ATHENA
ACTUARIAL CONSULTING

Actuarial Audit of the School Employees Retirement System of Ohio

Ohio Retirement Study Council

Proposer: Athena Consulting LLC

DBA/Trade Name: Athena Actuarial Consulting

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CAGE: 8RKG3

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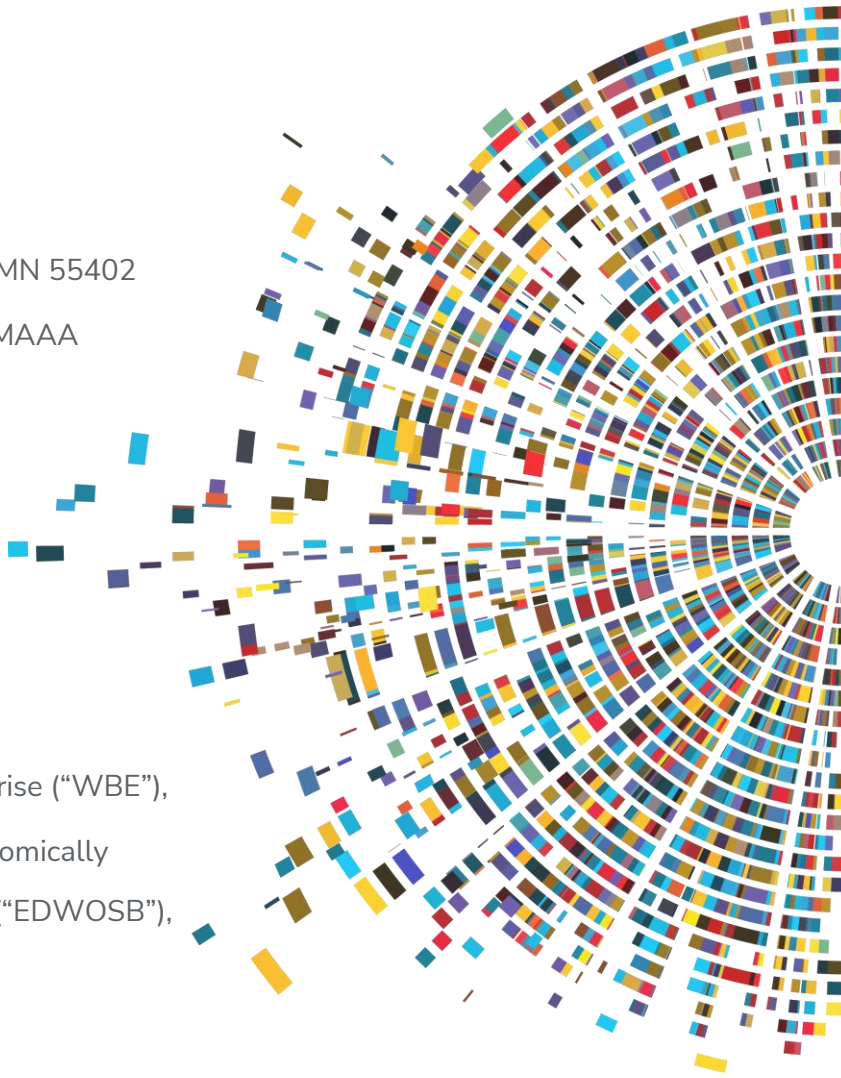
EIN: 61-1979324

Certifications: Women-owned Business Enterprise (“WBE”), Women-owned Small Business (“WOSB”), Economically Disadvantaged Women-owned Small Business (“EDWOSB”), Federal 8(a) & GSA Schedule Holder



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Letter of Transmittal

Bethany Rhodes, Director/General Counsel
Ohio Retirement Study Council
30 East Broad Street, 2nd Floor
Columbus, Ohio 43215

May 30, 2024

Subject: Actuarial Audit of the School Employees Retirement System of Ohio

Dear Bethany Rhodes:

Athena Actuarial Consulting ("Athena") is pleased to submit this bid to provide actuarial audit services to the Ohio Retirement Study Council ("ORSC") for the School Employees Retirement System ("SERS"). We believe that Athena's tenured actuarial skillsets and small-shop agility position us to be the partner that ORSC can count on to exceed the expectations of a traditional actuarial auditor.

Competitive Advantages of Athena

Our team of experienced consultants aspires to form long-lasting partnerships with our clients by demonstrating an extraordinary level of client service through exceeding expectations, being responsive, and creating precise results.

The following characteristics set our team apart:

We bring a diverse set of perspectives.

Athena Actuarial Consulting is a nationally-certified Woman-Owned Business Enterprise ("WBE") and, as a firm, is committed to challenging the status quo and bringing a diverse set of perspectives to build comprehensive, sustainable solutions for our clients.

We have the credentials to do the job.

Our team collectively maintains the highest credentials in our industry as Fellows of the Society of Actuaries (FSA) or Associates of the Society of Actuaries (ASA), Enrolled Actuaries (EA), Members of the American Academy of Actuaries (MAAA), and Fellows of the Conference of Consulting Actuaries (FCA). The majority of the actuarial work is completed by our credentialed actuaries with FSAs.

We are industry leaders.

Alicia Traviss, FSA, EA, FCA, MAAA holds active roles as a speaker with the Conference of Consulting Actuaries (CCA) and as a member and the Chair of the SOA's Retirement Section Council (RSC). The RSC facilitates the professional development of its members and their adaptation to changes in the retirement industry by conducting research studies and generating literature in the retirement field. Alicia's roles put her at the forefront of industry trends.

We consider effective project management a top priority.

We utilize industry-leading project management tools to generate weekly progress updates, which identify outstanding items, indicate the project phase, and show the stage of review for each calculation. We find that this extra attention to project management gives our clients confidence that we're making progress and tracking toward the agreed-upon completion date.

We believe in fee transparency.

There are no surprise bills for ad hoc services. If you would like to work with Athena on non-core services, we will provide an estimate in advance of beginning work, including both low-effort and high-effort options, so that you can make an informed decision given your goals and budget.

Moving the Needle on Diversity, Equity and Inclusion ("DEI")

As a nationally-certified women-owned small business, our commitment to DEI underscores our dedication to not only delivering top-tier client service but also becoming a trusted collaborative partner as you navigate the challenges and complexities ahead. At Athena, DEI is not just a statement – it's our philosophy deeply ingrained in every facet of our business. We believe that fostering a welcoming environment for employees of all backgrounds promotes a sense of belonging, and we integrate DEI principles into all aspects of our operations. Our leadership's active involvement in industry organizations such as Abacus Actuaries, the International Association of Black Actuaries ("IABA"), the Organization of Latino Actuaries ("OLA"), the Network of Actuarial Women and Allies ("NAWA"), and the Sexuality and Gender Alliance of Actuaries ("SAGAA") further exemplifies our commitment to driving change within the actuarial profession.

We understand that choosing a partner for your actuarial needs is a critical decision. By selecting Athena, you are not only engaging a highly skilled team but also aligning with an organization that champions DEI and values innovation, precision, and collaboration. We look forward to the opportunity to contribute our expertise and dedication to the success of your projects, and we thank you for your consideration. If you have any questions about this proposal, please don't hesitate to contact me at 630-984-9841 and/or alicia.traviss@athenaactuarial.com.

Very Respectfully,

Alicia Traviss

Alicia Traviss, FSA, EA, FCA, MAAA
Partner

4.1 Proposal Summary

RFP: Each proposal shall provide a narrative summary of the proposal being submitted. This summary should identify all of the services and work products that are being offered in the proposal and should demonstrate the firm's understanding of the project.

Athena's proposal offers a comprehensive approach to conducting an actuarial audit of the SERS, addressing each element outlined in the provided scope. We understand the primary purpose of this audit is to independently verify and analyze the assumptions, procedures, and methods used by SERS' consulting actuary for:

- SERS annual pension actuarial valuation as of June 30, 2023;
- The five-year experience review for the period ending June 30, 2020; and
- SERS annual retiree health care actuarial valuation as of June 30, 2023, including GASB 74 and 75 disclosures.

Our proposed methodology encompasses several key components. Firstly, we prioritize data validation and collection, ensuring the accuracy and completeness of demographic and financial information utilized in SERS' valuations. This includes a detailed review of calculations such as Total Pension Liability and actuarial assumptions like mortality rates and investment returns. Additionally, we conduct a thorough assessment of the consulting actuary's valuation methods and procedures to ensure compliance with professional standards. Our audit process also includes comparative analyses against previous valuations, providing insights into any significant changes and trends over time. We maintain a strong focus on quality control throughout the audit, implementing rigorous procedures to uphold the integrity of our findings. Moreover, we remain flexible to adapt our approach based on SERS' specific needs and preferences, ensuring a tailored and effective audit process. In terms of deliverables, our proposal commits to providing monthly updates to the ORSC, along with a final report that includes a detailed description of the work performed, an executive summary, and findings and recommendations. The report will be presented to both the ORSC and the SERS Board, ensuring transparency and accountability in our audit process.

Overall, our proposal reflects our firm's keen understanding of the project requirements and our commitment to delivering accurate, transparent, and actionable insights to enhance the stability and sustainability of SERS. We are confident that our comprehensive approach and experienced team will effectively fulfill the objectives of this actuarial audit.

RFP: The firm's primary contact for ORSC staff use and, if different, for SERS staff use during the audit, including the contact's address, telephone and e-mail address

Primary Contact Person	Alicia Traviss, FSA, EA, FCA, MAAA
Office Address	60 South 6th St #2800, Minneapolis, MN 55402
Telephone	630-984-9841
Email address	alicia.traviss@athenaactuarial.com

RFP: General ownership structure of the organization, including subsidiary and affiliated companies, and joint venture relationships

Athena takes pride in being a multi-member women-owned Limited Liability Company (LLC) with a strong presence in the actuarial industry. Our ownership structure consists of highly reputable and credentialed actuaries who are widely recognized

for their expertise and contributions to the field. Adrienne Lieberthal, FSA, EA, CERA, MAAA, FCA; Alicia Traviss, FSA, EA, FCA, MAAA; and Greg Drennan, ASA, EA, MAAA, FCA collectively bring a wealth of knowledge, experience, and professional qualifications, ensuring that our clients receive exceptional actuarial services and insights from industry-leading experts. At present, there are no subsidiaries, affiliates, or joint venture relationships.

RFP: Information regarding any material change in the firm's structure or ownership within the last eighteen months, or any material change in ownership, staff, or structure currently under review or being contemplated by the firm

As of April 1, 2023, Athena formally welcomed two (2) additional owners to the multi-member partnership. Alicia Traviss and Greg Drennan executed buy-in with an up-front cash infusion to secure their ownership in the business. Equity stakes are now split 15% to Alicia Traviss, 15% to Greg Drennan, and the remaining 70% to majority owner Adrienne Ostroff Lieberthal. At present, there are no material changes in ownership, staff, or structure currently under review or being contemplated.

RFP: If available, a third-party assessment or report concerning client satisfaction and measures of the firm's strengths and weaknesses

We do not have a third-party assessment or report concerning client satisfaction readily available. However, we are proud to report that all of our clients have consistently chosen to renew their contracts with us when the opportunity allowed. We believe this demonstrates a high level of client satisfaction and trust in our services. While we continuously seek feedback from our clients to improve our offerings, their decision to continue working with us is a testament to the quality of our work and the strength of our relationships. Some Letters of Recommendation from clients are provided in Section 4.6 Additional Information.

RFP: Any material litigation which has been threatened against the firm or to which the firm is currently a party

No material litigation has been threatened against Athena, nor is Athena currently a party to any litigation.

RFP: A list and brief description of litigation brought against the firm by existing or former clients over the last five years

No litigation has been brought against Athena since its inception.

RFP: A list of any professional relationships involving the ORSC, the five Ohio public retirement systems, the State of Ohio, or its political subdivisions for the past five years, together with a statement explaining why such relationships do not constitute a conflict of interest relative to performing the proposed review. In the event that the firm has had any professional relationships involving the ORSC, the five Ohio public retirement systems, the State of Ohio, or its political subdivisions for the past five years, the firm shall provide a statement explaining why such relationships do not constitute a conflict of interest relative to performing the proposed review, or, if necessary, an explanation of the actions that will be taken to ensure an independent review.

Athena does not have any conflicts of interest that could impair the objectivity of the work described. Our firm has an internal risk manager responsible for ensuring compliance with our clients' contracts. When a new client is awarded, the risk manager reviews current contracts to ensure that no conflict of interest would arise as a result of entering that contract. If a potential conflict does arise, both clients are notified prior to continuing work.

4.2 Capabilities and Experience

RFP: Each proposal shall describe the firm's capabilities and recent experience (at least during the last five years) in performing actuarial valuations, audits, or studies of public employee retirement systems. The response should include information on the types and sizes of public employee retirement systems for which past work has been performed, including whether the systems were defined benefit or defined contribution plans, the types and number of participating employers, number of participants, and other relevant indicators of plan type, size, and comparability to SERS. You should include other information you believe may be relevant in demonstrating your capabilities in performing the actuarial audit, including other professional experience and data processing capabilities.

At Athena, we approach our operations and services through various lenses, encompassing our practice areas, extensive capabilities, and core competencies. Our firm is organized into five (5) distinct practice areas, each designed to address specific client needs:

While Athena's range of services is extensive and designed to meet the evolving needs of our clients, our primary focus is in the public sector pension space. For public sector pension entities, we specialize in providing actuarial services, plan design and development, investment strategy, plan administration, risk management, employee communications, and compliance and governance with actuarial and accounting standards. Athena's mission is to provide unmatched expertise and strategic guidance across a spectrum of actuarial services. Our Retirement practice area team is committed to helping the ORSC navigate complex financial challenges and achieve its long-term objectives through this engagement.

As stated above, while our team regularly provides actuarial consulting services across the private and public sectors, we specialize in service to public entities, which constitutes over 80% of our annual revenue. Our clients consistently remark on our ability to convey complex results that inform and aid in critical decision-making. We rely on our training and experience from working in large-firm environments, yet we can offer the agility and independence of working with small shops. We are your go-to contacts, and you can feel free to call us at any time with questions or for a walk-through of your results.

The experience of our tenured consultants has spanned the top firms in actuarial consulting. Our experience working at larger firms has become the basis for our processes and procedures, though we offer more personalized services at reasonable cost points. Our reports are straightforward, organized, and efficient, and our presentations are informative; we have worked hard to remove the "actuary speak" from our vocabulary to ensure clear and effective communication.

As an example of our commitment to our clients, for the Fresno County Employees' Retirement Association ("FCERA"), we recently performed an actuarial audit of pension valuation and experience analysis with full-scope replication. While we issued a favorable audit opinion to FCERA, we still made over 40 recommendations to be considered to improve the accuracy of results, transparency of disclosures and adherence to the applicable ASOPs. This demonstrates the value Athena can add to a traditional actuarial audit and that we go above and beyond simply checking the box.

As shown in Section 4.3 Staff Qualifications, Alicia Traviss, FSA, EA, FCA, MAAA, our Lead Actuary, embodies our commitment to delivering exceptional actuarial consulting services. With extensive experience supporting public sector pension plans, Alicia has been instrumental in providing invaluable insights to some of our most recent actuarial audit clients. Her expertise has been pivotal for organizations such as the Defense Civilian Personnel Advisory Service, the State Universities Retirement System of Illinois, and the Metropolitan Government of Nashville and Davidson County Tennessee Pension Plan. Over her 20+ year actuarial career, she has split her time performing as a signing actuary as well as working with auditors to assess the reasonability of other plans' methods and assumptions. Her deep knowledge and dedication to her clients exemplify our team's commitment to delivering clear, effective, and personalized solutions, removing the complexity of actuarial language for transparent and informed decision-making.

Athena has a wide range of clients spanning the nation. We are proud that Athena has never lost a client, and all clients have opted to extend their contracts where the opportunity allowed. Our existing client base that we have supported within the last five (5) years is detailed below:

State	Client Name	Plan Type/ Employers	Participants	Services Provided	Dates
CA	Fresno County Employee Retirement Association	Defined benefit, cost-sharing, 5 employers	~20,000 members; general administrative employees, police, and fire	Pension Audit	09/2021 - 06/2022
	CalPERS	Multiple defined benefit plans, 2,892 employers	Over 2 Million members, various	Pension Audit and Benefit calculation tool enhancements	02/2023 - Present
	City of San Carlos/Redwood City	Defined benefit, Cost-sharing, 1 employer	600 participants, safety employees	Specialized Pension Study	09/2023 - Present
DC	Office of DC Pensions	Defined benefit, 4 employers	~15,000 members; general administrative employees, police, fire	Pension Valuation & Experience Study	04/2021 – Present
	Office of the Comptroller of the Currency	OPEB	~5,100 members	ASC 715-60 Valuations	03/2024 – Present
	Defense Civilian Personnel Advisory Service	Defined benefit and Health, 7 employers	~145,000 members for retirement, 33,600 members for health, and ~44,700 members for dental	Pension Audit	06/2022 - 6/2027

(Continued)

State	Client Name	Plan Type/ Employers	Participants	Services Provided	Dates
IL	Chicago Public Schools	Health, 1 employer	75,000 lives	Reserving & annual filings	07/2021 – 06/2023
	Illinois Tollway	Defined benefit and OPEB, 2 employers	4,000 participants	Review of assumptions for Pension/GASB 67/68 & OPEB/GASB 75 Valuations	09/2022 - Present
	State Universities Retirement System	Defined benefit & defined contribution, cost-sharing, 61 employers	~245,000 members, various types	Pension Audit	05/2023 - 12/2023
NC	State of North Carolina	Defined benefit, 1 employer	Over 1 Million members; teachers, fire/safety, local, legislature, national guard, and judicial	Pension Valuations	05/2022 - Present
RI	City of Providence	Defined benefit, 1 employer	~6,900 members; general administrative employees, police, fire	Pension & OPEB Valuations, Experience Study	09/2021 - Present
TN	Metro Nashville	Defined benefit, 1 employer	~21,000 members; general government employees, police, fire	Pension Experience Study	01/2023 - 1/2024
TX	Three (3) retirement systems of a large city	Defined benefit, 3 employers	~24,000 members; general government employees, police, fire	Pension Audits	10/2023 - Spring 2024

The following examples demonstrate that our firm and our senior actuaries are trusted to provide quality results in the public sector. Working with these large systems requires us to have best-in-class tools and procedures in place to support the services we provide. The variety of work we provide to public sector plan sponsors also requires us to be flexible and innovative in the work that we do. Some specific examples of actuarial audits we have performed are included below. We have also provided contact information for the clients in Section 4.4 References for whom we have completed services.

Example #1	
Client	Fresno County Employees' Retirement Association
Types of Plans	Defined Benefit Cost-sharing Multiple-Employer plan
Number of Participants	~19,950 members
Total Assets	$6.3 Billion
Performance Period	09/2021 - 06/2022
Scope of Services	Athena was engaged to provide a complete independent replication audit of the most recent FCERA actuarial valuation and a review of the most recent analysis of actuarial experience. We replicated the most recent actuarial valuation results, including each component and Tier (General and Safety). From these baseline results, we validated such program aspects as employee contribution rates, benefit levels, employer contributions, salary increases, eligibility, past service credits for military service, and actuarial liabilities.
Results & Impact	Athena validated that the actuarial valuation results prepared by the System actuary were reasonable and within the agreed-upon tolerances. As part of the audit, we identified 45 recommendations that could be considered to improve the accuracy of results, transparency of disclosures, and adherence to the applicable ASOPs. Our review confirmed the assumptions from the most recent experience study were reasonable and were used appropriately for the most recent valuation.

Example #2	
Client	State Universities Retirement System of Illinois
Types of Plans	Defined Benefit Cost-sharing Multiple-Employer plan
Number of Participants	240,307 members
Total Assets	$23.8 Billion
Performance Period	05/2023 - 12/2023
Scope of Services	Athena was engaged to provide a limited scope actuarial audit of the June 30, 2022 Actuarial Valuation Report with the following primary goals: 1) assessing the appropriateness of the actuarial assumptions; 2)compliance with generally accepted principles, state statutes, and board policies; 3)sufficiency of data used to perform the valuation; 4) accuracy of valuation results based on a review of sample test cases of data used to perform the valuation; 4) accuracy of valuation results based on a review of sample test cases; 5) overall accuracy of the valuation results, including the actuarial accrued liability, normal costs, and expected employer contributions; and 6)inclusion of information required for reporting standards.
Results & Impact	Athena validated the valuation results and did not identify any significant deficiencies in the reporting and did not identify any significant issues with the basis for which assumptions were determined. As part of the audit, we identified 35 recommendations that could be considered to improve the accuracy of results, transparency of disclosures, and adherence to the applicable ASOPs. Our review confirmed the assumptions from the most recent experience study were reasonable and were used appropriately for the most recent valuation. We also provided detailed commentary on the funding and amortization method and the impact on the contribution rates.

Example #3	
Client	Three (3) Retirement Systems in Texas
Types of Plans	Single employer contributory defined benefit plans
Number of Participants	24,758 members
Total Assets	$5.01 Billion
Performance Period	10/2023 - Spring 2024
Scope of Services	Athena was engaged to perform an actuarial audit of the actuarial valuations, studies, and reports for three retirement systems in Texas, which included a review of the most recent five (5) valuations for reasonableness, consistency, and completeness. Additionally, Athena reviewed any actuarial studies, including experience studies during the last five years for these retirement systems.
Results & Impact	Athena validated the valuation results and did not identify any significant deficiencies in the reporting and did not identify any significant issues with the basis for which assumptions were determined. As part of the audit, we reviewed each valuation assumption, actuarial methods used, and reviewed each system's compliance with state code. We identified over 20 recommendations for each system that could be considered to improve the accuracy of results, transparency of disclosures, and adherence to the applicable ASOPs. Our review confirmed the assumptions from the most recent experience study were reasonable and were used appropriately for the most recent valuation. We also provided a detailed review that the systems were acting according to prescribed statutes, including funding policies and the asset valuation method.

