



**Fresno County Employees'  
Retirement Association**

**Actuarial Audit and Review of  
Assumption and Methods  
June 30, 2014  
Actuarial Valuation and  
June 30, 2013  
Experience Study**

**Produced by [Cheiron](#)**

**April 1, 2015**

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March 26, 2015

Board of Trustees  
Fresno County Employees' Retirement Association  
1111 "H" Street  
Fresno, CA 93721

Members of the Board:

Cheiron is pleased to present the results of our actuarial audit of the June 30, 2014 actuarial valuation of the Fresno County Employees' Retirement Association (FCERA), the July 1, 2009 to June 30, 2012 experience study of demographic assumptions, and the review of economic assumptions for the June 30, 2013 valuation, performed by Segal Consulting (Segal). We would like to thank Segal for providing us with information and explanations that facilitated the actuarial audit process and ensured that our findings are accurate and benefit FCERA. We direct your attention to the executive summary section of our report which highlights the key findings of our review. The balance of the report provides details in support of these findings along with supplemental data, background information, and discussion of the process used in the evaluation of the work performed by Segal.

In preparing our report, we relied on information (some oral and some written) supplied by FCERA and Segal. This information includes, but is not limited to, actuarial assumptions and methods adopted by FCERA, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness in accordance with Actuarial Standard of Practice No. 23. A detailed description of all information provided for this review is provided in the body of our report.

We hereby certify that, to the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. 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.

This report was prepared exclusively for the Fresno County Employees' Retirement Association for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,  
Cheiron



Kenneth A. Kent, FSA, FCA, MAAA, EA  
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**SECTION I  
EXECUTIVE SUMMARY**

**Scope of Assignment**

Cheiron performed a complete independent replication of FCERA June 30, 2014 actuarial valuation and reviewed the actuarial methods underlying that valuation. Additionally, Cheiron performed a review of the economic assumptions presented for the June 30, 2013 valuation and an independent replication of the July 1, 2009 through June 30, 2012 non-economic experience study.

This audit provides FCERA confirmation that:

- The results reported by Segal can be relied upon,
- Segal's actuarial valuation report, assumptions, and methods comply with Actuarial Standards of Practice (ASOPs),
- The communication of the actuarial valuation results is complete and reasonable, and
- The Board and Segal have considered communications that may improve the valuation.

However, alternative assumptions in the next experience study should be considered based on review of trends that would be effective in anticipating future experience and could have a material impact on the liabilities and cost of the Plan going forward.

Our key findings and recommendations are summarized below. In the sections that follow, additional details that explain and support these findings and recommendations are presented.

**Key Findings and Recommendations**

Our independent replication of the June 30, 2014 actuarial valuation found no material difference in calculations of plan liabilities, actuarial value of assets, and overall contribution rates from the amounts calculated by Segal based on the adopted assumptions and methods. For the scope of this audit, materiality means the results in the aggregate were within industry standards of plus or minus 5%. Consequently, we conclude that the valuation prepared by Segal for FCERA as of June 30, 2014 is reasonable and can be relied on by the Board for its intended purpose. Our replication of the measures of plan liabilities is summarized in Table I-1 below.

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<b>Table I-1</b>				
<b>Fresno County Employees' Retirement Association</b>				
<b>Actuarial Valuation as of June 30, 2014</b>				
<b>Replication of Liabilities</b>				
<b>(in thousands)</b>				
		<b>Segal</b>	<b>Cheiron</b>	<b>Variance</b>
<b>Present Value of Future Benefits</b>	\$	5,710,397	\$ 5,695,059	-0.3%
<b>Present Value of Future Normal Cost (PVFNC)</b>	\$	833,643	\$ 868,593	4.2%
<b>Actuarial Liability (AL)</b>				
Active Members	\$	1,734,340	\$ 1,694,621	-2.3%
Vested Terminated Members		240,498	238,472	-0.8%
Retirees and Beneficiaries		<u>2,901,916</u>	<u>2,893,373</u>	-0.3%
<b>Total AL</b>	\$	4,876,754	\$ 4,826,466	-1.0%
<b>Valuation Value of Assets</b>	\$	3,824,221	\$ 3,824,221	0.0%
<b>Unfunded Actuarial Liability (UAAL)</b>		1,052,533	1,002,244	-4.8%
<b>Funded Ratio</b>		78.4%	79.2%	
<b>Total Salary</b>	\$	373,774	\$ 373,774	0.0%
<b>Present Value of Future Salaries</b>		3,266,105	3,297,620	1.0%

It is not unusual for there to be differences in the allocation of the total present value of benefits into past and future amounts (the actuarial liability and present value of future normal costs, respectively) due to the different valuation systems and minor differences in programming. We are not concerned with these differences when they offset each other – as is the case in Table I-1 above, where Cheiron's present value of future normal cost are higher than Segal's, but our actuarial liabilities are lower (the present value of future normal costs plus actuarial liabilities should equal the present value of benefits) – when the projected value of benefits match is close, as it is in our analysis.

In addition, the differences in the unfunded liability amounts are leveraged by the assets. Imagine a plan which is measured as 100% funded (assets exactly equal to actuarial liabilities) by the Plan's actuary. If the auditing actuary were to determine an actuarial liability 0.1% greater than the Plan's actuary, the differences would clearly be minor, but the relative size of the unfunded liability measures would be infinitely different, as the Plan's actuary's estimate of the UAL would be \$0, while the auditing actuary's estimate would be a positive number.

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Our replication of the aggregate employer contribution rates is summarized below in Table I-2. We note that the total contribution rate and the components are all within the 5% threshold.

<b>Table I-2 Fresno County Employees' Retirement Association Actuarial Valuation as of June 30, 2014 Replication of Employer Contribution Rates</b>			
	<b>Segal</b>	<b>Cheiron</b>	<b>Variance</b>
<b>Total Normal Cost Rate</b>	29.34%	30.03%	2.3%
<b>Member Contribution Rate</b>	<u>9.58%</u>	<u>9.84%</u>	2.7%
<b>Employer Normal Cost</b>	19.76%	20.19%	2.1%
<b>Amortization Payment of UAAL</b>	<u>32.80%</u>	<u>31.61%</u>	-3.6%
<b>Employer Contribution Rate</b>	52.56%	51.80%	-1.5%

In performing our audit, we found a number of issues for the Board and/or Segal to consider in the preparation of future valuations. Independently, these issues would have a marginal impact on the results of the valuation and would contribute to a better measurement of the liabilities. However, in aggregate, the impact on the valuation results and costs may be somewhat material. The primary issues to consider are as follows.

- **Data Findings** - Through our independent processing of the June 30, 2014 valuation data - including a comparison of the files provided by FCERA and Northern Trust - we found the following discrepancies compared to Segal's processed data.
  - There were 38 records where there was a difference in the member's status and thus, the value of their benefit liability. Most of these records were coded as terminated vested members by Segal but were actually retired members reported as receiving benefits from Northern Trust. Our estimate of the increase in the Plan's liability is \$4 million, which represents less than 0.1% of the Plan's overall actuarial liability.
  - There were 52 member records, mostly beneficiaries or alternate payees, that were not included in Segal's processed data. Our estimate of the increase in the Plan's liability is \$14 million, which represents less than 0.3% of the Plan's overall actuarial liability. The estimate is a rough approximation based on the information available, since some data on these participants is not contained in the databases we received.
- **Data Findings with Northern Trust** - There were some reporting issues with the retiree data from Northern Trust in the June 30, 2014 valuation data. There were 245 records where the member's status from Northern Trust differed from data provided by FCERA. Northern

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Trust reported certain beneficiary records as retirees. However, Segal used the correct status when valuing these benefits and therefore there was no impact on the valuation results. We recommend that Northern Trust is alerted to these issues so that future retiree data is provided accurately.

- **Mortality Rates** - We recommend that at the time of the next experience study, Segal consider the use of a new approach towards mortality assumptions, based on the use of generational mortality assumptions, as opposed to using a margin for future mortality improvement. The idea behind a generational mortality assumption is to build in an automatic expectation of future improvements in mortality. This is a different approach from building in a margin for conservatism in the current rates to account for the expectation that the same rates will be applied in future years, when mortality experience has improved.
- **Retirement and Termination Rates** - We recommend at the time of the next experience study, Segal consider reviewing the service retirement rates and termination rates for vested members by looking at *both* the age and service of the members in relation to the probability of leaving employment. In the last experience study, the analysis was performed using only age-based rates. Based on our review, the number of years of service a member has earned not only affects the probabilities of retirement and termination but has an impact on the liabilities and costs of the Plan.
- **Inflation and Wage Growth** - We recommend that at the time of the next experience study, the Board consider making further reductions to the inflation, COLA, and wage growth assumptions.

**Additional Findings**

In addition to the key findings described above, there were a number of less significant findings which are described below.

- We suggest that at the time of the next experience study, Segal consider including in their analysis of demographic experience, a summary of data over time periods longer than three years for those assumptions which do not yield a credible data set over a three-year period, such as disabilities and Safety healthy post-retirement mortality.
- We commend Segal for their inclusion of asset and liability volatility ratios, and recommend they provide the Board with additional disclosures regarding future risks to the pension plan, either within the valuation report or via supplementary presentations and particularly with respect to the volatility associated with investments.
- We recommend Segal provide enhanced liability-related disclosures by including the membership-weighted employee contribution rates by tier, for both Regular and Settlement benefits, and in total (similar to the employer contribution rate disclosure on page 16 of the actuarial valuation report).

