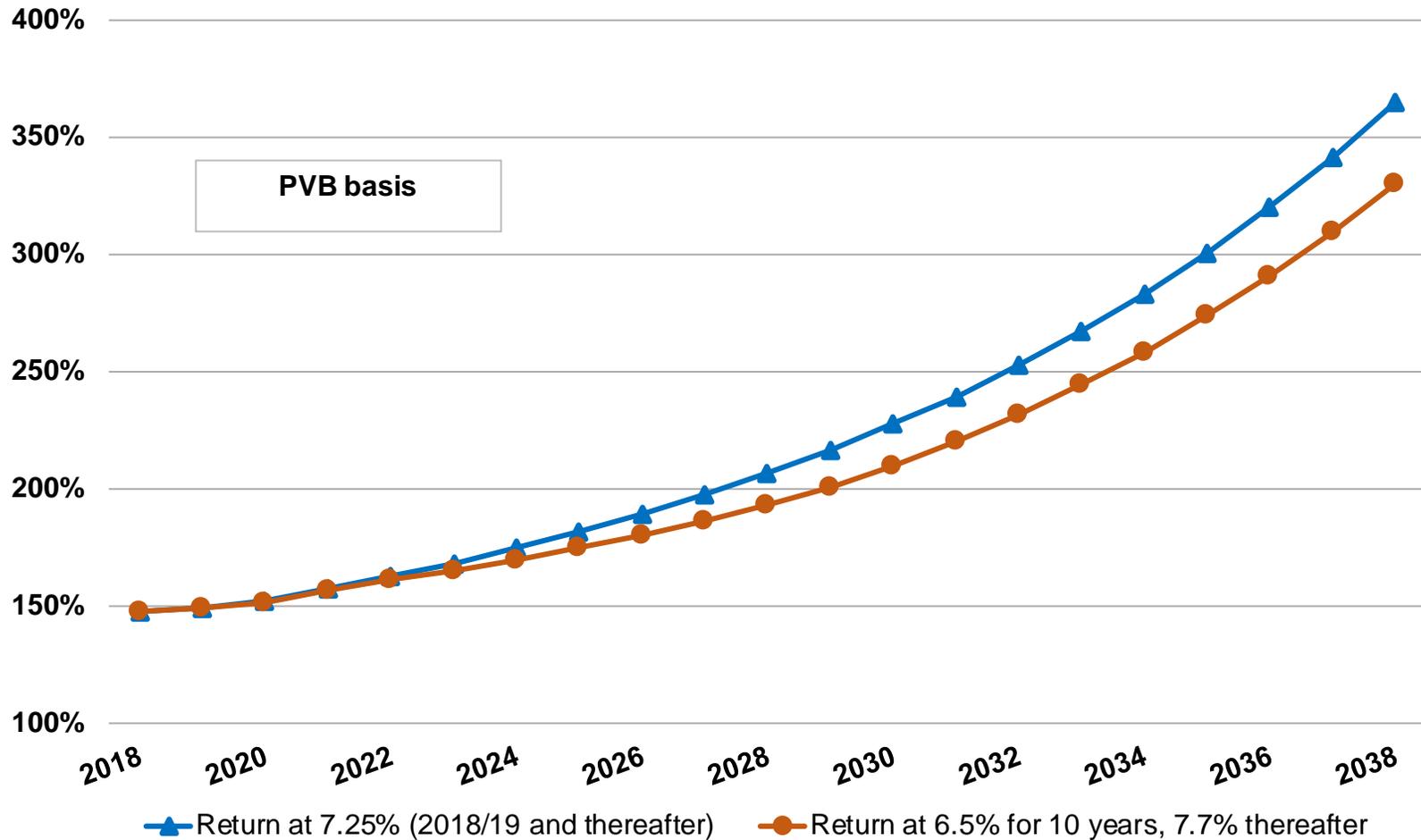
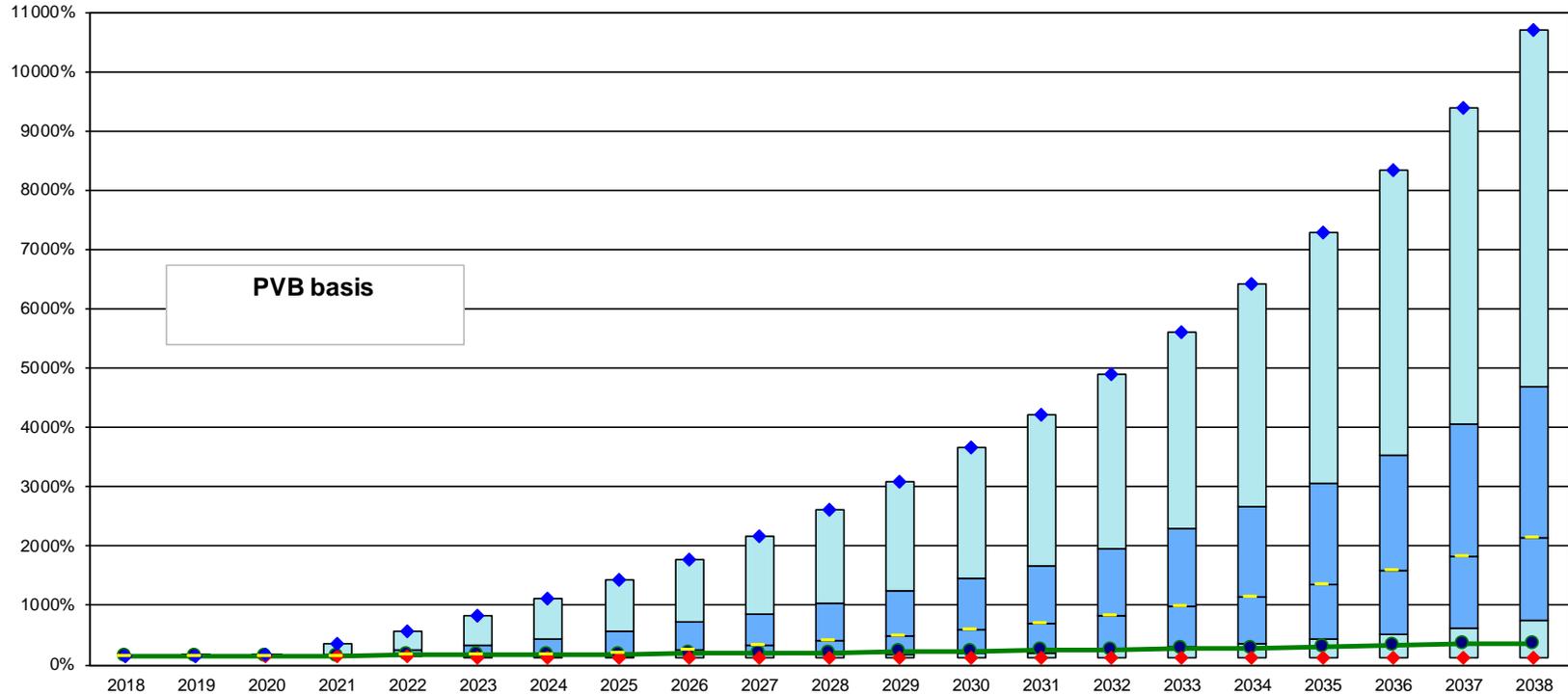


Chart 24

Projected Funded Ratios for SRBR



◆ 95th	147%	152%	170%	353%	574%	837%	1120%	1439%	1780%	2170%	2623%	3096%	3659%	4209%	4901%	5595%	6425%	7296%	8332%	9384%	10689%
— 75th	147%	151%	156%	162%	244%	330%	441%	570%	710%	863%	1040%	1246%	1452%	1675%	1966%	2286%	2653%	3070%	3520%	4064%	4685%
■ 50th	147%	149%	152%	157%	162%	168%	176%	206%	257%	320%	396%	485%	584%	701%	838%	984%	1153%	1354%	1581%	1829%	2127%
— 25th	147%	148%	148%	150%	151%	152%	153%	155%	159%	163%	169%	178%	190%	210%	239%	294%	352%	426%	510%	620%	736%
◆ 5th	147%	145%	141%	139%	135%	130%	127%	124%	122%	121%	120%	119%	117%	116%	117%	118%	119%	121%	124%	125%	128%
●	147%	149%	152%	157%	163%	168%	175%	182%	189%	198%	207%	217%	228%	240%	253%	267%	283%	301%	320%	341%	365%

● Baseline deterministic projection with current 7.25% investment return assumption

Appendix: Actuarial Assumptions, Methods and Actuarial Certification

Actuarial Assumptions and Methods

Unless otherwise noted, the results included in this report have been prepared based on the assumptions and methods used in preparing the June 30, 2018 valuation.

Deterministic Projection

In addition, we have prepared the deterministic projection using the following assumptions and methods applied in the June 30, 2018 actuarial valuation:

- Non-economic assumptions will remain unchanged.
- Retirement benefit formulas will remain unchanged.
- 1937 Act and PEPRA statutes will remain unchanged.
- UAAL amortization method will remain unchanged (i.e., 18-year layers and level percent of pay).
- Economic assumptions will remain unchanged, including the annual 7.25% investment earnings and 3.50% active payroll growth assumptions.
- Deferred investment gains and losses will be recognized semi-annually over a 5-year period.
- All other actuarial assumptions used in the June 30, 2018 actuarial valuation will be realized.

Stochastic Projection

Besides the assumptions and methods discussed above for the deterministic projection, the following additional assumptions or parameters are used in projecting KCERA's investment portfolio over the next 20 years based on performing 10,000 trial outcomes of future market returns.

Target Asset Allocation Percentage

The target asset allocation is based on that provided by KCERA at the last triennial experience study and used by Segal to set the investment return assumption of 7.25% that was applied in the June 30, 2017 and 2018 valuations. That target asset allocation is as follows:

Asset Class	Target Allocation
Large Cap U.S. Equity	15%
Small Cap U.S. Equity	4%
Global Equity	6%
Developed International Equity	8%
Emerging Market Equity	4%
U.S. Core Fixed Income	19%
High Yield/Specialty	6%
Emerging Market Debt	4%
Core Real Estate	5%
Value Added Real Estate	5%
Commodities	4%
Hedge Funds	10%
Private Equity	5%
Private Credit	<u>5%</u>
Total	100%

Simulation of Future Returns

In preparing the 10,000 trial outcomes of future market returns, we performed simulations using assumptions regarding the 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2018

survey prepared by Horizon Actuarial Services.²³ We used the assumptions that were closest to the asset classes found in KCERA’s investment portfolio.

A summary of the 10-year and 20-year arithmetic returns,^{24,25} standard deviations and correlation matrix for each of the different asset classes used in the modeling is as follows:

Asset Class	10-Year	20-Year	Standard	Correlation Matrix											
	Arithmetic Return	Arithmetic Return	Deviation	1	2	3	4	5	6	7	8	9	10	11	
1 US Equity - Large Cap	7.34%	8.73%	16.39%	1	1.00										
2 US Equity - Small/Mid Cap	8.49%	10.13%	20.20%	2	0.89	1.00									
3 Non-US Equity - Developed	8.36%	9.46%	18.67%	3	0.84	0.76	1.00								
4 Non-US Equity - Emerging	10.52%	11.94%	24.89%	4	0.72	0.67	0.79	1.00							
5 US Corporate Bonds - Core	3.54%	4.63%	5.71%	5	0.12	0.07	0.14	0.14	1.00						
6 US Corporate Bonds - High Yield	5.29%	6.44%	10.24%	6	0.61	0.60	0.60	0.62	0.36	1.00					
7 Non-US Debt Emerging	5.63%	6.85%	11.43%	7	0.54	0.49	0.58	0.66	0.44	0.59	1.00				
8 Real Estate	6.89%	7.67%	13.86%	8	0.44	0.41	0.40	0.33	0.10	0.30	0.24	1.00			
9 Hedge Funds	5.29%	6.61%	7.87%	9	0.66	0.64	0.68	0.67	0.14	0.58	0.48	0.35	1.00		
10 Commodities	5.46%	6.47%	17.60%	10	0.31	0.29	0.39	0.43	0.10	0.35	0.34	0.24	0.42	1.00	
11 Private Equity	10.72%	12.17%	22.16%	11	0.73	0.69	0.70	0.61	0.03	0.48	0.40	0.39	0.60	0.30	1.00

Other Considerations

The results presented in this report are intended to provide insight into key plan risks that can inform financial preparation and future decision making. However, we emphasize that both deterministic and stochastic projections, by their nature, are not a guarantee of future results. The modeling projections are intended to serve as illustrations of future financial outcomes that are based on the information available to us at the time the modeling is undertaken and completed, and the agreed-upon assumptions and methodologies described herein. Emerging results may differ significantly if the actual experience proves to be different from these assumptions or if

²³ That survey included responses from 34 investment advisors, including KCERA’s investment advisor at Verus.

²⁴ Note that only 13 investment advisors provided long-term (e.g. 20-year) capital market assumptions in the survey.

²⁵ These returns are gross of inflation and before any adjustment for investment expenses. The annual inflation assumption based on the Horizon Survey for 20 years was 2.48%.

alternative methodologies are used. Actual experience may differ due to such variables as demographic experience, the economy, stock market performance and the regulatory environment.

Actuarial Certification

The actuarial calculations in this report were completed under the supervision of John Monroe, ASA, MAAA, Enrolled Actuary.

The actuarial opinions expressed in this report were prepared by Paul Angelo, FSA, MAAA, FCA, Enrolled Actuary and John Monroe, ASA, MAAA, EA. They are members of the American Academy of Actuaries and they meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

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Appendix F: Sample Publications



**SOCIETY OF
ACTUARIES**

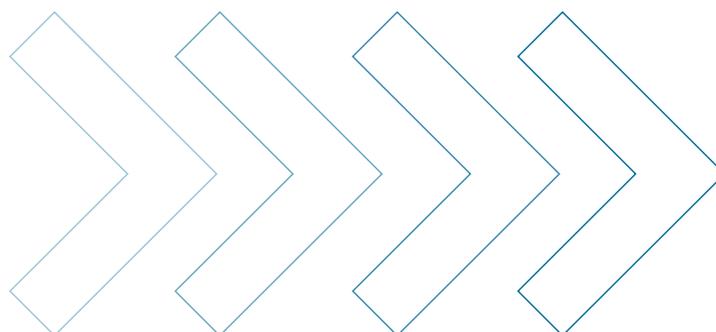
**SOCIAL INSURANCE
& PUBLIC FINANCE
SECTION**

In The Public Interest

ISSUE 12 • JANUARY 2016

**Employer-Sponsored
Health Insurance Under
the ACA**
Impacts from the Cadillac
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Understanding the Valuation of Public Pension Liabilities Expected Cost versus Market Price

By Paul Angelo

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With US state and local economies in slow recovery, workforce costs—including pensions and other benefits—remain front-page news. Taxpayers and public officials want to know the size of their financial obligations to employees and retirees for retirement benefits to assess how much it will cost—today and in the future—to meet those obligations.

Determining these obligations should be straightforward because governmental accounting standards and professional actuarial standards outline accepted methods for measuring pension liabilities. In particular, current practice measures pension obligations using long-term assumptions and methods, including an expected rate of return on plan assets. But alternative measures of pension liabilities are increasingly reported in the press. One measure might peg the size of the liability as two or even three times the size of the liability measures currently in use. As a result, a great deal of confusion and controversy has resulted over which measure is “correct.”

The controversy around measuring pension liabilities centers on a familiar subject for sponsors of public pension plans: the applicability of what is called the “market value of liabilities” (MVL) to public-sector pension obligations.¹ This paper explores the conceptual differences between two competing measures of liabilities: current practice versus the market-based measure. It also examines which measurement is most useful for public-sector decision makers. Finally, it reviews some of the issues that have yet to be resolved regarding measuring these pension obligations.

BACKGROUND: CURRENT PRACTICE VERSUS MARKET-BASED MEASUREMENT

Current practice for measuring the pension liabilities of public-sector pension plans provides information to plan stakeholders and decision makers about how much it will cost over time to satisfy the financial obligations to participants. This is accomplished by calculating what is called an actuarial accrued liability (AAL), which is based on both current information and reasonable expectations of future events.² The AAL measure is based on long-term methods and assumptions. It not only takes into account the service and pay earned by employees, but also anticipates future service and pay raises, which will increase the plan’s obligations. Current practice also incorporates information about the future investment earnings of the plan’s assets when selecting what is called the “discount rate.”³ In determining the AAL, the discount rate used to calculate public-sector pension liabilities is the long-term expected investment return on the plan’s investment portfolio.

The MVL approach differs from the AAL approach in important ways, especially when it comes to the discount rate. MVL measurements ignore expected investment earnings, and instead use current market rates of interest on relatively secure fixed-income instruments (for example, US Department of the Treasury rates or high-grade corporate bond rates). As discussed in the next section, the theory behind the MVL measure is that because public-sector pension benefits are fairly certain to be paid, they should be valued the same way that the market prices securities that have a similarly low “default risk.” This would indicate the use of the lowest current market interest rates, which are often called “risk free” rates. Note that “risk free” does not mean such rates are free of investment risk, but rather that they are the rates implicit in the market pricing of securities that, like public pensions, have low default risk.

There are other important differences between the AAL and the MVL. For instance, the MVL uses a much narrower definition of future benefits to calculate a plan’s liabilities, one that assumes that pay and service are frozen at current levels.⁴ However, our discussion will focus on the current controversy surrounding the discount rate: when measuring public pension liabilities and costs, should future benefit payments be discounted by using the expected long-term return on plan assets or by using current market interest rates?

TWO APPROACHES, TWO FUNDAMENTALLY DIFFERENT CONCEPTS

The MVL method differs from the current AAL approach at the most basic and conceptual level. The AAL and MVL are measurements that are designed to answer fundamentally different questions. Consequently, the usefulness of the information they impart depends on the needs and purposes of any given user.

The AAL provides information about expected actual costs to the employer and, ultimately, to the taxpayer; it is the best estimate of what it will cost to provide pension benefits today and into the future. This is why benefit obligations are discounted using the long-term expected return on plan assets. Since investment earnings reduce the net cost to the employer, an estimate of future investment earnings is appropriate in a measurement whose primary purpose is to inform stakeholders about current and future costs.⁵

The MVL, on the other hand, is not directly concerned with the question of funding. It is a measurement designed to estimate the theoretical market price of a plan's obligations. There are a couple of "what-if" scenarios that illustrate the meaning of this market price. For example, the MVL may be viewed as a "replacement value," meaning the price the market would charge if all plan participants wanted to replicate their accrued pension benefits by purchasing fixed-income securities that would provide the same stream of income.

Another way to view the MVL is as a "settlement value," which is what the market would charge if the employer were able to terminate the plan and transfer its benefit obligations to a third party.⁶ Under either of these scenarios, liabilities should be valued independently of the long-term expected return on assets, since the question being asked is: what is the market's "going price" today if the benefits are to be provided by fixed-income market instruments rather than long-term invested assets?⁷ Consequently, the MVL discounts benefit obligations by using current returns on fixed-income instruments instead of using the rate that plan assets are expected to earn.

The discount rate is one of the most significant factors in measuring any long-term obligation. A lower discount rate will produce a larger measure of the obligation, and vice versa. Given the importance of the discount rate in valuing long-term obligations, these two approaches to discounting—using long-term expected returns versus current market bond rates—will result in very different measures of a plan's liabilities. In today's low-interest-rate environment, an MVL measure will produce a liability that is substantially greater than the current expected return method would produce. Under alternative macroeconomic conditions (such as the high-interest-rate environment of the early 1980s), the MVL would result in a much smaller liability than the AAL.⁸

However, policymakers, trustees, and plan stakeholders are less concerned with broad conceptual differences and more concerned with the practical question of which measure is most useful for their purposes. The informational value of either measurement depends on what the users really want to know. Indeed, in its recent revisions to the governing Actuarial Standard of Practice (ASOP), the Actuarial Standards Board (ASB) stated



clearly: "the actuary should consider the purpose of the measurement as a primary factor in selecting a discount rate." This focus on the purpose of the measurement is found throughout the revised ASOPs that apply to both the measurement of pension obligations and the selection of discount rates.⁹

FINDING PURPOSE AND MEANING IN LIABILITY MEASUREMENTS

To the extent that funding costs are the overriding practical concern facing stakeholders of public-sector plans, it is easy to see how the AAL measurement provides viable information that can be used for hands-on decision making. Decision makers must be concerned not only with the here and now, but also with anticipating future developments. Because the AAL qualitatively and quantitatively incorporates more information than MVL measurements—information about future increases in the plan's benefit obligations (by incorporating future service and salary increases) and about expected long-term earnings on plan assets—it more accurately measures the likely financial burden of the plan on an employer. As a result, the AAL provides useful information to an employer seeking to understand how the plan fits in with the employer's overall financial position, or to trustees seeking to ensure the long-term viability of the plan.

There are few similar, practical applications in the public sector for MVL measurements, which were developed to address specific financial and policy concerns that are faced by corporations sponsoring defined benefit plans. As noted in the previous section, one interpretation of the MVL measure approximates the market replacement value of benefits earned to date by plan participants. This is inconsistent with the basic reason why pension plans are established: to provide employers with a more efficient, cost-effective means of delivering retirement benefits

than simply having individual employees obtain those benefits at fixed-income market rates. Although calculating this market replacement value of benefits might make for an interesting illustration of the economic efficiency of pension plans, it has limited relevance for trustees or employers looking for information on a plan's current and long-term prospects.