4.3 Staff Qualifications

RFP: Each proposal shall, at a minimum, describe the qualifications of all management and lead professional personnel who will participate in the audit. Each personnel description shall include: (1) a resume; (2) a summary of experience each has had in performing actuarial valuations, audits, or studies of public employee retirement systems; and (3) a management plan identifying the responsibilities each will have on the audit. Each resume should include information on the current and past positions held with the firm, educational background, actuarial and other relevant credentials, and other relevant information to demonstrate the person's qualification. Each proposal shall also include a description of the firm's procedures in the event that a key person assigned to this engagement leaves the firm during the engagement. The experience summaries should include information on the types and sizes of public employee retirement systems for which the designated staff have completed actuarial work, including whether the systems were defined benefit or defined contribution plans, the types and number of participating employers, number of participants, and other relevant indicators of plan type, size, and comparability to SERS. It is permissible to reference, rather than repeat, duplicative information provided elsewhere in the proposal. The experience summaries should describe the work performed and detail the roles and responsibilities that the individual staff had on the projects. The management plan should specify the roles and responsibilities that each of the management and professional staff will have on the actuarial audit and include an estimated portion of the audit's time that will be spent by each on the audit.
Actuaries included on the project team should meet the following criteria:

- **Be members of the American Academy of Actuaries;**
- **Be enrolled actuaries with experience in governmental plans;**
- **Be, at a minimum, associates with at least five years of experience in public practice, although preference will be given to actuaries that are Fellows of the Society of Actuaries; and**
- **Have performed an actuarial valuation, audit, or study of a public employee retirement system within the last two years.**

In the event that the firm or any personnel listed in the proposal has had any professional relationships involving the ORSC, the five Ohio public retirement systems, the State of Ohio, or its political subdivisions for the past five years, the firm shall provide a statement explaining why such relationships do not constitute a conflict of interest relative to performing the proposed review, or, if necessary, an explanation of the actions that will be taken to ensure an independent review.

Our actuarial staff is well-trained and thoughtfully managed. We rely on a stringent quality assurance process as outlined in Section 4.6 Additional Information to ensure accurate results and strategic consulting advice. Compared to a larger firm, our team is leaner, and our credentialed actuaries are involved in the day-to-day calculations and development of recommendations. Compared to other small firms, our quality assurance processes are best-in-class and provide a more robust review than is typical in our industry to ensure the accuracy of results. Athena consultants are active participants in the actuarial and benefits community. We are members of the Society of Actuaries (SOA), the American Academy of Actuaries (AAA), and the Conference of Consulting Actuaries (CCA). We take significant research and leadership roles within these organizations. For example:

- Alicia Traviss, FSA, EA, FCA, MAAA holds active roles as a speaker with the Conference of Consulting Actuaries (CCA) and as a member and the Chair of the SOA's Retirement Section Council (RSC).
- Adrienne Lieberthal, FSA, EA, CERA, MAAA, FCA holds active roles as a volunteer with the Conference of Consulting Actuaries (CCA) and as a member of the SOA's Retirement Plan Experience Committee (RPEC).

We have assembled a team of seasoned professionals to work on this engagement to deliver the requested services. Drawing upon our extensive experience in similar projects, we have determined that this team size strikes the ideal balance between expertise and cost-effectiveness for the ORSC. Additional credentialed actuaries and support staff are readily available to assist

in the execution of these services as needed. The quality and experience of our staff and the direct involvement of daily tasks by senior actuaries ensure that we will deliver the highest quality work.

Primary Roles	Name	Qualifications	Years of Exp.	Estimated % of Audit Time
Lead Actuary	Alicia Traviss	FSA, EA, FCA, MAAA	22+	30%
Supporting Pension Actuary	Adrienne Lieberthal	FSA, EA, CERA, FCA, MAAA	12+	20%
Supporting Health Actuary	Emily Redder	FSA, ACAS, CERA, MAAA	23+	10%
Quality Assurance Reviewer	Greg Drennan	ASA, EA, MAAA, FCA	34+	5%
Project Manager	Logan Grime	ASA, ACA	8+	20%
Actuarial Analyst	Paula Villafane	*Pursuing actuarial credentials*	6+	15%

We have assigned Partner **Alicia Traviss** as **Lead Actuary** and **Managing Partner & Founder, Adrienne Lieberthal** and **Emily Redder,** as **Supporting Actuaries** for the audit. Alicia, Adrienne, and Emily will have ultimate responsibility for ensuring we deliver the proposed services on time and at the highest quality. They will have primary responsibility for the preparation of our reports and the formal presentation of the audit findings to you. The **Project Manager**, **Logan Grime**, will supervise the work performed during the actuarial valuation audits. Logan will be responsible for ensuring the project remains on schedule, maintaining a log of any issues that arise during our review that should be reviewed with ORSC, assigning tasks to the actuarial analysts, and identifying any need for additional resources to support our work. As an additional technical resource, he will be available to step in at any of the levels (primary actuary or programming support). Logan has been involved with several of our large actuarial audit engagements, bringing additional depth of expertise to our project team. **Paula Villafane** will be the primary **Actuarial Analyst** for the audit. Paula's experiences at Athena have involved supporting public pension plan sponsors, including preparation of all aspects of the annual actuarial valuation and GASB reporting. To ensure proper quality control, we have assigned **Greg Drennan**, as the **Quality Assurance Reviewer**. Greg will be involved throughout the project, including at the planning stage, to ensure Athena's quality control procedures are implemented throughout the project and the final work product is given an independent actuarial review.

In the event of a key person's departure during the engagement, our firm has readily available credentialed actuaries prepared to seamlessly step into the role, ensuring no impact on the project timeline or budget due to our robust internal project management and communication processes. Furthermore, none of our personnel have had professional relationships or conflicts of interest with ORSC-related entities.

Alicia Traviss, EA, FSA, FCA, MAAA

Audit Engagement Role: Engagement Lead & Principal Actuary
Current Position at Athena: Partner
Past Position at Athena: Principal

Certifications & Committee Memberships

- **Enrolled Actuary (EA)**
- **Fellow of the Society of Actuaries (FSA)**
- **Member of the Academy of Actuaries (MAAA)**
- Fellow of the Conference of Consulting Actuaries (FCA)
- Member of Society of Actuaries Grading Committee
- Chair of Society of Actuaries Retirement Section Council

Education

Bachelor of Science | University of Illinois
Majors: Actuarial Science and Finance

Software Proficiency

MS Excel, Word, Powerpoint |
ProVal | Adobe Acrobat

1) Resume

Background

Alicia has spent her 22+ year career helping plan sponsors implement and manage various benefit plans, emphasizing the valuation and analysis of qualified and non-qualified pension plans. She has split her time performing as a signing actuary as well as working with auditors to assess the reasonability of other plans' methods and assumptions. This has allowed her to stay at the forefront of current trends and puts her in a unique position to look at the plans from various angles. Her extensive experience brings her clients a more well-rounded actuary who is able to not only complete the required reports, but to also ensure that the plan sponsors understand the benefits, underlying assumptions, and associated liabilities.

Experience

- **Athena Actuarial Consulting – Partner, Consulting Actuary** **July 2022 – Present**
  - Lead Firm Actuary overseeing pension and postretirement medical actuarial audits
  - Prepares and delivers GASB 74/75 accounting valuations and experience studies, including managing the data collection process, overseeing the calculation of results and preparation of client deliverables.
  - Consults on and reviews actuarial valuations and experience studies performed by other actuaries to ensure reasonability and compliance with actuarial standards of practice.
  - Completes multiemployer pension valuations, including preparation of withdrawal liability reports, experience studies, projections of liabilities, assets, and benefit payments necessary for the annual zone certifications and projections of funded status, including impact on the funded status of benefit changes.
  - Consults with multiemployer 401(k) pension plans to ensure compliance with regulations, including preparation of lifetime income factors.
  - Prepares and reviews actuarial calculation templates to ensure accuracy and efficiency.
  - Current clients include a mix of pension and postretirement medical.
- **Deloitte Consulting – Specialist Leader, Firm Actuary** **May 2002 – July 2022**
  - Supervised the preparation and delivery of funding valuations and ASC 715-30, ASC 715-60, ASC 712 and GASB 67/68 accounting valuations, including managing the data collection process, overseeing the calculation of results and the preparation of client deliverables, government forms and audit responses.
  - Completed multiemployer pension valuations, including preparation of withdrawal liability reports, experience studies, projections of liabilities, assets, and benefit payments necessary for the annual zone certifications and projections of funded status, including impact on the funded status of benefit changes.
  - Lead Firm Actuary overseeing pension and postretirement medical reviews for 100 Deloitte audit clients under ASC 715-30, ASC 715-60, ASC 712, GASB 67/68/74/75, SSAP 92 and IAS19 accounting standards. Reviews include assessment of assumptions and methodologies, as well as sensitivity testing the results.
  - Carried out all aspects involved with terminating a pension plan.
  - Responded to RFPs to create new business and expand current client relationships.

- Managed experience studies, benefit redesigns, projections, benefit calculations, benefit statements and non-discrimination testing.
- Educated plan participants via phone and in-person meetings.
- Pension Training Lead - Led the development and delivery of training for all pension actuaries and students in the US and India.
- National Exam Coordinator – Administered exam program covering all US students confirming consistent application of the program, making updates as changes are announced by the SOA and CAS, working with HR to validate and process compensation adjustments and assisting students with exam strategies.
- Author of Form 5500 Survey – Oversaw and edited annual survey, which analyzes public data from Form 5500 to identify trends year over year, by plan size and by industry.

2) Summary of Experience with Public Employee Retirement Systems

- **Audit Clients with Pension Plans (2022-2024) –** Engaged to review benefit plans of audit clients under ASC 715-30, ASC 712, GASB 67/68, SSAP 92 and IAS19 accounting standards. Worked on approx. 100 clients per year for the past decade
  - Assessed assumptions and methods utilized and provided estimated quantification of any assumptions and methods that do not appear to be reasonable
  - Prepared sensitivity testing of the results to ensure year-over-year results appear accurate
  - Communicated with both audit teams and clients any concerns and suggested best practices
- **Defense Civilian Personnel Advisory Service ("DCPAS") (2022-2024) -** Engaged to review seven (7) DoD NAF Component employer retirement plan reports, monitor funding levels, and assess regulatory and policy compliance
  - Assessed methods and assumptions used by Plan actuaries and suggested modifications as needed to reflect the current economic environment and actuarial trends
  - Reviewed calculations year over year to ensure consistency and numerical accuracy
  - Presented findings and annual updates to DoD NAF leadership
  - Responded to questions pertaining to plan design options to ensure plan was meeting participant's needs
- **State Universities Retirement System of Illinois (2023) -** Engaged to perform an actuarial audit of a valuation report and experience study
  - Evaluated appropriateness of methods and assumptions selected by plan actuary
  - Reviewed sample life calculations for consistency with provisions in plan document
  - Evaluated techniques and results of experience study
- **Metropolitan Government of Nashville and Davidson County Tennessee Pension Plan (2023)** – Engaged to perform independent experience study and compare to experience study prepared by plan actuary
  - Performed independent, 5-year experience study of demographic assumptions, economic assumptions and actuarial methods, focusing on compliance with relevant ASOPs.
- **Pension Clients (2022-2024) –** Engaged as Plan Actuary
  - Completed annual funding and accounting valuations
  - Completed benefit statements and benefit calculations
  - Performed experience studies and non-discrimination testing
  - Completed projections under ongoing plan and termination scenarios

3) Management Plan/Responsibilities

- 30% of the audit time will be completed by Alicia Traviss
- Key point of contact with ORSC and SERS
- Authorized to negotiate on behalf of Athena
- Responsible for the overall timeliness and quality of the engagement
- All team roles report up to Alicia Traviss

Adrienne Lieberthal, FSA, EA, CERA, MAAA, FCA

Audit Engagement Role: Supporting Actuary
Current Position at Athena: Managing Partner & CEO
Past Position at Athena: Founder

1) Resume

Certifications & Committee Memberships

- **Fellow of the Society of Actuaries (FSA)**
- **Enrolled Actuary (EA)**
- **Member of the Academy of Actuaries (MAAA)**
- Chartered Enterprise Risk Analyst (CERA)
- Fellow of the Conference of Consulting Actuaries (FCA)
- Certificate in Predictive Modeling
- Member of the SOA's Retirement Plan Experience Committee (RPEC) – Public Sector Mortality Committee
- Member of the CCA Membership Committee

Education

Bachelor of Arts | University of Virginia
Major: Mathematics, Probability & Statistics
Minor: French
Division I Student-Athlete, Field Hockey

Software Proficiency

MS Excel, Access, Project | VBA | R | ProVal | ProVal-PS | Tableau | Visio

Background

Adrienne founded Athena in 2020 after a decade of experience consulting across sectors, industries and geographies at two (2) large consulting firms. She is passionate about creating an authentic and inclusive environment for her team to bring their full self to work each and every day. She has managed a variety of State, Local, and Federal pension and OPEB consulting engagements and understands the intricacies of data management, assumption-setting, benefit structure evaluation, funding mechanisms, and ASOP-compliant reporting. In addition to reporting and disclosures, Adrienne has experience delivering strategic consulting services to her clients centered around improving the efficiency of operations and administration of benefits. She relies on tried-and-true methodologies and a passion for understanding the root causes of her clients' issues to deliver comprehensive, effective solutions that exceed expectations.

Experience

- **Athena Actuarial Consulting – Managing Partner, Consulting Actuary** **December 2020 – Present**
  - Prepares and delivers accounting valuations, funding valuations and experience studies, manages the data collection process, and oversees the calculation of results for single-employer and multi-employer pension plans.
  - Performs actuarial audits and actuarial reviews of actuarial valuations and experience studies performed by other actuaries to ensure reasonability and compliance with actuarial standards of practice.
  - Leads large Federal contract management with variable workflow and staffing arrangements; spearheaded the growth of a large team from three (3) practitioners to 18 employees in six (6) months.
- **Deloitte Consulting – Consulting Actuary** **February 2016– December 2020**
  - Supported PBGC resources in the casework associated with the Multiemployer Plan Reform Act (MPRA) application review process for suspension and partitions, including census data review, benefit projections, and test case review
  - Supported the evaluation of two-pool method applications and spin-off applications, working closely with the PBGC Office of General Counsel (OGC), necessitating the skills to communicate complex arrangements to non-actuarial professionals
  - Provided strategic assistance in the allocation of resources and development of project management and reporting tools for inter- and intra-agency reporting
  - Managed the review of MPRA applications, working collaboratively with NRAD actuaries to assess the completeness and reasonableness of assumptions, methods, plan provisions and accuracy of programming.
  - Managed valuations and actuarial review work for various Federal agencies, including experience interfacing with actuaries at all major consulting firms.

- Managed funding valuations and accounting valuations, including managing the data collection process, overseeing the calculation of results and the preparation of client deliverables, government forms and audit responses.
- Performed full experience study for Federal agency, relying on expertise as a member of RPEC to build credibility-weighted mortality tables.

- **Willis Towers Watson – Consulting Actuary** **August 2012 – February 2016**
  - Managed valuation cycles for five single employer plans and one multiemployer plan, varying in size and complexity from a 30,000-employee business services firm to a 118,000-employee global beer distributor
  - Responsibilities included funding valuation, assistance with annual financial disclosures, benefit cost projection scenarios, quality assurance review of processes and fielding follow-up questions from client regarding impacts of the information communicated
  - Supported benefit administration for two clients, drafting and reviewing qualified and nonqualified benefit calculations, including QDRO calculations, 70 ½ calculations, suspension of benefit calculations and other complex situations

2) Summary of Experience with Public Employee Retirement Systems

- **Fresno County Employees' Retirement Association ("FCERA") (2021-2022)**– Engaged by the Board to perform an Actuarial Audit
  - Performed replication of plan actuary valuations for pension fund
  - Evaluated appropriateness of assumptions selected by plan actuaries and assessed alternative assumptions using replicated valuation models
  - Assessed alternative funding methods and amortization policies
  - Prepare exhibits under GASB 67/68 and compared to plan actuary's prepared exhibits
- **City of Dallas – with Police, Fire and General Employee Pension Plans (2018-2020)** – Engaged by the City to perform an annual actuarial review of two (2) large pension funds under Texas Government Code Section 802.1012, plus a review of OPEB plan
  - Performed review under Section 802.1012, which led to several findings resulting in a more extensive and annually reoccurring review to resolve
  - Performed annual replication of plan actuary valuations for pension funds and OPEB plan
  - Reviewed GASB 67/68 statements for pension funds, and GASB 74/75 statements for OPEB plan
  - Evaluated appropriateness of assumptions selected by plan actuaries and tested alternative assumptions using replicated valuation models
  - Assessed alternative benefit structures during union negotiations, including evaluation of DROP provisions
- **City of Atlanta Auditor's Office (2019-2020)** – Engaged by the City to perform an actuarial review of three (3) large pension funds.
  - Performed replication of valuation reports for all three (3) plans
  - Performed full replication of most recent experience study for both plans
  - Evaluated the appropriateness of assumptions
  - Reconciled data and identified significant data issues; issued recommendations for remediation

3) Management Plan/Responsibilities

- 20% of the audit time will be completed by Adrienne Lieberthal
- Supporting Actuary to Alicia Traviss
- A Principal Actuary that provides an independent review of all audits to ensure consistency of review and identification of systemic or common issues across plans
- Ensures that the deliverables are written in a manner that will resonate with non-actuary stakeholders, key risks and recommendations are highlighted, and all applicable standards of practice have been addressed

Greg Drennan, ASA, EA, MAAA, FCA

Audit Engagement Role: Quality Assurance Reviewer
Current Position at Athena: Partner
Past Position at Athena: Advisor

1) Resume

Certifications & Committee Memberships

- **Enrolled Actuary (EA)**
- **Member of the Academy of Actuaries (MAAA)**
- Associate of the Society of Actuaries (ASA)
- Fellow of the Conference of Consulting Actuaries (FCA)

Education

Bachelor of Science | University of Tennessee
Major: Statistics

Background

Greg has more than 34 years of actuarial consulting experience. He has a broad range of retirement and employee benefits experience, including retirement strategies, actuarial audits, plan financials and accounting, administration, health and financial wellness programs, business process improvement, technology implementation, organizational design, regulatory compliance, and participant communications. Greg's experience includes 20 years at Big Four firms, where he had the opportunity to support and lead many actuarial audits. He has built and led teams of actuaries and consultants in delivering all aspects of retirement programs, operationally and strategically.

Experience

- **Athena Actuarial Consulting – Partner** **May 2022 – Present**
  - Responsibilities include strategic direction, revenue growth, client management, employee oversight, risk management, contract negotiations and financial stability
  - Serve as the strategic partner and trusted advisor to clients in the execution of client goals and priorities.
  - Contribute to marketing Athena and promoting the company
  - Handle escalations and lead conflict resolutions
  - Oversee relationships between clients and vendors
  - Grow firm revenue through anticipating client needs and cross-selling new solutions to current clients
  - Serve as the expert in new client pursuits by crafting solutions to meet prospects' needs and helping to close them as clients
  - Serve as Career Advisor to senior-level employees
- **Independent Contractor** **January 2021 - May 2022**
- **Deloitte Consulting – Managing Director (15 yrs), Sr Manager (3 yrs)** **May 2002 – July 2020**
  - Responsible for practice and revenue growth, risk management, strategic planning, people management and client relationship management
  - Led Total Rewards offshore practice in Hyderabad, India
  - Initiated and led Rewards, Actuarial and Insurance onshore practice in Orlando, FL
  - Led large client relationships in commercial and governmental practices
  - Led projects and client service teams related to Total Rewards strategy, plan administration, vendor management, communications, and technology implementation
  - Led presentations to executive teams and public sector boards
- **Arthur Andersen LLP - Senior Manager** **September 2000 – May 2002**
  - Established and led Human Capital practice in Nashville, TN
  - Responsible for initiating and growing large client relationships related to employee benefits consulting
- **Bryan, Pendleton, Swats and McAllister (Wells Fargo) - Consulting Actuary/Team Leader** **July 1989 - Sep 2000**
  - Led operations of daily defined contribution plan administration
  - Led team of actuaries in performing pension plan valuations for purposes of funding and financial reporting
  - Performed ongoing pension actuarial services
  - Responsible for the development of people and actuarial training

2) Summary of Experience with Public Employee Retirement Systems

- **Metropolitan Government of Nashville & Davidson County (2001 – 2007; 2013 – 2024) -** Engagement Lead
    - Audit of pension actuarial assumptions and methodologies
    - Consultation with respect to the design and efficiency of all benefits programs
    - Pension benefits data review and clean-up
    - Pension recalculations and communications
    - Implementation of pension administration technology solution
    - Pension benefit statements to employees for the first time in the client's history
    - Benefits team organizational design
    - Process reengineering and sourcing strategies for employee benefit programs
    - Operational compliance reviews
- **Defense Civilian Personnel Advisory Service ("DCPAS") (2022-2024) -** Engagement Lead
    - Engaged to review seven (7) DoD NAF Component employer retirement plan reports
    - Monitored funding levels
    - Assessed regulatory and policy compliance
- **Commander, Navy Installations Command ("CNIC") (2010 – 2020) -** Engagement Lead
    - Retirement plans reviewed to assess the current state of the program and administration
    - Provided oversight to a team auditing over 4000 benefit calculations and 7,000 benefit statements
    - Process redesign efforts, including the development of the Policy and Procedures Manual, pensionable data collection process, and retiree payment validation process
    - Redesigning benefit administration processes, including the collection of participant data required for benefit calculations
    - Application under IRS's Voluntary Correct Program
    - Communications command related to error corrections and response to participant inquiries

3) Management Plan/Responsibilities

- 5% of the audit time will be completed by Greg Drennan
- A Principal Actuary providing in-depth knowledge and insight into actuarial practices and compliance standards as needed
- Offers expertise to ensure that the audit process aligns with industry best practices, actuarial standards, and legal requirements, while also providing valuable guidance and recommendations to improve the overall quality of the audits

Emily Redder, FSA, ACAS, CERA, MAAA

Audit Engagement Role: Supporting Health Actuary
Current/Past Position at Athena: Senior Manager

1) Resume

Certifications & Committee Memberships

- Fellow of the Society of Actuaries (FSA)
- Associate of the Casualty Actuarial Society (ACAS)
- Chartered Enterprise Risk Analyst (CERA)
- Member of the Academy of Actuaries (MAAA)

Education

Bachelor of Arts | Calvin University

Majors: Mathematics, Economics

Background

Emily is a credentialed actuary specializing in health, property and casualty, life, and risk assessment. Emily has over 23 years of consulting and industry experience as an actuary focusing on the valuation of liabilities, financial reporting, rate setting, and risk assessment. She is sought after for her critical thinking in a wide array of actuarial problems and is passionate about helping non-actuarial audiences understand and manage their risk.