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- In the assumptions section of the valuation report, we recommend Segal clarify which benefits are assumed to be enhanced with the conversion annual leave credit to service. We also suggest that Segal provide more disclosure on how an active member's eligibility for an annual leave plan is determined for the valuation.
- We recommend Segal add a description of the assumption regarding future growth in the PEPRA wage cap.
- We recommend Segal use an adjusted PEPRA wage cap based on a fiscal year rather than a calendar year.



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**SECTION II  
ACTUARIAL VALUATION AUDIT PROCESS**

Cheiron was retained by FCERA to conduct a replication and peer review of the June 30, 2014 actuarial valuation and the most recent demographic and economic experience studies of the Plan performed by Segal Consulting. The replication and peer review was completed over a six-month period commencing in October 2014.

With an independent replication, FCERA can be confident that there are no material difference in the measure of liabilities and funding obligations or provided evidence of potential variances from generally accepted actuarial practices. In addition, other aspects of the valuation process are reviewed and the independent opinions provided on issues have been addressed and alternative perspectives to be examined.

Cheiron's replication and peer review process includes the following:

- **Review of census data used.** Valuation results are only as good as the inputs used to generate them. Thus, it is important to analyze the processed data used by Segal and address any inconsistent data. We reviewed the data by reproducing the valuation data based on raw data received from FCERA and comparing our results to Segal's processed data. For this audit, we also collected data from Northern Trust, the entity responsible for issuing benefit payments.
- **Replication of liabilities and contribution rates.** By separately programming our valuation system for the same benefits, using the same census data, actuarial cost methods and assumptions as reported in the June 30, 2014 valuation, we can compare and contrast the results developed by Segal. This provides an explicit check of the "*black-box*" valuation process.
- **Assessment of funding sufficiency.** To test the effectiveness of the actuarial funding method in providing a systematic and smooth pattern of contributions to fund the Plan, we built our interactive projection and simulation model, P-Scan, and intend to demonstrate it to the Board as part of our audit presentation. With P-Scan, we can explore with the Board different potential economic scenarios to illustrate how the actuarial funding method behaves when stressed as well as demonstrate that the assumptions and methods employed by the Board, do not create systematic funding issues.
- **Review of actuarial communications.** We reviewed the actuarial valuation report to determine if it complies with actuarial standards of practice for communicating actuarial results. This review confirms that the report provides complete and accurate information to the user and includes any recommendations for enhancements to that end.

The replication and peer review process is conducted in accordance with generally accepted actuarial principles and methods. The balance of our report presents our detailed findings.

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**SECTION III  
REVIEW OF CENSUS DATA USED**

We received a copy of the FCERA processed data file Segal used for the June 30, 2014 valuation. We compared key statistics between the file and our independently processed data based on the information received from both FCERA and Northern Trust. The table below summarizes the results.

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**SECTION III  
REVIEW OF CENSUS DATA USED**

Table III-1 Fresno County Employees' Retirement Association Data Comparison			
	General	Safety	Total
<b>Cheiron Processed Data</b>			
<b>Active Members</b>	6,129	838	6,967
Average Age	44	41.0	43.6
Average Service	11	12.5	11.0
Projected Average Compensation	\$ 51,004	\$ 71,732	\$ 53,497
<b>Vested Terminated Members</b>	1,223	130	1,353
Average Age	49	45	48.8
<b>Retired Members</b>	4,895	563	5,458
Average Age	69.0	65.6	68.6
Average Monthly Benefit	\$ 2,744	\$ 4,590	\$ 2,936
<b>Disabled Members</b>	202	154	356
Average Age	66.6	58.3	63.0
Average Monthly Benefit	\$ 1,918	\$ 3,268	\$ 2,495
<b>Beneficiaries</b>	686	144	830
Average Age	72.6	67.7	71.8
Average Monthly Benefit	\$ 1,663	\$ 2,036	\$ 1,728
<b>Valuation Report - June 30, 2014 (Segal)</b>			
<b>Active Members</b>	6,130	838	6,968
Average Age	44.0	41.0	43.6
Average Service	10.7	12.5	10.9
Projected Average Compensation	\$ 51,005	\$ 72,925	\$ 53,641
<b>Vested Terminated Members</b>	1,249	131	1,380
Average Age	49.4	45	49.0
<b>Retired Members</b>	4,865	564	5,429
Average Age	69.1	65.7	68.7
Average Monthly Benefit	\$ 2,741	\$ 4,558	\$ 2,930
<b>Disabled Members</b>	197	147	344
Average Age	66.6	58.0	62.9
Average Monthly Benefit	\$ 1,914	\$ 3,313	\$ 2,512
<b>Beneficiaries</b>	659	138	797
Average Age	72.9	67.5	72.0
Average Monthly Benefit	\$ 1,668	\$ 2,075	\$ 1,739
<b>Percent Difference</b>			
<b>Active Members</b>	0.0%	0.0%	0.0%
Average Age	0.0%	0.0%	0.0%
Average Service	0.2%	0.3%	0.2%
Projected Average Compensation	0.0%	-1.6%	-0.3%
<b>Vested Terminated Members</b>	-2.1%	-0.8%	-2.0%
Average Age	-0.5%	-0.1%	-0.5%
<b>Retired Members</b>	0.6%	-0.2%	0.5%
Average Age	-0.1%	-0.1%	-0.1%
Average Monthly Benefit	0.1%	0.7%	0.2%
<b>Disabled Members</b>	2.5%	4.8%	3.5%
Average Age	0.0%	0.5%	0.2%
Average Monthly Benefit	0.2%	-1.3%	-0.7%
<b>Beneficiaries</b>	4.1%	4.3%	4.1%
Average Age	-0.4%	0.3%	-0.3%
Average Monthly Benefit	-0.3%	-1.9%	-0.6%

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**SECTION IV  
REPLICATION OF LIABILITIES AND CONTRIBUTION RATES**

We have noted above in our primary findings the reasons for the discrepancy in the headcounts between our database and Segal's, mostly due to a number of alternate payees not included in Segal's data file and a number of members reported as terminated vested by Segal who were receiving benefits as of the valuation date. These differences also result in small differences in the average benefit amounts and ages reflected in these populations.

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**SECTION IV  
REPLICATION OF LIABILITIES AND CONTRIBUTION RATES**

After collecting the census data and actuarial assumptions, we programmed our valuation system based on our understanding of the Plan's provisions and performed calculations based on Segal's processed data files. The table below shows the comparison of our independent calculations of the results by group compared to those calculated by Segal.

Most of the differences shown below are within normal industry standards for an audit. There are several figures outside of the normal 5% industry standard; however, none of them raise material concerns with respect to whether Segal's results are reasonable. While our results are well within 5% for all General and Safety Tiers in the measures of the total present value of benefits, our results for the actuarial liability are smaller than Segal's for every Tier and most noticeable for the newer Tiers.

As stated earlier, it is not unusual for there to be differences in the allocation of the total present value of benefits into past and future amounts (the actuarial liability and present value of future normal costs, respectively) due to the different valuation systems and minor differences in programming. We are generally not concerned with these differences when they offset each other – i.e., when the projected value of benefits match is close.

In addition, the difference in the actuarial liability for the newer Tiers is heavily leveraged since the value of the newer tiers' actuarial liability is relatively small because the members do not have much service earned yet relative to their projected service at retirement. These differences are most notable for the PEPRA tier, which is not surprising, since different approaches to the calculation of past service – resulting from minor variations in rounding or other methodologies – will have a significant impact on the amount of actuarial liability estimated for these members. As the size of the PEPRA population grows, and as these members accumulate more service, the percentage differences between different valuation systems should decline significantly. Finally, despite the difference in liabilities, we are well within normal industry standards on the employer contribution rates.

As part of the actuarial valuation, Segal calculates an employer contribution rate as a level percent of payroll. We understand the employer's contribution rate to be made up of the following components:

- The employer's normal cost, which is equal to the total normal cost attributed to the Regular and Settlement benefits, offset by expected member contributions,
- The amortization of the unfunded actuarial liability (amortized over 19 years as of June 30, 2014) and changes in the unfunded actuarial liability (amortized over 15 years, or 5 years for Early Retirement Incentive programs)

In determining the unfunded actuarial liability, Segal relies on reserve balances provided by FCERA, which we have not audited.

We replicated the development of the contribution rate for each group as illustrated below. The differences in the total employer contribution rates shown on the next page are within normal industry standards for an audit. However in future audits and as these Tiers get larger the differences should be monitored.