Another interpretation of the MVL—as a measure of a plan's settlement value or "termination liability"—may be useful in the context of single-employer corporate pension plans, where federal law specifically permits an employer to terminate a pension plan and provides an explicit regulatory protocol for doing so. Corporate employers that decide to terminate their pensions must either pay an insurance company to issue annuities to pay plan participants or hand over control of the plan and its assets to the federal Pension Benefit Guaranty Corporation, which values pension liabilities in a way that mirrors annuity pricing.

This is why MVL measurements that are used in the private sector are often designed to approximate settlement values for the pension benefits. A corporation's creditors or a potential merger or acquisition partner will be interested in the net termination value (market price) of the firm's pension obligations. None of this is generally relevant to public-sector plans, which are governed by state and local laws and statutes that do not contemplate termination.¹⁰ For discussions about the likely cost of a public-sector plan for a sponsoring employer or the long-term financial health of the plan, MVL estimates will be inaccurate at best and misleading at worst, because these measurements explicitly exclude information about funding costs.

RECENT DEVELOPMENTS: THE GASB AND ASB

This discussion might raise the question: if current practice is so useful, why did both the Governmental Accounting Standards Board (GASB) and the ASB decide to review it? The answer is that, like any standards, those governing the calculation of pension liabilities are, and should be, subject to periodic review to ensure that they are meeting the needs of stakeholders. It is significant that the GASB and the ASB have reaffirmed the basic conceptual framework underlying the AAL and the appropriateness of using the expected rate of return to discount pension liabilities for both accounting expense and funding cost. However, these reviews have raised some important questions, and the answers may have an impact on public plans.

One of the critical questions concerns how to reconcile the AAL measurements with the actual contribution behavior of a plan's sponsor. The AAL anticipates long-term investment returns on plan assets. However, the liability and cost estimates will only be accurate if the plan sponsor is actually funding the plan in accordance with the actuarially determined needs of the plan. To the extent that an employer fails to fund the actuarially required contributions, the plan will fail to achieve the investment earnings

it expected. Consequently, the AAL, as traditionally calculated, may be underestimating long-term plan costs. (For information on whether investment earnings assumptions are too high, see the sidebar "Selecting an Expected Investment Return.")

Decision makers and stakeholders certainly need reliable information on the consequences that flow from a failure to appropriately fund a plan. In its revised accounting standards, the GASB determined that liabilities should continue to be calculated using the expected return on plan assets for plans that are being properly funded on an actuarial basis. However, for those not being funded in accordance with the actuarially determined needs of the plan, GASB determined that liabilities should be discounted using a "blended rate."

Under the GASB's approach, only benefits that are projected to be funded from plan assets are discounted using the expected return on plan assets, while any remaining benefits are discounted using a current bond index rate.¹¹ This provides an explicit measure of the cost of long-term underfunding by denying the use of the long-term earnings rate for future unfunded benefit payments. Note that in contrast, because MVL measures are divorced from the concept of funding, they offer no information on the incremental cost of a failure to fund future benefits.

As for the actuarial standards (ASOPs), as noted earlier the ASB has issued revised standards both for measuring pension obligations and for selecting discount rates. Unlike the GASB's accounting and financial reporting standards for public plans, pension ASOPs apply to all actuarial measurements related to pensions and are therefore much wider in scope. That is why rather than attempting to specify particular measurements, the revised pension ASOPs require that, "[w]hen measuring pension obligations and determining periodic costs or actuarially determined contributions, the actuary should reflect the purpose of the measurement."¹²

Under this guidance, just as the GASB has determined that expected earnings is the appropriate discount rate for the purpose of measuring accounting cost (in other words, expense), expected earnings is also the appropriate discount rate for the purpose of measuring funding cost (in other words, contributions). This is evident in the following excerpt from GASB Statement 68, which applies equally well to both accounting and funding cost:

"The amounts that are projected to be provided by pension plan investment earnings represent a reduction in the employer's expected sacrifice of resources to satisfy the obligation for pensions. Therefore, if the potentially significant effect of pension plan investment earnings is not considered in the measurement of the pension lia-

Selecting an Expected Investment Return

Aside from the issue of market-based discount rates, there is also an active discussion on editorial pages and in board meetings as to whether the current long-term expected earnings assumptions used by public plans are too high. This is a valid topic for discussion. Indeed, trustees and their actuaries routinely review investment earnings assumptions. They may periodically revisit and change their earnings assumptions, either because of changes in asset allocation or changed future market expectations. This is entirely appropriate.

Unfortunately, this discussion has a tendency to get muddled with the MVL debate, because some commentators who champion the use of the MVL for public plans also claim that it justifies a more conservative, and therefore more appropriate, long-term earnings rate.

The MVL debate has no bearing on the selection of the long-term expected earnings rate because the MVL measure is not based on future returns on a plan's invested assets. It explicitly avoids forward-looking assumptions about the expected return on a plan's assets, since these are not relevant to determining the market replacement value, nor would they be relevant in the context of a plan termination.

Another proposed use for MVL measures, and particularly the market-based discount rate, is to illustrate the downside risk associated with using a long-term earnings-based discount rate. Even here, the MVL terminology can be misleading. The market-based discount rate is commonly referred to as the "risk-free" rate, even though using such a discount rate would not preclude future investment losses relative to that assumption.*

A more meaningful illustration of investment risk is to show results under alternative investment return scenarios, perhaps with the expected probabilities associated with the different outcomes.

While discussions of appropriate long-term earnings assumptions and their associated risks should be encouraged, they should not be influenced by arguments based on liability measures that are unrelated to expected investment earnings.

* In fact, the term "risk-free" rate does not refer to investment risk at all. Rather, it is the rate that the market would use to price a cash flow that is sure to be paid, and thus free of default risk.

bility, the Board believes that amounts recognized by the employer, including the employer's cost of services associated with pensions as they are earned, potentially would be misstated."¹³

Under the revised ASOPs, there may be purposes for which a market-based MVL measure would be appropriate. These might include settlement values for withdrawing employers (as discussed earlier) or values for use in market-based financial economic models.¹⁴ Nonetheless, the expected earnings-based AAL is most consistent with the purpose of measuring the current costs and accrued liabilities for an ongoing public pension plan.

CONCLUSION

Liability measurements must be useful and relevant to inform stakeholders. The AAL imparts information about the issues that are most important to decision makers: the expected costs associated with funding promised benefits. The MVL measures are far less useful for public-sector plans because they are not designed to answer the critical questions facing policymakers, employers, and trustees related to the expected cost of current and future benefit obligations.

In many cases, actions to resolve the difficult issues facing public-sector pension plans in the present fiscal environment will have to include implementing appropriate funding policies and disciplines, as well as developing sustainable benefit designs. Those policies and plan designs should be evaluated using measures consistent with the purpose of the measurement—determining the resources needed to fund the pension obligation—and not on a theoretical market price of that obligation. ■

NOTES

This paper is based on The Segal Company's June 2011 Public Sector Letter. See The Segal Company, "Actual Cost vs. Market Price: Does Market Valuation of Pension Liabilities Fit the Public Sector?," June 2011, www.segalco.com/publications/publicsector-letters/june2011.pdf.

ENDNOTES

- ¹ For an introduction to the MVL approach to valuing pension liabilities, see The Segal Company, "Market Value Liability and Public Pension Plans: A Continuing Controversy," January 2009, www.segalco.com/publications/publicsectorletters/jan2009.pdf.
- ² The AAL is the liability for all service to date. A pension valuation also determines a "normal cost" for active members, which is the cost for the next year of service. For active members, the AAL is the current value of the normal costs for past years of service. For inactive members, the AAL is simply the present value of their future benefits.
- ³ Any current measure of a pension plan's liability is essentially a calculation, in current dollars, of some portion of the value of future benefit payments. In recognition of the time value of money, future benefit payments must be "discounted" to arrive at a value today.

⁴ For a detailed description of these differences, see The Segal Company, “Market Value Liability and Public Pension Plans.”

⁵ Note that this applies not only to funding cost (contributions) but also to accounting cost (expense). In its recently released revised accounting standards for pensions (Statements 67 and 68), the Governmental Accounting Standards Board states that, when setting the discount rate for financial reporting, “the amounts that are projected to be provided by pension plan investment earnings represent a reduction in the employer’s expected sacrifice of resources to satisfy the obligation for pensions. Therefore, if the potentially significant effect of pension plan investment earnings is not considered in the measurement of the pension liability, the board believes that amounts recognized by the employer, including the employer’s cost of services associated with pensions as they are earned, would potentially be misstated.” See Governmental Accounting Standards Board, “Statement No. 68: Accounting and Financial Reporting for Pensions,” June 2012, paragraph 228.

⁶ In practice, to terminate a plan, the employer would have to buy annuities. Because of margins, profit, and other factors, actual annuity prices would generally be higher than the theoretical MVL discussed here.

⁷ As noted earlier, the fixed-income instruments used here should have the same generally low default risk as is associated with public pension obligations.

⁸ This discussion only considers the effect of the different discount rates. If measured using the same discount rate, the MVL will generally be less than the AAL because the MVL does not reflect future service and salary increases.

⁹ Note that in the revised edition of ASOP No. 4, what we are calling the “MVL” is described as a “market-consistent present value.” See Actuarial Standards Board, “Actuarial Standard of Practice No. 4 (Revised Edition): Measuring Pension Obligations and Determining Pension Plan Costs or Contributions,” December 2013, www.actuarialstandardsboard.org/pdf/exposure/aso-p4_2nd_exposure%20draft_dec_2012.pdf; and Actuarial Standards Board, “Actuarial Standard of Practice No. 27 (Revised Edition): Selection of Economic Assumptions for Measuring Pension Obligations,” September 2013, www.actuarialstandardsboard.org/pdf/exposure/ASOP_No27_second%20exposure_2011.pdf.

¹⁰ There may be some limited contexts in which the MVL could impart useful information to public-sector plan stakeholders and decision makers. For instance, in cases where one employer wishes to withdraw entirely from a plan that covers multiple employers, the plan may calculate the value of that employer’s termination obligation to the plan using an MVL-type approach. Similarly, trustees of some plans may decide that an MVL approach is the correct one to use in determining purchases of service credit, since, in effect, the participant is purchasing future benefits that would otherwise need to be purchased in the market. However, these are the exceptions to the general situation of an ongoing public-sector pension plan.

¹¹ Note that the new GASB standards are sometimes misinterpreted to require that the blending of the expected return and bond index rate is based on the current funded status of the plan. This is incorrect. As described earlier, the blending of these two rates depends on whether projected benefits will be covered by projected assets, including future contributions to fund those benefits. For that reason, the inclusion of the bond index rate in the discount rate depends more on having future contributions based on an actuarially sufficient funding policy and less on the current relationship between plan assets and liabilities.

¹² Actuarial Standards Board, “Actuarial Standard of Practice No. 4 (Revised Edition);” and Actuarial Standards Board, “Actuarial Standard of Practice No. 27 (Revised Edition).”

¹³ Governmental Accounting Standards Board, “Statement No. 68,” paragraph 228.

¹⁴ Another purpose often suggested for MVL measures is to illustrate the downside risk associated with using an expected earnings-based discount rate. This is discussed in the sidebar “Selecting an Expected Earnings Assumption.”

AUTHOR’S NOTE:

This article was prepared in May 2013 for a forum sponsored by the American Enterprise Institute. At that time, revisions to ASOPs 4 and 27 were both at the “Second Exposure Draft” stage; the final Revised Editions were released in December and September 2013, respectively. This article has been updated to refer to those Revised Editions of the ASOPs and to reflect their final texts wherever they differed slightly from the quotes taken from the Exposure Drafts.

The appropriate roles of “level cost” models versus “market pricing” models¹ in valuing public pension obligations and liabilities continue to generate debate and discussion. As discussed in the article, ASOPs 4 and 27 provide the key insight that the type of model used should reflect the purpose of the measurement. However, these ASOPs (and ASOP 27, in particular) also contain what I think is a new—or at least a clarifying—insight on the relationship between type and purpose of measurement, particularly when it comes to market pricing measures.

Generally, there is a clear distinction between the type and the purpose of a pension measurement. If the purpose of the measurement is funding, corporate plans generally use market pricing types of measures (e.g., the OBRA ’87 “current liability” and the PPA ’06 “target liability”), while public sector plans generally use level cost types of measures. The same is true if the purpose of the measurement is financial reporting. For purposes of defeasance or settlement, generally both corporate and public plans use a market pricing type of measure, either based on a theoretical market value or from an actual market transaction.

However, when ASOP 27 (in Section 3.9) lists possible purposes to consider when selecting a discount rate, it includes “market-consistent measurement” as one of the possible purposes of measurement. In effect, this means that the underlying justification for wanting a market pricing type of measure may simply be that it is the value that is most consistent with a market-based financial economic model. Perhaps the framework of ASOP 27 will allow for a clearer identification of this purpose, whatever other purposes may be proposed to justify the disclosure of a market pricing type of measure for public pension obligations.

ENDNOTES

¹ “Level cost” models use assumed expected return discount rates and (most often) level cost actuarial cost methods. “Market pricing” models use observed market return discount rates and accrued benefit actuarial cost methods. The article uses “expected cost” in its title only because it focuses on the discount rate aspect of this type of model.

— Paul Angelo ■



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Credit FAQ:

Looking Forward: The Application Of The Discount Rate In Funding U.S. Government Pensions

September 13, 2018

(Editor's Note: This commentary applies to state and local government pensions within U.S. Public Finance and is not intended to describe or represent S&P Global Ratings' methodology for analyzing pensions in other sectors.)

Public pension system costs can have a significant impact on U.S. governments' credit quality. However, the magnitude of these costs can be quantified in different ways. These differences can lead to market confusion and potential misunderstanding that stalls constructive public dialogue on addressing rising unfunded pension liabilities. For example, size estimates of U.S. public pension systems' unfunded liabilities vary widely from as low as \$1.9 trillion to as high as \$8 trillion. This wide gap presents challenges in properly evaluating the future risks and financial burdens states, cities and other municipal entities may face as a result of underfunded pension plans.

S&P Global Ratings believes a cornerstone for constructive municipal market discussion on pension liabilities is to determine the most relevant and practical use of the discount rate. The discount rate is the value used to discount future cash flows or benefit payments back to their present value. It typically is the most influential factor used in measuring pension liabilities, but there are different methods in arriving at a pension plan's discount rate based on different applications.

In this Credit FAQ, we discuss the two primary approaches used to determine a discount rate. We also discuss our view on the preferred use and treatment of the discount rate on public pension plan funding and how that ultimately factors into our assessment of municipal entities overall creditworthiness. In addition, we further clarify our approach in evaluating discount rates and why we believe that using a more forward-looking methodology provides us with a better view of credit risks.

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Key Takeaways

- Unfunded pension liabilities are an important credit factor that are heavily influenced by the discount rate, which can be applied in different ways.
- Having a forward-looking view enhances our analysis and enables us to evaluate the funding strategies and budgetary ramifications pension plans could have on each government over time.
- In our view, the expected cost methodology to measure government pension liabilities effectively weighs the immediate balance of assets and liabilities and also evaluates the trajectory of pension costs going forward.
- We avoid broad sweeping changes to reported liability measurements, which can lead to an unintended obfuscation of risk factors and negatively affect credit analysis.
- We assess credit-specific demographics, funding discipline, and additional elements such as legal or regulatory factors within our ratings process.

Frequently Asked Questions

What is the expected cost approach to establishing a discount rate and measuring public pension liabilities?

The expected cost (or level cost) approach is a forward-looking methodology that anticipates growth in both earned benefits and assets over time and is designed to measure funding progress over the long term. U.S. public pension plans currently use this approach for funding. Pension liability under this method is defined as the amount of assets needed today to be expected, based on the assets' long-term expected rate of return, to fund future benefit payments that have already been accrued. Therefore, liability tracks the amount of pension plan assets needed today to pay benefits when they come due. If a plan is not on track, contributions into the plan must increase in order to secure the promised benefits. At its core, this methodology is designed to evaluate a government's current and ongoing required costs to adequately fund its pension benefits. The liability measured under the Governmental Accounting Standards Board (GASB) for financial reporting also uses the expected cost basis. GASB Statement 68 states "the amounts that are projected to be provided by pension plan investment earnings represent a reduction in the employer's expected sacrifice of resources to satisfy the obligation for pensions." Put another way, contributions and the return generated from investing them can both be anticipated to be used to pay future benefits.

Expected cost is a forward-looking methodology that is designed to measure funding progress over the long term.

What is the financial economics approach to establishing a discount rate and measuring government pension liabilities?

The application of financial economics (FE) to public pensions has also been used to set discount rates and measure liability, but in a fundamentally different way than the expected cost approach. At its core, FE as applied to government pensions attempts to approximate the value of the benefit obligations to an independent third party in the market through the tenets of market pricing of corporations made popular by the Modigliani and Miller Theorem (see sidebar). Therefore, liability is ideally defined as the fair amount to pay an individual or entity in the market in order for them to agree to cover the pension obligations. To determine the present value of obligations in this context, the future cash flows are discounted according to the earning potential of market instruments that best match the pension payouts in terms of duration and certainty, regardless of

The Financial Economics methodology is not forward-looking but rather a point-in-time estimate.

how plan assets are invested. Practically, this is not fully feasible, especially with the growth in risk sharing and variable benefit features for public plans, but the closest approximations tend to create a discount rate that falls into a category that we call a near risk free rate. The simple argument indicates that because pension benefit payments are relatively fixed and dependable in aggregate, market instruments that best replicate those payouts should also be relatively fixed and dependable (and therefore, nearly risk free), especially from a default risk perspective. This liability measurement is often known as a settlement measure of liability because it approximates the value an insurance company or other party might require to wind up the pension plan. This methodology is not forward-looking but rather a point-in-time estimate essentially presupposing that a transfer of responsibility for the pension obligations to an independent market participant is freely possible.

What approach does S&P Global Ratings believe best aligns with evaluating pension pressures that affect government credit quality?

In our view, underfunded public pensions can pose a credit risk in terms of potential near-term and long-term cost pressures for a government. In the extreme, unfunded pension liabilities can threaten a government's finances and ability to fulfill debt obligations in full and on time. Therefore, we believe the expected cost approach to the discount rate and calculated liability better reflects the anticipated cost to a government on an ongoing basis, and can demonstrate how such costs could change based on risks taken, market experience, and other significant factors. Examining the discount rate in this context allows us to evaluate how appropriate or risky the discount rate might be, and allows us to understand the practical implications to budgets when unraveling the credit story. The FE methodology of approximating the intrinsic value of the benefit payments to an outside and independent third party at a specific point in time fails to provide the information necessary to understand actual cost implications to governments over time. In contrast to corporations addressed by the Modigliani and Miller theorem, a government cannot easily or efficiently be bought out, merged, transferred, or changed by other methods, and its primary stakeholders--the residents--are relatively intransigent, leaving the assumptions required to apply FE and treat a government pension plan akin to a corporation difficult to justify. Furthermore, the FE approach inherently assumes the free transfer of benefit obligations from one party to the next (this is necessary for market pricing to function as intended), which relates to why it is often called a settlement valuation. For many state and local governments this is essentially impossible, with bankruptcy as the only remote possibility to enable that transfer. However, our analysis evaluates the events and pressures that could cause credit deterioration for a government, not assume a settlement value within our analysis.

We believe the expected cost approach better reflects the anticipated cost to a government on an ongoing basis.

Corporate plans in the U.S. use a form of FE methodology in measuring liabilities. Why is it appropriate there but not in public plans?

Historically, both corporate and public plans were evaluated on an expected cost basis--using a forward-looking approach of anticipating both liability growth and asset growth over time to manage costs over time. Around the turn of the century, corporations altered their approach based on two primary factors. First, corporations aim to enhance their value to their shareholders, resulting in a need to value all of the corporation's components according to a market price as much as possible. Second, corporations have more avenues for changing hands or dissolving, including but not limited to buyouts, mergers, and bankruptcy, all of which require some immediate assessment of market price. In recognition of these market factors, one of the provisions of the 2006 Pension Protection Act solidified the focus of liability evaluation for their

funding target on a point-in-time estimate based on FE principles. As a result, liabilities are primarily valued without anticipation of growth, typically using what is called a traditional unit credit cost methodology, and asset growth is measured by a yield curve annually updated by the U.S. Treasury and meant to represent high quality corporate bonds. While this may be appropriate given the structure and financial environment of a corporation, we again note that public entities are not market based and cannot be easily or efficiently bought out, merged, transferred, or changed by other methods, and their primary stakeholders are relatively intransigent, all of which distinguishes them from corporations and the need to develop some form of total market price.

Today, public plans use a forward-looking evaluation involving projected growth in both assets and benefits, and corporations use an estimate based on static benefits and near risk-free rates. To adequately anticipate changing costs and pressures to a government's budget, it is advantageous to use a forward-looking view whenever possible. This enhances our analysis and enables us to evaluate the assumptions, funding discipline, and strategies that go into funding a pension plan and what budgetary ramifications they could have for each government over time.