Experience

1. **Athena Actuarial Consulting - Senior Manager, Healthcare Services** **February 2023 - Present**
    - Co-leads Healthcare Services team of 10+ staff to support Medicaid capitation and fee-for-service rate setting; financial monitoring; the data analysis and visualization, reviews, and audits of Medicaid programs and managed care organizations (MCOs); analysis of federal and state policies; predictive analytics and model building; and stakeholder engagement and facilitation of feedback from providers regarding the rates
    - Conducts medical trend analyses and sensitivity testing
    - Pricing of plan design changes to align health coverage with strategic goals

2. **Casualty Actuaries of Michigan - Actuary** **January 2016 - February 2023**
    - Evaluated actuarial liabilities and computed annual costs for self-insured plans or insurance companies, ensuring accuracy in financial forecasting
    - Employed statistical models to assess risks, enabling precise determination of liabilities and rates for insurance plans, maintaining financial stability and solvency

3. **Priority Health - Actuarial Manager** **April 2017 - May 2020**
    - Served as the Manager of Medical Economics IBNR and Valuation team
    - Developed reserves, analyze claim costs, and prepare financial elements for quarterly and annual reports, ensuring accurate and compliant financial statements
    - Conducted medical trend analysis, facilitated employer group renewal analysis, and managed reinsurance programs, contributing to comprehensive risk assessments and strategic pricing

4. **Jackson - Actuarial Manager** **January 2016 - April 2017**
    - Served as a Manager within the valuation team

- Oversaw and guided a team of analysts in actuarial valuation processes, ensuring accurate assessment and compliance with industry standards and regulations
- Provided managerial insights and strategic recommendations derived from comprehensive actuarial valuations, contributing to informed decision-making within the organization

5. **Michigan Professional Insurance Exchange - Associate Actuary** **October 2009 - December 2015**
   - Evaluated and set pricing for liability insurance products, alongside accurately assessing and managing reserves, ensuring financial stability and compliance
   - Conducted comprehensive financial forecasts and performed actuarial studies

6. **Deloitte Consulting - Manager** **January 2001 - September 2009**
   - Served as an employee benefits consulting actuary, evaluating and maintaining oversight of benefit plans' funded status, ensuring accurate assessment and strategic guidance for clients
   - Assisted clients in comprehending the costs and value of their benefit plans, offering insightful analysis to aid in decision-making processes. Additionally, trained and supervised staff to maintain service excellence

2) Summary of Experience with Public Employee Retirement Systems

1. **Middlesex County Joint Health Insurance Fund** – Supporting Health Actuary (GASB 75)
   - Biannual accounting valuation, with interim roll forwards, under GASB 75 for six (6) plans in the Fund
   - Advised on optimal methodologies for per capita claims, aging, and trend analysis, contributing to the development of sound actuarial frameworks that align with the agency's specific needs and objectives

2. **Dormitory Authority of the State of New York (DASNY)** - Supporting Health Actuary (GASB 75)
   - Annual accounting valuation under GASB 75 for one (1) plan
   - Offered expert consultation on per capita claims, aging, and trend methodologies, delivering valuable insights to enhance the actuarial strategies

3. **City of Wichita** - Supporting Health Actuary (GASB 75)
   - Biannual accounting valuation, with interim roll forwards, under GASB 75 for one (1) plan
   - Provided comprehensive guidance on per capita claims, aging, and trend methodologies, ensuring the adoption of robust and customized approaches to address their unique actuarial requirements

4. **Defense Civilian Personnel Advisory Service – 100,000+ member self-insured health program**
   - Determination of annual overall renewal rates as well as differentiation of rates by plans
   - Medical trend analysis and sensitivity testing
   - Pricing of plan design changes to align health coverage with strategic goals

3) Management Plan/Responsibilities

- 10% of the audit time will be completed by Emily Redder
- Reviews the deliverables for the health care audit
- Reviews content for transparency, readability, and adherence to applicable ASOPs
- Prepared to support with the preparation of deliverables as needed
  Tracks milestones and project progress to ensure timely execution within budget

Logan Grime

Audit Engagement Role: Project Manager
Current/Past Position at Athena: Manager

1) Resume

Certifications

- Associate of the Society of Actuaries (ASA)
- Associate of the Conference of Consulting Actuaries (ACA)

Education

Bachelor of Arts | Whitman College
Major: Mathematics/Economics

Background

Logan has over eight (8) years of professional consulting experience in actuarial valuation services and data analytics projects. He has provided pension and OPEB actuarial services for a variety of municipal, state and federal clients in assessing the reasonability of plan assumptions, valuation programming, benefit calculation reviews, and developing finalized valuation reports. Additionally, he has worked on a variety of pension valuation and consulting engagements and understands the intricacies of data management, assumption-setting, benefit structure evaluation, funding mechanisms, and GASB 67/68 and ASOP-compliant reporting. He handles complex mathematical concepts and calculations daily in consultation with certified actuaries. Logan has experience handling large data sets and providing easy-to-digest reports and visuals for summarizing data.

Experience

- **Athena Actuarial Consulting - Manager** **February 2023 - Present**
  - Prepare valuations and accounting disclosures under ASC 960 and GASB 67/68/74/75 for various pension and OPEB plans
  - Check accounting and funding valuation data, results, and reports.
  - Review results through gain/loss analysis, test lives review, and single benefit calculations.
- **Deloitte Consulting LLP - Senior Consultant** **February 2019 - February 2023**
  - Provided multi-employer, single-employer, OPEB, and data analytics support within the Human Capital Workforce Transformation Service Area
  - Supported PBGC resources in the set-up of the Special Financial Assistance (SFA) program after the passage of the American Rescue Plan (ARP).
  - Supported SFA implementation, reporting, and reviewing of applications for SFA.
  - Assessed reasonability of assumptions used for SFA.
  - Provided actuarial support in administering the payment of pension benefits on time and accurately for terminated single-employer pension plans.
  - Determined benefits payable to each participant within a single-employer pension plan through a series of complex actuarial calculations based on plan provisions and standards set by law.
  - Performed single-employer pension and OPEB plan valuations for a variety of plans.
  - Assisted in an HR Modernization Implementation for a large government agency.
  - For the Reporting and Analytics (R&A) team, led the team in discovery of gathering business requirements and led the migration to the future state of R&A using PowerBI, Tableau, and BusinessObjects.
- **Bolton - Actuarial Analyst** **October 2015 - February 2019**
  - Determined benefits payable to each participant within a single-employer pension plan through a series of complex actuarial calculations based on plan provisions and standards set by law.
  - Performed single-employer pension plan valuations for a variety of plans including cash balance plans, top-heavy plans, etc.

2) Summary of Experience with Public Employee Retirement Systems

- **Metropolitan Government of Nashville and Davidson County Tennessee Pension Plan (2023-2024)** – Actuarial Experience Study (Lead Preparer)
    - Provide independent, 5-year experience study of demographic assumptions, economic assumptions and actuarial methods, focusing on compliance with relevant ASOPs.
- **State Universities Retirement System of Illinois (2023)** – Actuarial Audit of Valuation Report and Experience Study (Lead Preparer)
    - Evaluated appropriateness of methods and assumptions selected by plan actuary
    - Reviewed sample life calculations for consistency with provisions in plan document
    - Evaluated techniques and results of experience study
- **Office of D.C. Pensions (2023-2024)** – Police, Fire, Teachers, Judges Pension Plans – Lead Preparer
    - Development of annual actuarial determined contribution under Agency funding policy
    - Annual accounting valuation support
    - Full gain/loss study performed each year with an extensive five-page report detailing sources of all off-setting components delivered annually
    - Full experience study performed in 2019, with credibility adjustment procedures applied to Pub-2010 tables
- **Plumbers & Pipefitters Local Union Clients (2023-2024)** – Lead preparer on engagement for actuarial services
    - Completes multiemployer pension funding valuations based on client-specific policies.
    - Prepares withdrawal liability reports and partial or complete withdrawal liability estimates as needed for withdrawing employers. Maintains withdrawal pools.
    - Completes projections of liabilities, assets, and benefit payments necessary for the annual zone certifications.
    - Prepares projections of funded status and calculates cost per hour of potential benefit improvements.
- **Single Employer Pension Clients for Federal Client (2023-2024)** – Serve as lead preparer on actuarial support services
    - Completed one-time actuarial valuations for terminated pension plans.
    - Completed benefit statements and benefit calculations.
    - Completed projections under plan termination scenarios.
- **Multiemployer Pension Clients for Federal Client (2023-2024)** – Serve as lead preparer on SFA application reviews
    - Review assumptions used for Special Financial Assistance application under the American Rescue Plan Act for reasonableness

3) Management Plan/Responsibilities

- 20% of the audit time will be completed by Logan Grime
- Reviews the deliverables for the audits
- Reviews content for transparency, readability, and adherence to applicable ASOPs
- Prepared to support with the preparation of deliverables as needed
- Tracks milestones and project progress to ensure timely execution within budget

Paula Villafane

Audit Engagement Role: Actuarial Analyst
Current Position at Athena: Manager
Past Position at Athena: Senior Analyst

1) Resume

Certifications & Committee Memberships

- Society of Actuaries exams passed: P, FM, IFM, STAM, PA, FAP Modules
- Member, Organization of Latino Actuaries

Education

Bachelor of Science | New York University's Stern School of Business
Major: Business
Concentrations: Actuarial Science, Computing & Data Science
Minor: Global and Urban Education Studies

Software Proficiency

MS Excel, Word, PowerPoint | R

Background

Paula Villafane has over six (6) years of actuarial consulting experience.Through her work on various pension and OPEB clients, Paula has experience in conducting data analysis, performing actuarial calculations, and assisting with the development of actuarial models and methodologies. In addition to her retirement expertise, Paula's health expertise enables her to interpret and evaluate complex healthcare data, identify trends, and assess risk factors affecting health insurance programs. Paula actively collaborates with the project team to prepare reports, provide actuarial recommendations, and support the implementation of actuarial strategies. Additionally, she contributes to actuarial audits, regulatory compliance, and client communication. Paula is also currently pursuing her ASA through the Society of Actuaries.

Experience

- **Athena Actuarial Consulting - Manager** **June 2022 - Present**
  - Leads conversations with Health Benefit Program Managers to walk through the assumptions, methodology, results, and recommendations for annual rate-setting strategy discussions, as well as factors driving the increase or decrease year over year
  - Conducts benchmarking analyses of employer health plans against competing employers to identify opportunities to make plan design changes to align closer to benchmarks and mitigate increases to the employer-sponsored health plan rates
  - Coordinates project kickoffs, analyses, and review of analyses, which calculate individual per member per month (PMPM) impact of project components (such as program changes and trends) to annual Medicaid rates
  - Project manages annual medical and pharmacy claims audits
  - Serves as the Diversity, Equity, and Inclusion manager (DEI) with responsibilities including hosting annual employee trainings, distributing and reviewing quarterly employee NPS surveys, and maintaining our relationships with the DEI-focused professional organizations Athena sponsors
- **Willis Towns Watson - Lead Actuarial Associate, Health and Benefits** **June 2018 - December 2021**
  - Managed $200M+ healthcare budgets for clients by calculating premium equivalent rates and COBRA rates, developing cost-share strategies, monitoring monthly spend, estimating claim liabilities, and overseeing relationships with vendor partners and utilization metrics to ensure benefits were being properly administered
  - Oversaw project plans, delegated responsibilities to both junior and senior colleagues, and led weekly check-in calls to ensure projects were kicked off with an ample amount of time to review results with the teams' lead Actuaries and meet clients' deadlines
  - Supported employee contributions strategy for self-insured employer with multiple union employee groups
  - Negotiated renewals, including performance guarantees and administrative fees for the plan sponsor's medical, dental, and vision self-funded benefits, as well as fully insured benefits such as stop loss
  - Conducted RFPs for benefits such as healthcare navigation and mental health services that requested capability summaries and financial savings projections from 10+ vendors

2) Summary of Experience with Public Employee Retirement Systems

- **Department of Defense Civilian Personnel Advisory Service (2022-2024)** – Lead preparer; engaged to review seven (7) DoD NAF Component employer retirement plan reports, monitor funding levels, and assess regulatory and policy compliance
    - Assessed methods and assumptions used by Plan actuaries and suggested modifications as needed to reflect the current economic environment and actuarial trends
    - Reviewed calculations year over year to ensure consistency and numerical accuracy
    - Presented findings and annual updates to DoD NAF leadership
    - Responded to questions pertaining to plan design options to ensure plan was meeting participant's needs
- **North Carolina (2022-2024)** – Lead preparer for Actuarial Valuation Support
    - Supported plan Actuaries by conducting an external quality assurance review of funding and GASB valuations for six of their funds, including the Firefighters and Rescue, Legislative Retirement System, and National Guard groups
    - Peer-reviewed exhibits included in valuation reports summarizing the principal results, membership data, valuation balance sheet, asset allocation, gains/losses, actuarially determined employer contributions, accounting information, and actuarial assumptions and methods
- **Plumbers & Pipefitters Local Union Clients (2022-2024)** – Lead preparer on engagement for actuarial services
    - Completes multiemployer pension funding valuations based on client-specific policies.
    - Prepares withdrawal liability reports and partial or complete withdrawal liability estimates as needed for withdrawing employers. Maintains withdrawal pools.
    - Completes projections of liabilities, assets, and benefit payments necessary for the annual zone certifications.
    - Prepares projections of funded status and calculates cost per hour of potential benefit improvements.
- **Middlesex County College (2022-2024)** – Lead preparer for Actuarial Valuation Support
    - Performed a roll-forward valuation for Middlesex College's Retiree welfare plan, updating Actuarial assumptions to reflect changing discount rate
    - Summarized financial disclosures under GASB 75

3) Management Plan/Responsibilities

- 15% of the audit time will be completed by Paula Villafane
- Conducts initial preparation of key deliverables
- Aggregates and organizes information, ensuring an organized and thoughtful approach to the reviewing actuary's audit

4.4 References

RFP: Each proposal must include a list of at least three organizations, but no more than five, that may be used as references for the firm's work on actuarial audits or studies. References may be contacted to determine the quality of the work performed, personnel assigned to the project, and contract adherence. The following should be included for the references listed:

- **Date of the actuarial audit work;**
- **Name, email address, and address of client;**
- **Name, email address, and telephone number of an individual in the client organization who is familiar with the work; and**
- **Description of the work performed.**

We have no doubt that our client references will attest to the high level of service received from Athena. We have provided five (5) references below for similar services to those requested under this scope.

Reference #1			
Client	Fresno County Employees' Retirement Association ("FCERA")		
Date	09/2021 - 06/2022		
Purpose	Actuarial audit of pension valuation and experience analysis with full scope replication for a cost-sharing, multiemployer defined benefit plan with over $5B of assets, $6B of liabilities, and 19,950 members		
Contact Name	Donald Kendig	**Title**	Retirement Administrator
Email	dkendig@fresnocountyca.gov	**Telephone**	559-457-0681
Address	7772 N Palm Ave, Fresno, CA 93711		
Relevancy	Pension Valuation Audit with Very Similar Scope for a Public Client		
Impact	Athena team was successfully awarded the contract to perform an actuarial audit of Segal Consulting's actuarial valuation and experience analysis. Our team performed an independent replication of the valuation results, inclusive of a data reconciliation and review. In addition, we opined on the assumptions developed by Segal during their most recent experience study and assessed compliance with ASOPs, relevant accounting standards, and industry best practices. A copy of the report can be found here: http://www2.co.fresno.ca.us/9200/Attachments/Agendas/2022/20220615/20220615-5A-AthenaActuarialAuditReport-Compiled.pdf. Also, a Letter of Recommendation is included in Section 4.6 Additional Information.		
Reference #2			
Client	State Universities System of Illinois		
Date	05/2023 - 12/2023		
Purpose	Actuarial audit of pension valuation and experience analysis with sample lives study for a cost-sharing, multiemployer defined benefit plan with over $23.8B of assets, $48B of liabilities, and 240,307 members.		
Contact Name	Jackie Hohn	**Title**	Chief Internal Auditor
Email	jhohn@surs.org	**Telephone**	217-378-8841
Address	1901 Fox Drive, Champaign, IL 61820		
Relevancy	Pension Valuation Audit with Very Similar Size and Similar Scope for a Public Client		
Impact	Our team completed the audit review ahead of schedule, identified numerous places where improvements could be made based on the current economic environment and recent actuarial trends, and presented a consolidated and actionable executive summary. Athena validated the valuation results and did not identify any significant deficiencies in the reporting and did not identify any significant issues with the basis for which assumptions were determined. As part of the audit, we identified 35 recommendations which could be considered to improve the accuracy of results, transparency of disclosures, and adherence to the applicable ASOPs. We also provided detailed commentary on the funding and amortization method and the impact on the contribution rates.		

Reference #3			
Client	Defense Civilian Personnel Advisory Service (DCPAS)		
Date	6/27/2022 - 6/27/2027		
Purpose	Pension and health actuarial services, including audit of reserves, pension reports and annual filings. Client hired Athena to perform annual actuarial audits of seven (7) pension valuation reports prepared by three (3) actuarial firms with combined assets over $10B, liabilities over $9B, and ~130,000 members.		
Contact Name	Karen Dowd-Carpenter	Title	HR Specialist
Email	karen.v.dowd-carpenter.civ@mail.mil	Telephone	703-405-9561
Address	PO Box 183140, Columbus, OH 43218-3140		
Relevancy	Pension Valuation Audits with Similar Scope for a Public Client		
Impact	Our team completed the audit reviews ahead of schedule, identified numerous places where improvements could be made based on the current economic environment and recent actuarial trends, and presented a consolidated and actionable executive summary.		
Reference #4			
Client	Office of DC Pensions		
Date	5/5/2022 - Present		
Purpose	Annual pension valuation with supplemental open projections and an experience study with the development of credibility-weighted mortality tables for three (3) large pension plans with multiple contributing employers, and one (1) small single-employer fund. In total, the plans have ~15,000 members, consisting of general administrative employees, police, and firefighters		
Contact Name	Kande Hooten	Title	Assistant Director
Email	Kande.hooten@treasury.gov	Telephone	202-622-0052
Address	1500 Pennsylvania Avenue, NW, Washington, DC 20001		
Relevancy	Pension Valuation Support Relevant Scope for a Public Client		
Impact	Worked closely with Office of DC Pensions' staff to remediate several issues which had occurred before our engagement commenced; remarked by the client as having the clear, concise explanations that they needed to defend their position to the plan auditors. Also, a Letter of Recommendation is included in Section 4.6 Additional Information.		
Reference #5			
Client	Metropolitan Government of Nashville and Davidson County		
Date	1/30/2023 - 1/29/2024		
Purpose	Pension Actuarial Experience Study of plan with over $4B of assets, $4B of liabilities, and ~23,000 members.		
Contact Name	Ginger Hall	Title	Assistant Director, HR
Email	Ginger.hall@nashville.gov	Telephone	615-862-6640
Address	100 Metropolitan Courthouse, Nashville, TN, 37201		
Relevancy	Experience Study with Relevant Scope for Public Pension System		
Impact	Athena was engaged by Metro Nashville to perform an independent actuarial experience study covering a five year exposure period from 2017-2022. The study included a study of all valuation assumptions and methods, recommended assumptions for consideration by the Board, and the estimated financial impact of the assumption changes. Our study was performed in compliance with ASOPs, relevant accounting standards, and industry best practice and culminated with a presentation to the Board of our results and recommendations.		

4.5 Methodology, Work Product, and Timeline

RFP: Each proposal shall describe the proposed methodology for each element of the components listed under Scope of Audit. The description should include specific techniques that will be used, including anticipated sampling techniques and sizes, and proposed sources of data and information. You may propose alternative ways of addressing the elements of the audit's scope.

Our team has experience on both sides of the table, as the actuary and the auditor, giving us the unique ability to effectively critique assumptions, methods, and procedures, document communications in a transparent and actionable manner, and properly weigh materiality vs. effort when prioritizing our findings. We have delivered actuarial and consulting services across the public sector for several of the industry's most reputable consulting and audit firms, the most recent and notable being Deloitte. This project team's most complex actuarial audits the Defense Civilian Personnel Advisory Service ("DCPAS"), the City of Dallas Police and Fire Pension System, the City of Dallas Employees' Retirement Fund, the City of Atlanta Fire and Police Pension Plans, the City of Atlanta General Employees Fund, the Fresno County Employees' Retirement Association ("FCERA"), the State Universities Retirement System of Illinois, and three (3) retirement systems for a large city in Texas.

We will be performing Actuarial Audits on the two (2) June 30, 2023 SERS Valuations and the June 30, 2020 Five-Year Experience Study in accordance with the definition as promulgated by Government Financial Accounting Office ("GFOA"). Athena holds the perspective that actuarial audits should be more than just "checking the box." Our goal is to prepare a report and accompanying executive-level presentation informing our client of the most significant risks their plan is exposed to, especially if the current actuary's work product does not emphasize the potential impact of that risk. Now more than ever, public sector entities must make difficult decisions around managing risk. We believe that the actuarial auditor's role is to challenge the perspectives of the plan actuary to ensure that the plan is operating prudently on behalf of the plan participants. In addition to performing a diligent, detail-oriented review, we prepare a report that conveys our findings in laypeople's terms such that all stakeholders can glean the information they need for informed decision-making.

*We break our approach down into the following **six (6) key components** and seek to respond to the questions outlined below:*

01 Data Validity

- Was the data prepared and disclosed in compliance with ASOP No. 23?
- Were participants properly transitioned from active to annuitant status and properly removed from the active lives valuation and added to the retired lives valuation at the appropriate time?
- Was the data provided to the actuary through a secure transfer method and stored securely?
- Was the PII contained in the data properly protected? Was all PII collected necessary for completing the valuation?
- Was the data provided to the actuary utilized as the basis for the valuation?
- In the absence of available data, did the actuary make and properly disclose reasonable assumptions?
- Based on a sampling of test cases, is the data in the valuation consistent with the data provided to the actuary?