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**SECTION IV  
REPLICATION OF LIABILITIES AND CONTRIBUTION RATES**

<b>Table IV-1 Fresno County Employees' Retirement Association Actuarial Valuation as of June 30, 2014 Replication of Liabilities (General) (in thousands)</b>			
	<b>Segal</b>	<b>Cheiron</b>	<b>Variance</b>
<b><u>Tier 1 - Active Members</u></b>			
Present Value of Future Benefits	\$ 1,755,698	\$ 1,748,093	-0.4%
Actuarial Liability (AL)	1,294,233	1,267,505	-2.1%
Present Value of Future Normal Costs	461,465	480,588	4.1%
Total Salary	225,890	225,890	0.0%
Present Value of Future Salaries	1,720,603	1,748,511	1.6%
<b><u>Tier 2 - Active Members</u></b>			
Present Value of Future Benefits	\$ 39,910	\$ 39,996	0.2%
Actuarial Liability (AL)	14,655	13,817	-5.7%
Present Value of Future Normal Costs	25,255	26,179	3.7%
Total Salary	11,369	11,369	0.0%
Present Value of Future Salaries	113,249	113,102	-0.1%
<b><u>Tier 3 - Active Members</u></b>			
Present Value of Future Benefits	\$ 139,386	\$ 140,651	0.9%
Actuarial Liability (AL)	49,858	47,458	-4.8%
Present Value of Future Normal Costs	89,528	93,192	4.1%
Total Salary	36,434	36,434	0.0%
Present Value of Future Salaries	399,508	398,473	-0.3%
<b><u>Tier 4 - Active Members</u></b>			
Present Value of Future Benefits	\$ 20,283	\$ 20,716	2.1%
Actuarial Liability (AL)	2,688	1,684	-37.4%
Present Value of Future Normal Costs	17,595	19,032	8.2%
Total Salary	10,620	10,620	0.0%
Present Value of Future Salaries	134,656	133,922	-0.5%
<b><u>Tier 5 - Active Members</u></b>			
Present Value of Future Benefits	\$ 45,235	\$ 46,325	2.4%
Actuarial Liability (AL)	2,005	1,037	-48.3%
Present Value of Future Normal Costs	43,230	45,287	4.8%
Total Salary	28,350	28,350	0.0%
Present Value of Future Salaries	342,771	342,649	0.0%

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**SECTION IV  
REPLICATION OF LIABILITIES AND CONTRIBUTION RATES**

<b>Table IV-2</b>				
<b>Fresno County Employees' Retirement Association</b>				
<b>Actuarial Valuation as of June 30, 2014</b>				
<b>Replication of Liabilities (Safety)</b>				
<b>(in thousands)</b>				
	<b>Segal</b>		<b>Cheiron</b>	<b>Variance</b>
<b><u>Tier 1 - Active Members</u></b>				
Present Value of Future Benefits	\$ 513,635		\$ 513,120	-0.1%
Actuarial Liability (AL)	361,357		354,757	-1.8%
Present Value of Future Normal Costs	152,278		158,363	4.0%
Total Salary	49,350		49,350	0.0%
Present Value of Future Salaries	392,227		398,836	1.7%
<b><u>Tier 2 - Active Members</u></b>				
Present Value of Future Benefits	\$ 27,327		\$ 27,485	0.6%
Actuarial Liability (AL)	7,663		7,211	-5.9%
Present Value of Future Normal Costs	19,664		20,274	3.1%
Total Salary	4,178		4,178	0.0%
Present Value of Future Salaries	53,526		53,156	-0.7%
<b><u>Tier 4 - Active Members</u></b>				
Present Value of Future Benefits	\$ 12,050		\$ 12,183	1.1%
Actuarial Liability (AL)	1,287		762	-40.8%
Present Value of Future Normal Costs	10,763		11,421	6.1%
Total Salary	3,241		3,241	0.0%
Present Value of Future Salaries	48,793		48,409	-0.8%
<b><u>Tier 5 - Active Members</u></b>				
Present Value of Future Benefits	\$ 14,459		\$ 14,646	1.3%
Actuarial Liability (AL)	594		389	-34.5%
Present Value of Future Normal Costs	13,865		14,257	2.8%
Total Salary	4,342		4,342	0.0%
Present Value of Future Salaries	60,772		60,562	-0.3%

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SECTION IV  
 REPLICATION OF LIABILITIES AND CONTRIBUTION RATES

<b>Table IV-3</b>			
<b>Fresno County Employees' Retirement Association</b>			
<b>Actuarial Valuation as of June 30, 2014</b>			
<b>Replication of Contribution Rates (General)</b>			
	<b>Segal</b>	<b>Cheiron</b>	<b>Variance</b>
<b><u>Tier 1 - Active Members</u></b>			
Employer Normal Cost	20.46%	20.78%	1.6%
Amortization Payment of UAAL	<u>30.34%</u>	<u>29.44%</u>	-3.0%
Employer Contribution Rate	50.80%	50.22%	-1.1%
<b><u>Tier 2 - Active Members</u></b>			
Employer Normal Cost	17.75%	18.33%	3.3%
Amortization Payment of UAAL	<u>30.34%</u>	<u>29.44%</u>	-3.0%
Employer Contribution Rate	48.09%	47.77%	-0.7%
<b><u>Tier 3 - Active Members</u></b>			
Employer Normal Cost	17.04%	17.86%	4.8%
Amortization Payment of UAAL	<u>30.34%</u>	<u>29.44%</u>	-3.0%
Employer Contribution Rate	47.38%	47.30%	-0.2%
<b><u>Tier 4 - Active Members</u></b>			
Employer Normal Cost	7.81%	8.06%	3.2%
Amortization Payment of UAAL	<u>30.34%</u>	<u>29.44%</u>	-3.0%
Employer Contribution Rate	38.15%	37.50%	-1.7%
<b><u>Tier 5 - Active Members</u></b>			
Employer Normal Cost	7.02%	7.32%	4.3%
Amortization Payment of UAAL	<u>30.34%</u>	<u>29.44%</u>	-3.0%
Employer Contribution Rate	37.36%	36.76%	-1.6%



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SECTION IV  
 REPLICATION OF LIABILITIES AND CONTRIBUTION RATES

Table IV-4 Fresno County Employees' Retirement Association Actuarial Valuation as of June 30, 2014 Replication of Contribution Rates (Safety)			
	Segal	Cheiron	Variance
<b><u>Tier 1 - Active Members</u></b>			
Employer Normal Cost	29.20%	29.59%	1.3%
Amortization Payment of UAAL	<u>45.36%</u>	<u>42.72%</u>	-5.8%
Employer Contribution Rate	74.56%	72.30%	-3.0%
<b><u>Tier 2 - Active Members</u></b>			
Employer Normal Cost	28.84%	30.16%	4.6%
Amortization Payment of UAAL	<u>45.36%</u>	<u>42.72%</u>	-5.8%
Employer Contribution Rate	74.20%	72.88%	-1.8%
<b><u>Tier 4 - Active Members</u></b>			
Employer Normal Cost	14.01%	14.20%	1.4%
Amortization Payment of UAAL	<u>45.36%</u>	<u>42.72%</u>	-5.8%
Employer Contribution Rate	59.37%	56.92%	-4.1%
<b><u>Tier 5 - Active Members</u></b>			
Employer Normal Cost	12.51%	12.80%	2.3%
Amortization Payment of UAAL	<u>45.36%</u>	<u>42.72%</u>	-5.8%
Employer Contribution Rate	57.87%	55.51%	-4.1%

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**Employee Contribution Rates**

As part of the audit, we attempted to replicate the calculations of the individual employee contribution rates based on the applicable provisions of the County Employees Retirement Law (the CERL) and our understanding of cost-sharing that was agreed to with respect to the Supplemental benefits. For the Non-PEPRA tiers, we understand the employee contribution rates to be made up of the following components:

- A Basic rate providing for an annuity equal to
  - 1/200th (Safety Tier 1 and 2) Final Average Compensation at a retirement age of 50, or
  - 1/100th (Safety Tier 4) Three-Year Final Average Compensation at a retirement age of 50 (Safety), or
  - 1/200th (General Tier 1) Final Average Compensation at a retirement age of 60, or
  - 1/240th (General Tier 2) Final Average Compensation at a retirement age of 60, or
  - 1/200th (General Tier 3) Three-Year Final Average Compensation at a retirement age of 55, or
  - 1/120th (General Tier 4) Three-Year Final Average Compensation at a retirement age of 60.
- A Settlement rate providing for an annuity equal to 1/160<sup>th</sup> of Final Average Compensation at a retirement age of 50 (Safety Tier 1) or 55 (General Tier 1),
- A COLA rate providing for one-half of the cost of the COLA for the Regular and Settlement benefits for General Tiers 1, 2 and 3 and Safety Tiers 1 and 2.
- An Administrative Expense Load of 0.17%.

For the PEPRA members, the employee contribution rates are equal to 50% of the total normal cost rates for each group.

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Below we show a comparison of our average employee contribution rates to Segal's for each of the nine groups, all of which are within the 5% tolerance range for an audit.

<b>Table IV-5            Fresno County Employees' Retirement Association            Actuarial Valuation as of June 30, 2013            Replication of Employee Contribution Rates*</b>			
	<b>Segal</b>	<b>Cheiron</b>	<b>Variance</b>
General Tier 1**	9.95%	9.85%	-1.0%
General Tier 2**	6.58%	6.37%	-3.1%
General Tier 3**	7.75%	7.77%	0.3%
General Tier 4**	6.67%	6.81%	2.2%
General PEPRA	7.02%	7.31%	4.2%
Safety Tier 1***	13.02%	13.04%	0.2%
Safety Tier 2***	11.18%	11.12%	-0.5%
Safety Tier 4***	9.98%	10.38%	4.0%
Safety PEPRA	12.51%	12.62%	0.9%

\* For compensation over the \$350 per month threshold, non-PEPRA Tiers

\*\* Rates for entry ages of 33 (General Tiers 1 - 4)

\*\*\* Rates for entry ages of 28 (Safety Tiers 1, 2, 4)

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**SECTION V  
 SAMPLE BENEFIT CALCULATIONS FOR RECENT RETIREES**

To verify that the actuarial valuation accurately reflects the way the Plan is administered, sample benefit calculations for members who commenced receiving benefits on or shortly after June 30, 2013 were examined. We were provided with two such calculations, and compared the actual benefits these members are now receiving to the amount of benefit Segal expected them to receive if the member retired shortly after June 30, 2013. The table below shows the comparison of the actual benefit to the accrued benefit calculated based on the June 30, 2013 actuarial valuation when the member were still active.