Does S&P Global Ratings use a corporate or FE-like discount rate to adjust reported government liabilities?

Note that taking reported government liabilities, which project benefit growth of each member forward into retirement, and applying an FE-like discount rate to adjust those liabilities, does not fall in the expected cost or the FE methodology--it produces a number without basis. Recall that the expected cost method projects growth in both assets and benefits, while the FE position projects neither and is a point-in-time estimate. Therefore, taking the government's pension valuation, which projects benefit growth forward (primarily through salary growth), and applying a corporate-like discount rate to it (which is separated from anticipated asset growth), mixes apples and oranges into one calculation. This would artificially inflate the liability of government plans much higher than we would even see in a comparable corporate plan. S&P Global Ratings does not adjust reported government liabilities using an FE-based discount rate but rather evaluates the appropriateness and inherent risk factors of the actual discount rate used consistent with the expected cost approach.

We evaluate the appropriateness and inherent risk factors of the actual discount rate used.

Why does S&P Global Ratings not adjust reported liability using a single uniform discount rate?

In our view, plan assumptions should be appropriate for the plan's funding scheme, demographics, and other unique characteristics. The following are examples of individual plan factors that could result in varied capacity to withstand or capitalize on volatile assets and therefore are integral to our holistic credit evaluation.

Demographics. Plans that are closed no longer allow new entrants to join and have a limited time until all participants are receiving annuities. These plans will have a retiree-to-active ratio that accelerates over time. Variability in investment returns leads to larger contribution swings in mature plans, which, when compared with less mature plans, have more assets banked up relative to the payroll of their working population. To minimize intergenerational inequity and funding volatility--to which closed plans are more vulnerable--the portfolio will need to shift assets away from the high return-generating category over time and eventually eliminate most or all market risk. As the asset allocation shifts, the discount rate should decline in step to approach a rate that reflects minimal market risk. Plans that are open to new entrants and have an older

Credit FAQ: Looking Forward: The Application Of The Discount Rate In Funding U.S. Government Pensions

population and/or higher retiree-to-active ratio should monitor their investment risk appetite as well, although the asset allocation adjustments may not need to change as rapidly over time as in closed plans. Conversely, a new (or young) plan with only contributions coming in and no benefits being paid out could have a longer investment horizon and an appropriate appetite for more investment risk.

Funding discipline. There should be a stark difference in discount rates between prefunding plans and plans that pay benefits as they come due (pay-as-you-go). Pay-as-you-go plans have no assets and certainly cannot anticipate asset growth, whereas funded plans have assets that can grow and should be managed and assessed accordingly. In general, the better funded a plan is, and will continue to be, the more asset base it will have to generate returns and support the discount rate.

Other environmental factors. A variety of other factors could lead to different investment risk appetites and discount rates for pension plans. Legal, regulatory, or political flexibility in adjusting benefits affects their certainty and stability in different states and could influence funding strategies. Benefit features that are tied to a plan's investment return, such as some employee contribution rates or cost-of-living adjustments, should play a role in balancing risk and return. Support or financial backing from an outside entity could also affect the strategy used to fund plans.

We believe that each public pension plan and its participants has unique characteristics that might call for a divergence of particular assumptions and methods, including an appropriate asset allocation and prudent discount rate. Although we recognize current discount rates used by the majority of state and local plans still remain relatively optimistic at an average of 7.35% based on NASRA's February 2018 report "NASRA Issue Brief: Public Pension Plan Investment Return Assumptions", adjusting all plans in one broad stroke to a single discount rate (near risk free or other) eliminates vital information central to our analysis and establishes a false sense of comparability among plans that are not necessarily similar.

We tailor our credit analysis to highlight the risk factors in plan assumptions and anticipate the resulting cost trajectory. This enables our evaluation to be specific and relevant to each government and the retirement plans in which it participates.

Modigliani And Miller Theorem

The value of a corporation is independent of its capital structure, assuming no effects from second order factors such as taxes, information asymmetry, and transaction costs. This means that there is no inherent value gained by a corporation from adjusting investment allocations between stocks and bonds.

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External Publications By Your Segal Consultants

1. July 2019, *In The Public Interest* (Newsletter of the Society of Actuaries Social Insurance and Public Finance Section) “Decision-Useful Risk Measures for Public Pensions” by Paul Angelo (Public Pensions); by Todd Tauzer (Rating Agency Perspective)

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2. February 19, 2019, *S&P Global Ratings* Pension Brief: “Are Asset Transfers a Gimmick or a Sound Fiscal Strategy?” by Todd Tauzer
3. September 13, 2018, *S&P Global Ratings* Credit FAQ: “Looking Forward: The Application of the Discount Rate in U.S. Government Pensions” by Todd Tauzer
4. April 19, 2018, *S&P Global Ratings* Commentary: “For California, the Road to Fiscal Recovery; for Illinois, the Road not Taken” by Todd Tauzer

External Podcasts By Your Segal Consultants

1. Extra Credit: Todd Talks
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For California, The Road To Fiscal Recovery; For Illinois, The Road Not Taken

April 19, 2018

Key Takeaways

- California and Illinois suffered similar economic contraction in response to the Great Recession, which exacted a heavy fiscal toll in both states by exacerbating existing structural budget deficits.
- Although both states turned to temporary tax increases to boost revenues, only California paired the tax increases with spending adjustments, which has been an underappreciated linchpin of its fiscal recovery.
- Illinois had weaker pre-recession pension funded ratios, which continue to this day.
- Both states have tightened pension funding assumptions, but only California has exhibited contribution discipline and established a path to full funding.
- Illinois pension plans' negative amortization and negative cash flows compound the risks of low funding and restrain funding progress.

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Despite the widespread economic and fiscal stress associated with the Great Recession, most U.S. states weathered the historic downturn with their credit ratings intact. California (AA-/Stable) and Illinois (BBB-/Stable) were not as fortunate. The recession triggered sharp declines in tax revenue and asset values that plunged both states into severe budget crises, weakened the condition of their pension systems, and undermined their credit quality. During the period from late 2007 when the recession began, through its immediate aftermath in early 2010, S&P Global Ratings lowered its ratings on both states by two notches. In response to large fiscal gaps caused by the downturn, both would turn to temporary tax increases. However, of the two, only California paired its revenue enhancement with material spending-side policy changes designed to close its structural deficit. With the added advantage of a capacity for stronger post-recession economic and revenue growth, California was able to stabilize and then improve its credit quality. Conversely, Illinois--which did little beyond temporarily raise taxes--saw the initial signs of its modest fiscal recovery quickly falter. The state's unprecedented two-year budget negotiation stalemate compounded its fiscal problems, and by further diminishing its already weakened capacity to withstand unanticipated stress, pushed its credit rating to the brink of non-investment grade.

Synopsis

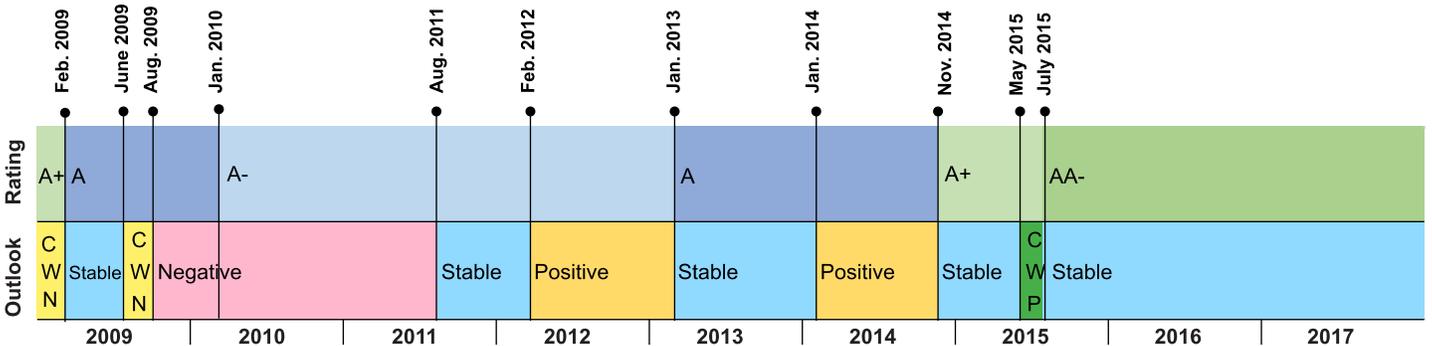
Already mired in a years-long fiscal crisis, California faced a \$27 billion projected budget deficit at the time of Gov. Edmund G. Brown, Jr.'s inauguration in January 2011. Within four months of taking office, however, the governor navigated through the legislature a package of deficit reducing budget reforms. Crucially, the fiscal measures reoriented the state general fund to a lower spending trajectory and improved the structural alignment of its finances which was a linchpin to the stabilization of its credit outlook. Enactment of the budget legislation had become easier in the wake of a 2010 voter-approved constitutional amendment that lowered the legislature's vote threshold for passing budget laws. Over the course of that and subsequent budget cycles, the simple majority-vote budget process made it easier for the governor to get a sufficient number of legislators to cosign his agenda of fiscal restraint. The state's budget condition would benefit further following the approval in 2012 of a voter initiative that temporarily raised personal income and sales tax rates.

Voters approved another budget reform in 2014, this time establishing a new budget stabilization account (rainy day fund). Although California remains susceptible to wide swings in revenue performance because of its volatility-prone tax structure, these institutional changes should better enable the state to manage the cyclicity.

Illinois entered the recession burdened by the consequences of its practice of chronically underfunding its pension systems. Even as the economy reached its pre-recession peak in 2007, the state's pension systems had a combined funded ratio of less than 63%, which foreshadowed its deterioration into fiscal distress. Whereas California matched—and even led its fiscal balancing efforts with spending-side adjustments—Illinois relied primarily on temporary increases to its corporate and individual tax rates that provided only transitory relief to its balance sheet. When the tax hikes partially expired, the state's misaligned fiscal structure fell deeper into debt as its backlog of unpaid bills mushroomed. From early 2015 through mid-2017, and faced with a large and growing structural deficit, the state's budget went from being a source of leverage in negotiations to collateral damage in a protracted ideological stalemate. Before the impasse ended, it would severely weaken the state's fiscal condition and push the state's credit rating to the precipice of below investment grade.

Timeline Of California's Fiscal Milestones And Rating Progression

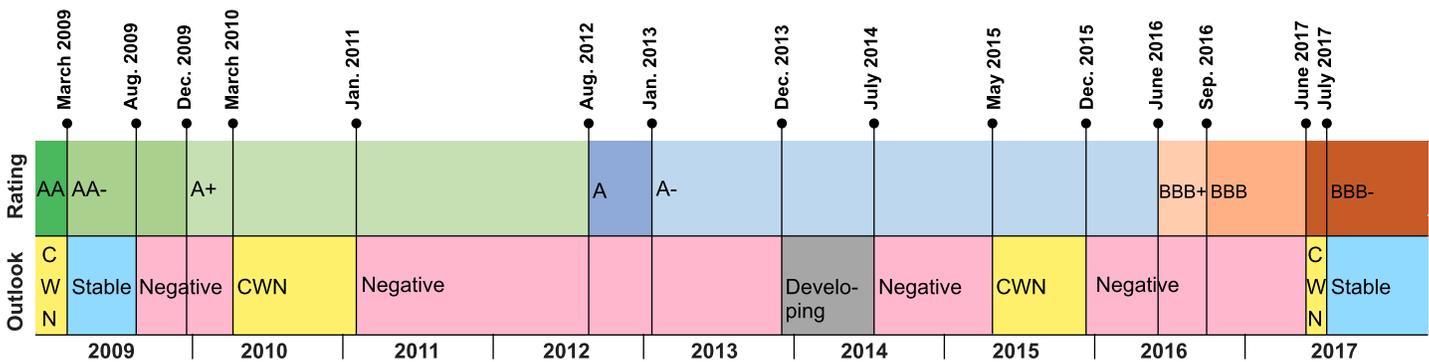
<p>Feb. 2009 Downgraded from 'A+' due to eroding cash position, concerns over ability to enter capital markets and expectation of not fulfilling regular operating obligations.</p> <p>June 2009 Put on negative CreditWatch for depleted liquidity and expectation of starting fiscal 2010 with stressed budget which may lead to deferred payments for some low priority obligations.</p> <p>Aug. 2009 Removed from CreditWatch for adoption of 2010 budget amendment which provided a path to improved financial liquidity. Negative outlook reflected optimistic operating assumptions and inclusion of considerable number of nonrecurring actions in budget.</p> <p>Jan. 2010 Downgrade reflected state's fiscal imbalance, impending recurrence of a cash deficiency and budget proposal that depended on increased federal aid to reach balance.</p>	<p>July 2011 Outlook was revised to stable for adopting a balanced 2012 budget which also addresses chronic cash deficiency and have provisions for improving operational liquidity.</p> <p>Feb. 2012 Positive outlook reflected significant improvement in structural budgetary performance reinforced by good liquidity and use of more realistic budget assumptions.</p> <p>Jan. 2013 Rating upgrade reflected improved fiscal condition and cash position, and the state's projections of a structurally balanced budget through at least the next several years.</p> <p>Jan. 2014 Positive outlook reflected governor's budget recommendations to improve fiscal position by addressing long-term obligations which will further strengthen state's credit quality and possibility of upgrade.</p>	<p>Nov. 2014 Upgraded to 'A+' for strong financial position, strengthening budget stabilization account under proposition 2 and partially offsetting volatile revenue profile by setting aside windfall revenue for periods of less than forecast tax revenue collection.</p> <p>May 2015 Put on positive CreditWatch due to accelerated improvement in fiscal profile fueled by upward revenue estimates, projection of paying down large funding obligations, and improving reserve levels.</p> <p>July 2015 Rating upgraded to 'AA-' for enactment of 2015-2016 budget which included improvement in revenue estimates and reduction in long-term obligations.</p>
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Timeline Of Illinois' Fiscal Milestones And Rating Progression

March 2009	State's limited actions to address sizable budget gap and limited reserves led to the downgrade from 'AA'.	Aug. 2012	Rating downgrade reflected weak pension funding levels and failure to improve (structural) budgetary performance.	June 2016	Lowered rating reflected weakened financial management, fiscal position, and continued delay in developing a plan to address its long-term liabilities.
Aug. 2009	Outlook was revised to negative on ineffective actions to address 2009 deficit and reliance on nonrecurring revenues to balance the budget.	Jan. 2013	Rating was lowered for weakened pension funded ratios, lack of action intended to improve funding levels, and increasing cost pressures associated with annual contributions.	Sep. 2016	Rating was downgraded due to continued weak financial position and increasing long- and short-term pressure tied to declining pension funded levels.
Dec. 2009	Rating was downgraded due to deteriorating liquidity and fiscal position driven by less than forecasted revenue realization coupled with uncertainty about results of steps taken for managing deficit.	Dec. 2013	Developing outlook reflected legal and budgetary risks associated with implementation of pension reforms.	June 2017	Downgraded for stalemated budget negotiations, severe fiscal condition, and risk of entering a negative credit spiral due to loss over autonomy over cash management.
March 2010	Negative CreditWatch reflected increasing budget gap, weak liquidity position, and continued dependence on nonrecurring solutions to balance upcoming budgets.	July 2014	Negative outlook reflected enactment of structurally imbalance 2015 budget and weaker liquidity position along with implementation risk associated with postretirement benefits reforms.	July 2017	CreditWatch removed for adopting a 2018 budget that includes permanent tax increases to shrink structural imbalance
Jan. 2011	CreditWatch was removed because of enacted solutions to address structural imbalance. Outlook was kept negative due to weak pension funding and in anticipation of high debt issuance to finance accumulated budget deficit.	Dec. 2015	Outlook was revised to negative due to absence of adopted 2016 budget and large pension funding deficiency.		



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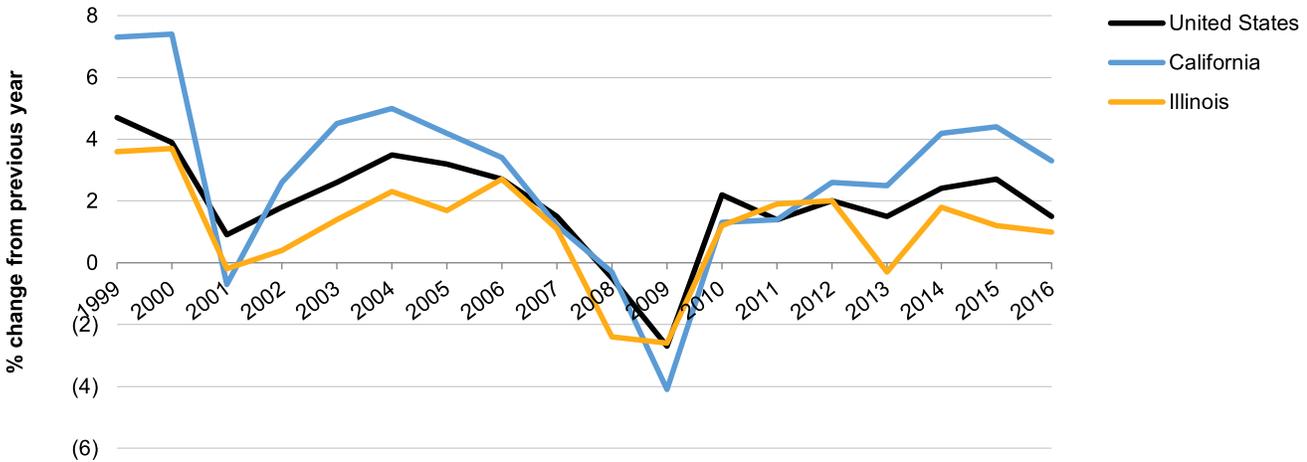
Illinois And California Suffered Similar Economic Weakening During The Great Recession

To an underappreciated extent, the economies of Illinois and California experienced a similar degree of contraction during the Great Recession. Nationally, the recession was most severe from 2008 through 2009, when real GDP contracted 2.7%. Illinois' economic decline that year was similar to the nation at -2.6% and substantially milder than the downturn that struck California's economy (-4.1%). However, more so than for either California or the U.S. as a whole, the recession in Illinois began earlier, in 2007. When ranked by real GDP performance from 2007 through 2009, California and Illinois had the forty-first and forty-second worst performing economies in the nation, declining 4.4% and 4.9%, respectively. Their growth during the first two years after the recession officially ended was also similar, ranking them twenty-eighth and thirty-second in the

nation from 2009 through 2011. In 2011, real GDP growth in Illinois (1.9%) outpaced California's (1.4%).

Chart 1

Real GDP Growth



Source: U.S. Bureau of Economic Analysis
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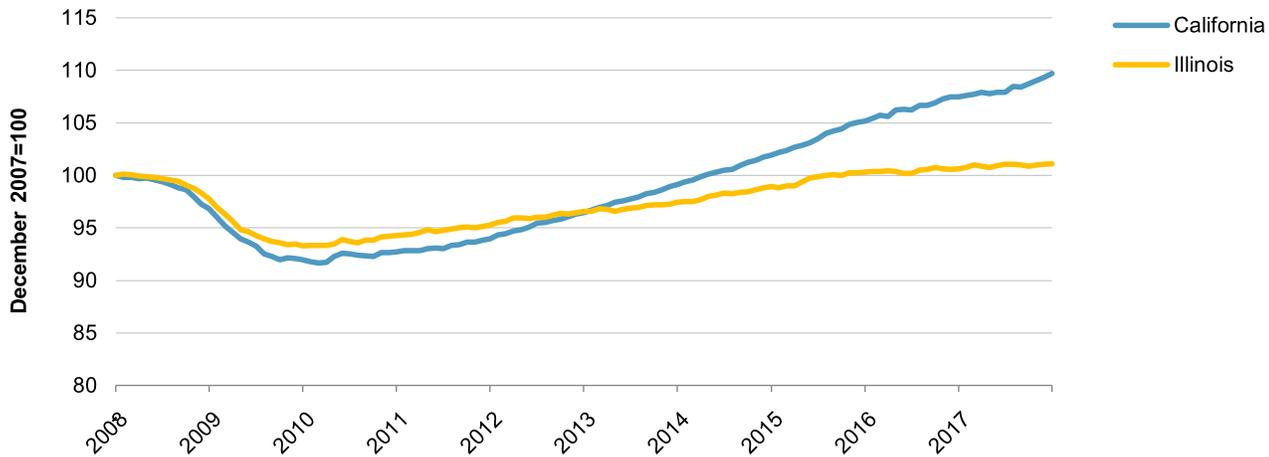
Since 2012, however, Illinois' economic expansion has slowed, averaging just 1.1% real GDP growth annually from 2012 through 2016, lagging both the nation (2.0%) and, to a more significant extent, California (3.4%). In effect, Illinois suffered a downturn that—similar to California's—was among the worst in the nation without the subsequent benefit of California's stronger than average recovery from 2012 through the present.