02 Actuarial Valuation Methods and Procedures

- Where applicable, was the asset valuation method selected and utilized according to ASOP No. 44?
- Did the actuary utilize the actuarial methods in accordance with Governmental Accounting Standards Board ("GASB")? If a method other than Entry Age Normal was selected, is there proper rationale used as a basis for that decision and is it cited?
- Were the valuation dates, measurement dates, and reporting dates selected in accordance with GASB?
- Based on a sampling of test cases, are the methods stated in the report utilized in the programming? (We use test cases to confirm.)
- Are outflows/inflows being recognized according to the method required by GASB?

03 Actuarial Valuation Assumptions

- Was the experience study performed in accordance with all applicable ASOPs and industry-leading practices?
- Were the economic and demographic assumptions selected and disclosed in accordance with ASOP No. 27 and ASOP No. 35, respectively?
- How were the assumptions selected? Was the experience study performed in accordance with all applicable ASOPs and industry-leading practices? Were assumptions set in accordance with statutory requirements, accounting standards, and industry-leading practices?
- Did the actuary provide enough information to the plan sponsor in the assumption-setting process such that a fully informed decision could be made?
- Based on a sampling of test cases, are the assumptions stated in the report utilized in the programming?
- Are the impacts of recent assumption changes reasonable?

04 Parallel Valuations

- Are the plan provisions adequately summarized in the report?
- Based on a sampling of test cases, are the plan provisions stated in the report utilized in the programming?
- Are we able to replicate the calculations in the actuary's exhibit to a reasonable degree?
- Are the plan provisions summarized in the report and utilized in the valuation consistent with the most recently released statute or participant benefit communication?
- Have changes in plan provisions been appropriately documented? Where changes have occurred, have they been accounted for in accordance with GASB?

05 Recommendations

- Are results communicated through any alternative formats aside from the actuarial valuation report? If so, is the format appropriate for the intended audience and are reported results consistent with the valuation report?
- Has the report been prepared in accordance with ASOP No. 41?
- Do the reports comply with ASOP 51: Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions?
- Is the report transparent and informative to the plan sponsor?
- Is the executive summary properly conveying key risks to the plan's stakeholders?

06 Review of Health Care

- Has the report and calculations been prepared in accordance with GASB 74 and 75?
- Are we able to replicate the calculations in the actuary's exhibit to a reasonable degree?
- Is the report transparent and informative to the plan sponsor?
- Are the retiree contributions to health care appropriately assessed?
- Are the SERS health care policies adequately being appropriately valued?

We employ a comprehensive methodology to ensure the successful execution of the actuarial audits, addressing the components specified in Section II of the RFP. Our approach combines traditional actuarial practices with modern data analytics and rigorous quality control procedures designed to provide accurate and transparent assessments of the SERS.

- **Data Validation and Collection:** We will meticulously validate and collect data from various sources, including SERS and the consulting actuary. This will encompass a review of critical calculations such as Total Pension Liability, Pension Expense, Deferred Outflows of Resources, and Deferred Inflows of Resources. Our analysis will also cover the accuracy of assumptions such as the single blended discount rate and average expected remaining service lives.
- **Assumption, Method, and Procedure Review:** Our methodology includes a detailed review of actuarial assumptions, methods, and procedures to ensure compliance with professional standards. We will assess the reasonableness and appropriateness of these assumptions based on SERS' structure and funding objectives.
- **Parallel Valuations:** We will replicate the valuations of the pension and retiree health care benefits utilizing the census data and the same actuarial assumptions to properly assess the consulting actuary's work.
- **Recommendations:** Should any assumption adjustments be recommended, we will provide detailed rationale and estimated impacts resulting from the proposed changes.
- **Health Care Review:** With the true client in mind - the ultimate beneficiaries of the program and their families - we will assess the appropriateness of retiree contribution determinations and whether the implementation differs.
- **Compliance Assessment:** We will rigorously evaluate the compliance of actuarial assumptions and calculations with GASB 67/68 standards, ensuring adherence to regulatory requirements.
- **Comparative Analysis:** Our audit will include comparative analyses against previous actuarial valuations, highlighting any significant changes and providing insights into the evolution of SERS' financial landscape over time.
- **Quality Control:** A multi-tier quality control process will be implemented to maintain the accuracy and integrity of our findings, ensuring that the audit results meet the highest standards of quality and reliability.
- **Alternative Approaches:** While we propose a comprehensive methodology, we remain flexible to adapt to SERS' specific needs. Our team is open to discussing alternative approaches and making adjustments based on your preferences and unique circumstances.
- **Sampling Techniques:** Our audit process will incorporate a combination of random and stratified sampling techniques tailored to the specific data sets involved. Sample sizes will be determined based on population size and data quality to ensure representative results.
- **Data Sources:** We anticipate sourcing data from multiple stakeholders, including SERS and the consulting actuary, to provide a holistic view of the retirement system's financial landscape.

In summary, our methodology prioritizes accuracy, transparency, and compliance with professional standards. We are committed to delivering a comprehensive actuarial audit that not only fulfills the specified components outlined in the RFP but also provides actionable insights to enhance the stability and sustainability of SERS.

RFP: In describing the proposed methodology, also identify the type and level of assistance that you anticipate will be needed from the staff of SERS and the consulting actuary, including: assistance to understand the operations and records of SERS; assistance to understand the actuarial assumptions, method, and procedures; and assistance to access, obtain, and analyze information needed for the audit. The description of the proposed methodology shall also identify meetings, interviews, programming support, space needs, etc., that you anticipate requiring from SERS and the consulting actuary.

To perform our actuarial audit, we require the following items to be provided by the plan actuary or the plan sponsor:

- **Raw Data:** Census data from the SERS pension administration system.
- **Trust Data:** Asset reconciliation which was provided to the actuary.
- **Valuation Data for Experience Study Period:** The Census data that was utilized as the basis for the actuarial valuation.
- **Test Cases:** We will utilize a stratified random sampling technique on the data provided to prepare a request for test cases; the actuary should provide the output directly from their valuation system.
- **Assumptions:** If abbreviated tables are disclosed in the valuation report, the actuary will need to provide full tables for assumptions.
- **Valuation Reports and Accounting Disclosure Reports:** All reports included in the audit will need to be provided, with supplemental accounting disclosure reports where applicable.

As for meetings and interviews, we are prepared for an initial kickoff meeting involving the SERS and the consulting actuary at the commencement of the contract term. The primary aim of this kickoff meeting(s) is to establish open and effective lines of communication and coordination among all stakeholders. We will delve into the scope, timelines, and expectations related to the actuarial audits. Moreover, this meeting(s) will provide an opportunity for the SERS and the consulting actuary to address any specific concerns, priorities, or areas of focus. In addition, we may reach out with data requests and clarification questions that may arise during the audit process, and will ask as early as possible to ensure minimal disruption to your day-to-day operations while maintaining transparency and the smooth progression of the audits. This may include a meeting with SERS after all actuarial information has been received and reviewed prior to performing the parallel valuations.

RFP: Each proposal shall also include one or more examples of work product(s) from actuarial valuations or audits that may help to illustrate the proposed methodology and final work product.

Our actuarial audit reports are structured with the following sections:

- Overall **opinion of the validity, completeness, and appropriateness** of the demographic and financial information used by the actuary;
- Overall **opinion of the reasonableness** of the actuary's valuation results and their conformance to ASOPs;
- **Detailed description of audit exceptions** with the estimated impact for each exception on SERS;
- **Detailed recommendations for improvement** presented clearly in the report; and
- Appended **response from plan actuary**.

A copy of an audit report that our team prepared for FCERA can be found in Appendix A. While this sample report reflects our standard structure and formatting, we want to emphasize our commitment to flexibility and tailoring our work to meet your needs. Understanding the importance of aligning with the ORSC and SERS's preferences and conventions, we are fully prepared to adapt our reports to the structure and style you are most familiar with.

RFP: Each proposal shall provide an estimated date that the final report will be submitted and the projected timeline or the anticipated work requirements and milestone dates to reach that date.

We have outlined the preliminary schedule below for each step of the actuarial audits. Timing will be adjusted to meet the needs of the SERS, as well as the availability of various data items. We have the resources and capacity to conduct the audits of the two (2) June 30, 2023 valuations and the June 30, 2020 Five-Year Experience Study, with the preliminary work products completed within 16 weeks. The following timeline applies to each audit simultaneously and is flexible to meet the needs of the SERS and the ORSC.

Timing	Task	Responsible
Audit Kickoff		
Day 0	Kickoff meeting with the SERS, the consulting actuary, and Athena (actuarial auditor) to discuss project details, deliverables, timeline, staff support, and expectations.	SERS/Cavanaugh Macdonald/Athena
By the end of week 1	Athena to provide data requests to SERS and the consulting actuary for information needed to complete the actuarial audits.	Athena
By the end of week 3	SERS to provide the actuarial auditor with the same data files as were given to the consulting actuary for the two (2) valuations and the experience study.	SERS
By the end of week 3	Consulting actuary to provide valuation data, complete tables of assumptions, health claims cost calculations, and other relevant actuarial information.	Cavanaugh Macdonald
Review of Experience Analyses		
By the end of week 4	Actuarial auditor reviews the consulting actuary's actuarial valuations, and documents preliminary findings and potential changes	Athena
By the end of week 4	Actuarial auditor requests tests cases	Athena
By the end of week 5	Actuarial auditor and SERS to meet after materials provided have been reviewed to gain a better understanding of the valuation data, benefits, methods, etc.	Athena/SERS
By the end of week 6	Consulting actuary provide actuarial auditor with test cases requested	Cavanaugh Macdonald
By the end of week 8	Actuarial auditor replicates the valuations using the same assumptions, methodologies, and funding method as the consulting actuary	Athena
By the end of week 10	Actuarial auditor reviews test cases and clarification from the consulting actuary and SERS to reconcile differences	Cavanaugh Macdonald/Athena
Deliver Report and Present Results		
By the end of week 14	Actuarial auditor issues a draft report with a preliminary conclusion and findings for the consulting actuary and SERS to review	Athena
By the end of week 14	Actuarial auditor presents an executive summary of the preliminary findings to the SERS and the consulting actuary	Athena
By the end of week 16	Comments/suggested changes from the consulting actuary and SERS are due, if any	Cavanaugh Macdonald
By the end of week 18	Final actuarial audit report is issued	Athena

Note: Please see Section 4.6 Additional Information for our overall project management approach.

4.6 Additional Information

RFP: It is permissible to include additional information that will be helpful to gain an understanding of the proposal. This may include diagrams, excerpts from reports, or other explanatory documentation that would clarify or substantiate the proposal. Any material included here should be specifically referenced elsewhere in the proposal.

Letters of Recommendation

FRESNO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
FCERA

7772 N. Palm Ave.
Fresno, CA 93711
(559) 457-0681 p.
(559) 457-0318 f.
FresnoCountyRetirement.org

August 19, 2022

To whom it may concern:

I am providing a letter of recommendation on behalf of my experience in working with Athena Actuarial Consulting ("Athena") on the contract to perform an actuarial audit for Fresno County Employees' Retirement Association which commenced on 9/1/2021 and concluded on 6/9/2022.

Scope of Services
For this engagement, Athena audited the most recently prepared valuation and experience studies prepared by the plan actuary, Segal Consulting. The audit included a full replication of the valuation.

Timeliness of Work Products
Work products were delivered on time based on the original schedule.

Quality of Services
Athena is fully qualified to perform actuarial audits. The activities and reports were professionally completed and presented. Professional and competent service equals quality service and that is what Athena provided.

Other Comments
Athena was able to handle an audit that was more complicated than a typical audit. We split our demographic and our economic assumptions into separate experience studies over two years resulting in the ultimate actuarial valuation that was fully replicated. This resulted in a longer than normal timeline and the stitching together of two data sets. Athena did well and was not tripped up by it.

Signed,

Don Kendig
Retirement Administrator
Fresno County Employees' Retirement Association

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

January 13, 2022

To whom it may concern:

I am providing a letter of recommendation on behalf of my experience in working with Athena Actuarial Consulting ("Athena") on the contract to perform actuarial services for the U.S. Department of the Treasury, Office of D.C. Pensions (ODCP), which commenced on April 12, 2021 and is still in place (option years extend to April 11, 2026). Athena's founder, Adrienne Ostroff, was a highly valued team member on the previous actuarial services contract covering 2016 to 2021 when she worked at Deloitte.

Quality of Work Products

The work products delivered under the contracts have met or exceeded the quality expectations defined in the Performance Work Statement (PWS) and comply with applicable Actuarial Standards of Practice. The high quality of the actuarial valuation report has contributed to ODCP receiving unmodified audit opinions for the last several years. ODCP had received an adverse audit opinion due to issues with the actuarial valuation in the year before Deloitte and Adrienne began providing actuarial services. ODCP received an unmodified opinion the first year of the contract. Adrienne and the Deloitte team continued to collaborate with ODCP to improve ODCP's internal controls, which resulted in no audit findings related to the actuarial valuation in the second year.

Timeliness of Work Products

All deliverables and other word products described in the PWS have been submitted on or before the designated due date. Progress updates were clear and transparent, such that our team was made aware far in advance of any potential delays or roadblocks. Athena's resources showed great flexibility during the most recent actuarial valuation when our team needed to revise the deliverable schedule to accommodate the availability of ODCP resources, including some deliverables being provided earlier than planned.

Understanding of Work Requirements

Athena's resources have time and again demonstrated their thorough understanding of our requirements and relied on their actuarial experience and expertise to deliver high-quality services. In addition to their actuarial expertise, Athena's resources are currently assisting us with evaluating our internal processes and procedures for preparing the participant data, with the goal of streamlining the process, improving documentation, and developing a tool to manage the data.

Consulting Relationship

Adrienne has been a great actuarial partner to us for several years. She is able to translate complex actuarial concepts into layman's language and tailor it to the audience, which has been necessary when briefing a variety of stakeholders - from upper management to IT experts to financial interns. Our retirement plans have some unique complexities and Adrienne has been able to quickly grasp the concepts, understand the level of detail required for reporting and audit purposes, and develop innovative ways to address our needs. Because our plan populations are primarily annuitants, Adrienne's participation in the SOA RPEC has been helpful and informative during our recent experience study and as we evaluate future impacts of mortality.

Sincerely,

Kande R. Hooten

Digitally signed by Kande R. Hooten
Date: 2022.01.13 16:36:54 -05'00'

Kande R. Hooten
Assistant Director, Benefits Administration
Office of D.C. Pensions

Resources Dedicated to Quality Assurance

Our organization leverages the best quality control practices utilized by the industry's largest and most reputable firms. Yet, our small-firm culture encourages our resources to remain agile and responsive in supporting our clients.

Prepare. The key deliverables under this contract will be prepared by Paula Villafane, in consultation with our credentialed actuaries. Consistency in this team member differentiates our team from larger actuarial firms, where staff members rotate throughout a project. We have backup support when necessary but strive to keep your team intact throughout the contract.

Check. Logan Grime, ASA, ACA and Alicia Traviss, FSA, EA, FCA, MAAA will review the deliverables, emphasizing the technical results and a strategic and consultative lens.

Review. Finally, Adrienne Lieberthal, FSA, EA, CERA, MAAA, FCA and Greg Drennan, ASA, EA, MAAA, FCA will provide independent reviews and ensure that the deliverables are compliant with all GASB and applicable actuarial standards of practice (ASOPs).

Project Management Approach

The ORSC can be confident that they will understand where things stand, any roadblocks (if applicable), and any items needed from the SERS or the consulting actuary to move forward. We rely on the following items to make sure we are all on the same page:

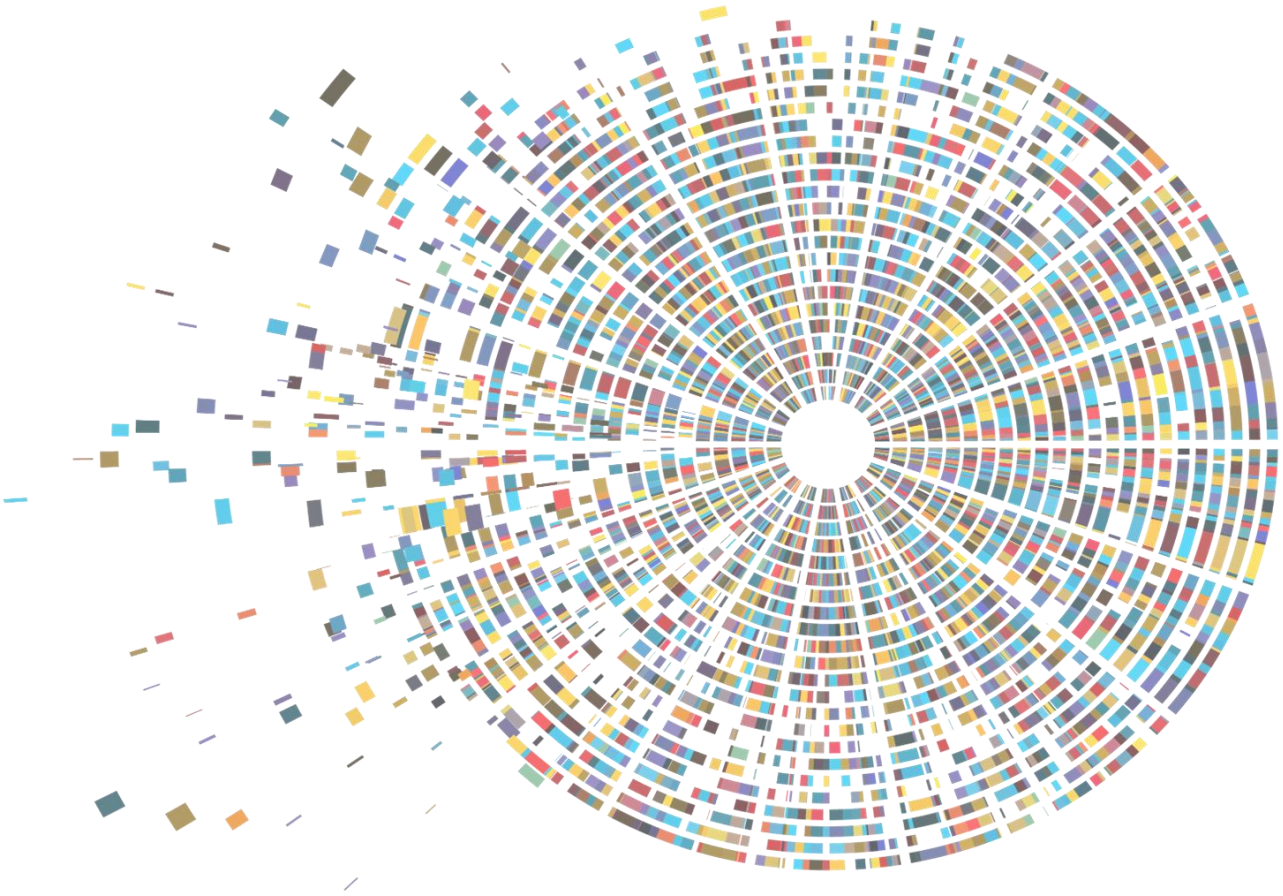
Kickoff Meeting: Prior to commencing, we meet with our client to discuss the following:

- Appropriate cadence for status updates provided via email with accompanying call, if desired;
- Preferred level of client involvement in reviewing iterative results and providing feedback;
- Key deadlines and timing requirements for reporting, certifying, or presenting;
- General timing for in-person meetings throughout the year; and
- Data that we will request throughout the year, to be provided in one (1) comprehensive data request after the meeting.

Status Updates: We utilize an informative and concise status update log, which is provided on an agreed-upon cadence (usually biweekly) and will alert the SERS of any issues. If any urgent problems arise, we will reach out to resolve them as soon as is feasible, and this log provides an efficient way for stakeholders to understand where the engagement stands.

Debrief Meeting: We set aside time each year to review the valuation and consider any improvements for the following year. We want to make sure that we exceed your expectations wherever possible.

At Athena, we believe in the power of effective project management to drive successful outcomes. To this end, we employ cutting-edge project management tools like Asana, which enables us to maintain a highly organized and efficient workflow. Asana facilitates seamless communication, transparent task tracking, and real-time project updates. Additionally, we understand that successful projects are built on strong collaboration. That's why we internally host regular 'Retirement Office Hours' for our project managers to meet with leadership. These sessions provide a platform for open discussions, sharing insights, and addressing client questions or concerns promptly. By combining the efficiency of digital tools with the value of real-time interactions, we ensure a well-rounded approach to project management that keeps our team engaged, informed, and equipped to efficiently support clients like the ORSC.



4.7 Glossary

RFP: Each proposal shall provide a glossary of all abbreviations, acronyms, and technical terms used to describe the services or products proposed. This glossary should be provided even if the terms are described or defined when first used in the proposal response.

- **ASC 712:** ASC 712 deals with non-pension post-employment benefits.
- **ASC 715-30:** This Accounting Standards Codification (ASC) section relates to how employers report defined benefit pension costs in their financial statements.
- **ASOPs:** Actuarial Standards of Practice; these are the professional standards that actuaries must follow in their work.
- **Athena:** Athen Actuarial Consulting, the Proposer.
- **Conference of Consulting Actuaries (CCA):** A professional organization of consulting actuaries in the U.S.
- **Diversity, Equity and Inclusion (DEI):** A collective term used to describe policies and programs that promote diversity, equity, and inclusion in organizations and institutions.
- **Enrolled Actuaries (EA):** Actuaries who are authorized by the federal government to perform actuarial services required by the Employee Retirement Income Security Act (ERISA).
- **Fellows of the Conference of Consulting Actuaries (FCA):** Actuaries who have met the requirements for Fellowship in the Conference of Consulting Actuaries, a professional organization focused on actuarial consulting.
- **Fellows of the Society of Actuaries (FSA):** Actuaries who have completed the rigorous requirements and exams of the Society of Actuaries, earning the highest professional designation.
- **GASB 67/68:** Governmental Accounting Standards Board (GASB) Statements 67 and 68 address the financial reporting and accounting standards for pension plans of state and local governments.
- **Government Financial Accounting Office (GFOA):** The Government Finance Officers Association, which provides resources and support for government financial professionals.
- **IAS19:** International Accounting Standard 19, which deals with accounting for employee benefits.
- **Members of the American Academy of Actuaries (MAAA):** Actuaries who are part of the professional organization known for its commitment to serving the public and the U.S. actuarial profession.
- **ORSC:** Ohio Retirement Study Council
- **Retirement Plan Experience Committee (RPEC):** A part of the Society of Actuaries (SOA) dedicated to analyzing mortality trends within retirement plans.
- **Retirement Section Council (RSC):** A part of the Society of Actuaries (SOA) dedicated to retirement actuarial issues.
- **SERS:** School Employees Retirement System of Ohio
- **Society of Actuaries (SOA):** A professional organization for actuaries in the U.S.
- **SSAP 92:** This is Statutory Statement of Accounting Principles No. 92, which relates to accounting for post-employment benefits in the insurance industry.