<b>Table V-1</b>					
<b>Fresno County Employees' Retirement Association</b>					
<b>Comparison of Benefits - Actual Calculations to Valuation</b>					
<b>Group</b>	<b>Actual Benefit</b>		<b>Valuation Benefit</b>		<b>Variance</b>
General Tier 1	\$	1,744	\$	1,766	1.3%
Safety Tier 1	\$	8,938	\$	8,960	0.2%

**Results**

The small differences in the benefit calculations are likely attributable to a variety of factors (e.g., difference in actual versus assumed leave conversion at retirement, small data corrections) that do not indicate any material issues with the actuarial valuation. Consequently, we believe Segal is valuing benefits in a manner that is consistent with the way actual benefits are calculated.

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We reviewed the actuarial assumptions and methods used in the June 30, 2014 actuarial valuation, the economic assumption review for the June 30, 2013 actuarial valuation, and the non-economic assumption review performed by Segal for the three-year experience study during the period from July 1, 2009 through June 30, 2012.

The FCERA Board adopted new demographic and economic assumptions recommended by Segal Consulting as part of the June 30, 2013 actuarial valuation. The June 30, 2014 actuarial valuation was based on the same set of assumptions, with the exception of incorporating an explicit load for administrative expenses.

### **Economic Assumptions**

The questions guiding our review of the economic assumptions were the following:

- Do the assumptions reflect the anticipated future experience of the Plan?
- Is there consistency among the economic assumptions in their magnitude and development?

### **Investment Return Assumption**

After reviewing the June 30, 2013 economic experience study and the subsequent adjustments made with respect to the administrative expenses as part of the June 30, 2014 actuarial valuation, we conclude that the rate of return that will be used in the next valuation – 7.25%, net of expected investment expenses – is a reasonable assumption and satisfies the current relevant Actuarial Standards of Practice (ASOPs).

We note that a revised version of the ASOP governing the selection of the discount rate – ASOP 27 – has been adopted by the Actuarial Standards Board and will be effective beginning with the June 30, 2015 actuarial valuation. We believe that the methodology employed by Segal is generally consistent with the revised standard of practice. However, Segal may need to provide additional disclosures to fully satisfy the standard's documentation requirements.

### **Inflation**

Segal recommended a reduction in the assumed rate of inflation from 3.50% to 3.25% in the June 30, 2013 experience study. We concur with the change as well as the rationale and process that led to the recommendation. We would recommend that at the time of the next review of economic assumptions, if the markets and forecasters continue to indicate lower expectations of future inflation, the Board may wish to consider further reductions in the assumption.

### **Wage Inflation**

Segal recommended a reduction in the assumed wage inflation from 4.00% to 3.75% in the June 30, 2013 experience study. Wage inflation is comprised of price inflation plus an across-the-board increase, so decreasing the inflation assumption by 0.25% results in a similar decrease in the wage inflation. Segal maintained the across-the-board component of 0.50%. Although, this is certainly a

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reasonable assumption given the historical data and forward-looking information cited by Segal in their assumption review, we would note some public sector systems have reduced their expectations for across-the-board (or “real”) wage growth, given the financial pressures for many public sector employers.

**Cost-of-Living Adjustments (COLA)**

Segal recommended the COLA assumption remain at 3.00%. This is consistent with the recommended inflation assumption of 3.25%, in the sense that if inflation is equal to 3.25% every year, the COLA will always be 3.00%.

However for some systems, particularly those with maximum COLAs close to the inflation assumption, we have generally recommended a COLA assumption lower than the maximum, as simulations we have performed suggest that expected growth in the COLA will be less than the maximum due to annual variation in inflation, even if the inflation assumption is met over the long term.

Segal has acknowledged this potential approach in their experience study. They did not recommend this approach, and provided two stated reasons:

- *“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 assumption.*
- *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 3.25% is met in a year. We question the reasonableness of this result.”*

With respect to the first point: it is true that the reason that simulations will show an average COLA growth rate lower than the COLA maximum is because some scenarios will exhibit lower levels of inflation in the early years, even if the average inflation rate over the long term equals or exceeds the maximum COLA. However, we find it odd that Segal dismisses the likelihood of this potential scenario, as it is exactly the situation FCERA has been in for a number of years (i.e., a low inflation environment, with new retirees experiencing COLA increases below the cap) and current market signals point strongly towards a continued low level of expected inflation.

With respect to the second point – that a loss would occur even if inflation happens to equal the assumption of 3.25% in a single year – we note that actuarial assumptions are intended to predict experience over a period of time, not just a single year. When measured over a period of time, any reasonable simulation where the average inflation rate is not expected to be significantly higher than the COLA maximum will demonstrate an average compounded rate of COLA growth less than the COLA maximum.

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The new ASOP 27 defines a reasonable assumption as one that:

*“.. has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed under section 3.5.1.”*

If Segal continues to recommend a rate of expected COLA growth equal to the cap, we recommend that they include a disclosure that the assumption is intentionally conservative (i.e., it contains a provision for adverse deviation). Regardless of the assumption used, we recommend they perform a stochastic analysis so as to be able to estimate the impact of the cap on the expected rate of COLA growth over time.

**Administrative Expenses**

In the June 30, 2014 actuarial valuation, the 7.25% investment return assumption was restated to be no longer net of administrative expenses. We further understand that an explicit charge to cover the administrative expenses has been allocated to the employers and employees based on their share of the contribution rates before expenses.

We find this approach to be reasonable, as it has several advantages over the prior approach of using a discount rate net of administrative expenses. Perhaps most importantly, it enables the use of the same discount rate for funding and financial disclosure purposes, assuming other requirements (i.e., the cross-over test) are met.

**Investment Expense Assumption**

Traditionally, the expected rate of return on pension assets is expressed net of investment expenses. As a result, actuaries will typically adjust expected asset class returns for anticipated investment expenses when setting the overall assumption rate. Segal has followed this practice in their Review of Economic Assumptions: they computed an average level of investment expenses of 0.43% over the past three years, and reduced the expected overall investment return by a similar amount.

This level of expenses is based on recent investment policies, which include a significant amount of active management. However, the average real returns collected by Segal from various investment consultants are stated to be based on indexed (or passively managed) returns – which would generally reflect investment expenses significantly lower than 0.43%. As a result, Segal is using an investment return assumption based on passive investing, but reflecting active management expenses.

Their report contains a statement that the use of the expected passive returns, excluding any “alpha” from active management, is consistent with Section 3.6.3.e of the Actuarial Standard of Practice (ASO) No. 27:

*“Investment Manager Performance – Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). Few investment managers consistently achieve significant above-market returns net of expenses over long periods.”*

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However, as described above, Segal is in essence assuming some levels of “negative” alpha on the investments of the Plan, because the returns were estimated based on the assumed indexed returns, but were then reduced by active management expenses. The new revised version of ASOP No. 27 is even more explicit that an actively-managed portfolio should not be expected to return less than a passively-managed portfolio, **net of fees**:

*“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 believes, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the measurement period.”*

While our preference would be to develop expected returns and expected investment expenses on a consistent basis, we think Segal’s approach ultimately produces a reasonable investment return assumption, as described above. To the extent the investment return assumption produced by their model would otherwise be higher as a result of lower assumed investment expenses, the recommended assumption can be seen as having a higher level of confidence (or margin for conservatism) than otherwise stated.



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**Demographic Assumptions**

The questions guiding our review of the demographic assumptions were the following:

- Do the rates of termination from active service due to retirement, withdrawal, disability, and death, follow reasonable patterns?
- Do the rates reflect the experience of the Plan?

To answer these questions, we performed a full parallel investigation of experience. First, as described above, we collected data from FCERA and performed an independent analysis of the changes in Plan population over the 2009-2012 experience study period. We then compared the assumptions proposed by Segal in their Experience Study report to our analysis of the data. We believe an alternative approach should be considered for several of the assumptions contained in their study:

**Mortality Assumption**

The mortality assumptions recommended by Segal as part of the most recent Actuarial Experience Study – the RP-2000 Combined Healthy Tables, projected to 2015 using Scale AA, with ages set back one year for General males and all Safety members, two years for General females – are reasonable when compared to recent mortality experience and appear to contain a small amount of conservatism for future improvement.

However, while the tables recommended by Segal do still have a margin for future mortality improvement based on the methods they used – close to the traditional 10% margin used by some actuaries – we suggest Segal consider using a generational mortality assumption at the time of the next experience study. As stated earlier, the idea behind a generational mortality assumption is to build in an automatic expectation of future improvements in mortality, as opposed to building in a margin for conservatism in the current rates to account for the expectation that the same rates will be applied in future years, when mortality experience has improved.