Illinois and California also both experienced significant labor market deterioration, though unemployment rates and total job losses were more acute in California. The unemployment rate in California peaked at 12.2% in 2010, 1.8 percentage points higher than Illinois' 10.4% that same year. Consistent with this, California's more pronounced peak-to-trough decline in nonfarm payroll jobs ranked forty-fifth in the nation during that period and was weaker than in Illinois, which was thirty-fifth. From July 2007 through February 2010, California lost nearly 1.3 million nonfarm payroll jobs, equal to 8.1% of total payroll jobs in the state. Illinois' job losses from its peak in January 2008 to trough in December 2009, reached 408,900, which was a smaller hit in relative terms, at 6.8% of its job base.

As with other parts of its economy, California's more dynamic labor market allowed it to replace all the jobs that had been lost in the recession by April 2014, 16 months ahead of Illinois. Moreover, California's economy has continued to add jobs while Illinois' job growth—after returning to pre-recession job levels—has plateaued.

Chart 2

Cumulative Monthly Jobs



Source: Bureau of Labor Statistics

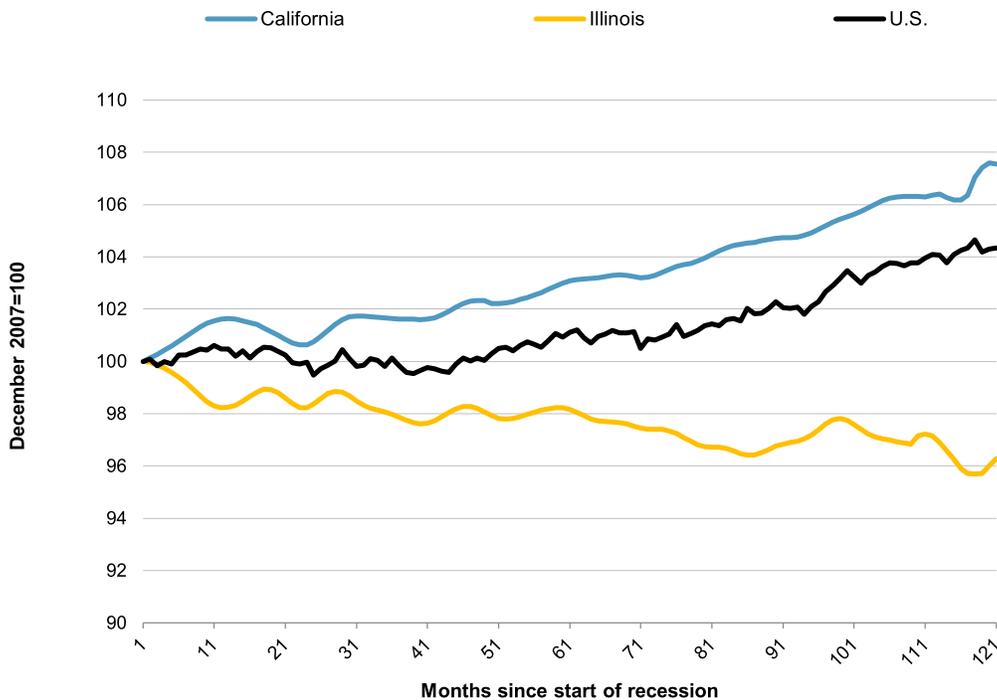
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With the U.S. and most state economies (including Illinois and California) now operating near full employment, there is limited additional cyclical upside to the pace of growth. As is expected when the labor market tightens, job growth in both states has begun to slow, though the deceleration both began earlier and has been more pronounced in Illinois. From this point forward, additional economic expansion will increasingly reflect the underlying growth potential of each state's economy. Potential economic growth comes from the sum of increases in total hours worked and gains in output per hour, or labor productivity. Anemic gains in labor productivity have become endemic to the macroeconomic landscape of recent years, and is not an economic problem easily solved by any individual state. As for the other factor, total labor hours worked, domestic outmigration of residents places both states at a disadvantage, though to an even greater extent for Illinois.

Net domestic outmigration—more residents moving to other states than moving in from other states—has weighed on the population growth rates in California and Illinois in recent years. However, California's overall net migration remains positive because of greater net in-migration from other countries. While Illinois' international migration is also a net positive, on balance it is not sufficient to offset its larger domestic out-migration, which has accelerated in recent years. California's slow but steady population growth and above-average economic recovery have allowed its labor force to increase more rapidly than the nation or Illinois. A shortage of affordable housing supply has emerged as a leading threat to California's ability to continue expanding its pool of workers, however. In Illinois, a more lackluster cyclical recovery and outright population losses have led to a declining labor force that undermines its underlying capacity for economic growth relative to other states. For both states, shifts in federal policy that restrict international in-migration have the potential to further constrain potential economic growth.

Chart 3

Labor Force



Source: U.S. Bureau of Labor Statistics
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Revenue trends are a function of economic performance and tax structure

California's general fund revenues have a well-documented penchant for volatility. True to form, as the recession took hold, California's general fund revenues plummeted by 19.3% from fiscal 2008 through 2009. Illinois' general funds' revenues also experienced a significant slump, though at 9% the decline was both smaller and spread across two years (fiscal 2008 through 2010). On the other hand, until the full-year uplift from its 2011 temporary tax increase materialized in 2013, Illinois' initial revenue recovery was comparatively slower. Although California's revenue collections were initially stronger after the recession, this was a byproduct of a temporary sales tax increase. Revenue growth slowed when it expired in 2011. Tax receipts once again began to accelerate in 2013, following approval by voters in 2012 of Proposition 30, which temporarily raised California's retail sales and use and personal income tax rates.

California relies on the personal income tax for a significant majority (70%) of its general fund revenue. A graduated rate structure and the state's upwardly skewed income distribution cause California's general fund revenue performance to correlate with that of its high-income taxpayers. The faster pace of income growth among the state's top income percentiles in recent years has provided additional lift to its post-recession revenue performance. However, because these high-income taxpayers receive a relatively large share of their incomes from capital gains on their investments in financial assets, California's revenues are also sensitive to fluctuations in financial

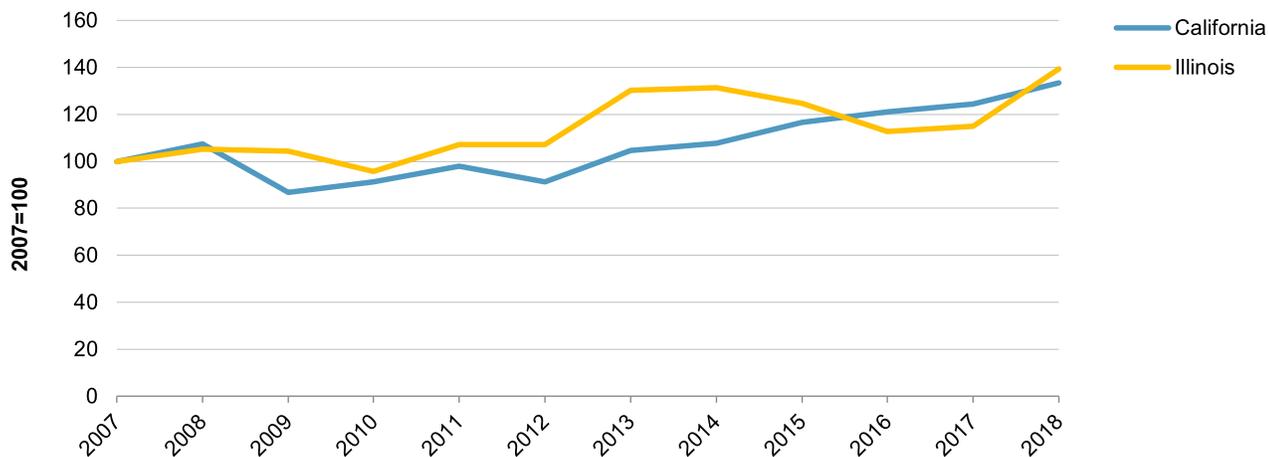
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markets. For Illinois, the individual income tax is a less prominent revenue source, making up approximately half of its general funds' revenue. Additionally, Illinois' constitution requires a flat income tax rate, resulting in a much less top-heavy reliance on its high-income taxpayers than California. Whereas taxpayers with adjusted gross incomes above \$500,000 accounted for 73.3% of California's total personal income tax liability in tax year 2015, they represented just 19.7% of the total in Illinois.

Pronounced revenue elasticity is a perennial risk to California's budget, but it also facilitates a more robust recovery during expansionary periods and when financial markets are rising. Throughout the post-recession years, the average annual rate of general fund revenue growth in California, at 4.9%, has outpaced that of Illinois at 3.3%. However, from a through-the-cycle perspective, taking into account its downside volatility, California's revenue advantage is less clear. Indexed to 2007, just prior to the recession's start and incorporating the effect of California's severe decline in 2009, Illinois' general funds revenue performed better than California's in eight of the past 11 years (see chart 4).

Chart 4

General Fund Revenue



Source: National Association of State Budget Officers Annual Fiscal Surveys; state budget proposals
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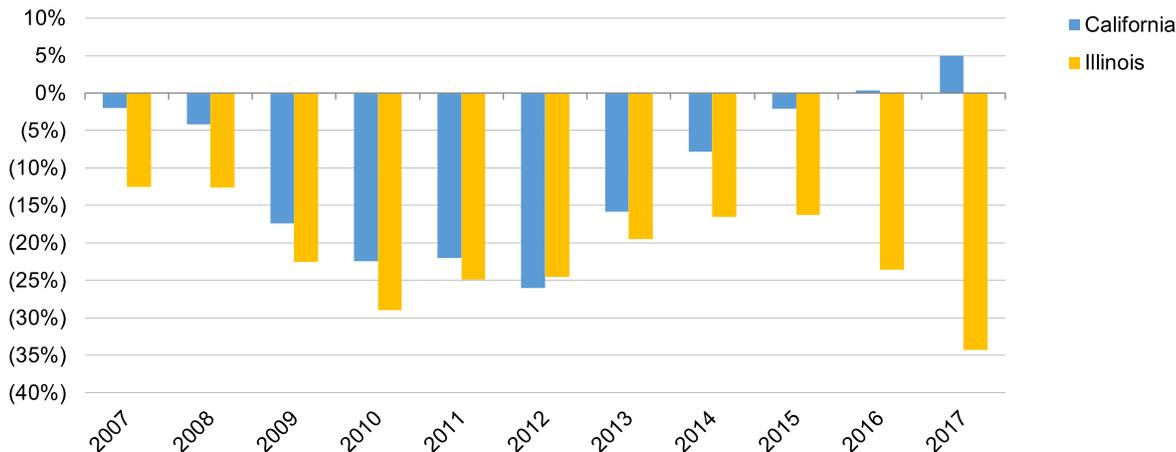
Budget Management: Integral To California's Fiscal Recovery; Gone Missing In Illinois

The economic contraction in California and Illinois from 2007 through 2009 ranked among the worst in the nation and directly contributed to their ensuing budget crises. But one reason the recession took an outsized toll on the finances of the two states, in our view, is that both were running structural deficits before it began. Despite a growing economy from 2002 through 2007, each state had come to rely on borrowing and other nonrecurring accounting gimmicks to bridge fiscal gaps. Both had used proceeds from long-term bond issues to finance their recurring deficits along with, in California's case, school aid deferrals and, in Illinois, accumulating a backlog of unpaid bills. In each case, the latter of these practices is evident in the negative fund balances

they had accumulated by the end of fiscal 2007—before the recession had begun. For California and Illinois, therefore, the recession unmasked and exacerbated their structural deficits more than it created them.

Chart 5

General Fund Total Fund Balance Share Of Expenditures



Sources: State CAFRS
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As the recession got underway, cash receipts in both states were to an increasing extent insufficient to cover all their payment obligations. Episodes of critically low liquidity prompted the chief financial officers of both to triage the cash they had on hand, favoring payments deemed to hold priority claims, including debt service. While these maneuvers provided near term flexibility that illustrated how state sovereignty over resource management can backstop credit quality in times of stress, both states pushed the boundaries of these extraordinary measures to unprecedented extremes. Payment deferrals in California and unpaid bills in Illinois piled up rapidly from 2009 through 2012 and contributed to deeply negative fund balance positions, equal to more than 20% of their expenditures. The accumulation of large net liabilities in their general funds was associated with rating deterioration for both states.

The Recession's Aftermath

Political stalemate undermines Illinois' post-recession fiscal recovery

Illinois' financial condition initially showed modest improvement thanks to the increased revenue from its 2011 temporary tax increase, which shrunk its structural deficit. The additional revenue enabled the state to pay down its bill backlog and improve the health of its general funds' balance sheet from fiscal 2012 through 2015. This was despite economic performance that lagged the national growth rate and, to a larger degree, that of California. In our view, the state's fiscal gains were limited, short-lived, and largely the byproduct of its temporarily enhanced revenue base. Because the tax increases would partly phase out in January 2015, the full revenue benefit they

provided (between \$7.5 billion and \$8.0 billion annually) lasted just three fiscal years (2011 through 2014). On the expenditure side, the General Assembly closed some state facilities and passed the Save Medicaid Access and Resources Together (SMART) Act, which took effect in fiscal 2013. The SMART Act aimed to produce programmatic savings of \$1.6 billion by trimming certain Medicaid benefits. Actual savings were lower, however, at \$1.04 billion. Therefore, although the SMART Act improved the state's budget condition to a degree, its finances remained overextended and reverted into decline following the partial expiration of its tax increase in 2014.

The ensuing political stalemate and corresponding fiscal logjam that began in early 2015 exacerbated the state's weakening budget situation. For two consecutive fiscal years, 2016 through 2017, lawmakers were unable to agree on a comprehensive budget and made essentially no adjustments to fiscal policy. Left on autopilot, court mandates, continuing appropriations, and stopgap spending bills dictated state spending. Untethered to any guiding fiscal objectives, outlays in fiscal 2016 continued to drift higher even as \$2.9 billion in annual revenue from its 2011 temporary tax increase fell away (and after the revenue base had already decreased by \$1.9 billion in fiscal 2015). This caused the state's backlog of unpaid bills to balloon to more than \$16 billion by September 2017 after having fallen to \$5 billion at the end of fiscal 2015. Deficit operations also drained the state's budget reserve to depletion by the end of fiscal 2017.

In July 2017, the General Assembly enacted permanent increases in the individual and corporate income tax rates, thereby adding approximately \$5 billion to the general funds' revenue base. The revenue enhancements alone were insufficient to eliminate the state's structural deficit, however. With no material changes to the state's expenditure base, the Governor's Office of Management and Budget projected in October 2017 that in fiscal 2019, the state faces a deficit of approximately \$2.2 billion, equal to 6.1% of expenditures.

In February 2018, Gov. Bruce Rauner proposed his budget for fiscal 2019, which included provisions that would bring finances closer to structural alignment by shifting a portion of the normal cost of pension contributions to universities and local school districts. While the details differ, the proposal is analogous to the approach proffered by California's Gov. Brown in 2011 and 2012, which shifted some educational funding responsibility away from the general fund.

California adopts strengthened budget management practices

Prior to 2011, it was common for California to begin its fiscal year without an enacted spending plan. The state's constitution required approval from two-thirds of the legislature in order to pass budgets. Given the pronounced ideological polarization of its two main political parties, assembling this high level of consensus among state legislators proved difficult, especially when the state faced budget deficits. When they voted as a bloc, minority party legislators held the equivalent of a veto over budget passage. In our view, the political impracticality of the supermajority requirement facilitated the state's tendency to rely on budget gimmicks and a stopgap approach to fiscal policymaking. Perennially late budget adoption often compounded by a reliance on politically expedient but unrealistic revenue assumptions also provoked periodic cash shortages and fiscal emergencies.

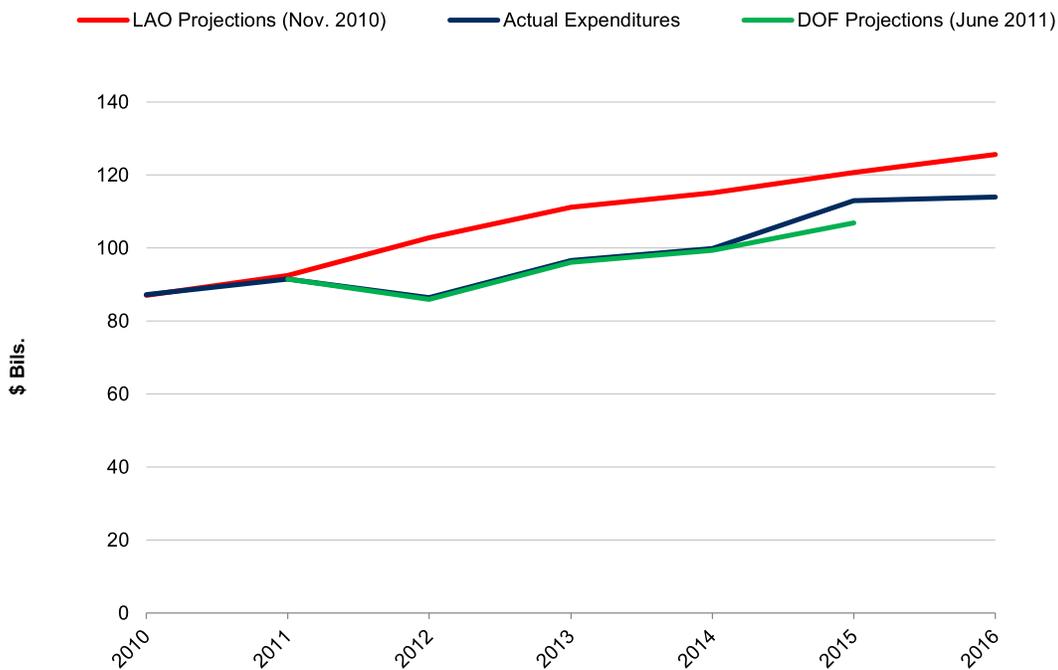
This changed in November 2010, when voters approved Proposition 25, which removed the supermajority requirement. Shortly thereafter, when Gov. Brown took office in January 2011 as Proposition 25 took effect, he promptly proposed mid-fiscal year legislation to shrink the deficit. Three months prior to finalizing the budget for fiscal 2012, the legislature approved the governor's package of approximately \$13.4 billion in deficit reducing measures. The policy changes had the effect of shifting a portion of the responsibility for funding kindergarten through community college to local property tax bases, providing relief to the general fund. Together with other

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spending reductions, including cutbacks to various social services, the fiscal reforms helped lower the state's expenditure base by approximately \$10 billion as it approached fiscal 2012. Although the budget that year fell short of eliminating the state's \$20 billion structural gap altogether, it made significant headway, cutting it approximately in half. The emphasis on lowering the spending trajectory in order to achieve structural fiscal alignment helped stabilize the state's credit quality. We revised our outlook on California's rating to stable from negative in July 2011, 16 months before the vote to temporarily raise taxes would occur.

Chart 6

California General Fund Expenditures, Projected And Actual



Sources: California Legislative Analyst's Office; California Department of Finance
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In January 2012, the governor proposed another austere budget for fiscal 2013, this time pairing an absence of new spending commitments with the expectation of additional revenue from a temporary tax increase. Unable to obtain the requisite two-thirds legislative support still necessary for tax increases under Proposition 13, the governor went on to endorse a ballot initiative (Proposition 30) that temporarily raised both the personal income tax rate for high-income taxpayers and the sales and use tax rate. Voters approved the tax measure in November 2012, and in so doing increased the state's revenue base for several years by \$6 billion to \$8 billion annually. (Although Proposition 30 tax rates will phase out entirely in 2018 when the personal income tax provisions sunset, voters extended the elevated income tax rates through 2030 with approval of Proposition 55 in November 2016.)

In our view, the additional revenue combined with a reduced expenditure base—which, again, was largely absent in Illinois--was integral to California's fiscal recovery. Furthermore, policymakers in

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California directed much of the additional revenue from the 2012 tax increase toward reversing the state's accumulated school aid deferrals (and other forms of budgetary debt) and later, to capitalize the budget reserve. Importantly, the emphasis on debt retirement meant that most of the Proposition 30 revenues, presumed by budget officials to be temporary, did not go toward funding recurring commitments.

In short, while both states would turn to temporary tax increases as a response to the fiscal holes created by the recession, only California matched them with material policy adjustments on the spending side. Without policy changes addressing its underlying structural imbalance, Illinois' expenditures continued on their path upward. Inevitably, any modest improvement in its financial position quickly faded when its tax increase expired in 2014.