4.8 Cost Information

RFP: The pricing summary should include a breakdown of costs per element listed under Scope of Audit, including: personnel costs (including hourly rates and estimated hours for professional and clerical staff assigned to the audit); travel and lodging; data processing costs; materials, and any other potential costs. The cost estimates in the pricing summary must include all necessary charges to complete the audit and must be a "not to exceed" figure.

When it comes to billing, we believe the simpler, the better. As a small actuarial firm, we are free from the overhead and administrative loads that our large firm competitors add to your hourly billing rates. We can also customize our billing model to meet the needs of our clients.

Not-To-Exceed Figures

Data Validity			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	10	$3,950
Adrienne Lieberthal	$395	6	$2,370
Greg Drennan	$395	2	$790
Emily Redder	$291	2	$582
Logan Grime	$218	6	$1,308
Paula Villafane	$218	1	$218
Total		**27**	**$9,218**

Actuarial Valuation Method and Procedures			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	10	$3,950
Adrienne Lieberthal	$395	6	$2,370
Greg Drennan	$395	2	$790
Emily Redder	$291	4	$1,164
Logan Grime	$218	3	$654
Paula Villafane	$218	2	$436
Total		**27**	**$9,364**

Actuarial Valuation Assumptions			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	14	$5,530
Adrienne Lieberthal	$395	8	$3,160
Greg Drennan	$395	3	$1,185
Emily Redder	$291	4	$1,164
Logan Grime	$218	3	$654
Paula Villafane	$218	4	$872
Total		**36**	**$12,565**

Parallel Valuation			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	24	$9,480
Adrienne Lieberthal	$395	16	$6,320
Greg Drennan	$395	1	$395
Logan Grime	$218	40	$8,720
Total		**81**	**$24,915**

Recommendations			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	16	$6,320
Adrienne Lieberthal	$395	10	$3,950
Greg Drennan	$395	5	$1,975
Emily Redder	$291	4	$1,164
Logan Grime	$218	4	$872
Paula Villafane	$218	2	$436
Total		**41**	**$14,717**

Review of Health Care			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	2	$790
Greg Drennan	$395	1	$395
Emily Redder	$291	13	$3,783
Paula Villafane	$218	17	$3,706
Total		**33**	**$8,674**

Total			
Personnel	**Hourly Rate**	**Hours**	**Costs**
Alicia Traviss	$395	**76**	**$30,020**
Adrienne Lieberthal	$395	**46**	**$18,170**
Greg Drennan	$395	**14**	**$5,530**
Emily Redder	$291	**27**	**$7,857**
Logan Grime	$218	**56**	**$12,208**
Paula Villafane	$218	**26**	**$5,668**
Grand Total		**245**	**$79,453**

Costs for on-site travel

Travel would be billed directly to the client based on actual travel costs. Meetings can be held virtually to avoid additional costs.

Appendix A: Sample Actuarial Audit Report

We have attached a sample Actuarial Audit report completed for the Fresno County Employees' Retirement Association in California, which serves as an example of the high-quality work the ORSC and SERS can anticipate from Athena. This report showcases our standardized yet flexible structure. We understand each client's unique needs, and thus, we are fully prepared to customize the SERS report to align seamlessly with its specific requirements and expectations.

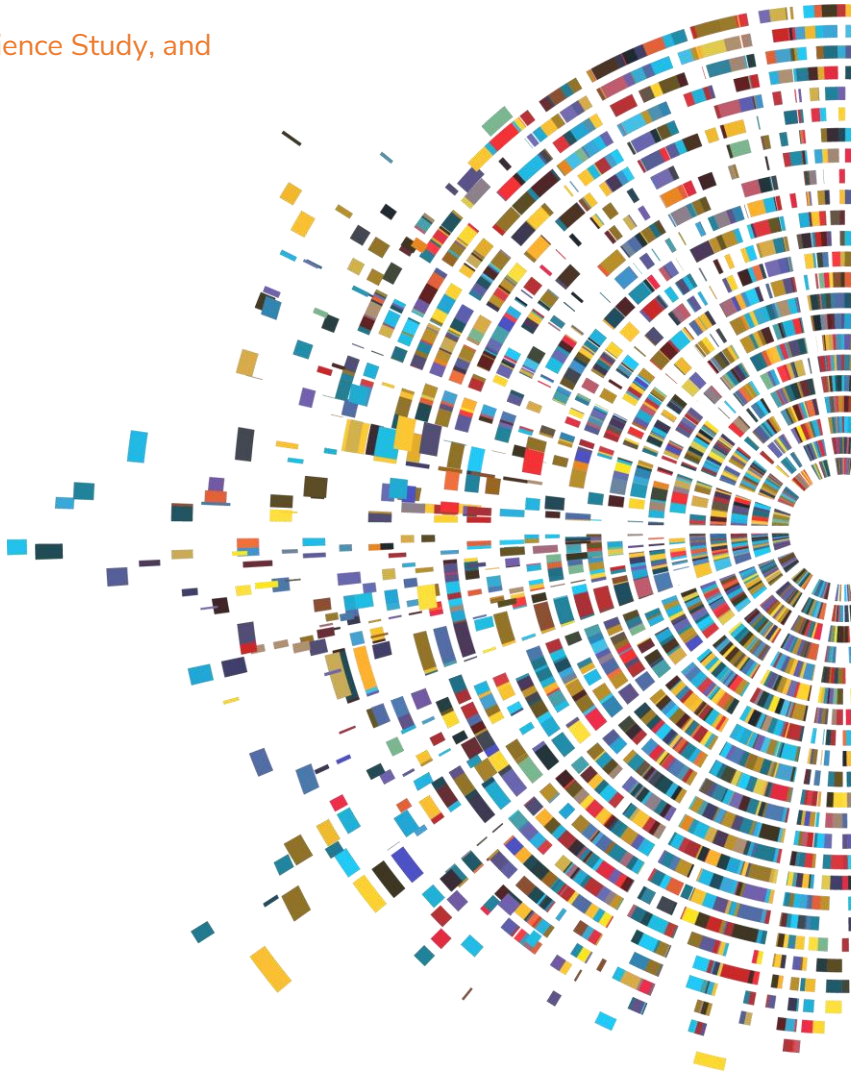
ATHENA
ACTUARIAL CONSULTING

Fresno County Employees' Retirement Association

Review of the June 30, 2021 Actuarial Valuation,

July 1, 2015 – June 30, 2018 Actuarial Experience Study, and

Subsequent Economic Assumption Review



Actuarial Peer Review Audit

Prepared by Athena Actuarial Consulting

June 1, 2022

1-888-989-8967

info@athenaactuarial.com

8014 Hwy 55, Ste 610,
Golden Valley, MN 55427

certified WBENC WOMEN'S BUSINESS ENTERPRISE

CONTENTS

Actuarial Valuation Opinion

This report presents the results of Athena Actuarial Consulting's actuarial audit of the June 30, 2021 actuarial valuation of Fresno County Employees' Retirement Association ("FCERA"), the analysis of actuarial experience covering the period from July 1, 2015 to June 30, 2018, and the subsequent off-cycle review of the economic assumptions adopted June 16, 2021 performed by The Segal Company ("Segal").

All data and information, including participant data, financial information, and plan descriptions have been provided by FCERA and Segal to be used as the basis of this review. Athena Actuarial Consulting ("Athena") has analyzed the data and other information provided for reasonableness. The actuary has no reason to believe the data or other information provided is not complete and knows of no further information that was essential to the preparation of Segal's actuarial valuation.

The undersigned with actuarial credentials collectively meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. This report was prepared solely for the benefit and internal use of FCERA. We understand that FCERA may share the recommendations and conclusions with the plan actuary. This report is not intended for the benefit of any other party and may not be relied upon by any third party for any purpose, and Athena Actuarial Consulting accepts no responsibility or liability with respect to any party other than FCERA.

To the best of our knowledge, no real or perceived conflict of interest exists between FCERA and Athena Actuarial Consulting which would impair the objectivity of the work detailed in this report.

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Executive Summary

Purpose of the Review

Athena performed a complete independent replication of Segal's FCERA actuarial valuation as of June 30, 2021 and reviewed the data, assumptions, methods and interpretations of plan provisions underlying that valuation. In addition, a review of the analysis of actuarial experience covering the period July 1, 2015 to June 30, 2018, and of the economic assumptions adopted as of June 16, 2021 was conducted.

The primary goals in this actuarial audit were to evaluate the following:

- the available data for the performance of the experience study, the degree to which such data is sufficient to support the conclusions of the study, and the use and appropriateness of any assumptions made regarding such data;
- the results of the experience study, and reconciliation of any discrepancies between the findings, assumptions, methodology, rates, and/or adjustments of Athena and FCERA's consulting actuary;
- the available data for the performance of the June 30, 2021 valuation, the degree to which such data is sufficient to support the conclusions of the valuation, and the use and appropriateness of any assumptions made regarding such data;
- the recommended economic and non-economic assumptions as presented in FCERA's consulting actuary's Review of Economic Actuarial Assumptions; and
- Athena's replication of the June 30, 2021 valuation results and reconciliation of any discrepancies between the findings, assumptions, methodologies, rates, and/or adjustments of Athena and FCERA's consulting actuary.

Athena's review approach can be broken down into the following six key components: data, assumptions, methods, plan provisions, results, and report communications. Each key component was thoroughly assessed for reasonableness, and the results have been documented herein.

Audit Opinion

Based on our work replicating valuation results and preparing the actuarial audit, we believe that Segal's actuarial valuation report complies with the applicable Actuarial Standards of Practice ("ASOPs").

We performed a full replication of Segal's June 30, 2021 actuarial valuation and did not identify any material differences in calculations of plan liabilities, actuarial value of assets, and overall contribution rates from the amounts calculated by Segal based on the current data, assumptions, methods, and plan provisions. We believe that the valuation prepared by Segal for FCERA as of June 30, 2021 appears to be reasonable and can be relied on by the Board for its intended purpose.

We have prepared a comprehensive list of recommendations in the subsequent section. As stated in the prior section, we believe the valuation results and experience study analyses were prepared in a reasonable manner. However, we have summarized 45 recommendations which should be considered to improve the accuracy of results, transparency of disclosures and adherence to the applicable ASOPs.

The majority of the recommendations are expected to have a "low" level of impact on the overall results. There are no items which we believe would have a "high" level of impact on results. The items which may have a "medium" level of impact should be prioritized by Segal and FCERA; they fall into three categories:

1. **Credibility Concerns:** It was acknowledged by Segal that, statistically, this population is not fully credible for purposes of setting the mortality, retirement, termination, and disability assumptions. In some cases, the population is partially credible, in others, the population experience is too limited to consider as even partially credible. In the scenarios where the population is partially credible, we recommend that Segal consider a more mathematical and robust analysis to apply credibility theory in the development of these assumptions. In the scenarios where the population is not even partially credible, we recommend that Segal look to sources related to similar, larger populations as the basis for these assumptions.
2. **Amortization Policy Considerations:** FCERA's current amortization policy is consistent with CAAP and GFOA guidance. With the current revision to ASOP No. 4, we recommend that Segal work closely with FCERA to consider the implications of adverse scenarios under the current amortization policy, and how those scenarios may be mitigated by alternative amortization policies.
3. **Impact of COVID-19**: While not in the scope of this actuarial audit, the next experience analyses will need to determine an approach to reviewing data during the period impacted by COVID-19. The most recent experience analysis did not consider the impact of COVID-19 due to lack of available data. We have included some considerations and potential impacts of COVID-19 in this report.

For ease of review, these three "themes" have been expanded upon in the comprehensive list of recommendations to follow, with more detail to follow in the report.

Comprehensive List of Recommendations

There were 45 recommendations noted by Athena during the course of the actuarial audit. These findings are summarized in the table on the following page and described in detail in the subsequent sections of this report. Our recommendations should be taken under consideration by the Board and/or Segal in preparation for future actuarial valuations. The expected level of impact has been provided at a level of high, medium or low within the table. It should be noted that none of the findings are believed to have a "high" level of impact, and should therefore be considered as recommended improvements, rather than changes which would have a material impact on results.

Each section break and page number is a live hyperlink which can be clicked to navigate to more information.

No.	Impacted Item	Page #	Level of Impact	Recommendation	Affected Party
General Commentary on COVID-19 Impact on U.S. Public Pension Plans					
1	Economic and Demographic Projections – Impact of COVID-19	12	Medium	Perform projections using a scenario analysis which demonstrates the impact on contribution rates and other key reporting metrics.	Segal
2	June 30, 2021 Census Data	20	Low	Disclose specific data assumptions in the valuation report.	Segal
3	June 30, 2021 Census Data	20	Low	Clarify treatment of "pending withdrawal" population.	Segal
4	June 30, 2021 Census Data	20	Low	Consider valuing "fractional" sex for member and spouse sex assumptions where data is unknown.	Segal
5	June 30, 2021 Census Data	20	Low	Clarify availability of data and how it is utilized for service with reciprocal employer, COLA bank, employee contribution refunds, and annual leave bank.	Segal
6	June 30, 2021 Census Data	20	Low	To the extent not part of current administrative procedure, consider outreach to terminated vested participants over age 70.	FCERA
Review of Economic Assumptions					
7	Inflation Rate	23	Low	Given the volatile current environment, closely monitor the inflation assumption.	Segal
8	Inflation Rate	23	Low	Reconcile differences between inflation rates predicted by markets/Social Security and what is being predicted by Verus for the FCERA system.	Segal

9	Investment Return	25	Low	Assess whether the input from the 5 investment advisory firms is relevant to FCERA. Disclose whether asset classes of these investment returns were able to be matched exactly to FCERA's portfolio or state necessary assumptions.	Segal
10	Investment Return	25	Low	Reconcile differences between weighted real average of return determined by Verus and the overall weighted real average of return among the six firms combined.	Segal
11	Investment Return	25	Low	Provide information on FCERA's investment policy statement.	Segal
12	Investment Return	25	Low	Calculate and disclose the differences between the arithmetic and geometric assumed real rates of return.	Segal
13	Cost of Living Adjustment ("COLA")	28	Low	Consider actual market conditions and other reference sources when developing the COLA assumption.	Segal
14	COLA	28	Low	Track and disclose historical COLA vs. standard CPI measures.	Segal
15	COLA	28	Low	Provide additional information regarding how the excess COLA bank is tracked year-over-year such that a replication of this feature could be performed.	Segal
16	Merit and Promotional Increases	30	Medium	Include Merit and Promotional Increases as a part of the analysis when economic assumptions are being studied.	Segal
17	Merit and Promotional Increases	30	Medium	Consider conducting discussions with HR or compensation professionals to understand any anticipated future changes to compensation or hiring plans, including potential impact of COVID-19.	Segal
18	Active Member Payroll	32	Low	Consider modeling scenarios to understand the impact on UAAL contribution rates of lower payroll growth (or even payroll declines).	Segal
Review of Demographic Assumptions					
19	Retirement Rates	35	Medium	Consider expanding the number of years included in the study (i.e., to improve credibility) OR increasing reliance on experience of large state retirement systems (i.e., CalPERS).	Segal

20	Retirement Rates	35	Low	Demonstrate analysis of retirement rates as a function of both age and service to support any conclusions made in the development of the assumption.	Segal
21	Retirement Rates	35	Low	Review methodology for setting assumptions when no retirements occur over the exposure period.	Segal
22	Retirement Rates	35	Low	Provide commentary as to how the retirement age assumption is reflected for current and future reciprocal participants in future valuations*.	Segal
23	Reciprocity	38	Low	Use the past three years of data as of June 30 to develop reciprocal assumptions rather than just data as of 6/30/2018.	Segal
24	Reciprocity	38	Low	Provide further clarification on how retirement age is assumed for future and current reciprocal employees*.	Segal
25	Marital Percentage, Sex, and Age Assumptions	40	Low	Disclose what additional "studies done for other retirement systems" were referenced for determining the survivor age and sex assumptions.	Segal
26	Marital Percentage, Sex, and Age Assumptions	40	Low	Continue to monitor the survivor sex assumption and consider using a blended assumption for same-sex vs. opposite-sex surviving spouses.	Segal
27	Marital Percentage, Sex, and Age Assumptions	40	Low	Consider collecting active beneficiary data to conduct independent analysis and development of future retiree spousal age and sex assumptions.	FCERA
28	Marital Percentage, Sex, and Age Assumptions	40	Low	Review language for future studies and valuations to reflect a complete description of the spousal assumption.	Segal
29	Mortality	42	Low	Provide additional rationale for the updated pre-retirement mortality and disabled mortality assumptions, including actual amounts-weighted analysis for pre-retirement mortality.	Segal

30	Mortality	42	Medium	Provide a credibility demonstration that blends actual plan experience with standard base mortality tables*.	Segal
31	Mortality	42	Low	Provide rationale explaining why 100% of Safety disabilities are assumed service connected, while no pre-retirement deaths are assumed service connected.	Segal
32	Mortality	42	Medium	Consider using separate tables for healthy retirees and beneficiaries based on the provided healthy annuitant and contingent survivor Pub-2010 tables*.	Segal
33	Mortality	42	Medium	Monitor future MP scale releases and mortality improvement reports to ensure that significant changes are reflected.	Segal
34	Mortality	42	Low	Conduct an off-cycle analysis or apply same fully generational mortality tables used in valuation for conversion to optional forms when possible.	Segal
35	Mortality	42	Low	Clarify methodology for male/female blend of member contribution mortality and disclose the specific uses of this table in the valuation report.	Segal
36	Termination Rates	49	Low	Demonstrate analysis of termination rates as a function of both age and service to support any conclusions made in the development of the assumption.	Segal
37	Termination Rates	49	Low	Consider additional factors that could influence the proportion of terminated members assumed to receive refund.	Segal
38	Disability	51	Medium	Consider studying additional years of data such that plan experience analysis is considered credible OR consider relying on a state system disability assumption (i.e., CalPERS).	Segal

39	Disability	51	Low	Demonstrate analysis of disability incidence rates as a function of both gender and age to support any conclusions made in the development of the assumption.	Segal
40	Disability	51	Low	Disclose assumptions regarding disability lag time.	Segal
41	Annual Leave Conversion	53	Low	Disclose details of ongoing analysis performed to develop annual leave conversion assumptions and consider using the past three years of data as of June 30 to develop annual leave conversion assumptions rather than just data as of 6/30/2018 for future experience studies.	Segal
42	Annual Leave Conversion	53	Low	Analyze year over year data on annual leave amounts to determine any potential trends for future experience studies.	Segal
Review of Methods					
43	Actuarial Cost Methods	55	Low	We understand that the Entry Age Normal Cost Method is prescribed by GASB. We recommend noting that it is prescribed in the accounting valuation report, to comply with ASOP 4.	Segal
44	Amortization Policy	58	Medium	Perform analysis to demonstrate potential impact of adverse scenarios on the plan and understand effect of possible changes to the amortization policy.	Segal
Review of Report Communications					
45	Report Communications	61	Low	Add qualitative description of context to graphs on pages 74-75.	Segal

**Segal has indicated that these findings have been addressed in an analysis performed since this audit commenced.*

General Commentary on COVID-19 Impact on U.S. Public Pension Plans

Segal performed an experience study, spanning the period of July 1, 2015 through June 30, 2018, dated April 9, 2019, with a subsequent Review of Economic Actuarial Assumptions for the June 30, 2021 Actuarial Valuation dated June 8, 2021. Since the original experience study was released, events surrounding COVID-19 have impacted actual experience and anticipated outlook. The Review of Economic Actuarial Assumptions intentionally excluded analysis of the effects of COVID-19, due to the difficulty of determining "how and to what extent the economy may be affected." While it is still difficult to ascertain the impact of COVID-19 and related events on key economic and demographic assumptions, we have prepared a summary of industry information which could be considered by Segal and FCERA for the upcoming valuation.

Assumptions have been deemed "key" based on assumptions which tend to be most critical to pension plans in general. The evaluation of COVID-19 impact on the FCERA population is out of the scope of this actuarial audit, however, it would be remiss not to include considerations for the upcoming valuation given the state of the pandemic.

Impact on Key Demographic Assumptions

Mortality

The United States experienced higher than expected mortality for 2020-2022. The extent to which FCERA's population was impacted compared to the greater population has not been explicitly quantified. It may be challenging to isolate the impact due to COVID-19, but special precaution will need to be taken when performing the next experience study for FCERA, presumed to cover the period from June 30, 2018 through June 30, 2021. While the actual mortality experience is captured with each new valuation as the population changes are reflected in the census, the long-term effects of COVID-19 and other medical challenges occurred during 2020-2022. We recommend that FCERA and Segal monitor reports and information released from the Retirement Plans Experience Committee ("RPEC"), a Society of Actuaries ("SOA") committee that periodically collects data, and studies and releases public sector mortality tables ("Pub-2010"). Segal is currently utilizing the SOA's Pub-2010 mortality tables in the development of the plan's mortality assumption. The next public sector mortality study is underway with expected table release within the next two years.

In addition, RPEC releases mortality projection improvement scales annually. The most recent improvement scale, MP-2021, is based on mortality through the year 2019. Segal has not updated the mortality projection improvement scale since MP-2018, a practice which is further investigated in the Review of Demographic Assumptions section. This practice should be revisited in the context of new information released around COVID-19.

Retirement

Across the U.S., it has been reported that public pension plan participants – teachers, police officers, firefighters and other general employees – have exhibited different retirement patterns during the years 2020-2022 than in the

past. In particular, individuals who had met retirement eligibility criteria commenced retirement at higher rates than in the past.

Disability

Similar to retirement experience, U.S. public pension plans experienced higher than typical disability incidence. The degree to which this experience deviated from expectations varied based on geography and disability administrative practices.