For an example of how this would work, a set of generational mortality assumptions would assign different mortality rates to members of the same age, depending on the year the person will attain the specific age. For instance, a person age 65 in 2015 will be expected to have a higher mortality rate at that age than a person who turns 65 in 2025, since there are explicit mortality improvements projected in future years at each age. Segal uses a method that uses the same mortality rates for members of a certain age, regardless of when the member reaches that age, and builds a set margin into these rates to anticipate future improvement. In this scenario, a person age 65 in 2015 will have the same assumed mortality as someone who is 65 in 2025, but mortality improvements for both are projected only to a specified date into the future. Thus, there is a margin for mortality improvement but it is a static projection versus the dynamic projection of a generational assumption.

Recent changes to Actuarial Standards of Practice support the use of generational mortality assumptions, as it allows for an explicit declaration of the amount of future mortality improvement included in the assumptions. It is also strongly encouraged by the Retirement Plans Experience Committee (RPEC) of the SOA, the group responsible for producing widely-used US pension plan mortality tables. We note that several '37 Act systems have recently made a change to using such a

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generational approach, which often results in a material increase in costs (up to 4% of pay in some systems), corresponding to a margin in the range of 20-30%, as compared to the traditional 10%.

Some actuaries have been hesitant to recommend generational mortality approaches for plans such as FCERA, because the employee contribution rates and optional form adjustment factors must also be based on a specified set of mortality assumptions, and the use of a generational approach could present administrative issues. However, in these circumstances it is possible to adopt a set of traditional mortality tables (known as static tables, such as those suggested by Segal) that approximate the generational rates for a given time period, and which could be used for employee contribution rates and various administrative purposes.

We note that the Society of Actuaries has developed replacements to the RP2000 mortality tables (the RP-2014 tables) and a new mortality improvement scale (MP-2014). We also note that CalPERS has developed a full set of mortality tables. We recommend Segal include either the RP-2014 tables in their next experience study, or as an alternative, since the replacement tables do not reflect data from public sector plans, Segal could look to the rates developed by CalPERS for their actuarial valuations. We note that the use of these new tables – in particular the MP-2014 mortality improvement table – can be expected to result in material increases in costs and liabilities.

A final recommendation on mortality rates would be to encourage Segal to review the impact of benefit size on mortality rates, in addition to reviewing the experience based on gender and retirement status. Based on our recent review of mortality among a number of '37 Act systems, we have found a significant impact on the analysis of mortality rates for some – but not all – of these systems, as members with higher benefits tend to live longer. If not taken into account, this can lead to underestimations of liability, even if the number and timing of deaths is accurately predicted for the group as a whole. Both the RP2000/2014 mortality tables and the CalPERS tables were developed using benefit weighting.

### **Retirement Assumption**

As stated above, we reviewed the data supporting the retirement assumptions developed by Segal as part of the most recent experience study, and found the information presented in their report to be consistent with that in our own analysis. Segal proposed rates that vary by age, gender and Tier; the analysis in their report focused on the experience and recommendations related to the General Tier 1 and Safety Tiers 1 and 2, because those were the groups with the most observed experience.

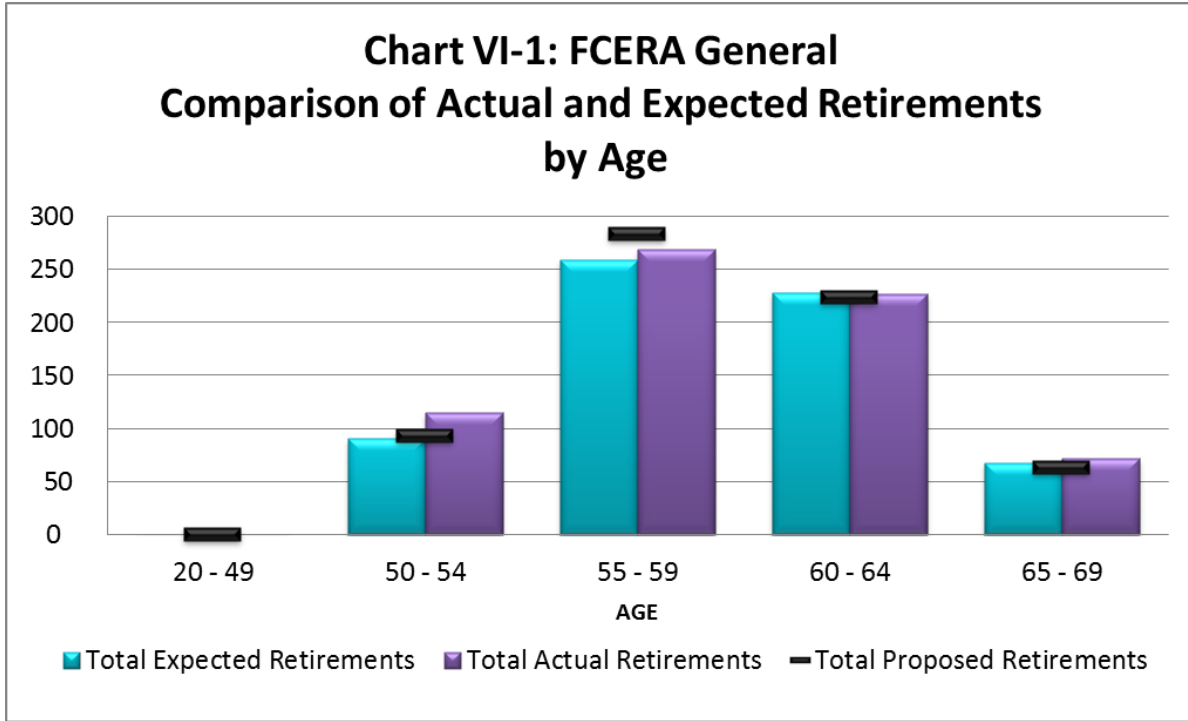
The rates recommended by Segal appear reasonable based on the experience presented in their report – which was confirmed in our independent data analysis – if the comparison of the actual and expected number of retirements is performed *looking only at the member's age at retirement*. However, the appropriateness of the assumptions appears quite different if the experience is reviewed by looking at both the age and service of the members in relation to the probability of retirement.

For example, when we compared the actual to expected number of General member retirements using Segal's recommended age-based retirement rates, the total number of expected retirements matched very closely to the actual number: 677 expected vs. 698 actual retirements, for an A/E ratio of 103.1%, reasonably close to the 100% target ratio. The match between the number of expected vs. actual retirements at various age ranges was also reasonably close – a comparison of the expected

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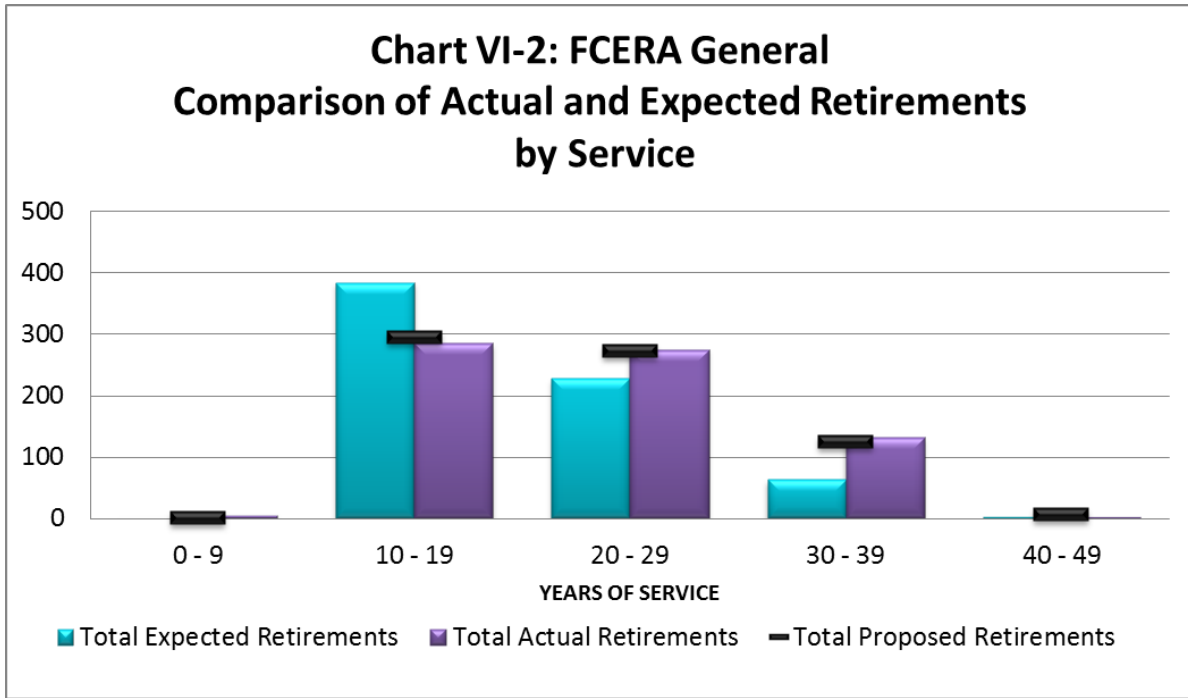
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retirements using Segal's recommended assumptions (blue bars) to the actual retirements (purple bars) is shown in Chart VI-1 below.