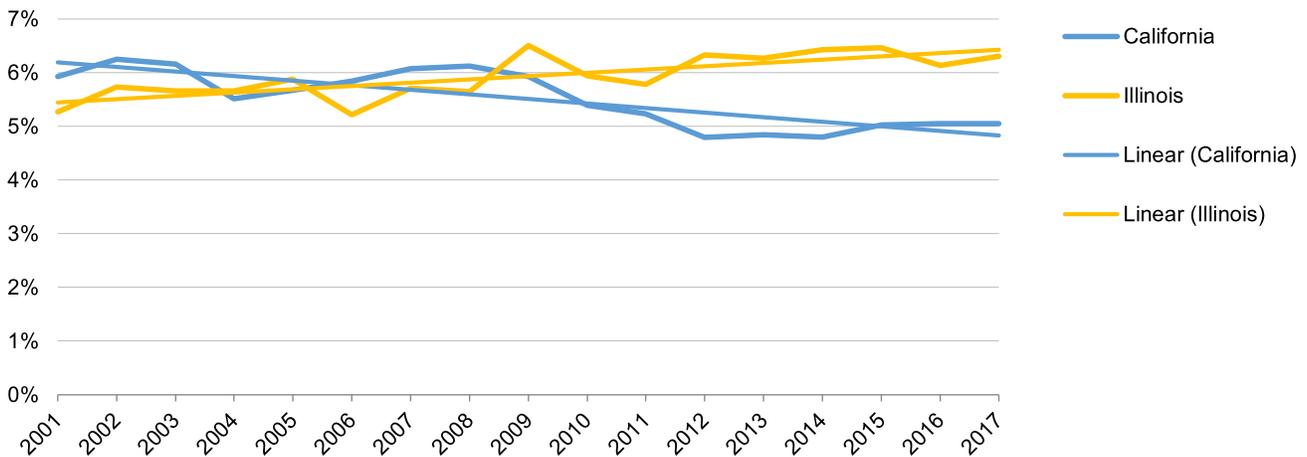
Outright declines are not the only way to cut spending

For most states, formulaic inflation adjustors and trends in caseloads drive a significant portion of programmatic spending. Viewed across the span of several years, this feature of state government finance results in an inherent upward trajectory to spending trends. Consequently, genuine spending restraint and even budget austerity does not necessitate outright declines in year-over-year expenditures. For example, California's general fund expenditures reached \$114 billion in fiscal 2016 (on a budgetary basis), an increase of \$1.0 billion from 2015. Despite the increase, expenditures in 2016 remained \$11.6 billion below what the state's Legislative Analyst's Office had projected in November 2010, when the state faced annual deficits of \$20 billion.

The results of the two states' disparate approaches to budget management are evident when viewing state spending in real terms—as a share of their respective state economies (see chart 7).

Chart 7

General Fund Expenditures As Percent Of Total Personal Income



Source: State CAFRs and U.S. Bureau of Economic Analysis
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Preserving Budgetary Gains Through Stronger Fiscal Institutions

In addition to improved budget management, California took steps to cement some of the fiscal gains it would achieve during the recovery by strengthening certain governing institutions. Among these are two constitutional amendments including the aforementioned streamlined budget adoption process (Proposition 25) and an enhanced rainy day fund requirement (Proposition 2). A provision of Proposition 2 requires that tax revenue from capital gains income—when it exceeds 8% of general fund tax revenue—be deposited in the budget stabilization account (or spent on infrastructure if the account balance equals its maximum allowed 10% of revenues). The requirement to capitalize a budget reserve encourages policymakers to run countercyclical fiscal policy that should help avoid an overcommitting state resources based on temporary revenue surges.

California's revenue structure, with its concentrated reliance on a narrow segment of its high-income taxpayers, remains unaltered, however. In fact, passage of Proposition 30 and, subsequently, Proposition 55 have increased the state's dependence on its highest income taxpayers. Consequently, while the majority-vote budget process should facilitate a timelier response, we expect the state will remain susceptible to disproportionate revenue declines in response to even moderate recessions and stock market corrections.

Early in 2015, budget negotiations in Illinois stalemated when its temporary tax increase expired. In exchange for any replacement tax increase, the governor insisted on a package of policy changes he said would improve the state's business climate. They included measures that the majority party in the state's General Assembly steadfastly opposed. For two years, the gridlock precluded lawmakers from agreeing on a budget, let alone any fiscal reforms or elements of the governor's agenda. There was a breakthrough in 2017 when the legislature approved, over the governor's veto, the state's first comprehensive budget since fiscal 2015. Lawmakers also enacted the Debt Transparency Act, which requires state agencies to report to the comptroller monthly any bills they are holding that lack an appropriation or are subject to processing delays. Considering that previous law required agencies to report such bills annually, we expect the more frequent reporting should make the state's financial condition less opaque. Continuing political discord between the governor and key legislative leaders casts a shadow on the state's budgetary outlook and ability to assemble a sustained fiscal repair effort. Complicating matters is that from June 1 through Dec. 31, the constitution requires a three-fifths supermajority of the legislature to pass budgets--an impediment to budget enactment like California's previous two-thirds requirement.

Table 1

Select Credit Metrics Comparison

	California	Illinois
Population (2017 est) (000)	39,536	12,802
GDP (2016) (\$ mil.)	2,622,731	796,012
Per capita personal income % of U.S. (2017)	116	105
Unemployment rate (2017) (%)	4.8	5
General fund budget (FY 2018) (\$ mil.)	126,512	37,403
Ending balance and budget reserve (2018) (\$ mil.)	12,597	0
Reserve % of expenditures	10.0	N/A
Tax-supported debt (FY 2017) (\$ mil.)	84,396	31,320
Debt per capita (\$)	2,135	2,446

Source: 2017 population from IHS Markit

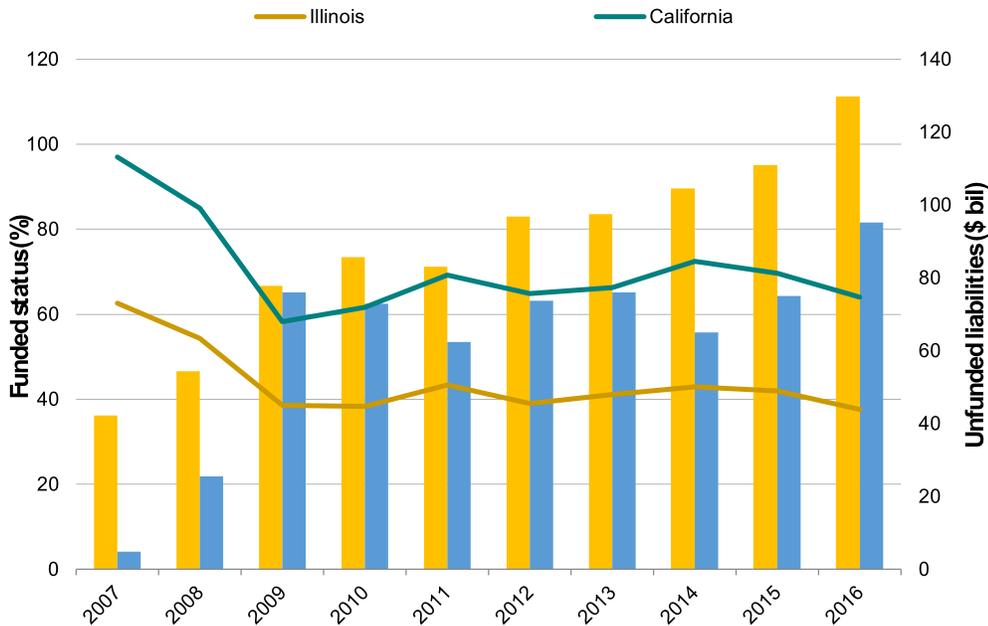
Pension Liability Profiles Are A Key Fault Line In Fiscal Sustainability

The liability profiles of California and Illinois, particularly with respect to pension benefits, are an important fault line in the longer-term sustainability of each state's finances and creditworthiness. In both states, promised pension benefits have strong legal protections, effectively locking in the long-term liabilities associated with them as well as the costs to fund them. However, pension contributions in Illinois account for 21.2% of general fund expenditures in fiscal 2018 versus just 4.2% in California. The gap in burdens these differing contribution levels represent is a substantial share of overall state fiscal capacity. Moreover, Illinois has consistently held fast to policies that defer necessary contributions and weigh down its pension plans' funded status. This staunch resistance to dedicated funding discipline is apparent in a review of its funded status during 2007 through 2016 (see chart 8). In 2007, even before the recession began, Illinois' combined funded status was a poor 62.6%. It has also failed to make any improvement from the bottom of the recession, falling to its lowest point in 2016. We view unfunded liabilities consistently rising during a long economic recovery as a clear sign of weak pension management.

By contrast, California had capitalized on the surging pre-recession economy by starting 2007 at nearly 100% funded. Entering the recession with more assets meant it had more to lose, reporting a drop in position of nearly \$100 billion across its pension plans at the time. As a result, in 2009 California's unfunded liability nearly reached Illinois' for the first and only time, even though California's population is nearly three times as large. During the subsequent recovery period, California worked through challenging choices around long-term sustainability by updating to more conservative assumptions and improving funding policies. These decisions created a drag on funding progress as they reflected a higher valuation of liabilities, but the stagnation is somewhat transient in nature as both primary California systems have committed to a contribution path that targets full funding.

Chart 8

Pension Path



Source: pension funds actuarial valuations
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The Ghost of Illinois' Past, Present, And Future: Deferred Pension Contributions

Illinois has a long history of treating pension liabilities as "soft" debt, deprioritizing prudent actuarial contributions in the face of competing expenditures. The report from the Illinois Commission on Government Forecasting and Accountability on the state retirement systems notes that from fiscal year 2002 to fiscal year 2016, unfunded liabilities increased \$94.8 billion, with the first cause of increase labeled as "actuarially insufficient employer contributions." As a result, all five state plans project asset depletion (insolvency) within the century. The lengths of time until these crossover dates hit are contingent on Illinois maintaining the fiscal capacity to accommodate a doubling of its contributions between now and 2045. However, the state's past contribution practices and current political gridlock cast doubt on its ability to do so. Furthermore, even if underlying assumptions hold, Illinois' pension plans exhibit negative cash flows given that annual benefit payments exceed incoming contributions. As a result, these plans are required to sell assets each year to maintain benefit payments, compounding system liquidity constraints and raising the specter of sub-optimal market timing, both of which can create headwinds for healthy investment returns. Illinois' plans in particular are vulnerable to these challenges and any significant market correction, with less than 40% of assets on hand to pay liabilities and a steep contribution road ahead.

Illinois' retirement benefits enjoy strong constitutional protections, complicating the legal path to reform even if it managed to assemble the necessary political support. The Illinois Supreme Court's on May 8, 2015, struck down the pension reform legislation passed by the General Assembly in 2013. In its decision, the court affirmed the circuit court's decision declaring Public Act 98-599 to be unconstitutional and enjoining its enforcement. Among other things, this sweeping legislation required the state to fund the plans more evenly over time using the Entry Age Normal cost methodology, and replaced the 90% funding target with 100%. In our view, the Supreme Court ruling, along with the earlier ruling on other postemployment benefits (OPEBs), calls into question the legal viability of future pension and OPEB reform initiatives and underscores the profound credit challenges facing the state from a budget and liability standpoint.

Nevertheless, Illinois has taken some initial steps toward tempering the financial impact of these unyielding liabilities. On Jan. 1, 2011, it implemented a second tier which significantly lowered benefits for all new future hires. This tier will provide minimal savings in the short term but will curtail costs significantly once the entire active population has shifted over to tier 2 in about 30 years. Illinois has also established more conservative liability assumptions and moved toward an actuarially determined contribution--albeit in a slow and incomplete manner. The state passed statutes to set contribution rates to target 90% funded after 50 years with a 15-year ramp-up. In our view, pension plans with long, 30-year amortizations reflect weak funding discipline, and were one of the primary causes of significant pension plan underfunding in the 21st century. Pushing that timeline to 50 years and lowering the target to 90% funded compounds the risk--setting in place many years of negative amortization where the unfunded liability is set to grow while full contributions are being made (and even if all assumptions are met). In the meantime, unfunded liabilities are calculated at \$11,000 per capita or 21.2% of total personal income.

The Golden State Muddles Through Its Share Of Pension Challenges

California, while much larger than Illinois with less unfunded pension liability, has certainly had a rocky path of its own. At the turn of the century the legislature, spurred on by unions, voted in extremely generous retirement benefits and applied those benefits retroactively to past service--service which had not been funded based on the increased provisions. California rolled back a significant portion of those benefits in 2013 with AB 340, but could only do so prospectively for new hires after the effective date, leaving a massive portion of liabilities today based on the pre-reform levels.

The largest California system, CalPERS, has worked through rounds of tightening its funding discipline through adjustments to actuarial assumptions and methods. It moved out of open (or rolling) amortizations that essentially refinanced the unfunded liability every year and in February shortened the payback period to 20 from 30 years, overhauled its mortality assumptions to be forward looking, and lowered its discount rate multiple times. We view these adjustments as necessary steps towards achieving long-term sustainability for the system. However, implementing these changes on a reactionary basis instead of building them into the system proactively has caused the state to see required contributions nearly double in the last five years, with more increases projected to come.

The second largest California system, CalSTRS, has shared some challenges with Illinois plans in that historic required contributions were set statutorily by the state and did not necessarily address the level of unfunded liabilities, which has precipitated significant underfunding in recent years. However, in 2014 California passed AB 1469 that steps up contributions (employees, local districts and the state) to address actual unfunded liability and target full funding within 30 years. Similar to CalPERS, CalSTRS has also significantly lowered its discount rate and adjusted its

mortality assumptions to be more forward looking--increasing the valuation of liabilities but allowing those liabilities to be addressed instead of underfunded going forward. In total, California unfunded liabilities are \$2,400 per capita or 4.2% of total personal income.

Beyond The Headlines

While Illinois and California are among the worst three states in terms of pension unfunded liability, a number of differences set them firmly apart when examined more closely. Illinois ranks clearly worse than California on measures such as total unfunded liability, unfunded liability per capita, unfunded liability as a percentage of budget expenditures, and others. Perhaps more importantly for the long run, California has set both its plans on a target to full funding and has never paid less than required for a given year--neither of which is true of Illinois. In our view, that difference in funding discipline illustrates both the historic and projected divergence of trajectories for these states' pension plans which will have a strong influence on their respective budgets for years to come.

Table 2

Select Pension And OPEB Metrics

	California	Illinois
Pension unfunded liability (FY 2016) (\$ bil.)	95.2	129.8
Pension funded ratio (FY 2016)	64.0	37.6
General fund pension contributions (FY 2017) (\$ mil.)	5,600	6,951
Unfunded OPEB liability (FY 2017 California, FY 2016 Illinois) (\$ mil.)	91,008	38,138
OPEB liability per capita	2,139	2,979

Source: 2017 population from IHS Markit

On Deck: Other Post-Employment Benefits

For OPEB, both California and Illinois have historically failed to prefund their promises, resulting in inefficient funding with large exposure to unfunded liabilities and growing costs. We expect this cost, and its volatility, to grow progressively worse as the baby boomer cohort continues to retire and live longer, and medical costs sustain significantly higher growth rates than inflation. Here again, however, California's long-term outlook is more favorable than is Illinois for two reasons. First, the Illinois State Supreme Court ruled in 2015 that OPEB benefits enjoy the same constitutional protection as pension benefits. Absent a constitutional amendment, the ruling would seem to lock in the state's \$38.1 billion (fiscal 2016) unfunded OPEB liability. Second, California has commenced an initiative of prefunding the normal cost of its OPEB benefits. The state's strategy envisions continuing to fund benefits on a pay-go basis while the annual normal cost contributions—split between employees and the state—accumulate in an OPEB trust established in 2016. According to its plan, the state would not withdraw funds from the OPEB trust to pay benefits until the trust reaches a fully funded status, projected to occur in 2045. Although any number of developments could interrupt the state's progress toward funding the liability on an actuarial basis, its prefunding initiative is a step in the right direction.

We expect implementation of GASB statements 74 and 75 to bring further transparency on OPEB liabilities. California's measured unfunded liability increased to \$91 billion from \$75 billion in fiscal 2017, largely because of the more conservative discount rate required under the new GASB

accounting standards. On a per capita basis, California's 2017 OPEB unfunded liability is approximately \$2,100. Illinois' 2016 unfunded liability is \$38.1 billion or \$3,000 per capita. It is worth noting that despite California's economic base being 2.5 times that of Illinois, the two states have very similar total unfunded liabilities when combining both pensions and OPEB.

Managing The Cycle: Fiscal Resilience During The Bust Depends On Fiscal Restraint During The Boom

Generally speaking, a state's fiscal resilience through an economic bust depends at least in part on its financial management during the preceding boom. In a departure from its past tendencies, California has steadily consolidated its financial position since 2011, thereby conforming to the best practice implied by the axiom. In a nod to long-term sustainability, lawmakers (and the CalPERS board) have also taken steps to constrain the growth of the state's pension and OPEB liabilities. In addition, new policies cause it to recognize and fund more of the normal cost of its retirement benefits as they are earned, further taming the growth of these liabilities. These efforts notwithstanding, California's credit rating remains constrained by its volatile revenue structure. Even after several years of funding discipline, the state's budget reserve amounts to only a fraction of the fiscal deficits that the state can anticipate in a moderately severe recession. That said, the state's better-aligned fiscal structure would allow it to enter an economic slowdown on stronger footing and with a better institutional ability to respond than before, both of which should somewhat insulate its credit quality. The post-recession progression of California's credit rating, rebounding by a full category to what remains slightly below average, reflects these tensions.

Contrary to the best practice in state finance of shoring up the budget during the good times, Illinois' fiscal deterioration has intensified even as the nearly nine-year-long economic expansion has matured. Instead of forging a fiscal recovery, the state's chronic structural deficit has continued to accumulate in the form of its unpaid bill backlog. Moreover, unless the legislature approves the governor's cost-shift proposal, the state's already strained fiscal structure faces the prospect of accommodating a steeply increasing pension contribution schedule. Therefore, even in the unlikely scenario that the economy avoids experiencing a recession through the next decade, Illinois' fiscal outlook is daunting. The state's depleted reserves, ongoing budget deficit, severely underfunded pension systems, backlog of unpaid bills, and lack of political consensus on how to proceed leave it ill-prepared to withstand additional stress. The unprecedented downward slide of Illinois' credit rating reflects both the magnitude and immutable nature of its long-term liabilities and the risk they present given its persistent fiscal imbalance. There is also an utter lack of consensus among Illinois' political leadership on how to define the primary threats to solvency, which serves to undermine their ability to work toward solutions.

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Pension Brief: Are Asset Transfers A Gimmick Or A Sound Fiscal Strategy?

February 19, 2019

(Editor's Note: This publication marks the start of a series of short comments on credit matters of interest in the municipal retirement space. This first "Pension Brief" follows up on our publication one year ago surveying pension reform initiatives across the states ("Recent U.S. State Pension Reform: Balancing Long-Term Strategy And Budget Reality," Feb. 9, 2018). There we noted that the lethargic economic recovery, weak investment returns (past and projected), demographic challenges, and resulting assumption changes had exerted more pressure on pension systems than ever before, creating a heightened urgency for reform. This was especially true for states with weak funding discipline that had utilized years of underfunding or deferring prudent payments to advance other priorities. That is still true, and in fact may be even more concerning as the next recession looms closer the longer the current expansion lasts.)

To face persistent and growing pension challenges, some U.S. state and local governments have looked to develop creative solutions to help mitigate expanding liabilities and bolster wanting asset levels. Increasingly, they are considering asset transfers along with other revenue streams that can be used to both improve pension funding levels and provide budgetary relief. However, the way that these solutions are valued and influence funding discipline can have varying impacts on the overall health and long-term fiscal sustainability of a pension system. To the degree that they are based on unsubstantiated valuations, create liquidity concerns, or otherwise undermine long-term funding progress, S&P Global Ratings would view them as negative credit factors.

An Innovative Approach

Enhancing pension system assets often revolves around a proposal to capitalize on or enhance the value of government assets or revenues and in the process dedicate them to the pension system. We categorize them in three ways:

Physical asset transfer. This method recruits often-underutilized physical assets that have some value and are owned by the government to be gifted to the pension system in order to bolster its portfolio of real assets. Examples could include the dedication of a state building or land.

Dedication of a future revenue stream. This method identifies particular funding sources that can be any kind of ongoing revenue stream. Examples could include general taxes or charges on particular services.

Physical asset transfer that provides a revenue stream. This method is a combination of the first two, where assets are dedicated to the pension system, but also developed or utilized to generate ongoing revenues. Examples could include the transfer of a tollway or lottery enterprise.

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Considerations Of Asset Transfers On Creditworthiness Can Vary

Generally, governments considering asset transfers exhibit ongoing budgetary stress and significant unfunded pension liabilities. As rising pension costs become so severe that required revenue increases or expenditure reductions seem unpalatable, asset transfers may look appealing as an option that both help address pension liabilities and provide budgetary relief. They provide the potential to supplement required contributions into pension plans, freeing up revenues for government services. However, over the longer term, if assets prove to be illiquid or improperly valued, future pension costs could escalate. When approaching an asset transfer's impact on credit quality, we assess the following:

- Is the valuation of the asset reasonable and verifiable?
- Is liquidation of the asset practical?
- Does the plan have such a low funded status that liquidity issues may arise prior to the realization of a future revenue stream?
- Is the asset valuation technique an attempt to reduce contribution requirements in the short term while further underfunding the pension system and compounding future contribution requirements?

Details of the asset itself as well as other circumstances surrounding the issuer can have a unique impact on creditworthiness.

A danger: fitting a square peg in a round hole

One limitation of asset transfer-based solutions is that pensions cannot use physical assets to fulfill their basic mission of providing retirement benefits--they must pay out cash and cash alone. Assets are only valuable to pension systems if they can generate cash (with or without being sold). If a real asset dedicated to the pension system does not generate revenue on its own, the only use a pension system has from it is to sell it and use the proceeds to help fund future benefits. If a government gifts particular assets to a pension system with the justification that the pension system values it higher than anyone in the market would buy it, we believe the asset value is being overstated. Furthermore, the inability to sell these assets to the market would be another clear barrier and red flag. This asset valuation technique could indicate an attempt to reduce contribution requirements in the short term while underfunding the pension system and compounding future contribution requirements and budgetary stress.