Impact on Key Economic Assumptions

Inflation

Based on the "building block" approach to developing economic assumptions, inflation is a key foundational element underlying wage increases and discount rates. Throughout 2020-2022, the US experienced higher rates of inflation than in previous years. Since inflation assumptions for pension valuations should be based on long-term expectations, it is not clear how the recent volatility in consumer prices should be reflected in the inflation assumption (if at all)

Market Volatility

In any given year, market volatility is to be expected; however, we saw more volatility during the 2020-2022 period than we would expect in a typical three-year period. Since pension plans require the management of long-term risk, the recent market volatility is not necessarily indicative that a major change is needed.

Athena's Recommendations:

1. On page 10 of the June 30, 2021 actuarial valuation report, item #15, Segal points out that "market conditions have changed significantly since the onset of the Public Health Emergency…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." Segal offered their availability to prepare projections of possible outcomes upon request. **We recommend that these projections be performed using a scenario analysis which identifies potential economic and demographic scenarios and demonstrates the impact on contribution rates and other key reporting metrics.** It would be prudent to summarize this information in a memo or report similar to the Review of Economic Assumptions for the June 30, 2021 Actuarial Valuation, summarizing the impact of COVID-19 on the covered population compared to the state of California and greater U.S.

Review of Results

Replication of Liabilities

Athena's Assessment of Reasonableness:

The pension liabilities represent the present value of benefits due in the future. There are different ways of accruing this liability over time; these cost methods are dictated by the accounting standard which governs a plan and the Actuarial Standards of Practice ("ASOP"). Under the scope of work for this actuarial audit, Athena performed an independent replication of Segal's liabilities based on the data provided and our understanding of the plan's provisions. The table below displays Segal's key results compared to Athena's independent calculations. Due to differences in actuarial software and procedures, results prepared by different actuaries (using the same data and plan provisions) may not be identical – i.e., differences could be as large as 3%-5%. For these replications, we expect that the difference between the original calculation and the replication should not exceed 3%-5%.

Key Liability Measures	As of June 30, 2021 (thousands)		
	Segal	Athena	Difference
Present Value of Future Benefits (PVFB)			
Active Participants	$ 3,086,448	$ 3,062,740	-0.77%
Inactive Vested Participants	348,871	345,470	-0.97%
Retired Members and Beneficiaries	4,191,596	4,207,275	0.37%
TOTAL	7,626,915	7,615,485	-0.15%
Actuarial Accrued Liability (AAL)			
Active Participants	$ 2,109,164	$ 2,062,195	-2.23%
Inactive Vested Participants	348,871	345,470	-0.97%
Retired Members and Beneficiaries	4,191,596	4,207,275	0.37%
TOTAL	6,649,631	6,614,940	-0.52%
Actuarial Value of Assets	5,710,379	5,710,379	0.00%
Unfunded Actuarial Accrued Liability (UAAL)	939,252	904,561	-3.69%
Funded Ratio	85.88%	86.33%	
Total Salary	$ 482,500	$ 484,116	0.33%
UAAL as a % of Covered Payroll	194.66%	186.85%	
Discount Rate	6.50%	6.50%	

The Present Value of Future Benefits ("PVFB") is the most foundational metric used in a replication. We have displayed the other key metrics which are provided in an actuarial valuation report; however, it should be noted that these metrics are based on PVFB. Even so, for all key metrics the difference between the original calculation and the replication is within the 3%-5% threshold. We believe that **Segal's results appear to be reasonable.**

Replication of Active Liabilities by Tier

Athena's Assessment of Reasonableness:

Under the scope of the actuarial audit, we performed an independent replication of various key plan active metrics by tier, including the Present Value of Future Benefits, Accrued Liability, and Normal Cost. When reviewing each metric by tier, it should be noted that small changes may be magnified, though still deemed immaterial relative to the overall liability. Based on our independent validation of each key metric by group and in aggregate, we believe that **Segal's results appear to be reasonable.**

Active Members	As of June 30, 2021		
	Segal	Athena	Difference
General Tier 1			
Present Value of Future Benefits	$ 1,719,232	$ 1,706,722	-0.73%
Actuarial Liability (AL)	1,399,568	1,387,724	-0.85%
Normal Cost	36,110	34,220	-5.23%
General Tier 2			
Present Value of Future Benefits	$ 43,189	$ 42,160	-2.38%
Actuarial Liability (AL)	27,034	26,163	-3.22%
Normal Cost	1,409	1,415	0.43%
General Tier 3			
Present Value of Future Benefits	$ 191,216	$ 188,310	-1.52%
Actuarial Liability (AL)	119,222	117,121	-1.76%
Normal Cost	6,010	6,030	0.33%
General Tier 4			
Present Value of Future Benefits	$ 44,238	$ 43,764	-1.07%
Actuarial Liability (AL)	18,971	18,735	-1.24%
Normal Cost	1,571	1,646	4.77%
General Tier 5			
Present Value of Future Benefits	$ 411,756	$ 410,279	-0.36%
Actuarial Liability (AL)	104,098	98,770	-5.12%
Normal Cost	14,908	15,260	2.36%
TOTAL GENERAL			
Present Value of Future Benefits	$ 2,409,631	$ 2,391,235	-0.76%
Actuarial Liability (AL)	1,668,893	1,648,513	-1.22%
Normal Cost	60,008	58,571	-2.39%

Safety Tier 1			
Present Value of Future Benefits	$ 461,518	$ 453,093	-1.83%
Actuarial Liability (AL)	379,194	354,543	-6.50%
Normal Cost	10,717	11,220	4.69%
Safety Tier 2			
Present Value of Future Benefits	$ 38,351	$ 38,144	-0.54%
Actuarial Liability (AL)	21,351	20,515	-3.92%
Normal Cost	1,320	1,327	0.53%
Safety Tier 4			
Present Value of Future Benefits	$ 25,650	$ 27,184	5.98%
Actuarial Liability (AL)	9,594	9,474	-1.25%
Normal Cost	904	899	-0.55%
Safety Tier 5			
Present Value of Future Benefits	$ 151,298	$ 153,083	1.18%
Actuarial Liability (AL)	30,132	29,150	-3.26%
Normal Cost	4,609	4,119	-10.63%
TOTAL SAFETY			
Present Value of Future Benefits	$ 676,817	$ 671,505	-0.78%
Actuarial Liability (AL)	440,271	413,682	-6.04%
Normal Cost	17,550	17,565	0.09%
TOTAL - ALL ACTIVES			
Present Value of Future Benefits	$ 3,086,448	$ 3,062,740	-0.77%
Actuarial Liability (AL)	2,109,164	2,062,195	-2.23%
Normal Cost	77,558	76,136	-1.83%

Replication of Contribution Rates

Athena's Assessment of Reasonableness:

The pension plan has unfunded actuarial accrued liability (UAAL), which reflects the portion of the benefit obligation that has not yet been funded by existing assets. To fund this UAAL, contributions must be made by both the employer and employee. Contribution rates are set based on a calculation of a theoretical annuity due from the plan and these contributions are the primary method of funding the plan.

Under the scope of the actuarial audit, we calculated the contribution rates based on the liability measures which were calculated under Athena's replication. These values for employee and employer contribution rates have been summarized in the tables below.

Employer Contribution Rates	As of June 30, 2021		
	Segal	Athena	Difference
General Tier 1			
Normal Cost	22.17%	21.20%	-4.38%
UAAL	33.22%	32.68%	-1.63%
Total Contribution	55.39%	53.88%	-2.72%
General Tier 2			
Normal Cost	18.71%	18.93%	1.18%
UAAL	33.22%	32.68%	-1.63%
Total Contribution	51.93%	51.61%	-0.62%
General Tier 3			
Normal Cost	19.15%	19.41%	1.36%
UAAL	33.22%	32.68%	-1.63%
Total Contribution	52.37%	52.09%	-0.53%
General Tier 4			
Normal Cost	10.53%	11.21%	6.46%
UAAL	33.22%	32.68%	-1.63%
Total Contribution	43.75%	43.89%	0.31%
General Tier 5			
Normal Cost	8.00%	8.33%	4.13%
UAAL	33.22%	32.68%	-1.63%
Total Contribution	41.22%	41.01%	-0.51%
Safety Tier 1			
Normal Cost	30.44%	31.85%	4.63%
UAAL	49.02%	47.56%	-2.98%
Total Contribution	79.46%	79.41%	-0.06%
Safety Tier 2			
Normal Cost	31.04%	31.18%	0.45%
UAAL	49.02%	47.56%	-2.98%
Total Contribution	80.06%	78.74%	-1.65%
Safety Tier 4			
Normal Cost	17.32%	17.16%	-0.92%
UAAL	49.02%	47.56%	-2.98%
Total Contribution	66.34%	64.72%	-2.45%
Safety Tier 5			
Normal Cost	13.26%	11.78%	-11.16%
UAAL	49.02%	47.56%	-2.98%
Total Contribution	62.28%	59.34%	-4.73%

Employee Contribution Rates	As of June 30, 2021		
	Segal	Athena	Difference
General Tier 1	11.15%	11.20%	0.45%
General Tier 2	7.32%	7.40%	1.09%
General Tier 3	8.78%	8.80%	0.23%
General Tier 4	7.82%	7.90%	1.02%
General PEPRA	8.00%	8.33%	4.13%
Safety Tier 1	14.18%	14.20%	0.14%
Safety Tier 2	12.19%	12.20%	0.08%
Safety Tier 4	11.47%	11.40%	-0.61%
Safety PEPRA	13.26%	11.78%	-11.16%

There are several components to this calculation which may exacerbate the differences from the replication. **In total, the difference between Segal's contribution rates and our replication is within the realm of reasonable based on the overall replication and the size of each sub-population, and therefore we believe that Segal's contribution rates appear to be reasonable.**

Review of Census Data

Applicable Standards:

ASOP No. 23, *Section 3.3 - Review of Data – A review of data may not always reveal existing defects. Nevertheless, whether the actuary prepared the data or received the data from others, the actuary should perform a review, unless, in the actuary's professional judgment, such review is not necessary or not practical. In exercising such professional judgment, the actuary should consider the purpose and nature of the assignment, any relevant constraints, and the extent of any known checking, verification, or audit of the data that has already been performed.*

When determining the nature and extent of such a review, the actuary should do the following:

- *a. make a reasonable effort to determine the definition of each data element used in the analysis;*
- *b. perform a review of the data used in the actuary's analysis for the purpose of identifying data values that are questionable or relationships that are significantly inconsistent. If the actuary believes questionable or inconsistent data values could have a significant effect on the analysis, the actuary should consider further steps, when practical, to improve the quality of the data. Any unresolved questionable data values that may have a significant effect on the analysis, and significant steps taken to improve the data, should be disclosed in summary form, as described in section 4; and*
- *c. if similar work has been previously performed for the same or recent periods, perform a review of the current data for consistency with the data used in the prior analysis. If the actuary does not have the prior data, the actuary should consider requesting the prior data.*

If, in the actuary's professional judgment, it is not appropriate to perform a review of the data, the actuary should disclose that the actuary has not performed such a review, the reason the actuary has not performed such a review, and any resulting limitation on the use of the actuarial work product, as described in section 4.

Section 3.8 – Documentation – The actuary's documentation should include the following:

a. the process the actuary followed to evaluate the data, including the review or any consideration of prior data;

b. a description of any significant defects the actuary believes are in the data;

c. a summary description of any adjustments or modifications made to the data, other than routine corrections made by reference to source documents, that are expected to have a significant effect on the analysis, including the reasoning to support any such adjustments or modifications; and

d. any other documentation necessary to comply with the disclosure requirements of section 4.

Review of Experience Study Census Data

The goal of an experience study is to review the actual experience over a 3-5 year span compared to the actuary's expectation of experience over that period. Under the scope of the actuarial audit, Athena performed a review of the census data, which was used as the basis of the most recently completed full experience study.

Plan Actuary's Process:

To execute this review, we received data from both Segal and FCERA for the years 2015 through 2018. Segal's data represents the cleansed data which was used in the valuation; FCERA's data represents the original data provided to Segal. To start, we found total counts of active members, beneficiaries and alternate payees, retired members, and vested terminated members, and compared these to the counts that Segal reported.

Year	Status	Count	Percent of population	Issue Details
2015	Active	25	0.15%	25 active members not listed in FCERA's active dataset
	Beneficiary	71	0.42%	46 beneficiaries missing a final digit in the Segal dataset 1 duplicate beneficiaries in FCERA's dataset that is not a duplicate in Segal's 2 duplicate beneficiaries in Segal's dataset that are not duplicates in FCERA's 22 beneficary IDs in FCERA's dataset that are not in Segal's beneficiary dataset
	Retiree	47	0.28%	4 retirees in FCERA's dataset that are not in Segal's 43 retirees in Segal's dataset that are not in FCERA's
	Terminated Vested	2	0.01%	2 terminated vested plan members in Segal's dataset that are not in FCERA's
2016	Beneficiary	72	0.41%	46 beneficiaries missing a final digit in the Segal dataset 1 duplicate beneficiary in FCERA's dataset that is not duplicated in Segal's 24 beneficiaries in FCERA's dataset that are not in Segal's 1 beneficiary in FCERA that is not in Segal
	Retiree	1	0.01%	1 retiree in FCERA's dataset that is not in Segal's
2017	Beneficiary	72	0.40%	40 beneficiaries missing a final digit in the Segal dataset 28 beneficiaries in FCERA's dataset that are not in Segal's 2 beneficiaries in Segal's dataset that are not in FCERA's 2 duplicate beneficiaries in FCERA's dataset that are not duplicates in Segal's
	Terminated Vested	2	0.01%	2 terminated vested members in Segal's dataset that are not in FCERA's
2018	Beneficiary	15	0.08%	7 beneficiaries in Segal's dataset that are not in FCERA's 7 beneficiaries in FCERA's dataset that are not in Segal's 1 duplicate benficiary in FCERA's dataset that is not duplicated in Segal's

Athena's Assessment of Reasonableness:

For each of the four years, we note some small discrepancies between our counts and those in the Segal reports; however, the total number of affected plan members did not exceed 1% of Segal's total reported population for any given year. We see a decrease in the number of data discrepancies each year, indicating that the data quality improved over time, with fewer questions from Segal to FCERA as part of the annual data preparation process and improved data quality in general. The issues we saw in 2015-2017 were significantly reduced, which we believe reflects effort by FCERA and Segal to improve data quality. **It is our opinion that the data utilized by Segal for the experience study was reasonably prepared and consistent with the data that they were provided by FCERA.**

Athena's Recommendations:

None.

Review of June 30, 2021 Valuation Census Data

Plan Actuary's Process:

Under the scope of the actuarial audit, we performed a review of the census data utilized as the basis for the June 30, 2021 valuation. To execute this review, we received data from both Segal and FCERA. Segal's data represents the cleansed data which was used in the valuation; FCERA's data represents the original data provided to Segal.

Similar to our process for reviewing the experience study data, we found total counts of active members, beneficiaries and alternate payees, retired members, and vested terminated members. Using member counts and ages and, where applicable, years of service, compensation, and monthly benefits, we compared key statistics based on information we received from both FCERA and Segal. These results are summarized below.

	As of June 30, 2021		
	Segal	FCERA	Difference
Active Members	**7,660**	**7,638**	-0.29%
Average Age	42.3	42.3	-0.05%
Average Service (Years)	10.2	10.4	2.10%
Projected Average Compensation	$62,989	$63,360	0.59%
Vested Terminated Members	**4,308**	**4,300**	-0.19%
Average Age	44.3	44.3	0.08%
Retired Members	**6,465**	**6,465**	0.00%
Average Age	70.5	70.5	0.03%
Average Monthly Benefit	$3,504	$3,535	0.87%
Disabled Members	**415**	**415**	0.00%
Average Age	63.3	63.3	0.00%
Average Monthly Benefit	$2,955	$2,989	1.16%
Beneficiaries	**1,102**	**1,105**	0.27%
Average Age	71.4	71.4	0.00%
Average Monthly Benefit	$2,074	$2,068	-0.27%
TOTAL MEMBERS	19,950	19,923	-0.14%

Athena's Assessment of Reasonableness:

Minor data adjustments were made as part of the data preparation process, which is a typical process for a valuation actuary. **Overall, the discrepancies we found were relatively immaterial, representing less than 0.5% of all plan members.** Therefore, we assert that the data utilized as the basis for the June 30, 2021 valuation is a reasonable representation of the covered population. We have noted several opportunities for improvement below.

Where data is missing or incomplete, it is necessary and reasonable to make assumptions for missing data. In Segal's report, they state that where data is unknown, they assume the "same as those exhibited by members with similar

known characteristics." They do also state that gender is assumed male when unknown. While this practice is not necessarily unreasonable, we recommend that Segal disclose the specific data elements, aside from gender, which have unknown entries and state the assumption which was utilized. If Segal is making assumptions about missing data to "fill in the gaps", the report should indicate whether or not the changes are material.

We note that Segal shows 7,660 active members. Of these, 22 are listed as "pending withdrawal" in FCERA's data files and are not listed in the Active dataset. The date of withdrawal is unspecified in FCERA's data. We assume that the treatment of these individuals was clarified by Segal during the data question and answer process. We recommend clarifying the rationale for this group of individuals in the valuation report.

Where sex is not specified, the members are assumed to be male. Where spouse sex is not specified, male members are assumed to have female spouses and female members are assumed to have male spouses. The rationale for these assumptions is stated in the experience study. For spouse sex, this assumption is based on the experience study's finding that "more than 95% of the survivors are actually the opposite sex." For certain valuation software, it is possible to value a member and spouse with a "fractional" split by sex. We recommend that this approach be considered as the percentage of same-sex partners is expected to grow based on the elapsed time since same-sex partners became eligible.

The availability of data, tracking of information, and approach for the valuation of the following items is unclear in the valuation report. We recommend adding language to clarify the approach.

- Participants entering FCERA from a reciprocal employer may count their past service toward eligibility in FCERA. We believe that this difference is likely immaterial, but the result is that FCERA participants are assumed to become eligible later than expected.
- It is unclear whether COLA bank amounts are tracked in the data and how actual information by participant may be used in the valuation.
- Employee contribution refunds do not appear to be tracked in the data; it is unclear how this information may or may not be used in the valuation.
- Annual leave bank data does appear to be available, but it was not considered during the 2021 experience study. We recommend clarifying how available data is used and how it feeds the development of the assumption.

In the data we received from FCERA, we saw 30 terminated vested members that are over age 70, representing about 0.7% of all terminated vested members. It should be noted that these former employees could potentially lose benefits if they do not claim them as soon as they attain age 70. If it is not already a standard practice, we recommend that FCERA attempt to contact these participants to commence their benefits as there have been situations with other pension funds where members have attempted to claim back-payments for lost value of benefits.

Athena's Recommendations:

1. Disclose specific data assumptions in the valuation report.

2. Clarify treatment of “pending withdrawal” population.
3. Consider valuing “fractional” sex for member and spouse sex assumptions where data is unknown.
4. Clarify availability of data and how it is utilized for service with reciprocal employer, COLA bank, employee contribution refunds, and annual leave bank.
5. Consider additional outreach to terminated vested participants over age 70.

Review of Economic Assumptions

Actuarial Standards of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, provides guidance regarding the selection and recommendation of economic assumptions. The following process is set forth by ASOP 27 (Section 3.3) in selecting an identified economic assumption:

a. identify components, if any, of the assumption;
b. evaluate relevant data;
c. take into account factors specific to the measurement;
d. take into account other general considerations, when applicable; and
e. select a reasonable assumption.

We have followed the above process in assessing the economic assumptions described throughout the section below for the purposes of this audit review. Additional applicable ASOPs have been cited throughout this section.

Inflation

Applicable Standards:

ASOP No. 27, *Section 3.7.1 – Data – The actuary should evaluate appropriate inflation data. These data may include consumer price indices, the implicit price deflator, forecasts of inflation, yields on government securities of various maturities, and yields on nominal and inflation-indexed debt.*

Plan Actuary's Assumption:

2019 Experience Study: 2.75% per annum.

2021 Economic Assumption Review: 2.50% per annum.

Plan Actuary's Rationale:

The plan actuary used several sources of information in order to determine the inflation rate. The same sources of information were reviewed in the 2021 economic assumption review as were reviewed in the 2019 actuarial experience study. In determining the rate of inflation, the plan actuary considered:

- **15- and 30-year moving averages of historical inflation rates** from 1930 to 2020.
- **Median inflation assumption used by 178 large public retirement funds in their fiscal year valuations** sourced from the Public Plans Data website.
- **Inflation rates of the 1937 Act CERL systems.**
- **Annual inflation rates provided by FCERA's investment consultant Verus**, as well as five other investment advisory firms.
- **Projected average increase in Consumer Price Index (CPI) over the next 75 years** sourced from the Social Security Administration's 2020 report.

- **A comparison of the yields on thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds**.

Based on the six sources of information outlined above, the plan actuary chose an annual inflation assumption of 2.75% during the 2019 Experience Study Review, and 2.50% during the 2021 Economic Assumption Review.

The plan actuary acknowledges that the setting of the inflation assumption was a somewhat subjective process and did not apply a specific weight to each of the metrics in determining the recommended inflation assumption.

Athena's Assessment of Reasonableness:

According to the ASOPs regarding selection of an inflation assumption, the plan actuary should consider both historical observations and future expectations. Of the six sources of information the plan actuary used to determine the FCERA inflation assumption, one is based on historical observations (review of 15- and 30-year moving average of historical inflation rates) and two are based on future expectations (review of projected average increase in CPI over next 75 years and comparison of yields on thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds). The remaining three sources are comparisons to other systems. It is reasonable to compare to other systems in conjunction with looking at historical observations and future expectations.

The historical 15- and 30- year moving averages of inflation include periods of high and hyperinflation, as well as periods of very low inflation. Given the volatility of inflation in recent years, it is unclear how reliable this historical information will be for the forward-looking component of the inflation assumption at this time.

Assumptions are forward looking, so while the historical observations are useful to provide background, they should not drive the decision on assumption setting. The strongest analyses for the inflation assumption conducted by the plan actuary are the two sources based on future expectations. The projected average increase in CPI over the next 75 years used by Segal was from 2020, and there has been an upward trend in inflation since then. The table below shows the percent change in CPI-U measures for each month in 2021 when compared to the year prior:

Month	Percent Change in CPI-U (compared to same month in 2020)
January	1.4%
February	1.7%
March	2.6%
April	4.2%
May	5.0%
June	5.4%
July	5.4%
August	5.3%
September	5.4%
October	6.2%
November	6.8%
December	7.0%

Recent higher-than-average inflation may point to a continued upward trend in the future, which will need to be monitored closely.