However, when we evaluate the recommended assumptions based on the member's *service* at retirement, the match does not appear nearly as close. Charts VI-1 and VI-2 show the number of expected retirements at the various age and service levels using an alternative set of retirement assumptions (shown using the black lines) based on age as well as service at retirement.

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In Chart VI-2, we see that the number of actual retirements (purple bars) among those with less than 20 years of service is more than 25% less than the number expected (blue bars) during the study period, while the number of actual retirements is much greater than the number of expected retirements for those with higher levels of service (20% greater for those with 20-29 years of service, more than 100% greater for those with 30+ years of service).

This discrepancy in the actual to expected number of retirements matters, because in general the liabilities will be more heavily weighted towards those with higher levels of service (and thus higher benefits). Therefore, if the retirement rates predict an accurate number of retirements by age, but overestimate the number of retirements for those with low levels of service and underestimate the number of retirements for those with high levels of service, it is likely that the assumptions will underestimate – potentially significantly – the future liabilities of the Plan.

In Charts VI-1 and VI-2 above, we have shown the number of expected retirements at the various age and service levels using an alternative set of retirement assumptions (shown using the black lines). These alternative assumptions were developed by taking the age-based rates recommended by Segal and applying an adjustment factor at each service level: 0.75 for those with less than 20 years of service, 1.20 for those with 20-29 years of service, and 2.00 for those with at least 30 years of service.

These adjustments make some sense on an intuitive level, as it is reasonable to assume that for two members of the same age, the one with the higher level of service will be more likely to retire, if for no other reason than because the higher-service member is more likely to have achieved their desired level of post-retirement replacement income.

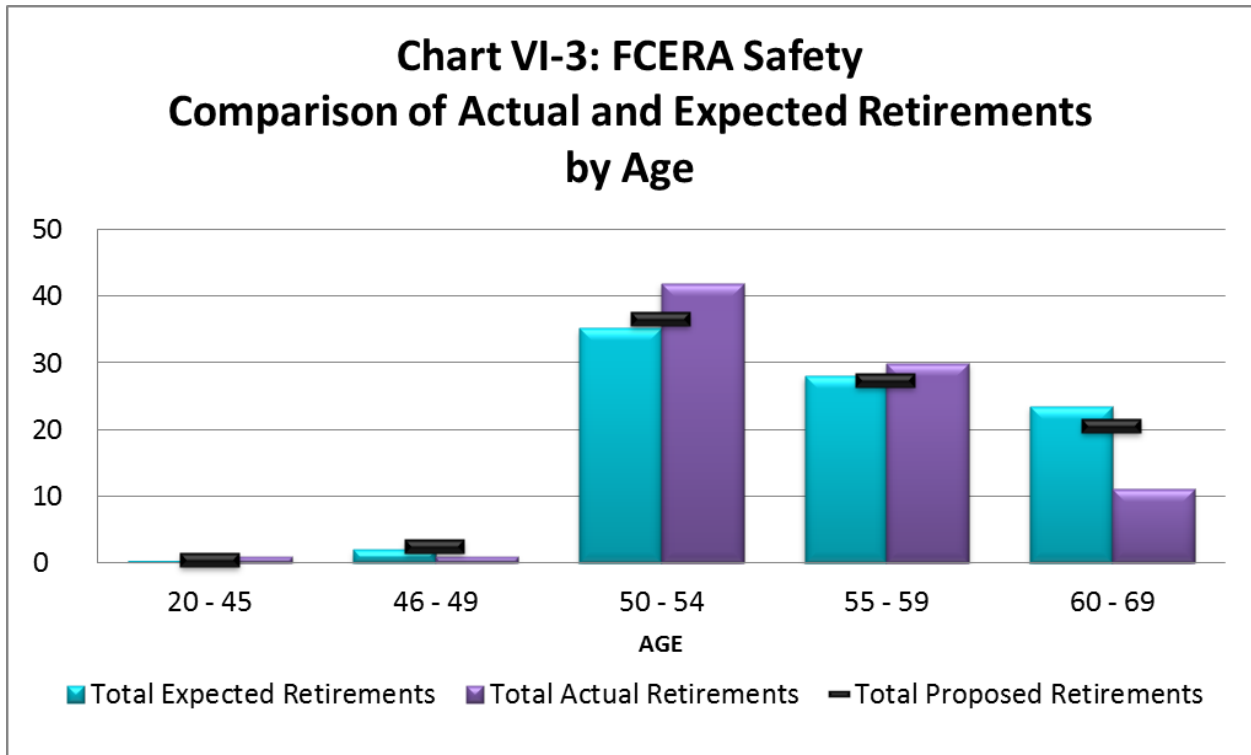
As can be seen in Chart VI-1, the alternative assumptions still provide a reasonable match between the actual and expected number of retirements at the various age ranges; in addition, the overall ratio

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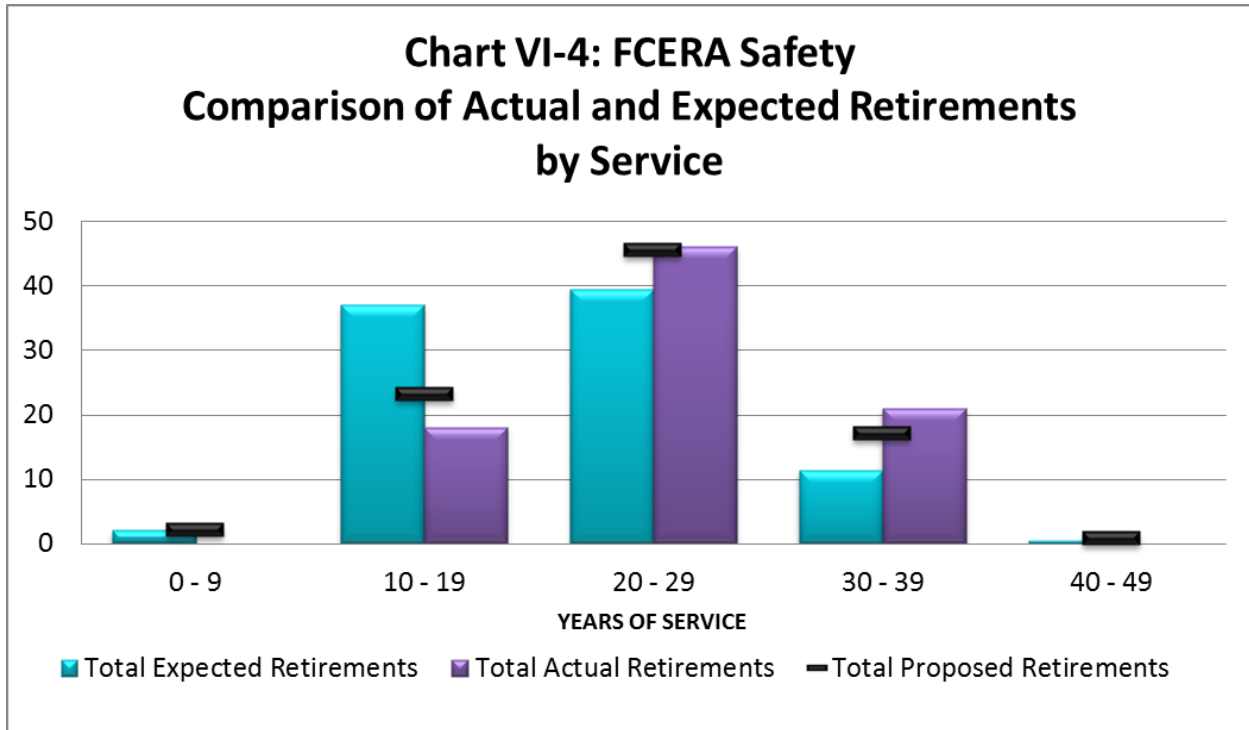
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of actual to expected retirements is very close (100.7% A/E ratio). However, unlike in Segal's recommended assumptions, the actual and expected number of retirements are also close when reviewed by service: compare the black lines in Chart VI-2 to the purple bars.

We found a similar pattern upon reviewing the Safety retirement experience. In this case, adjusting the recommended age-based assumptions by a factor of 0.50 for those with less than 20 years of service, 1.15 for those with 20-29 years of service, and 1.75 for those with at least 30 years of service yielded an expected number of retirements close to the actual number (96.5% A/E ratio, versus 94.2% under Segal's recommended assumptions). As can be seen in Charts VI-3 and VI-4 below, the alternative assumptions provide a closer match when reviewed by service amount, while retaining a reasonably close match by age.



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As stated above, applying a different age- and service- based set of retirement assumptions can have a significant impact on liabilities and costs. Using the simple adjustment factors described above, we performed a set of rough calculations that indicated 2% increase in the value of General Tier 1 projected benefits and an increase of 1% in the Safety Tier 1. We are not suggesting that the adjusted rates above be immediately adopted by the Plan to project future liabilities; we produced these alternative assumptions only to provide an estimate of the possible impact from the use of more reasonable assumptions.

**Termination Assumptions**

As with the retirement assumptions, we reviewed the data supporting the termination assumptions developed by Segal and found the information presented in their report to be consistent with that in our own analysis. Segal proposed rates that vary by age, gender and – for those with less than five years – number of years of service.

However, we found a parallel issue to that found in our analysis of the retirement rates: although the rates recommended by Segal appear reasonable on an overall basis based on the experience presented in their report, the appropriateness of the assumptions appears quite different if the experience is reviewed by looking at the level of service of the members in relation to the probability of termination, in particular for those with at least five years of service.