A danger: counting them before they hatch

Moving beyond physical asset transfers alone, the creation of revenue streams dedicated to the pension system can bolster assets levels. Finding revenue streams to help fund liabilities is a constructive goal, but in examples to date we have often seen a danger in the implementation of such solutions. The temptation with revenue streams is to develop assumptions around future revenue growth, discount future years' assumed income back to today, and treat the entire stream as an asset in the pension plan immediately. This "ghost" asset would immediately inflate the funded status of the plan and lower required contributions, and would be highly reliant on the dependability of the assumptions in the forecast. Paradoxically, this form of asset valuation can create lower total contributions (including the revenue stream) in the medium term to the pension system compared to before the revenue stream was identified, further exacerbating underfunding

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and enhancing credit risk. It can also create liquidity issues for low-funded plans, as the particular asset does not actually exist yet and cannot be turned into benefit payments. In the extreme, this technique is comparable to counting all future employer contributions into the plan as if they were there today, which could easily cause a plan to appear fully funded without justification.

Avoiding the pitfalls: potential for opportunity

Although we are obligated to highlight the paths to degrading credit quality that come with exploring new roads, we would be remiss if we concluded without the possibility of a route to greener pastures. Inherent in the dangers above is an opposite course of action that, if implemented successfully, could have the potential to unlock underutilized assets and generate needed cash flows for pension systems. That path would resist overvaluing assets at face value, and when there is any room for question, simply selling them to the highest bidder for cash to deliver to the pension system. It could establish new dedicated revenue sources either directly from the government or from assets within the government. Those assets could potentially be enhanced for a higher and greater use, creating cash and economic value that could lead to compounding benefits to come. Instead of offsetting contributions that leave a plan exposed to heightened risks which threaten future contribution increases, those resources could generate revenues over time to supplement pension contributions and accelerate funding progress. This opportunity, if scaled well and properly applied, could help lead to a consistent paydown of unfunded liability, a stabilization of pension contribution rates, and a more balanced budgetary impact that could enhance overall creditworthiness.

Recent Examples Of Implementation

New Jersey. The state passed legislation to irrevocably dedicate lottery revenue for pension contributions over 30 years. New Jersey will recognize the revenue transfer as an actuarial asset to boost actuarial-funded ratios; however, it does not currently plan to lower overall pension contributions into the system after the lottery contribution calculations. We believe the dedication of the lottery revenue to the pension fund from the general fund has minimally positive attributes because it could somewhat limit the state's ability to hold back a portion of pension contributions, and the state did not use it to explicitly lower contributions. However, New Jersey has not been making its full pension contribution on an actuarial basis for years, and in doing so has built up a large backlog of unfunded liabilities. Its large unfunded pension liabilities and underfunding of pension contributions remain a looming source of budgetary stress and negative credit pressure for the foreseeable future.

Jacksonville, Fla. Jacksonville's city council unanimously approved legislation which, among other things established a half-cent surtax to go into effect from 2031 to 2060 and is fully dedicated to the pension system. The statute mandated that forthcoming actuarial valuations incorporate the present value of the future surtax cash flows, projected to grow at 4.25% annually over the next 41 years. That present value calculation is to be counted as an asset today in order to raise the funded status of the plan and significantly reduce the city's current annual required contributions, even though the tax will not exist for over ten more years. While we view the dedication of a revenue stream to fund future contributions as positive, we do not consider those revenues to be a current asset, nor should it translate to immediate improved funding and reduced actual employer contributions. Jacksonville is also an example of having low funded plans at implementation, which creates liquidity concerns when current contributions are offset

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by a revenue stream implemented in the distant future. For more details see our commentary "Jacksonville Adopts Pension Reform, But The Ultimate Impact On Credit Quality Remains Uncertain," published May 24, 2017.

Alton, Ill. The city is in the process of selling its wastewater treatment plant and sewer system to Illinois American Water for \$53.8 million in the first quarter of 2019. The proceeds will help the city bolster its pension assets and thus ease the trajectory of near-term pension contributions. The pension plans are on the verge of going into pay-as-you-go status if not for the city's plans to sell its sewer treatment plant and invest the proceeds in the policemen's and firefighters' pension funds, which would boost assets and potentially investment income. Their actuarial reports indicate that the deposit of funds will improve funding levels and lower pension costs by about \$2 million per year for each plan, helping to slow the trajectory of pension payments and ease budgetary concerns, at least for the near term. After the sale of the plant, the city will still have a significantly high unfunded pension liability and exposure to escalating pension contributions, despite this effort to boost assets in the plans.

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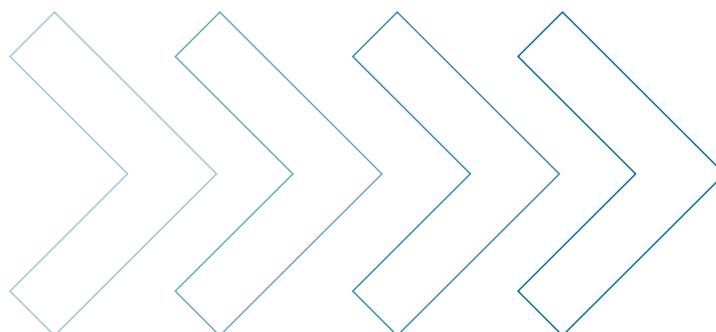
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Decision-Useful Risk Measures for Public Pensions

By William Fornia, Paul Angelo,
Randy Dziubek and Todd Tauzer

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Decision-Useful Risk Measures for Public Pensions

By William Fornia, Paul Angelo, Randy Dziubek and Todd Tauzer

Actuarial Standard of Practice (ASOP) No. 51 governs the “Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.” ASOP 51 is now effective and requires identification and assessment of funding risks in actuarial valuation. This article will address the new requirements with an emphasis on providing useful information to public pension stakeholders. The authors include consulting actuaries, a public pension system actuary and a rating agency actuary, who will bring three different perspectives to the topic.



Other ASOPs are relevant to pension plan actuarial valuations and include the following:

- ASOP 4—Measuring Pension Obligations and Determining Pension Plan Costs or Contributions
- ASOP 27—Selection of Economic Assumptions for Measuring Pension Obligations
- ASOP 35—Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations
- ASOP 44—Selection and Use of Asset Valuation Methods for Pension Valuations

ASOP 4 has a proposed revision that includes “Investment Risk Defeatment Measure” (IRDM). This will be contrasted somewhat with various Decision-Useful Risk Measures used by practitioners and presented in this article.

ASOP 51 presents several recommended practices:

- Identify risks that may be anticipated to significantly affect plan’s future financial condition
- Assess these risks including potential effects
- Recommend additional assessment if significantly beneficial
- Calculate plan maturity measures that are significant to understanding risks
- Identify historical measures that are significant to understanding risks

The risks to be evaluated under ASOP 51 are:

- a. Investment Risks (different returns from expected)
- b. Asset Liability Mismatch Risk (changes in asset values not matched by changes in liabilities)
- c. Interest Rate Risk (different from expected)
- d. Longevity and Other Demographic Risks (different from expected)
- e. Contribution Risk (not received)

Several risk-assessment methods are discussed in the ASOP and will be presented in more detail in this article. These include:

- Scenario Tests
- Sensitivity Tests
- Stochastic Modeling

ASOP 51 is now effective and requires identification and assessment of funding risks in actuarial valuation.

- Stress Tests
- Comparison of Present Values With Those Calculated at Minimal-Risk Discount Rates

Likewise, several plan maturity measures are discussed in the ASOP and are presented in this article, including:

- f. Ratio of Market Value of Assets to Active Payroll
- g. Ratio of Retiree Liability to Total Actuarial Liability
- h. Ratio of Cash Flow to Market Value of Assets
- i. Ratio of Benefit Payments to Contributions
- j. Duration of Actuarial Liability

Finally, ASOP 51 suggests certain historical measures incorporating risk:

- a. Plan Maturity Measures
- b. Funded Status
- c. Actuarially Determined Contribution
- d. Actuarial Gains and Losses
- e. Normal Cost
- f. Plan Settlement Liability

In the pages that follow, three practitioners share their Decision-Useful Risk Measures for Public Pensions.

PRACTICAL EXAMPLES

This section presents some quantitative risk assessment tools we have used with municipal (city and county) retirement systems that, by law, are funded based on an actuarially determined contribution rate. These systems generally have enjoyed a high level of Board involvement and stakeholder interest in actuarial decisions and results. These systems already have some qualitative and quantitative ASOP 51 risk assessment information in their actuarial reports, for example, the volatility ratios discussed a little later in this article. However, the more detailed quantitative risk assessments have been performed only for some of the systems, and are generally provided outside the actuarial reports. We expect that ASOP 51 may spur additional

interest and discussion of the more detailed quantitative risk assessments.

Volatility Ratios—Plan Maturity Measure and Quantitative Risk Assessment

Volatility ratios (sometimes called volatility indexes) are an easy-to-calculate measure of the relative sensitivity of employer contributions to changes in assets or liabilities. There are two common volatility ratios:

1. Asset Volatility Ratio (AVR): Assets/Payroll
2. Liability Volatility Ratio (LVR): Accrued Liability/Payroll

These ratios are most commonly thought of as maturity measures, along with ratios of retired to active members and ratios of benefit payments to contributions. In particular, ASOP 51 lists (only) the AVR as an example of a plan maturity measure.

We find that the AVR and LVR give a more quantitative indication of future cost volatility than headcount ratios, and thus are more useful as a risk assessment than some other plan maturity measures. Also, while the AVR gets more attention (such as being listed in ASOP 51) we find that the Liability Volatility Ratio better captures intrinsic plan volatility. One way to see this is to note that, as the plan approaches 100 percent funding, the AVR approaches the LVR.

We have found that the volatility ratios take some getting used to, and it takes some practice explaining them to trustees and stakeholders. However, we find they are worth the effort for communicating directional trends in cost volatility and especially for explaining the relative volatility for different tiers or plans.

Here is a simple LVR example. Consider an employer with a general and a safety plan, or a single plan with separate general and safety tiers and costs. Suppose the General Plan has an LVR of 5 and the Safety Plan has an LVR of 10. Then suppose the plan has an assumption change that increases the Actuarial Accrued Liability (AAL) of both plans by 10 percent.

For the General Plan: $AAL = 5 \times \text{Payroll}$, so $\Delta AAL = 50\%$ of payroll

For the Safety Plan: $AAL = 10 \times \text{Payroll}$, so $\Delta AAL = 100\%$ of payroll

This shows that the impact of the assumption change on the employer's contribution rates will be roughly twice as great for Safety compared to General. A similar example using the AVR will show the relative impact of investment experience on the employer contribution rates for the two plans.

For a live example, Table 1 shows the progression of these ratios over time for the General and Safety tiers of a particular county retirement system.

Table 1
Progression of Ratios Over Time

Year	General		Safety	
	AVR	LVR	AVR	LVR
2017	6.4	9.0	12.9	13.8
2016	6.0	8.9	12.2	13.4
2015	6.2	8.9	12.3	13.1
2014	6.2	8.6	12.1	12.9
2013	5.5	8.1	10.8	12.9

Here we see that the AVRs and LVRs are substantially higher for Safety than for General. Using the 2017 results we can observe that, comparing Safety to General:

10% asset loss is **129% vs 64%** of payroll—so Safety rates will be twice as volatile

10% change in AAL is **138% vs 90%** of payroll—so Safety rate impact is over 50% greater

Practical Investment Return Scenario Test

ASOP 51 lists several quantitative risk assessment methods:

- Scenario Tests—impact of future experience (“events”)
- Sensitivity Tests—impact of assumption changes
- Stochastic Modeling—distribution of future experience
- Stress Tests—impact of “adverse changes in factors affecting a plan’s financial condition” (i.e., experience)
- Comparison of valuation present values with present value “using a discount rate derived from minimal-risk investments”

Here is a particular type of deterministic investment return scenario test we have found very accessible and useful for both trustees and employers. It illustrates the projected effect of a single year of investment returns above or below the assumed investment return.

- Baseline: assets earn expected return every year
- Bad news scenario: one-year return of 0%
- Good news scenario: one-year return of 2 times assumed return

Note this is a relatively mild “stress test” compared to some recent proposals that would show multiple years of returns less



than assumed by some specific amount. In practice, we find this particular set of scenarios has several advantages:

- It does not introduce a new and arbitrary good news / bad news assumption parameter like “3% above or below the assumed rate,” which makes it look less like a prediction. Also we find everybody intuitively understands “zero” and “double.”
- Because it is a one-year variation, we find it is more credible than a specific multiyear variation because it shows a realistic range of outcomes. However, because it is a fairly mild “stress test,” it may not be an adequate risk assessment for systems that are already seen as financially stressed.
- Because it is a one-year variation, it can be used by employers to estimate next year’s contribution requirements for budgeting by interpolating based on actual returns as they emerge during the year.

In Figures 1, 2 (Pg. 9) and 3 (Pg. 10), we show the effect of these three scenarios on the funded ratio, the unfunded actuarial accrued liability or UAAL (both on a smoothed assets basis) and the employer contribution rate (aggregating all tiers together).

Finally, while we have not illustrated it here, we sometimes include a graph showing the new baseline scenario together with baseline projection from last year. This shows very clearly the projected effect of one year of actual investment and demographic experience.

Figure 1
 Projected Funded Ratios (Actuarial Value of Assets Basis)
 Under Three Market Return Scenarios for 2018/2019

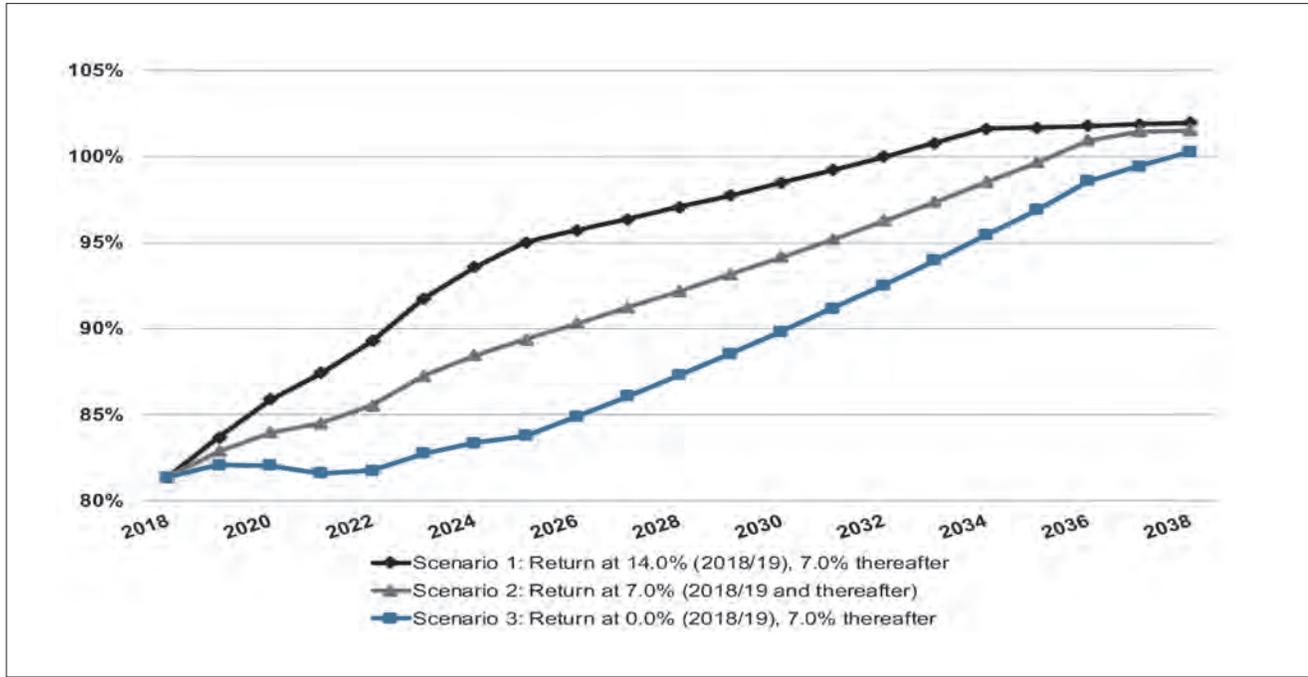


Figure 2
 Projected UAAL (on Actuarial Value of Assets Basis)
 Under Three Market Return Scenarios for 2018/2019 (\$ Millions)

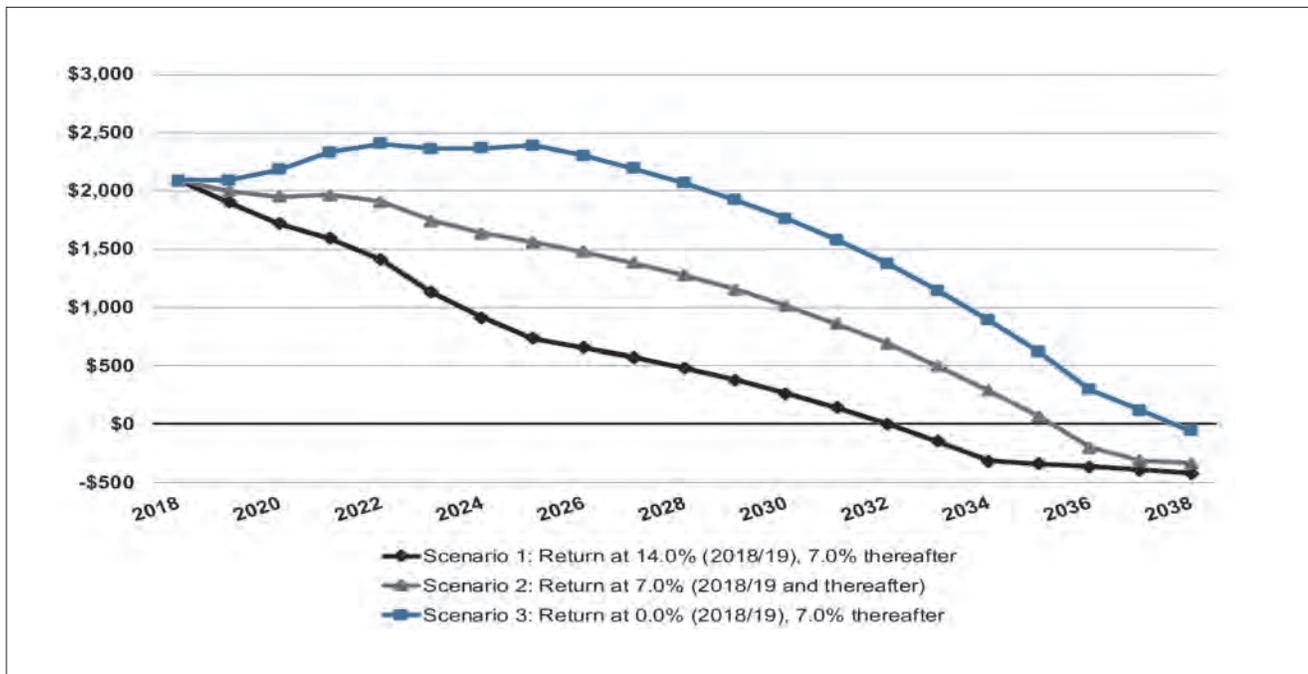
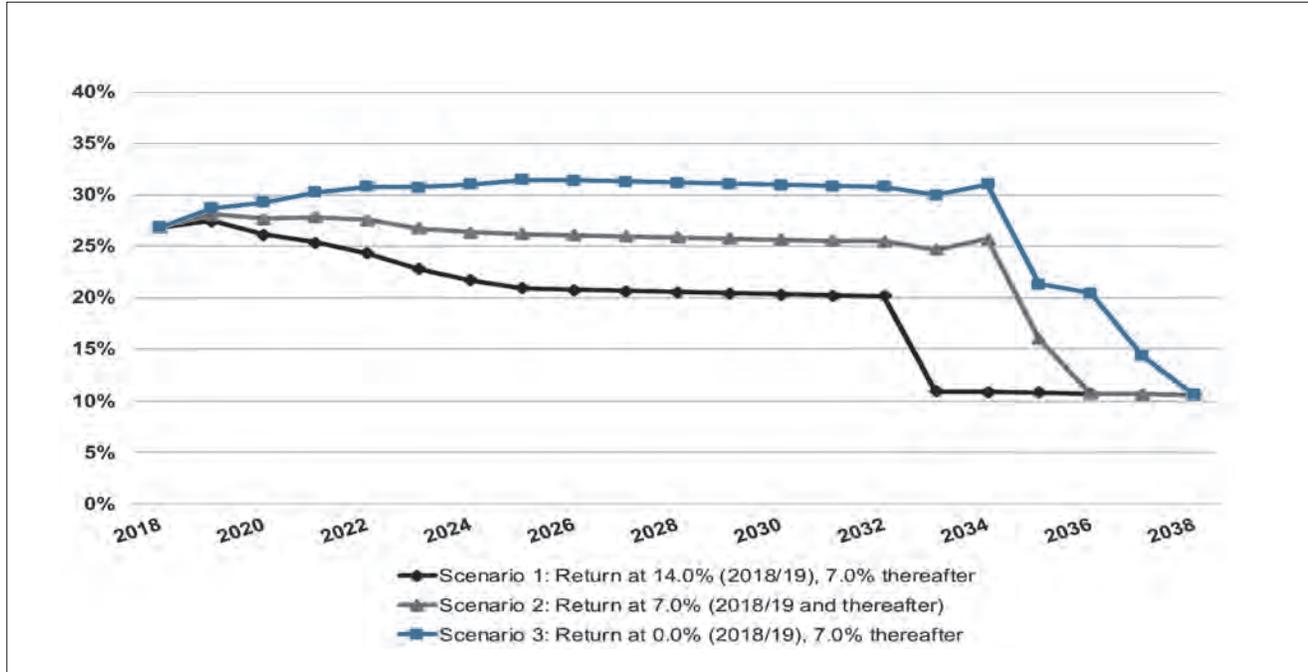


Figure 3
 Projected Employer Contribution Rates
 Under Three Market Return Scenarios for 2018/2019 (% of pay)



Stochastic Modeling

A stochastic modeling projection shows a probability distribution of future outcomes based on a specific matrix of capital market assumptions. This gives a quantified estimate of the likelihood of both relatively normal and extreme outcomes.