The table below shows the average change in June CPI-U measures for the past 1-year, 5-year, 10-year, 15-year and 30-year averages:

X Years	Average Percent Change in CPI-U
1 year	5.4%
5 years	2.4%
10 years	2.0%
15 years	2.0%
30 years	2.3%

The inflation rate from June 2020 to June 2021 (5.4%) is much higher than the longer time horizons, further showing the current volatility of inflation.

While the inflation assumption of 2.5% is still within a reasonable range, June 2021 did not seem to be the right time to be lowering the inflation assumption, based on the continually increasing inflation rates.

One of the approaches discussed in the ASOPs is the use of a select and ultimate inflation rate assumption. Even if a single rate assumption is preferred, a select and ultimate approach could be a viable framework to develop a single rate inflation assumption during years of significant inflation changes.

Overall, we have determined that the inflation rate of 2.50% per annum developed at the time of the 2021 economic assumption review appears to be reasonable; however, we do have recommendations regarding the setting and disclosure of the inflation rate assumption for consideration by the plan actuary in future years (see below).

Athena's Recommendations:

1. Given the current state of volatility, closely monitor the inflation assumption.
2. Consider using a select and ultimate approach in the future to develop a single inflation rate.

Investment Return

Applicable Standards:

ASOP No. 27, *Section 3.8.1 – Data – The actuary should evaluate appropriate investment data. These data may include the following:*

a. current yields to maturity of fixed income securities such as government securities and corporate bonds;

b. forecasts of inflation, GDP growth, and total returns for each asset class; and

c. *historical and current investment data including, but not limited to, real and nominal returns, the inflation and inflation risk components implicit in the yield of inflation-protected securities, dividend yields, earnings yields, and real estate capitalization rates.*

Plan Actuary's Assumption:

2019 Experience Study: 7.00% per annum.

2021 Economic Assumption Review: 6.50% per annum.

Plan Actuary's Rationale:

The plan actuary states that the investment return assumption is comprised of two primary components: inflation, and real rates of return on investment (with adjustments for investment expenses and risk). The calculations for the investment return assumption rationale as described below correspond to the 6.50% per annum determined in the 2021 economic assumption review.

Real Rate of Investment Return

To determine the real rate of investment return, the plan actuary looked at assumed rate of return per asset class for FCERA's target asset allocation. An overall weighted average of 5.07% was determined based on the average assumed real rates of return per asset class provided by Verus and five other investment advisory firms. It is noted by the plan actuary that the rates provided by investment consultants are projected over time periods that are shorter than the durations of a retirement plan's liabilities. The 5.07% weighted average is a reduction in the real rate of return assumption from 5.39% as determined in the 2019 actuarial experience study (which had increased the real rate of return assumption from the previous 5.03% rate).

Investment Expenses

To determine the investment expense assumption, the plan actuary looked at both a three- and five-year average of investment expenses as a percentage of the actuarial value of assets. The three- and five-year averages of investment expense percentage were 0.56% and 0.54%, respectively. Based on these averages, the plan actuary decided to maintain the current assumption of 0.60% as determined in the 2019 actuarial experience study (which had increased the investment expense from the previous 0.45% rate). The plan actuary notes that they 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 earned by active management. Per ASOP No. 27, Section 3.8.3.d, the real rate of return assumption should not include any additional returns from active management.

Risk Adjustment

The plan actuary also included a risk adjustment in the overall investment return assumption, to reflect the potential risk of shortfalls in the return assumptions, and to increase the likelihood of achieving the actuarial investment return assumption in the long term. In the plan actuary's model for risk adjustment, the confidence level represents the likelihood that future investment earnings would **equal or exceed** the assumed earnings over a 15-year period on an

expected value basis. The confidence interval under their model is 50% to 60%. The corresponding risk adjustment was determined to be 0.53%. This is a reduction in the risk adjustment assumption from the 0.67% risk adjustment rate determined in the 2019 actuarial experience study.

Overall Investment Return

Combining the above components, and based on the general practice of using one-quarter percentage point increments for economic assumptions, the plan actuary recommended a net investment return assumption of 6.50%:

> *5.07% real return rate + 2.50% inflation rate – 0.60% investment expenses – 0.53% risk adjustment =*
>
> *6.44% → rounded to 6.50%.*

This is a 0.50% reduction in the net investment return assumption from the 7.00% return rate determined in the 2019 actuarial experience study (which had remained the same from the previous 7.00% rate).

Athena's Assessment of Reasonableness:

The plan actuary did not disclose information regarding the target allocation of asset classes used to determine the assumed real rate of return. It would be helpful to clarify how they arrived at this target asset allocation. It would also be helpful to know more information regarding the maintenance of the allocation of assets, such as how frequently the target allocation is assessed and updated based on a comparison to actual allocation. An investment policy statement should be disclosed with the experience study.

Assumed real rates of return from FCERA's investment consultant Verus, as well as five other investment advisory firms were used in the development of the investment return assumption. The plan actuary did not disclose the names of the other five investment advisory firms. The weighted average real rate of return for Verus is much lower than the weighted average real rate of return among the six firms combined (4.46% vs. 5.07%), meaning some of the firms must have significantly higher rates of return. Because a combination of rates from Verus and five other investment advisory firms is being used as the basis of the assumption, it is important to understand why Verus' portfolio is much lower than the other investment firms in order to determine if they are applicable to FCERA.

Additionally, the plan actuary discloses only the assumed *arithmetic* real rate of return assumptions by asset class. It would be helpful to disclose both arithmetic and geometric real rates of return in order to analyze the difference between the two. Arithmetic real rates of return typically produce higher rates of return when compared to geometric, and returns are geometric in nature.

The methodology used to determine investment expense percentage by looking at the past three- and five- year averages appears to be reasonable for the purposes of this study and in use for the investment return assumption in actuarial valuations. The methodology and rationale behind the determination of the risk adjustment percentage also appears reasonable for the purposes of this study and in use for the investment return assumption in actuarial valuations.

Based on the asset allocation of this plan and the 2021 edition of the Horizon survey, we have independently determined that a reasonable range for the investment return assumption is 5.80% - 6.80% per annum. The current assumption of 6.50% per annum is within that range and we believe that it appears to be a reasonable assumption.

Athena's Recommendations:

Assess whether the input from the 5 investment advisory firms is relevant to FCERA. Were asset classes of these investment returns able to be matched exactly to FCERA's portfolio, or were assumptions necessary?

1. Reconcile differences between weighted real average of return determined by Verus and the overall weighted real average of return among the six firms combined. Why is Verus, the plan's own investment advisor, stating an expected return that is considerably lower?
2. Provide information on FCERA's investment policy statement.
3. Calculate and disclose the differences between the arithmetic and geometric assumed real rates of return.

Retiree Cost of Living Adjustment ("COLA")

Applicable Standards:

ASOP No. 27, *Section 3.11.2 – Cost-of-Living Adjustments – Plan benefits or limits affecting plan benefits, including the Internal Revenue Code (IRC) section 401(a)(17) compensation limit and section 415(b) maximum annuity, may be automatically adjusted for inflation or assumed to be adjusted for inflation in some manner (for example, through regular plan amendments). However, for some purposes (such as qualified pension plan minimum required contribution calculations), the actuary may be precluded by applicable laws or regulations from anticipating future plan amendments or future cost-of-living adjustments in certain IRC limits.*

Plan Actuary's Assumption:

2019 Experience Study: 2.75% per annum for General Tiers 1, 2, and 3 and Safety Tiers 1 and 2. Members in Tiers 4 and 5 (Safety and General) receive no COLA increases.

2021 Economic Assumption Review: 2.50% per annum for General Tiers 1, 2, and 3 and Safety Tiers 1 and 2. Members in Tiers 4 and 5 (Safety and General) receive no COLA increases.

Plan Actuary's Rationale:

COLA assumptions were reduced from 2.75% to 2.50% consistent with the recommended reduction in the inflation assumption.

The plan actuary compared the CPI measure used by FCERA for setting actual COLA increases based on annual change in CPI for the West Region with the CPI measure used by the plan actuary to study change in prices based on annual change in CPI for the U.S. City Average. While the change in the West Region is higher than the U.S. City Average for 5- 10- and 20- year periods, the changes are consistent with the recommended reduction in the COLA assumption.

Athena's Assessment of Reasonableness:

The methodology to reduce COLA consistent with the recommended reduction in the inflation assumption is reasonable for the purposes of this study and in use for actuarial valuations. The plan actuary did not provide detail regarding how this assumption is affected by the excess COLA "banks" that are developed in years in which change in CPI is in excess of 3.0%. The plan actuary also did not disclose historical actual COLA for this plan as compared to the measures in place to project for future COLA. While Athena agrees with the methodology to reduce COLA to be consistent with the recommended reduction in the inflation assumption, it is also important to compare with other reference sources (i.e., Social Security Trustee reports, standard CPI measures such as those displayed in the table in the Inflation section above, etc.).

Athena's Recommendations:

1. Consider actual market conditions and other reference sources when developing the COLA assumption.
2. Track and disclose historical COLA vs. standard CPI measures.
3. Provide additional information regarding the how the excess COLA bank is tracked year-over-year such that a replication of this feature could be performed.

Salary Increase

Applicable Standards:

ASOP No. 27, *Section 3.10.1 – Data – The actuary should evaluate available compensation data. Compensation data may include the following:*

a. *the plan sponsor's current compensation practice and any anticipated changes in this practice;*
b. *current compensation distributions by age or service;*
c. *historical compensation increases and practices of the plan sponsor and other plan sponsors in the same industry or geographic area; and*
d. *historical national wage increases and productivity growth.*

Plan Actuary's Assumption:

2019 Experience Study: 0.50% per annum.

2021 Economic Assumption Review: 0.50% per annum.

Plan Actuary's Rationale:

The plan actuary used several sources of information in order to determine the salary increase assumption. The same sources of information were reviewed in the 2021 economic assumption review as were reviewed in the 2019 actuarial experience study. In determining the 0.50% salary increase assumption, the plan actuary considered:

1. **The State and Local Government Employment Cost Index** produced by the Department of Labor. The index provides evidence of that real "across the board" pay increases have averaged about 0.5% - 0.8% annually during the last 10 – 20 years.

2. **Annual report on the financial status of the Social Security program.** The report states that real "across the board" pay increases are forecasted to be 1.10% per year.
3. **Recent salary experience with public systems in California.** Experience indicates lower future real wage growth expectations for public sector employees. However, FCERA's active members saw an actual average inflation plus salary increase of 3.10% over the three-year period ending June 30, 2020, compared to the 2.64% change in CPI for the West Region during the same period.

Based on the three sources of information outlined above, the plan actuary chose to maintain the salary increase assumption of 0.50% as was determined in the 2019 experience study (which had also maintained the previous salary increase of 0.50%). This means that the combined inflation and salary increase assumption decreased from 3.25% to 3.00% (due to the 0.25% reduction in the inflation assumption).

Athena's Assessment of Reasonableness:

The methodology described above to determine the real salary increase assumption is reasonable for the purposes of this study and in use for actuarial valuations.

Athena's Recommendations:

None.

Merit and Promotional Increases

Applicable Standards:

ASOP No. 27, *Section 3.10.1 – Data – The actuary should evaluate available compensation data. Compensation data may include the following:*

a. *the plan sponsor's current compensation practice and any anticipated changes in this practice;*
b. *current compensation distributions by age or service;*
c. *historical compensation increases and practices of the plan sponsor and other plan sponsors in the same industry or geographic area; and*
d. *historical national wage increases and productivity growth.*

Plan Actuary's Assumption:

2019 Experience Study:

	Rate of Salary Increase (%)	
Years of Service	General	Safety
Less than 1	8.50	8.50
1	7.50	7.75
2	6.50	6.50
3	5.25	5.50
4	4.75	4.75
5	3.75	3.75

6	3.00	3.50
7	2.00	2.50
8	1.50	1.70
9	1.25	1.60
10 & Over	1.10	1.50

2021 Economic Assumption Review: No Change.

Plan Actuary's Rationale:

Annual merit and promotional increases are determined by measuring the actual increases received by members over a period of time, net of inflationary and real salary increases. The plan actuary uses the following methodology to measure the merit and promotional salary increases (measured separately for General and Safety members):

4. measuring each continuing member's actual salary increase over each year of the experience period on a salary-weighted basis (higher weights assigned to members with larger salaries);
5. excluding members with increases of 50% or greater and decreases of 20% or greater during any particular year;
6. categorizing increases according to member demographics;
7. removing wage inflation components;
8. averaging annual increases over the experience period; and
9. modifying current assumptions to reflect some portion of these measured increases (reflective of their "credibility".

In the 2019 experience study conducted by the plan actuary, data from the **past nine years** was used to assess the merit and promotional increases. Over this time period, the salary of active members in FCERA increased less than assumed (inclusive of inflation and actual salary increases). Based on this observation, the plan actuary made relatively modest adjustments to the assumptions recommended for both General and Safety members. The plan actuary's revised assumptions show overall increases in the merit and promotional salary increases for both General and Safety members. Overall salary increases (combination of inflation, actual salary increases, and merit and promotional increases) are assumed to be slightly lower for both General and Safety members.

Athena's Assessment of Reasonableness:

The methodology described above to determine the merit and promotional increases assumption is reasonable for the purposes of this study and in use for actuarial valuations. The plan actuary did not, however, include merit and promotional increases as a part of the 2021 economic assumptions study. This assumption should be analyzed whenever other economic assumptions are reassessed given their dependence on one another. In addition, the plan actuary did not mention conducting conversations with HR or FCERA compensation professionals to understand any anticipated future compensation or hiring plans. It is important to have such discussions in order to anticipate any changes that could impact this assumption. It has been noted that Segal requests information on salary MOUs from

FCERA as part of the annual data request to take into consideration for the valuation and experience study. We recommend that applicable information from the MOUs that is relied on for purposes of the experience study be disclosed and described to give confidence that anticipated future experience has been taken into account.

Athena's Recommendations:

1. Include Merit and Promotional Increases as a part of the analysis whenever economic assumptions are being studied.
2. Consider conducting discussions with HR or compensations professionals to understand any anticipated future changes to compensation or hiring plans.

Active Member Payroll

Applicable Standards:

ASOP No. 27, *Section 3.11.3 – Rate of Payroll Growth – As a result of terminations and new participants, total payroll generally grows at a different rate than does a participant's salary or the average of all current participants combined. As such, when a payroll growth assumption is needed, the actuary should use an assumption that is consistent with but typically not identical to the compensation increase assumption. One approach to setting the payroll growth assumption may be to reduce the compensation increase assumption by the effect of any assumed merit increases. The actuary should apply professional judgment in determining whether, given the purpose of the measurement, the payroll growth assumption should be based on a closed or open group and, if the latter, whether the size of that group should be expected to increase, decrease, or remain constant.*

Plan Actuary's Assumption:

2019 Experience Study: 3.25% per annum.

2021 Economic Assumption Review: 3.00% per annum.

Plan Actuary's Rationale:

The average pay for all employees increases only by inflation and real salary increases and is not influenced by merit and promotional increases. Given the inflation of 2.50% and real salary increase of 0.50%, the plan actuary determined an active member payroll increase assumption of 3.00%. This is a reduction in the active member payroll assumption from the 3.25% rate determined in the 2019 experience study (which had reduced the active member payroll assumption from the previous 3.50% rate).

The active member payrolls are used to develop the UAAL contribution rate. It is assumed that the total payroll for all active members will increase annually over the amortization period at the same assumed rates of inflation plus real salary increase assumptions as are used to project the member's future benefits.

NOTE: The UAAL contribution rates are developed to be a level percentage of payroll. If actual future payrolls turn out to be smaller than the projections, future UAAL contribution rates will increase.

Athena's Assessment of Reasonableness:

The active member payroll increase assumption is used as the basis for the Entry Age Normal Cost. The assumption should represent the anticipated average growth of the population's payroll, without regard to individual merit or promotional increases. Alternatively, a salary scale assumption should be set consistently with the payroll increase assumption, but it will be more closely tied to the expectations for an individual which will increase based on merit and promotions.

The plan actuary is assuming a constant number of active members in their payroll growth assumption for determining employer contributions. As is stated in the June 30, 2021 valuation report:

> *"The contribution (or rate credit in the case of negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association)* ***assuming a constant number of active members****." (pg. 90)*

Under a constant headcount scenario, every person leaving is being replaced. Assuming constant headcounts and that the rate of payroll growth is the same as the rate of wage inflation could actually be a somewhat aggressive assumption. In reality, the number of active members will likely not remain constant. The number of active members decreased by 2.7% from June 30, 2020 to June 30, 2021. According to the schedule of funding progress, there was a substantial increase in projected covered payroll growth from 2015 -2020, with a slight decline in 2021. The growth in payroll from 2015 – 2020 was not solely a function of wage inflation; rather, it was also a function of the growth in headcount. If the situation were to reverse and headcounts were to decline (as they showed in 2021), this could result in payrolls growing at a rate lower than wage inflation, or even declining. In a post-COVID work world, it may be prudent to consider a less aggressive payroll growth assumption. If payroll doesn't grow as quickly as an individual's compensation, the contribution rates could be determined to be insufficient to support the growing liability.

Athena's Recommendations:

1. Consider modeling scenarios to understand the impact on UAAL contribution rates when there is lower payroll growth (or even payroll declines).

Administrative Expenses

Applicable Standards:

ASOP No. 27, *Section 3.8.3e – Expenses Paid from Plan Assets* – Investment and other administrative expenses may be paid from plan assets. To the extent such expenses are not otherwise recognized, the actuary should reduce the investment return assumption to reflect these expenses.

Plan Actuary's Assumption:

2019 Experience Study: 1.20% per annum.

2021 Economic Assumption Review: 1.30% per annum.

Plan Actuary's Rationale:

To determine the administrative expense assumption, the plan actuary looked at both a three- and five-year average of administrative expenses as a percentage of the projected payroll. The three- and five-year averages of administrative expense percentage were 1.39% and 1.32%, respectively. Based on these averages, the plan actuary decided on a 1.30% administrative expense assumption. This is an increase in the previous 1.20% administrative expense assumption as determined in the 2019 actuarial experience study (which had increased the administrative expense assumption from the previous 1.10%).

Athena's Assessment of Reasonableness:

The approach to determining the administrative expenses appears to be reasonable for the purposes of this study, and in use for actuarial valuations.

Athena's Recommendations:

None.

Review of Demographic Assumptions

Actuarial Standards of Practice No. 35, Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations, provides guidance regarding the selecting and recommending of demographic and other assumptions not covered by ASOP No. 27. The following general process is set forth by ASOP 35 (Section 3.2) in selecting a demographic assumption:

a. identify the types of demographic assumptions used in the measurement;
b. consider the relevant assumption universe;
c. select assumption formats;
d. select the specific assumptions; and
e. select a reasonable assumption.

We have followed the above process in assessing the demographic and other non-economic assumptions described throughout the section below for the purposes of this audit review. Additional applicable ASOPs have been cited throughout this section.

Retirement Rates

Applicable Standards:

ASOP No. 35, *Section 3.4.1 – Retirement – The actuary should take into account factors that may affect rates of retirement, such as the following:*

a. *employer-specific or job-related factors such as occupation, employment practices, work environment, unionization, hazardous conditions, and location of employment;*
b. *the plan design, where specific incentives may influence when participants retire;*
c. *the design of, and date of anticipated payment form, social insurance programs (for example, Social Security or Medicare) or other non-employer-sponsored benefit programs (for example, health insurance exchange plan); and*
d. *the availability of other employer-sponsored postretirement benefit programs (for example, postretirement health coverage or savings plan).*

Plan Actuary's Assumption:

General Retirement Rates (Illustrative)

	Rate of Retirement (%)					
Age	General Tier 1 – Less than 30 YoS	General Tier 1 – 30 or More YoS	General Tier 2	General Tier 3	General Tier 4	General Tier 5
50	5.00	15.00	3.00	3.60	2.00	0.00
55	8.00	16.00	8.40	10.00	4.00	3.50
60	16.00	24.00	15.00	16.00	9.00	8.50

65	40.00	60.00	35.00	35.00	23.00	22.00
70	35.00	52.50	70.00	60.00	60.00	60.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00

Safety Retirement Rates (Illustrative)

	Rate of Retirement (%)		
Age	Safety Tiers 1 & 2*	Safety Tier 4	Safety Tier 5
45	10.00	1.00	0.00
50	5.00	4.00	4.00
55	40.00	18.00	18.00
60	30.00	40.00	40.00
65 & Over	100.00	100.00	100.00

**Retirement rate for Safety Tier 1 and Safety Tier 2 is 100% after a member accrues a benefit of 100% of final average earnings.*

Deferred Vested Member Retirement Rates

The General Tier deferred vested retirement age assumption is 59; the Safety Tier deferred vested retirement age assumption is 54.

Plan Actuary's Rationale:

Retirement rates were analyzed and adjusted as a result of the 2019 experience study. The rates above have not been changed since adopted as a result of this experience study.

In the experience study, the plan actuary analyzed three years of retirement experience as a function of both age and years of service. The review determined that the retirement rates were correlated to both age and years of service for General Tier 1 and Safety Tiers 1 and 2. It was recommended that the retirement rates for General Tier 1 be based on both age and years of service (over or under 30 years), while for Safety Tiers 1 and 2, it was recommended to continue using the age-based retirement rates, until a member accrues a benefit of 100% final average earnings (at which point 100% retirement is recommended). It was recommended that General Tiers 2, 3, 4, and 5 and Safety Tiers 4 and 5 continue to use age-based retirement rates as well.

For General Tiers 1, 2, and 3 and Safety Tiers 1 and 2, observed retirement rates based on actual experience over the past three years were compared to the assumed retirement rates, and proposed assumptions were recommended as a result. The proposed assumptions for General Tier 1 reflected decreases in most retirement rates for members with less than 30 years of service and increases in most retirement rates for members with 30 or more years of service. The proposed assumptions for General Tier 2 maintained the same retirement rates at all ages, while the proposed assumptions for General Tier 3 reflected increases for most retirement rates. Proposed assumptions for Safety Tiers 1 and 2 increased retirement rates at lower ages, and decreased retirement rates at higher ages.