It is a common practice to produce termination rates that vary by service for newer employees, as Segal has done with their proposed rates for those with at least five years of service. However, for the vested members (i.e. those with at least five years of service) Segal proposed termination rates that are based only on age and gender; rates which decline steadily in concert with the member’s age.

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Our review of the data for FCERA, which is confirmed by our experience with other '37 Act systems, shows that termination rates are generally more correlated with service than age, even beyond the first five years of a member's career.

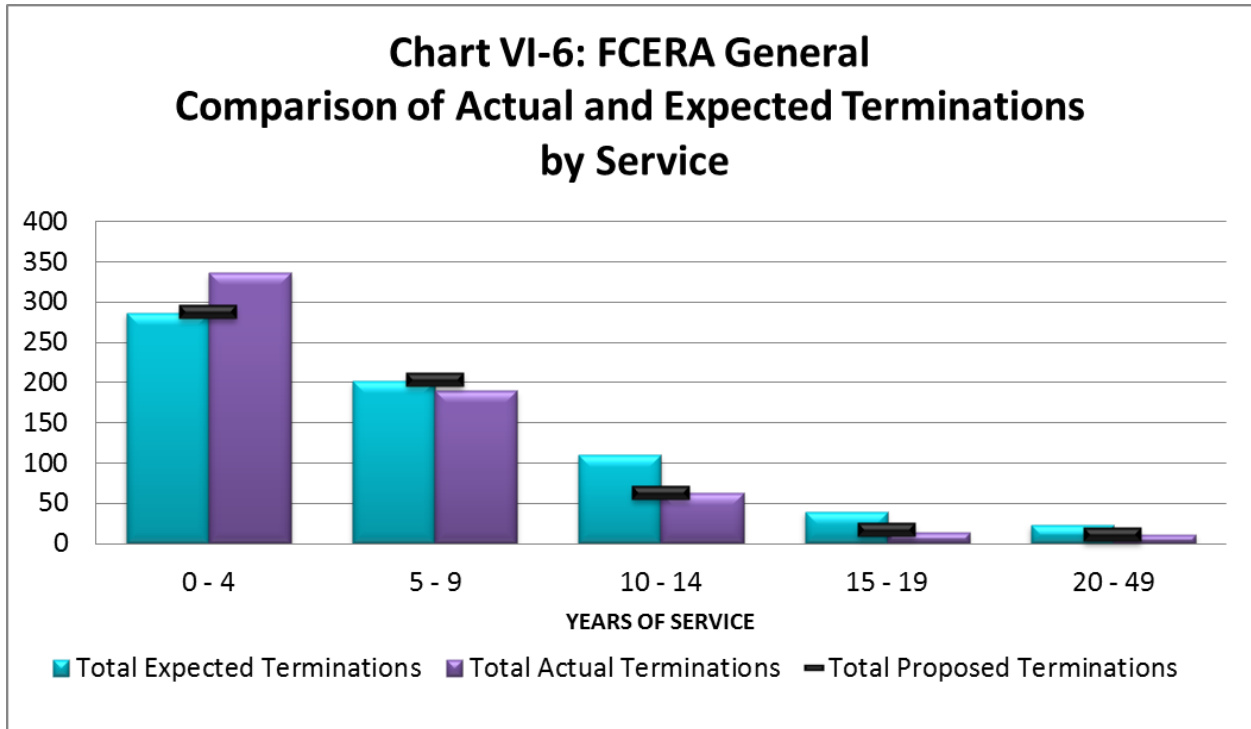
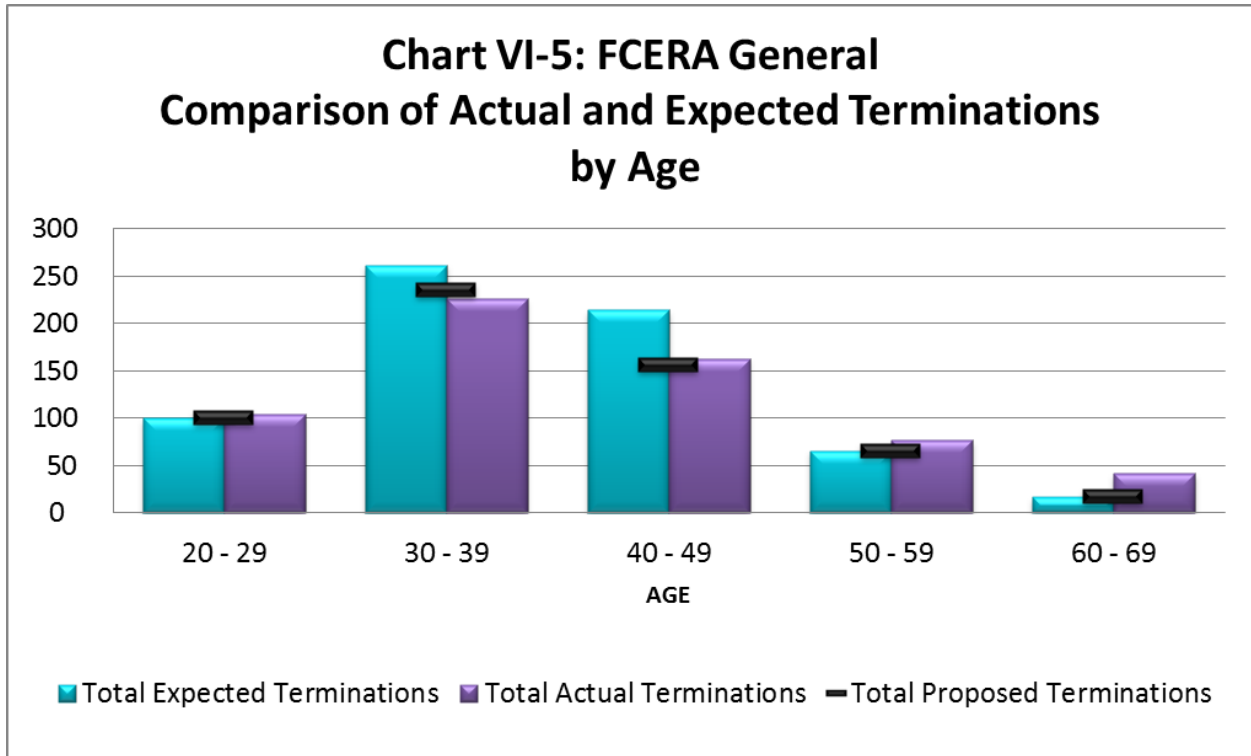
Segal's own analysis bears this out: Charts 16-18 on pages 34-36 of their experience study report illustrate the actual versus expected termination patterns by age for vested members. In all three charts (General Male, General Female, and Safety) the current and proposed termination rates decline with age, while the actual experience does not appear to support this pattern.

As with the retirement rates, we made some rough adjustments to Segal's proposed assumptions to explore the impact of varying the termination rates both by age and service. In Charts VI-5 and VI-6 below, we have shown the number of actual (purple bars) and expected terminations for General members at the various age and service levels using our own experience study dataset and an alternative set of termination assumptions (Segal's expected number shown in the blue bars, the expected number using the alternative assumptions shown using the black lines). These alternative assumptions were developed by taking the age-based rates recommended by Segal and applying an adjustment factor at each service level: 1.00 (i.e. no adjustment) for those with less than 10 years of service, 0.70 / 0.50 for males and females, respectively, with 10-14 years of service, and 0.40 for those with at least 15 years of service.

These adjustments again should make sense on an intuitive level, as it is reasonable to assume that for two members of the same age, the one with the higher level of service will be less likely to terminate and either take a refund of benefits or leave their contributions on deposit for a deferred vested benefit. It is also clear why a set of assumptions that underestimates the number of terminations for those with lower service amounts and overestimates the number of terminations for those with higher service amounts will tend to underestimate a plan's liabilities, since the overestimation of terminations will generally result in an actuarial loss and vice-versa. Using the simple adjustment factors described above, we performed a set of rough calculations that indicated an approximate 4% increase in the value of General Tier 1 projected benefits. Again, we are not suggesting that the adjusted rates above be immediately adopted by the Plan to project future liabilities; we produced these alternative assumptions only to provide an estimate of the possible impact from the use of assumptions more reflective of the actual experience.

As can be seen in Charts VI-5 and VI-6, the adjusted assumptions appear to provide a better match between the actual and expected number of retirements at the various age and service ranges. We found a similar pattern present in the data for the Safety members as well, but did not produce a set of adjusted rates due to the much smaller base of termination-related data for the Safety members. We recommend that Segal consider developing a set of service-based termination assumptions, or alternatively lengthening the select period beyond the current five-year approach, at the time of the next experience study.

SECTION VI  
 ASSUMPTIONS AND METHODS REVIEW



Disability Assumptions



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The number of disabilities reported by Segal in their analysis of the disability rates is based on the number of members who were reported by FCERA as changing to disability status during the study period, regardless of whether their retirement date happened within the study period. They did not make any adjustments for members who may have terminated service due to a disability during the study period, but were not reported as receiving a disability benefit due to a pending disability case.

We believe this is a reasonable approach for estimating the number of disabilities during the study period, as there is frequently a lag between the date a member terminates service due to a disability and the date the member is granted a disability benefit. However, a significant portion of the members who were reported by FCERA as changing to disability status during the study period actually left service during a prior period (before 2009). Some of these members were reported as receiving a deferred benefit or a service retirement during the prior period, and were then reclassified as disability retirements once the disability was approved.