We advise retirement systems that, like deterministic projections, stochastic modeling outcomes are also entirely dependent on assumptions, but that dependence is not as apparent as it is with deterministic projections. For example, users of stochastic modeling should consider:

How fat are your tails? The probability of extreme outcomes may be difficult to know with any reliability. If a stochastic model shows that your “probability of ruin” (however defined) is 5 percent, different capital market assumptions with fatter or narrower tails could show results of 7 percent or 3 percent, respectively.

What is an acceptable probability of ruin? Stochastic modeling can assign a likelihood to undesirable outcomes, but cannot say what likelihood is acceptable. This means that stochastic modeling may be more illustrative than specifically decision useful.

While a stochastic modeling report will usually include graphs of the full distribution of stochastic outcomes, it is also helpful to summarize some specific probability results from the full distribution, as in Table 2. The CalPERS case study that follows in the next section also includes examples of such probability summaries.

In conclusion, Figures 4 (Pg. 11), 5 and 6 (Pg. 12) show the full distribution of stochastic outcomes for funded ratio, UAAL and employer contribution rates. We show the 95th, 75th, 50th, 25th, and 5th percentile outcomes, along with the baseline deterministic projection.

Table 2
Specific Probability Results

	Any time in the next 20 years Total Employer Rate Increases by at least		
	5% of Payroll (to 32% of Payroll)	10% of Payroll (to 37% of Payroll)	15% of Payroll (to 42% of Payroll)
Probability	30%	22%	16%

	Any time in the next 20 years Total Employer Rate Spikes in a Single Year by		
	3% of Payroll	5% of Payroll	7% of Payroll
Probability	10%	3%	2%

Figure 4
Projected Funded Ratios (Actuarial Value of Assets Basis)

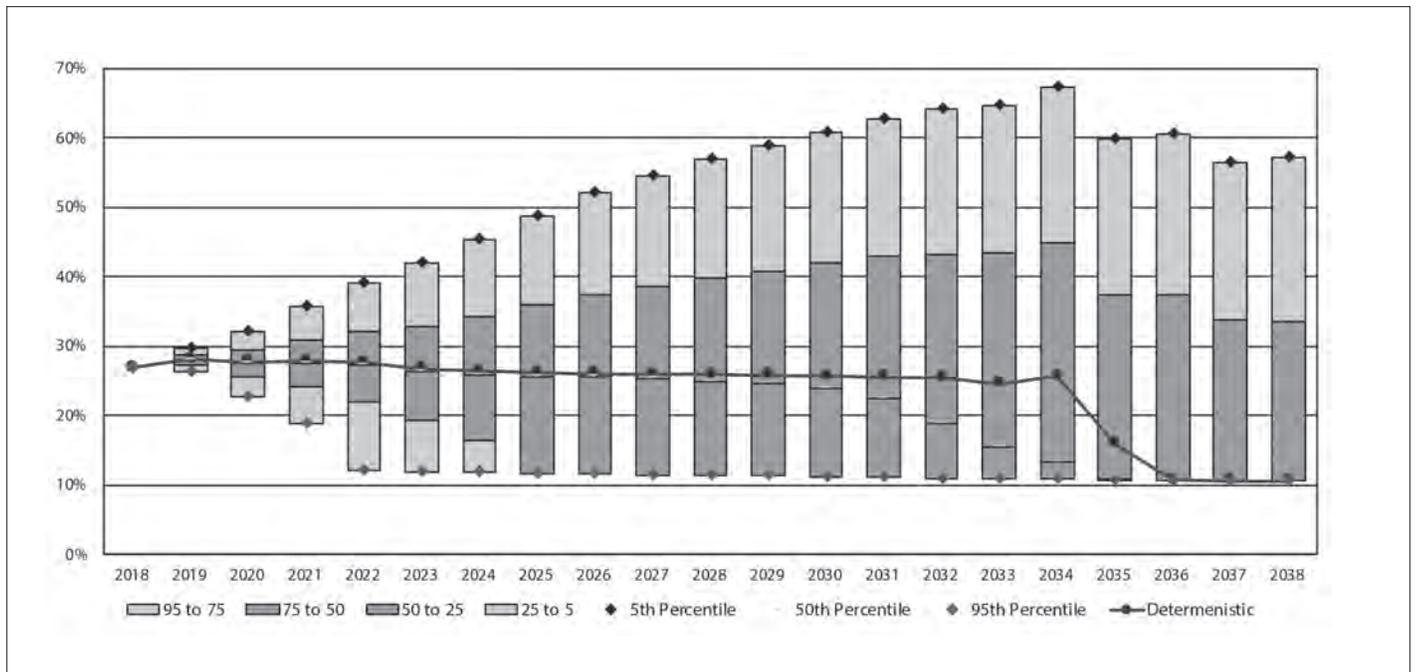


Figure 5
 Projected UAAL (Actuarial Value of Asset Basis) (\$ Millions)

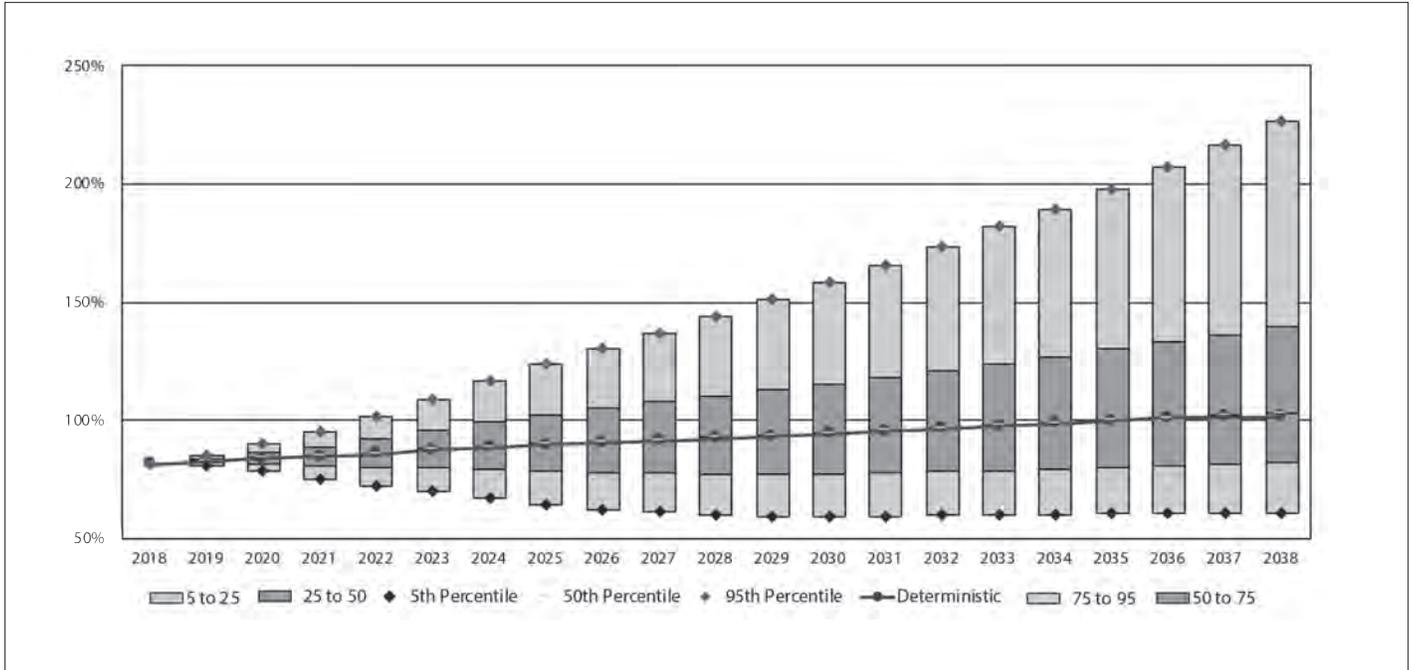
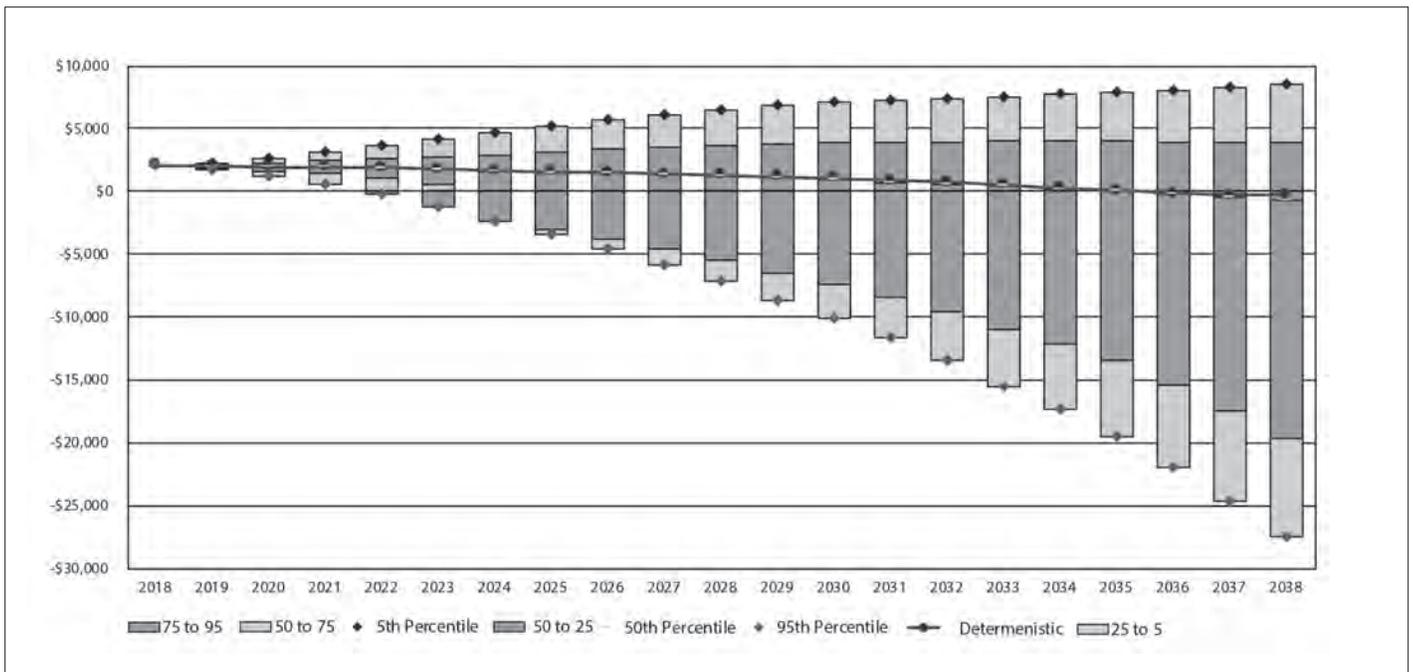


Figure 6
 Projected Employer Contribution Rates



CASE STUDY—CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM (CALPERS)

CalPERS strives to provide comprehensive risk assessments regarding plan funding and sustainability consistent with the Board of Administration’s pension and investment beliefs. Our 4,000-plus annual valuation reports include metrics on plan maturity, sensitivity analysis, and risk analysis to aid in the understanding of how plans are affected by investment return volatility and other factors.

Below is a summary of the specific items included in the CalPERS public agency reports intended to assess and disclose risks associated with the plans. In addition to the annual reports for public agencies, CalPERS produces an Annual Review of Funding Levels and Risks report that looks at the system as a whole. Exhibits from that report are also included below.

Public Agency Annual Valuation Reports

Many of the risk measures and accompanying text within our public agency reports were provided before the effective date of ASOP No. 51. However, others were added recently based on recommendations with ASOP No. 51.

Our participating agencies use this information for short- and long-term budgeting purposes as well as to assist them in making plan-related decisions including:

- Whether to make contributions to CalPERS in excess of minimum requirements
- Benefit-related decisions (limited to the addition of new tiers or minor adjustments to certain plan provisions)
- Whether to contribute to a section 115 trust and the selection of the investment mix for such assets
- Whether to terminate the CalPERS contract
- Whether to request short-term contribution relief
- Staffing decisions (potentially)

Investment Risk

All public agency reports include a four-year projection of required employer contributions under various investment return assumptions. The alternate investment return scenarios are based on the 5th, 25th, 75th and 95th percentile average returns for the projection period. This provides some indication of the likelihood of the alternate scenarios in addition to their impact on required contributions.

Since the projections in Table 3 do not illustrate the impact of a single year “shock” scenario, we also provide the following accompanying text from our valuation reports.

Table 3
Single Year “Shock” Scenario

Assumed Annual Return From 2018–20 through 2021–22	Projected Employer Contributions			
	2021–22	2022–23	2023–24	2024–25
1.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,527,000	\$7,665,000	\$8,766,000	\$10,051,000
4.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,417,000	\$7,339,000	\$8,122,000	\$8,988,000
7.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,307,000	\$7,007,000	\$7,450,000	\$7,857,000
9.0%				
Normal Cost	11.3%	11.5%	11.8%	12.0%
UAL Contribution	\$7,128,000	\$6,618,000	\$6,815,000	\$6,936,000
12.0%				
Normal Cost	11.3%	11.5%	11.8%	12.0%
UAL Contribution	\$6,671,000	\$5,652,000	\$5,276,000	\$4,752,000

“Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.”

Sensitivity Tests

Tables 4, 5 and 6 are provided in all public agency valuation reports to provide agencies with expected impacts should long-term experience vary from the actuarial assumptions.

Contribution Risk

CalPERS agencies have the ability to voluntarily terminate their contract. In addition, agencies that do not make minimum

Table 4
Discount Rate

Sensitivity Analysis				
As of June 30, 2018	Plan’s Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.00% (current discount rate)	18.529%	\$233,633,623	\$85,963,182	63.2%
6.0%	22.941%	\$263,189,076	\$115,518,635	56.1%
8.0%	15.123%	\$209,050,385	\$61,379,944	70.6%

Table 5
Inflation (discount rate held constant)

As of June 30, 2018	Current Inflation Rate	-1% Inflation Rate	+1% Inflation Rate
a) Accrued Liability	\$233,633,623	\$219,159,383	\$244,076,865
b) Market Value of Assets	\$147,670,441	\$147,670,441	\$147,670,441
c) Unfunded Liability (Surplus) [(a)-(b)]	\$85,963,182	\$71,488,942	\$96,406,424
d) Funded Ratio	63.2%	67.4%	60.5%

Table 6
Post-Retirement Mortality

As of June 30, 2018	Current Mortality	10% Lower Mortality Rates	10% Higher Mortality Rates
a) Accrued Liability	\$233,633,623	\$238,220,223	\$229,397,264
b) Market Value of Assets	\$147,670,441	\$147,670,441	147,670,441
c) Unfunded Liability (Surplus) [(a)-(b)]	\$85,963,182	\$90,549,782	\$81,726,823
d) Funded Ratio	63.2%	62.0%	64.4%

required contributions are generally terminated involuntarily. If unfunded liability exists at the time of termination, by law future member benefits—including those of existing retirees—are reduced by the percentage necessary to bring liabilities in line with assets. Table 7 provides information regarding the potential reduction in member benefits should the plan voluntarily or involuntarily terminate.

Given the liabilities in this exhibit are determined using Treasury rates, they also provide information regarding investment risk.

Maturity Measures

Each CalPERS public agency valuation report contains maturity measures (see Tables 8, 9 and 10). As suggested in ASOP No. 51, commentary is also provided to aid the user in understanding the significance of the measures.

Annual Review of Funding Levels and Risks

A few months after the completion of the annual reports that establish required contributions for our agencies, CalPERS actuaries produced the Annual Review of Funding Levels and

Table 7
Potential Reduction in Member Benefits

Market Value of Assets (MVA)	Hypothetical Termination Liability^{1,2} @ 2.50%	Funded Status	Unfunded Termination Liability @ 2.50%	Hypothetical Termination Liability^{1,2} @ 3.25%	Funded Status	Unfunded Termination Liability @ 3.25%
\$147,670,441	\$387,818,335	38.1%	\$240,147,894	\$356,508,322	41.4%	\$208,837,881

Table 8

Support Ratio	As of June 30, 2017	As of June 30, 2018
1. Number of Actives	262	261
2. Number of Retirees	398	420
3. Support Ratio [(1) / (2)]	0.66	0.62

Table 9

Ratio of Retiree Accrued Liability to Total Accrued Liability	As of June 30, 2017	As of June 30, 2018
1. Retired Accrued Liability	135,944,167	152,706,032
2. Total Accrued Liability	215,445,500	233,633,623
3. Ratio of Retiree AL to Total AL [(1) / (2)]	63%	65%

Table 10

Contribution Volatility	As of June 30, 2017	As of June 30, 2018
1. Market Value of Assets without Receivables	\$ 138,650,368	\$ 147,419,950
2. Payroll	20,779,907	21,276,242
3. Asset Volatility Ratio (AVR) [(1) / (2)]	6.7	6.9
4. Accrued Liability	\$ 215,445,500	\$ 233,633,623
5. Liability Volatility Ratio (LVR) [(4) / (2)]	10.4	11.0

Risks report that is presented to our Board. This report provides systemwide results that the Board uses to make decisions regarding:

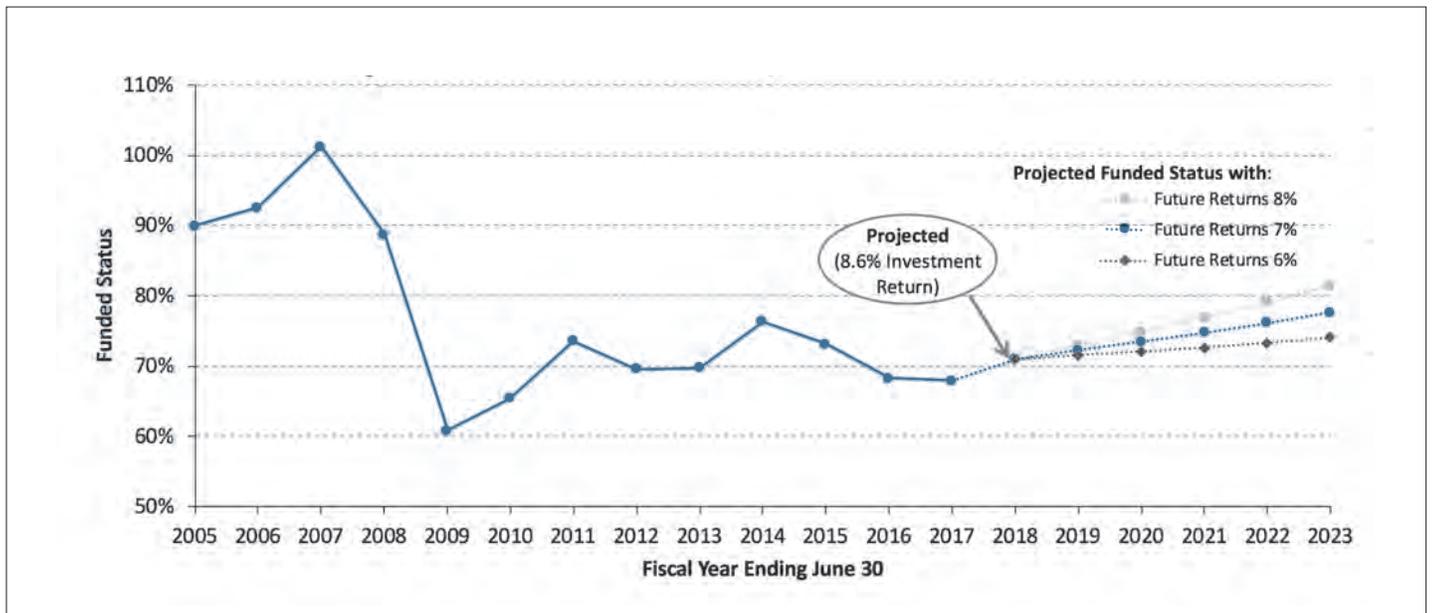
- Investment policy
- Funding policy (including amortization policy)
- Selection of actuarial assumptions (primarily economic)

Figures 7, 8, 9 (Pg. 17) and 10 (Pg. 18) illustrate the results.