For these members, the approach used by Segal will count two decrements applying to each individual: once as a service retirement in the prior study period and once as a disability retirement in the current study period. In general, double counting of decrements will result in an overestimation of one of the decrement rates – either service retirement rates or disability rates.

There are several ways that Segal could address this issue, including using a longer study period and not counting a decrement until the final retirement status change has been made, or adjusting the service retirement rates by a factor to reflect the number of service retirements that are expected to be reclassified as disability retirements. However, since the number of disability retirements is small compared to the number of service retirements, especially for General members, we would not expect these adjustments to have a significant impact on the proposed service retirement rates.

**All Other Demographic Assumptions**

In addition to the assumptions above, we reviewed all the other demographic assumptions and report that they appear to be reasonable based on the analysis presented in the experience study. A few additional comments related to our review of these assumptions follow:

- We support Segal's practice of analyzing the probability that a terminated member will either receive a refund or a deferred vested retirement, and we concur with the revisions to the rates given the evidence provided. We also support their recommendation to cut off termination rates once a member is eligible and assigned a probability of taking a service retirement.
- For those assumptions for which the number of decrements observed during a three-year period is relatively small – such as disabilities and Safety healthy post-retirement mortality – we recommend that Segal consider presenting an analysis of the experience over a longer time period, such as six years (i.e. combining two experience study periods) – in order to develop a more robust dataset from which to extrapolate assumptions. We understand that Segal is implicitly reflecting experience over such a time period by only partially adjusting the

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prior assumptions towards more recent experience, but still believe that presenting the data would help users of the report evaluate whether the recommended assumptions are reasonable.

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**Actuarial Methods**

**Actuarial Funding Method**

The individual Entry Age actuarial cost method is used in the June 30, 2014 actuarial valuation. Under this method, the expected cost of benefits for each individual member is allocated over that member's career as a level percentage of that member's expected salary. The normal cost for the plan is the sum of the individual normal costs calculated for each member. We concur with this methodology and note that it is a "Model Practice" based on the guidance issued by the California Actuarial Advisory Panel (CAAP), and a "Best Practice" based on guidance issued by the Government Finance Officers Association.

**Asset Smoothing Method**

FCERA smoothes assets over a five-year period, or 10 six-month interest crediting periods, with a corridor of 30% around the market value of assets. Actuarial Standard of Practice 44 requires the actuary to consider whether the smoothed value of assets falls within a reasonable range around the market value and if the differences between the smoothed value and market value will be recognized within a reasonable period of time. We believe the smoothing method used by FCERA satisfies this ASOP. We have also confirmed that Segal has applied the smoothing method as described in the valuation report.

We commend Segal for including the funded ratio and unfunded liability using both the market value and smoothed value of assets in their report. These disclosures are included in the "Model Disclosure Elements for Actuarial Valuation Reports" adopted by the CAAP.

**Amortization Policy**

The current Amortization Policy for FCERA is a layered amortization policy, with the balance of the unfunded liability as of June 30, 2003 amortized as a level percentage of payroll over a closed 19-year period, and with each subsequent year's unfunded liability attributable to experience gains or losses, assumption changes, plan amendments and cost methods are amortized as a level percentage of payroll over a new closed 15-year period. Early retirement incentive programs will be amortized over 5 years. This amortization method is in accordance with the recent funding policy guidance issued by the CAAP, GFOA, and the Conference of Consulting Actuaries Public Plans Community.

However, we note that the shorter the amortization periods, the more potential for contribution volatility when a significant gain or loss occurs, especially with plans close to being fully funded. If Segal has not already done so, we encourage them to ensure that the Board is comfortable with the level of contribution volatility that could arise from the amortization periods in effect. We also intend to use our interactive projection model, P-Scan, to illustrate this to the Board during the presentation of the audit. Specifically, our model shows the impact of how variations in the future investment returns affect the Plan's contribution rate and funded ratio. It provides a better understanding of the Plan's investment risks when it experiences returns that are different from the 7.25% assumed return.

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**SECTION VII  
REVIEW OF ACTUARIAL COMMUNICATIONS**

Actuarial communications should be clear and appropriate for their intended audience. In particular, an actuarial valuation report should identify the principal findings and describe the data, methods, assumptions, and plan provisions on which the actuarial valuation is based. We reviewed the report for compliance with both the Actuarial Standards of Practice (ASOP) as well as the model disclosures recommended by the California Actuarial Advisory Panel (CAAP). Our review of Segal's valuation report finds substantial compliance with these requirements. We do have some suggestions for where improvements could be made, or where certain elements of the Report should be reviewed.

- ASOP 41 (*Actuarial Communications*) states: "The actuary should consider what cautions regarding possible uncertainty or risk in any results should be included in the actuarial report." We commend Segal for adding an exhibit to the most recent valuation report (in Section 2F) reporting and explaining the Plan's Volatility Ratios, as recommended in the CAAP model disclosure document.

However, we recommend that Segal continue to expand on the discussions of risk, either within the valuation report or through other supplementary communications with the Board. The CAAP document includes other suggestions for "enhanced risk disclosures", such as sensitivity analyses, deterministic stress test projections and stochastic or probabilistic analyses, that may give the Board a better understanding of the risks associated with funding the pension plan.

- In the valuation report (page ii) Segal discloses the fact that potential liabilities arising from future unallocated earnings were not reflected in the valuation results. Given the substantial negative Contra Tracking Account (over \$604 million), as well as the Board's interest crediting and undistributed earnings policy, which first credits amount to the Contra Tracking Account and then any Unfunded Actuarial Accrued Liability associated with Settlement benefits, we believe it is reasonable for Segal to have not computed any additional liability or made any adjustment to the discount rate to account for any discretionary additional benefits the Board may grant. However, we recommend Segal include an explicit statement in the valuation report that they have considered the possibility of additional liabilities arising from future unallocated earnings, and believe it to be de minimis with respect to the funding and future benefits of the Plan.
- We recommend Segal provide enhanced liability-related disclosures in the valuation report, including the membership-weighted employee contribution rates by tier, for both Regular benefits and Total benefits.
- In the assumptions section of the valuation report, we recommend Segal clarify which benefits are assumed to be enhanced with the conversions of sick, vacation, or annual leave credit to service.
- The valuation report should disclose the assumption used to project future growth in the dollar amount of wage cap applicable to PEPRAs members.

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**APPENDIX A  
GLOSSARY**

**1. Actuarial Assumptions**

Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, investment income, and salary increases. Demographic assumptions (rates of mortality, disability, turnover, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**2. Actuarial Gain (Loss)**

The difference between actual experience and actuarial assumption anticipated experience during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial funding method.

**3. Actuarial Accrued Liability**

The Actuarial Accrued Liability is the difference between the present value of all future system benefits and the present value of total future normal costs. The Actuarial Accrued Liability represents the budgeted cost for benefits attributed to service prior to the valuation date by the Entry Age Actuarial Cost Method. It is also referred to by some actuaries as the “accrued liability” or “actuarial liability.”

**4. Actuarial Present Value**

The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

**5. Actuarial Value of Assets (AVA)**

The Actuarial Value of Assets equals the Market Value of Assets adjusted according to the smoothing method adopted by the Plan. The smoothing method is intended to smooth out the short-term volatility of investment returns in order to stabilize contribution rates and the funded status.

**6. Entry Age Actuarial Cost Method**

A mathematical budgeting procedure that allocates the cost of an individual's retirement trust benefits as a level percentage of pay over his or her working career.

**7. Funded Status**

The Actuarial Value of Assets divided by the Actuarial Accrued Liability. The Funded Status represents the percentage of assets in the Plan compared to the budgeted amount under the Entry Age Actuarial Cost Method. The Funded Status can also be calculated using the Market Value of Assets.

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**8. Governmental Accounting Standards Board**

The Governmental Accounting Standards Board (GASB) defines the accounting and financial reporting requirements for governmental entities. GASB Statement No. 67 defines the trust accounting and financial reporting for governmental pension plans, and GASB Statement No. 68 defines the employer accounting and financial reporting for participating in a governmental pension plan.

**9. Market Value of Assets (MVA)**

The fair value of the Plan's assets assuming that all holdings are liquidated on the measurement date.

**10. Normal Cost**

The actuarial present value of retirement system benefits allocated to the current year by the actuarial funding method.

**11. Present Value of Future Benefits**

The estimated amount of assets needed today to pay for all benefits promised in the future to current members of the Trust assuming all Actuarial Assumptions are met.

**12. Present Value of Future Normal Costs**

The Actuarial Present Value of retirement system benefits allocated to future years of service by the Entry Age Actuarial Cost Method.

**13. Unfunded Actuarial Accrued Liability (UAAL)**

The difference between Actuarial Accrued Liability and the Actuarial Value of Assets. The UAAL represents the shortfall of assets in the trust compared to the budgeted amount under the Entry Age Actuarial Cost Method. The UAAL can also be calculated using the Market Value of Assets.

**14. Valuation Value of Assets (VVA)**

The Actuarial Value of Asset less any non-valuation reserves such as the Contingency Reserve, Undistributed Earnings, Supplemental COLA and the Retiree Health Benefit (BOR).