Projections of Funded Status

Figure 7

PERF Funded Status Based on Market Value of Assets (June 30, 2005 to June 30, 2018)



Stochastic Analysis

Stochastic analysis is used extensively in the Annual Review of Funding Levels and Risk report to determine the likelihood of future events regarding funded status levels, contribution levels and contribution volatility. This analysis was used recently by the Board to assist in the analysis of proposed changes to the amortization policy which were presented and approved in February 2018.

Maturity Measures

Figure 8
Ratio of Active to Retirees

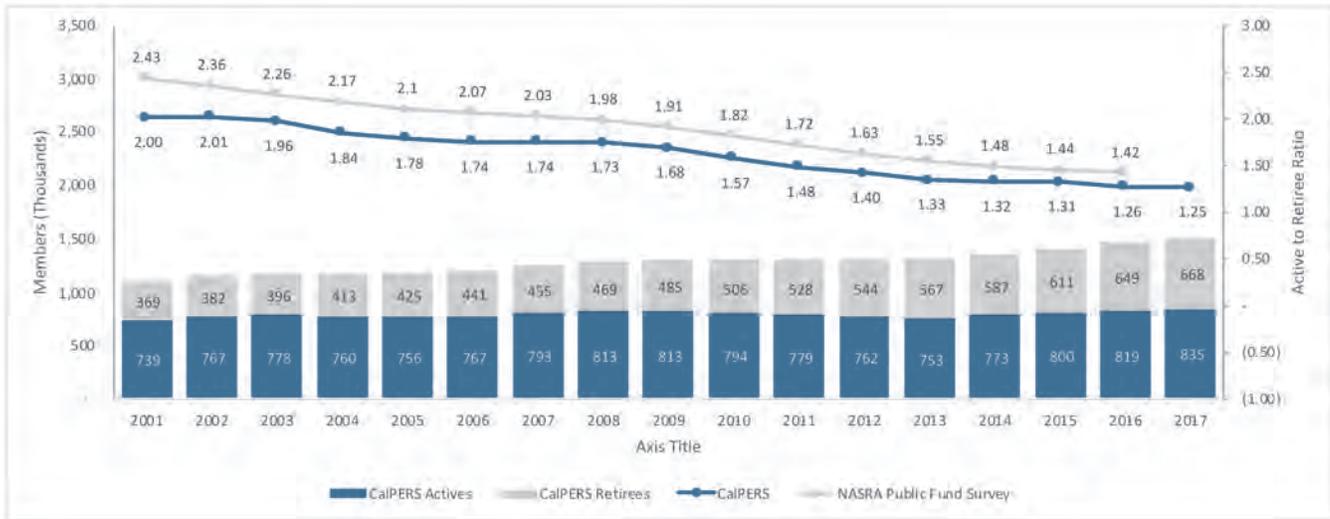


Figure 9
Ratio of Retiree Accrued Liability to Total Accrued Liability

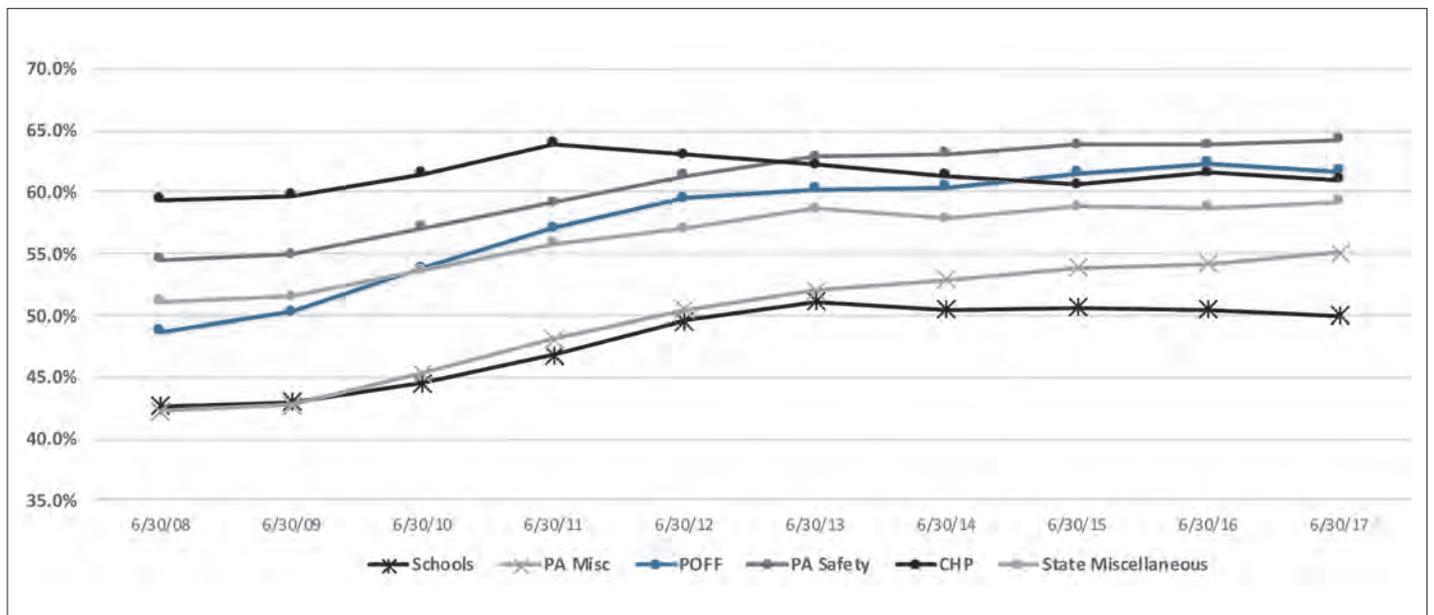


Figure 10
Asset Volatility Ration (MVA to Payroll)

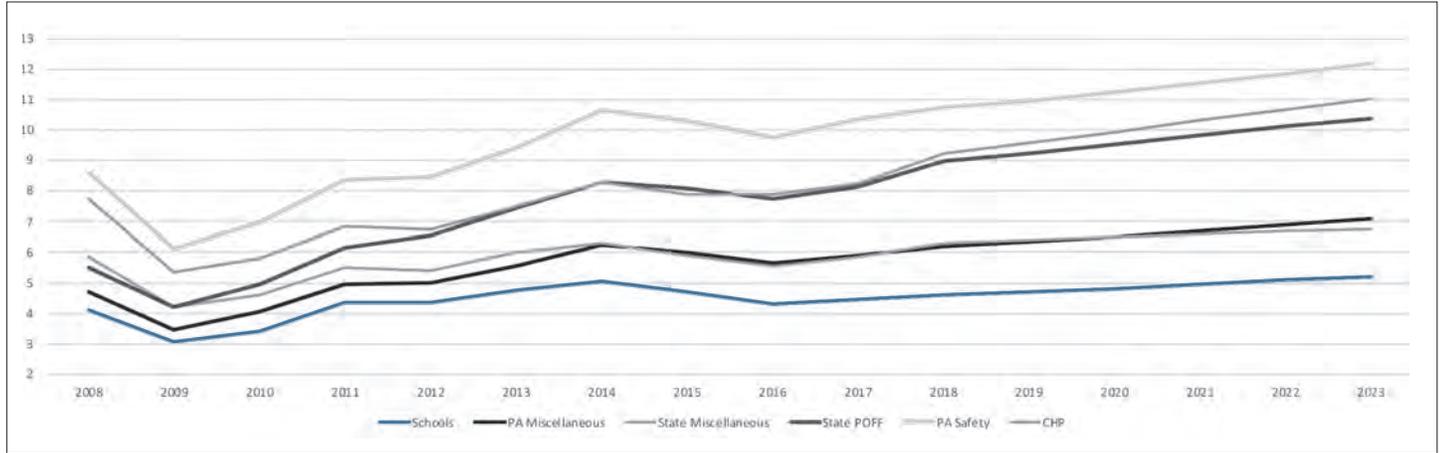


Table 11
Probability of Falling Below Given Funding Level (at any point in next 30 years)

Plan	40%		50%		60%	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	< 1%	< 1%	6%	1%	48%	24%
Schools	< 1%	< 1%	3%	1%	33%	22%
CHP	< 1%	< 1%	15%	2%	100%	100%
POFF	< 1%	< 1%	6%	1%	52%	26%
PA Miscellaneous	< 1%	< 1%	5%	2%	38%	27%
PA Safety	< 1%	< 1%	9%	4%	54%	43%

Table 12
Probability of Employer Contribution Rates Exceeding Given Level (at any point in next 30 years)

Plan	30% of Payroll		35% of Payroll		40% of Payroll	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	100%	100%	73%	56%	32%	28%
Schools	25%	36%	4%	11%	< 1%	1%
PA Miscellaneous	45%	53%	11%	23%	1%	6%
Plan	50% of Payroll		55% of Payroll		60% of Payroll	
	2017	2018	2017	2018	2017	2018
CHP	100%	100%	100%	100%	100%	87%
POFF	97%	80%	69%	52%	38%	32%
PA Safety	97%	100%	78%	79%	54%	61%

Figure 13
Probability of Employer Contribution Rate Increases of Selected Magnitudes (at any point in next 30 years)

Plan	3% of Payroll		5% of Payroll		7% of Payroll	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	18%	53%	< 1%	12%	< 1%	6%
Schools	21%	41%	< 1%	7%	< 1%	4%
PA Miscellaneous	3%	40%	< 1%	9%	< 1%	5%

Plan	5% of Payroll		7% of Payroll		9% of Payroll	
	2017	2018	2017	2018	2017	2018
CHP	25%	59%	1%	27%	< 1%	12%
POFF	8%	47%	< 1%	18%	< 1%	9%
PA Safety	12%	55%	< 1%	20%	< 1%	10%

Actual exhibits from the 2018 report are provided in Tables 11, 12 and 13.

The report templates used by the CalPERS actuaries are reviewed annually. We continually discuss possible additions or improvements—especially in the critical area of risk analysis—internally as staff and with our outside stakeholders.

RATING AGENCY PERSPECTIVE

As a credit rating agency, S&P Global Ratings provides intelligence to the marketplace on the potential ability and willingness of an issuer to meet its financial debt obligations in full and on time, a concept we identify as creditworthiness. For U.S. state and local governments, evaluation of creditworthiness encompasses several factors beyond an entity’s ability to meet its pension promises. However, pensions play a key role in our assessment of creditworthiness because of their continual and increasing pressure on states’ and municipalities’ finances, especially when considering the legal and political protections generally afforded pensions.

Our pension assessment starts with an examination of the current funded position and size of liabilities and contributions, but quickly focuses in on funding discipline metrics such as prudent assumptions, contribution practices, effective amortization of the unfunded liability, and related risk metrics including demographics. We are interested in knowing what kinds of historical decisions and practices have led to today’s position, and similarly how today’s policies will drive potential progress and cost trajectory going forward. In short, we endeavor to anticipate the potential for and scale of accelerating payments and increasing budgetary stress over time in light of a municipality’s complete financial profile.

To aid us in this determination, we use several risk metrics of our own, two of which will be highlighted here. The first, described in S&P Global Ratings’ U.S. States Methodology, is our minimum funding progress (MFP) metric, which compares total contributions to the sum of the service cost, interest cost on the NPL, and 1/30th of the NPL, as an annual snapshot of contribution effectiveness. We generally view negative amortization or even static funding poorly in credit analysis, especially when it lingers over a period of time. Figure 11 displays that recently only nine out of 50 states have met or exceeded this metric. Given that we consider the MFP a measure of “minimum progress,” it is clear that in our view there is room for significant improvement within contribution practices. We also examine whether or not (indicated by gray or blue respectively) all state plans in aggregate consistently and fully follow actuarially based contributions as another indicator of liability management over time.

Figure 12 examines the discount rate, asset allocation mix, and plan maturity for the largest pension plan in each state. Investment volatility is constantly in the news as a major driver of cost variation for pension plans, but we firmly hold that a plan’s tolerance to that investment volatility depends on many factors, including but not limited to the demographic profile of the plan. This is one of the reasons why we believe there is little analytical support for us to adjust all plans by one single uniform discount rate, even under the level cost method. And as plans grow more mature, the contribution rate sensitivity to investment volatility increases, even as plans have been increasing their allocation to complex and risky assets. The top left corner of Figure 12 represents high risk plans that are both more mature and have more risky investment portfolios.

We endeavor to anticipate the potential for and scale of accelerating payments and increasing budgetary stress over time in light of a municipality's complete financial profile.

While both assessments shown here are survey-based and not necessarily reflective of future deviations from expected values, the provisions of ASOP 51 still fit well into our forward-looking assessment of cost trajectory. In fact, we even have a score adjustment based on whether or not the issuer has a “credible

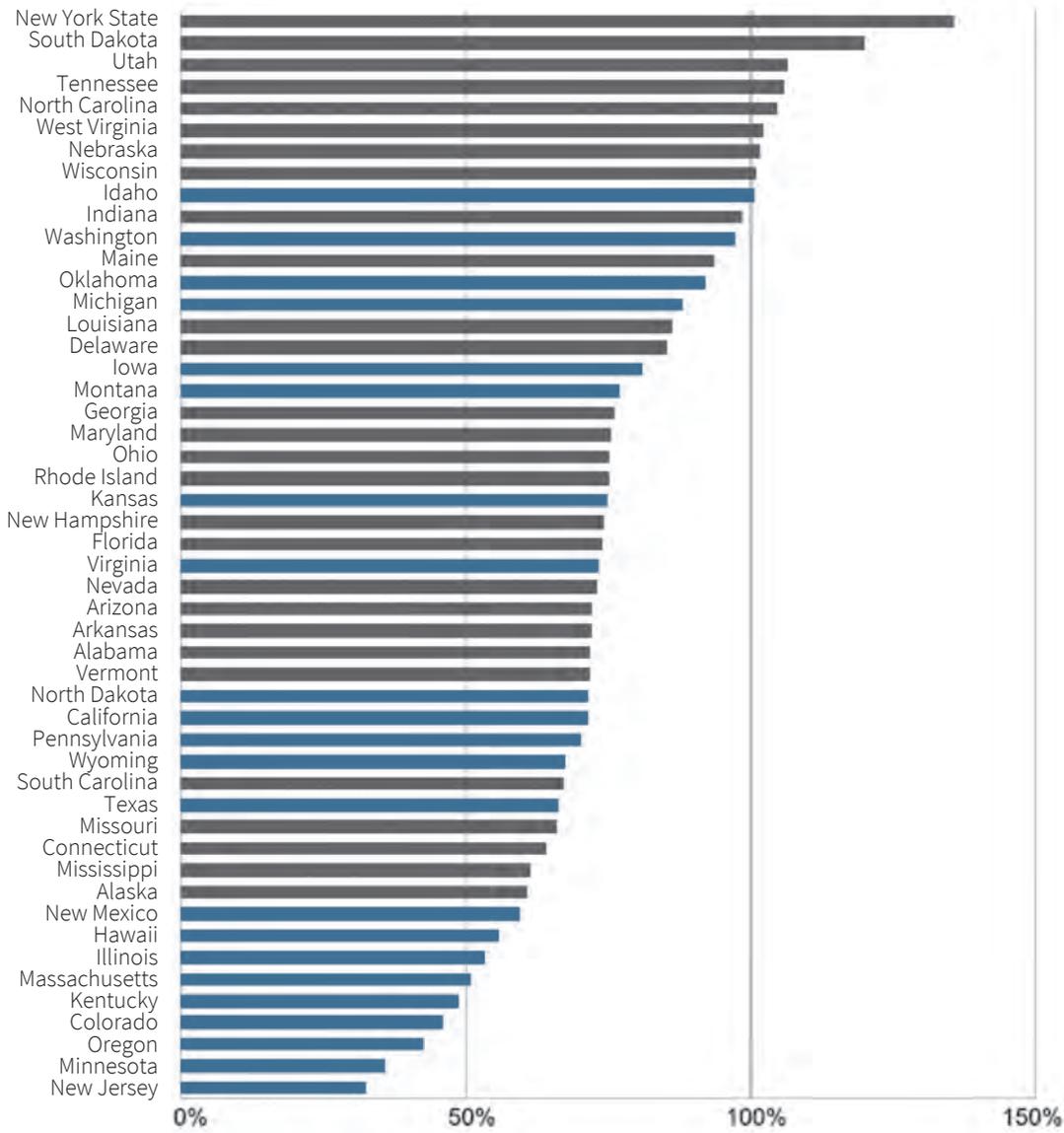
plan” in place to understand and address pension risk, which in my opinion speaks directly to the heart of the ASOP.

As pension risk always ties back to current and future financial impact for us, we especially see great value in full baseline and stressed projections of liabilities and costs going forward. It's surprising how many plan sponsors don't know what their estimated costs would be in five or ten years even if all assumptions are met. That lack of information can lead not only to poor financial planning over time, but also to potentially ill-informed perspectives and choices in benefits or funding practices that could have cost ramifications for decades to come.

The more ASOP 51 causes real and growing pension risks to be taken seriously, discussed in earnest, understood, and ultimately acted on from both the plan and plan sponsor perspective, the better the outlook will be for all parties involved.



Figure 11
State Plan Minimum Funding Progress



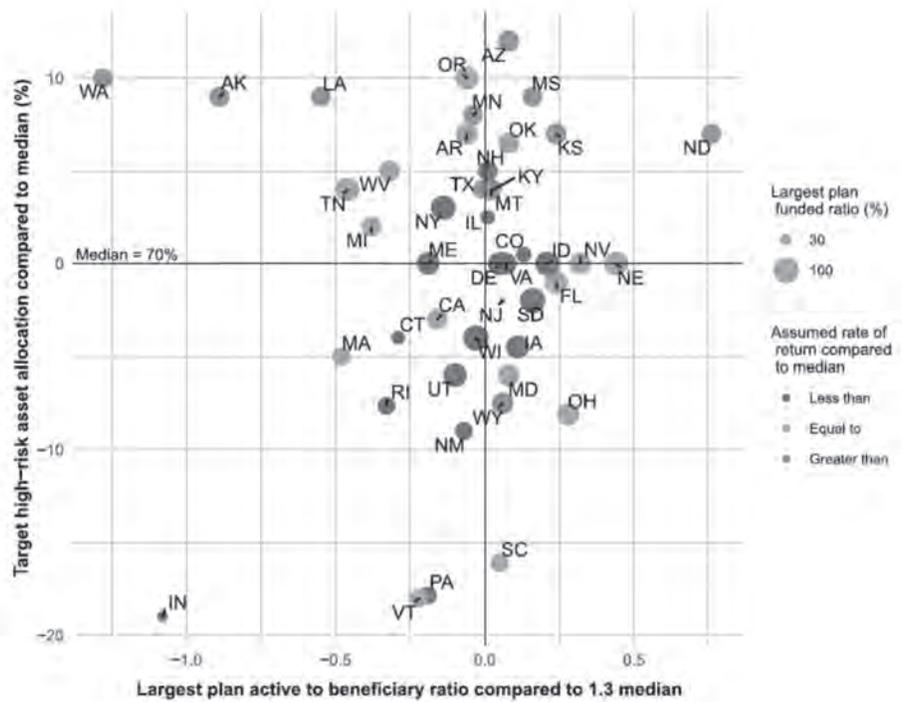
Total plan contributions to accounting measures for annual minimum funding progress

Blue: Pension contributions do not have an actuarial basis or are not usually fully funded. **Gray:** Pension plan contributions are actuarially based and usually meet or exceed required levels. *Alabama pension figures include the Alabama Employees' Retirement System agent plan measured as of fiscal 2016 as reported in the state's unaudited fiscal 2017 comprehensive annual financial report (CAFR). \$The funded ratio for Tennessee reflects 2016 plan information for the state's agent plans as reported in Tennessee's fiscal 2017 CAFR.

Source: S&P Global Ratings.
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Chart 12
Plan Demographics and Target Asset Allocations Largest State Pension Plans

Indiana’s pre-1996 Teacher’s Retirement Fund and Washington’s Public Employees’ Retirement System (PERS) Plan 1 are closed to new entrants. This Figure excludes information for Alabama, Georgia, Hawaii, and North Carolina because 2012 or 2017 targeted asset allocations for the largest plan were not available in the Public Plans Database (PPD). Missouri State Employees’ Retirement Systems is an outlier, with a 25 percent reduction in its targeted high-risk asset allocation since 2012 and falls outside the chart plot area.



Source: Pension plan and state reports. Investment allocation information from PPD. Copyright ©2018 by Standard & Poor’s Financial Services LLC. All rights reserved.

CONCLUSIONS

ASOP 51 requires identification and assessment of funding risks in actuarial valuation. The purpose is to provide useful information to public pension stakeholders. The various approaches illustrated above have been found to be useful by these experienced practitioners. As ASOP 51 is implemented, these measures and other risk assessment measures will be incorporated to enhance the understanding of public pensions. ■



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