There were no actual retirements throughout the experience study exposure period for Safety Tiers 4 and 5. The plan actuary recommended a decrease in retirement rates at older ages commensurate with changes recommended for Safety Tiers 1 and 2.

The proposed assumptions for General Tiers 4 and 5 maintained the same retirement rate at all ages, as there were no actual retirements for these members throughout the experience study exposure period.

The average age at retirement for deferred vested members over the three years of the experience study was 59.0 for General and 54.1 for Safety. Because of this, the plan actuary recommended increasing the General deferred vested retirement assumption from age 58 to age 59, and maintaining the Safety deferred vested retirement assumption at age 54.

Athena's Assessment of Reasonableness:

Credibility is a concern regarding the reasonableness of the retirement rates proposed by the plan actuary. The plan actuary used a three-year exposure period to study the retirement rates assumption. There did not appear to be enough retirements in the exposure period studied to justify altering the retirement rates, and yet the plan actuary made adjustments to the rates based on these results. The plan actuary should study additional years of data in the future to have enough credibility to adjust the retirement rates assumption.

The plan actuary states in their rationale for determining retirement rates that they examined the relationship between both age and service on retirement for all tiers to determine which factor was most correlated with retirement. However, there was no evidence provided to support their claim that retirement rates correlate to both age and years of service for General Tier 1 and Safety Tier 1 and 2 only. Assessment of retirement rates based on age and years of service was only provided for General Tier 1 in the 2019 experience study report. A clear analysis of age and service as they relate to retirements at all tiers should be demonstrated in the experience study to support Segal's conclusion as to which tiers should have rates based on age and service versus just age alone.

While the plan actuary states that retirement rates correlate to both age and service for General Tier 1 and Safety Tiers 1 and 2, only General Tier 1 was changed to be structured as a function of age and service. There is no explanation provided for why Safety Tiers 1 and 2 were not changed to be structured as a function of age and service as well.

The plan actuary also reports there were no actual retirements from General and Safety Tiers 4 and 5 over the exposure period. Regardless, the plan actuary recommended changes for Safety Tiers 4 and 5 at the older ages to be consistent with changes recommended for Safety Tiers 1 and 2. Their rationale was that retirement rates for General and Safety Tiers 4 and 5 were partially developed based on their current Tier 1. If this is the case, it is unclear why General Tiers 4 and 5 were not updated to be consistent with changes to General Tiers 1 and 2 (in parallel to Safety Tiers 4 and 5 being updated). It is also important to note that the benefit formulas for General and Safety Tier 1 groups are different than the benefit formulas for General and Safety Tiers 4 and 5, so although the rates may have been partially developed from their respective Tier 1 groups originally, the retirement behaviors of the different tiers may not

align. There should be consistency in methodology across General and Safety as to whether or not updates are made based on changes recommended for Tiers 1 and 2. If changes are to be made based on different Tiers due to no retirements occurring in the exposure period, this assumption should be monitored closely and adjusted as retirement experience may differ for Tiers 4 and 5 compared to Tiers 1 and 2 due to the different benefit formulas.

No explicit assumption was developed nor disclosed in the June 30, 2021 valuation report or the supporting experience analyses for the assumed retirement age of current or future reciprocal participants. The valuation report states an assumed retirement age for terminated vested participants and an assumption for the assumed percentage of these vested terminated employees who will enter reciprocal employment, however, it is not explicitly stated whether those reciprocal participants are anticipated to follow active retirement decrements or terminated vested retirement decrements. Experience of these reciprocal employees should be monitored and reviewed such that an appropriate assumption can be developed and disclosed.

There is not an explanation in the experience study nor in the 6/30/2021 valuation as to how the assumed retirement age works for current or future reciprocal participants.

Athena's Recommendations:

1. Consider studying additional years of data such that plan experience analysis is considered credible OR consider relying on a state system retirement assumption with a similar covered population (i.e., CalPERS).
2. Demonstrate analysis of retirement rates as a function of both age and service to support any conclusions made in the development of the assumption.
3. Use consistent methodology in revision of assumptions when no retirements occur over the exposure period.
4. Provide commentary as to how the retirement age assumption is reflected for current and future reciprocal participants in future valuations.

Reciprocity

Applicable Standards:

ASOP No. 35, *Section 3.5.5 – Transfers and Return to Employment – The assumptions for transfers or return to employment are generally plan- or industry-specific. Transfers and return to employment may be one-time events or may be continual if employees are required or permitted to move among groups that are covered by the same or different plans.*

Plan Actuary's Assumption:

20% of General deferred vested participants with less than five years of service, and 30% of General deferred vested participants with five or more years of service would be covered under a reciprocal retirement system and receive 4.10% annual salary increases from termination until their date of retirement.

30% of Safety deferred participants with less than five years of service, and 50% of Safety deferred vested participants with five or more years of service would be covered under a reciprocal retirement system and receive 4.50% annual salary increases from termination until their date of retirement.

Plan Actuary's Rationale:

The plan actuary used data as of June 30, 2018 to come up with the above percentages of General/Safety members who would be covered by a reciprocal system. The following table shows the original assumption, the data as of June 30, 2018, and the proposed new assumptions:

	Percent of Deferred Vested Members Covered by a Reciprocal System (%)			
	General		Safety	
	Less than 5 YOS	5 or more YOS	Less than 5 YOS	More than 5 YOS
Original Assumption	20.00	35.00	30.00	55.00
Data as of 6/30/2018	16.00	25.00	26.00	45.00
Revised Assumption	20.00	30.00	30.00	50.00

According to the plan actuary, the annual reciprocal salary increase assumption is based on the ultimate merit and promotional salary increase assumptions (for members with 10 or more years of service) for General and Safety members together with the inflation rate and real salary increase assumptions. The assumption is used to anticipate salary increases under the reciprocal system from termination from FCERA to the expected date of retirement. The plan actuary recommended reducing the annual reciprocal salary increase assumption from 4.50% to 4.35% (based on 2.75% inflation plus 0.50% real salary increase plus 1.10% merit and promotional increase) for General deferred vested participants, and from 4.90% to 4.75% (based on 2.75% inflation plus 0.50% real salary increase plus 1.50% merit and promotional increase) for Safety deferred vested participants. These were further reduced for the June 30, 2021 actuarial valuation to 4.10% and 4.50% respectively (to reflect the new 2.50% inflation assumption).

Athena's Assessment of Reasonableness:

The reciprocity assumptions were changed based solely on data as of 6/30/2018. It would be beneficial to look at the percent of deferred vested members covered by a reciprocal system for the past three years of data as of June 30, rather than just a single point in time when determining adjustments to the assumptions. This could be completed in a manner similar to how the plan actuary analyzed the marital percentage assumption in the Marital Percentage, Sex, and Age Assumptions section below.

Athena's Recommendations:

1. Use the past three years of data as of June 30 to develop reciprocal assumptions rather than just data as of 6/30/2018.

2. Provide further clarification on how retirement age is assumed for future and current reciprocal employees.

Marital Percentage, Sex, and Age Assumptions

Applicable Standards:

ASOP No. 35, *Section 3.5.2 – Marriage, Divorce, and Remarriage – Marriage, divorce, or remarriage may affect the payment of benefits, the amount or type of benefits, or the continuation of benefit payments. An assumption regarding beneficiary ages may also be necessary.*

Plan Actuary's Assumption:

Percentage Married Assumption

70% of all active and inactive male members and 50% of all active and inactive female members are assumed to be married or have an eligible domestic partner and assumed to select the unmodified option when they retire.

Beneficiary Sex Assumption

For all active and inactive members, the survivor's sex is assumed to be the opposite of the member.

Beneficiary Age Assumption

Male beneficiaries are assumed to be three years older than the member. Female beneficiaries are assumed to be two years younger than the member.

Plan Actuary's Rationale:

Marital percentage, beneficiary sex, and beneficiary age assumptions were analyzed and adjusted as a result of the 2019 experience study. The assumptions above have not been changed since adopted as a result of this experience study.

The plan actuary determined the above percentage marriage assumptions based on the three-year exposure period used in the 2019 experience study. Specifically, they looked at the actual percent of new retirees with eligible spouses or domestic partners who selected the unmodified option each year. The following table shows the original assumption, the data as of June 30 for the three years of the experience study, and the proposed new assumptions:

	Percent with Eligible Spouses and Selected Unmodified Option (%)	
	Male	Female
Original Assumption	75%	50%
6/30/2016	68%	46%
6/30/2017	66%	52%
6/30/2018	64%	52%
Total	66%	50%
Revised Assumption	**70%**	**50%**

According to the plan actuary, more than 95% of survivors are the opposite sex of their members (inclusive of domestic partners). Therefore, they recommended to continue using the assumption that for all active and inactive members, the survivor's sex is opposite of the member.

The plan actuary determined the above beneficiary age assumptions based on FCERA experience. The following table shows the original assumption, actual FCERA experience, and the proposed new assumptions:

	Beneficiary Sex	
	Male	Female
Original Assumption	3 years older	2 years younger
Actual FCERA Experience	2.8 years older	2.4 years younger
Revised Assumption	**3 years older**	**2 years younger**

Athena's Assessment of Reasonableness:

The plan actuary states that more than 95% of survivors are the opposite sex of their members, and therefore recommended assuming the survivor sex is opposite of the member for all active and inactive members. While this is a reasonable assumption, the plan actuary could consider doing a blended assumption rate that is 95% opposite sex, 5% same sex. Athena suggests the plan actuary continue to monitor this assumption moving forward and consider a blended assumption if the percentage of survivors that are the same sex of their members increases. In addition, no breakdown of member and beneficiary sex between future and current retirees is provided. The plan actuary should consider what data they could receive from FCERA for active beneficiary sex for the purposes of studying and developing an independent assumption.

We reviewed the experience study's discussion on beneficiaries. It does not appear to formally discuss gender – perhaps, it implies that married male members would have female spouses and married female members would have male spouses. The valuation appears to have adopted that approach. In hindsight, the study should have been clear on that point.

Finally, for the survivor age and sex assumptions, the plan actuary states that recommendations were made based on experience during the three-year exposure period and "studies done for other retirement systems". It is not disclosed what other studies were used to arrive at their recommended assumption changes.

Athena's Recommendations:

1. Disclose what additional "studies done for other retirement systems" were referenced for determining the survivor age and sex assumptions.
2. Continue to monitor the survivor sex assumption, and consider using a blended assumption for same-sex vs. opposite-sex surviving spouses

3. Consider collecting active beneficiary data to conduct independent analysis and development of future retiree spousal age and sex assumptions.
4. Update language in future valuations to reflect an accurate description of the spousal age assumption.

Mortality

The plan's mortality assumption usually consists of (1) a table of gender-specific mortality rates for a base year and (2) a mortality improvement scale to project rates to future years. Periodically, the Society of Actuaries has performed studies of pensioner mortality and developed a series of tables that can be used in pension valuations. Instead of the SOA tables, some plans have chosen to use tables based on their own experience where that experience is statistically credible.

Considering its impact on the valuation results, we note that the post-retirement mortality assumption is one of the most important valuation assumptions.

Applicable Standards:

ASOP No. 35, *Section 3.4.3 – Mortality – The actuary should take into account factors that may affect rates of mortality, such as the following:*

a. *the characteristics of employees and retirees (for example, it may be reasonable to select different assumptions for pre and post retirement);*
b. *the size of the covered population (for example, for some small plans, a reasonable model for mortality may be to assume no mortality before retirement);*
c. *the characteristics of disabled lives, which may depend on the plan's definition of disability and how it is administered; and*
d. *the characteristics of different participant subgroups and beneficiaries.*

The actuary should consider using actual participant mortality data, to the extent fully or partially credible, or published and generally available mortality tables. If the actuary selects a mortality assumption that is based on mortality tables that substantially predate more recently published relevant and generally available mortality tables, the actuary should disclose the rationale for use of such tables instead of a more recently published table.

ASOP No. 35, *Section 3.4.4 – Mortality Improvement – The actuary should reflect the effect of mortality improvement (which may be positive, negative, or zero) both before and after the measurement date. With regard to mortality improvement, the actuary should do the following:*

a. *adjust mortality rates to reflect an assumption as to mortality improvement before the measurement date. For example, if the actuary starts with a published mortality table, the mortality rates may need to be adjusted to reflect mortality improvement from the effective date of the table to the measurement date. Such an adjustment is not necessary if, in the actuary's professional judgment, the published mortality table reflects*

expected mortality rates as of the measurement date. This assumption should be disclosed in accordance with section 4.1.1, even if the actuary concludes that such an adjustment is not necessary; and

b. *include an assumption as to expected mortality improvement after the measurement date. This assumption should be disclosed in accordance with section 4.1.1, even if the actuary concludes that an assumption of zero future improvement is reasonable as described in section 3.2.5. Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption.*

Plan Actuary's Assumption:

Pre-Retirement Mortality

General Tier: Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with two-dimensional mortality improvement scale MP-2018.

Safety Tier: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with two-dimensional mortality improvement scale MP-2018.

All pre-retirement deaths are assumed to be non-service connected for both General and Safety members.

Post-Retirement Mortality

General Tier Heathy Retirees and All Beneficiaries: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) times 110%, projected generationally with two-dimensional mortality improvement scale MP-2018. *NOTE: Instead of using the "unadjusted" table prepared by the Society of Actuaries, the plan actuary has adjusted the SOA table (i.e., multiplying the rates by 110%) to reflect FCERA's actual experience.*

Safety Tier Healthy Retirees: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with two-dimensional mortality improvement scale MP-2018.

General Tier Disabled Retirees: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with two-dimensional mortality improvement scale MP-2018.

Safety Tier Disabled Retirees: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with two-dimensional mortality improvement scale MP-2018.

Mortality Rates for Member Contributions

General Tiers: Blended table based on the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) times 110%, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2018, weighted 35% male and 65% female.

Safety Tiers: 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-2018, weighted 80% male and 20% female.

Plan Actuary's Rationale:

Mortality rates were analyzed and modified as a result of the 2019 experience study. The rates above have not been changed since they were modified as a result of that experience study.

At the time of the 2019 experience study, the Retirement Plans Experience Committee ("RPEC") of the Society of Actuaries ("SOA") had recently published the Pub-2010 Public Retirement Plans Mortality tables ("Pub-2010"). In the prior experience study (July 1, 2012 – June 30, 2015) it was noted that for the next experience study the plan actuary recommended that FCERA move from a Headcount-Weighted to a Benefit-Weighted table, and from a "static" to a "generational" approach to anticipate mortality improvement. Upon looking at the benefits (and salaries for employees), it was recommended by the plan actuary that the Above-Median tables be used, as FCERA's members' benefit amounts were generally greater than the median amounts adjusted by a reasonable measure of U.S. price inflation from 2010 to 2018.

In order to compare actual mortality to expected experience under the current and new assumptions, the plan actuary used experience from a nine-year exposure period (July 1, 2009 – June 30, 2018). Even with nine years of data, the plan actuary concluded that the Pub-2010 tables could be partially adjusted for FCERA experience for only the General Tier healthy retirees, based on standard statistical theory. It was recommended that in future studies, even more experience be used in order to reach full credibility.

Pre-Retirement Mortality

General Tier: The plan actuary recommended updating the pre-retirement mortality to follow the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate table for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Safety Tier: The plan actuary recommended updating the pre-retirement mortality to follow the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate table for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Post-Retirement Mortality

General Tier Heathy Retirees: For General Tier members, the combined ratio of actual to expected deaths under the prior assumption on an amounts-weighted basis was 110%. It was recommended to update the table to the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) times 110% to adjust for FCERA experience, projected generationally with the two-dimensional mortality improvement scale MP-2018. The resulting mortality table has an actual to expected ratio of 103% when comparing on an amounts-weighted basis.

The plan actuary noted that if the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table was used without adjustment for the FCERA experience, the resulting table would have an actual to expected ratio of 113% when comparing on an amounts-weighted basis.

Beneficiaries: When setting the mortality table for beneficiaries, the plan actuary does acknowledge that Pub-2010 has separate mortality tables for healthy General retirees and contingent annuitants. However, the Pub-2010 Contingent Survivors Table is developed based on contingent survivor data after the death of retirees. In consideration of the size of FCERA's beneficiary population, and that the contingent survivor mortality rates are comparable to those of the General healthy retiree mortality tables, the plan actuary recommended using the same mortality assumption for General Tier healthy retirees as beneficiaries (for both Safety and General beneficiaries).

Safety Tier Healthy Retirees: For Safety Tier members, the combined ratio of actual to expected deaths under the prior assumption on an amounts-weighted basis was 116%. As mentioned above, the plan actuary determined there was not enough credibility in the Safety mortality experience to adjust the Pub-2010 tables. It was therefore recommended to update 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-2018. The resulting mortality table has an actual to expected ratio of 110% when comparing on an amounts-weighted basis.

General Tier Disabled Retirees: For Disabled General Tier members, the combined ratio of actual to expected deaths under the prior assumption on an amounts-weighted basis was 109%. The plan actuary determined there was not enough credibility in the Disabled mortality experience to adjust the Pub-2010 tables. It was therefore recommended to update to the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018. The resulting mortality table has an actual to expected ratio of 103% when comparing on an amounts-weighted basis.

Safety Tier Disabled Retirees: For Disabled Safety Tier members, the combined ratio of actual to expected deaths under the prior assumption on an amounts-weighted basis was 86%. The plan actuary determined there was not enough credibility in the Disabled mortality experience to adjust the Pub-2010 tables. It was therefore recommended to update to the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018. The resulting mortality table had an actual to expected ratio of 133% when comparing on an amounts-weighted basis.

Mortality Rates for Member Contributions: The plan actuary states that "emerging practice" for determining member contributions 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 close to the duration of benefit payments for active members. This is what the plan actuary recommends for use in the legacy tiers.

For General members, the plan actuary recommends a blended table based on the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table times 110%, projected 30 years with MP-2018, weighted 35% male

and 65% female. This is based on proposed valuation mortality table for General members and actual gender distribution of General members.

For Safety members, the plan actuary recommends the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table, projected 30 years with MP-2018, weighted 80% male and 20% female. This is based on proposed mortality table for Safety members and actual gender distribution for current Safety members.

Mortality Rates for Optional Forms of Payment: In prior experience studies, the plan actuary recommended mortality tables for determining optional forms of payment were determined based on post-retirement mortality recommended for service retirement and disability retirement, projected with a static scale to anticipate future mortality improvement. The plan actuary noted in the 2019 experience study that because the post-retirement mortality now includes a generational mortality improvement scale, there are some administrative issues that need to be resolved prior to providing a recommendation to FCERA for use in reflecting mortality improvement for determining optional forms of payment.

Athena's Assessment of Reasonableness:

Consistent with the recommendation of the previous auditing actuary, the plan actuary updated their mortality tables to be on an amounts-weighted basis with generational projections. Athena agrees that using amounts-weighted tables with generational projections is the preferred table for use in FCERA's mortality assumption.

The plan actuary did not provide any rationale for the updated pre-retirement mortality assumption, aside from updating to the Pub-2010 tables to align with best practices. There is no analysis of actual versus expected deaths provided under the current or new assumptions for pre-retirement mortality. While we acknowledge that the plan actuary updated the tables to align with industry standards, we point out that they could have examined the differences between actual versus expected to determine if an adjustment would be reasonable for a partially credible population. However, such changes to the pre-retirement mortality assumption would likely not have a material effect on plan results.

For the post-retirement mortality assumption, the plan actuary is using unadjusted SOA tables with the exception of the General Tier Healthy retirees. For the General Tier Healthy retirees, the plan actuary decided to reflect FCERA's actual experience by multiplying the rates by 110%. As noted above, adjustments to base mortality rates for the plan's actual experience should be made only when the experience is credible. Our concerns are:

- Providing support and documentation

  The plan actuary did not provide a demonstration in the 2019 experience study of the derivation of the "partial" credibility adjustments to the standard SOA mortality tables based on FCERA's experience.

- Amount of data required for full credibility

  While experience studies typically consider three to five years of experience, it appears that the plan actuary used experience from a nine-year exposure period (July 1, 2009 – June 30, 2018) to study mortality for the General Tier

Healthy retirees. Even with nine years of data, the plan actuary concluded that the actual experience was not fully credible – and that only a partial adjustment for actual experience could be made. We understand that they may consider further expanding the exposure period in future studies, but this may continue to prove challenging. See our thoughts below on alternative development.

Applicable "credibility" standards

Actuarial Standards of Practice No. 25, Credibility Procedures, provides guidance to actuaries with respect to selecting or developing credibility procedures and applying those procedures to sets of data. Section 3.1 indicates that a level of credibility should be considered in the development of assumptions where the population may be substantial enough to do so.

ASOP No. 25, Section 4.1 indicates that the actuary should disclose the credibility procedures used in determining assumptions.

Alternative Post-Retirement Mortality Table Development for General Tier Healthy Retirees.

Consider the following post-retirement mortality assumption:

Base table: Use 100% of the PUB-2010 rates (instead of 110%) – this is the SOA-produced table

Improvement: For 2021 and later years, use the MP-2018 table

Improvement: Prior to 2021, none.

The above assumption is not the same as the plan actuary's assumption, but the valuation results it would produce are unlikely to be materially different from the results produced by the plan actuary's assumption. However, it may be simpler to provide support for the above assumption since rates for the base year use the unadjusted SOA table. ASOP No. 35 provides that actuarial judgment can be employed in applying the appropriate mortality improvements from the base year to the valuation year. This is not intended to be a prescription, but rather a consideration for the actuary in the future.

The plan actuary states that the disabled tables were selected, "based on actual experience", however they do not show how actual experience helped determine their final assumptions in the 2019 experience study report. While the A/E ratio is stated under the old assumption and new assumption, it is not clearly stated how this actual experience was reflected in the selection. In addition, the extent to which actual experience is relied upon should consider the credibility of this population. In fact, the actual to expected ratio becomes worse for Safety disabled members under the revised mortality assumption (86% A/E under old assumption versus 133% A/E under revised assumption, according to page 45 of the 2019 experience study report).

Additionally, the plan actuary states that all pre-retirement deaths (Safety and General) are assumed to be non-service connected. However, it is also assumed that 100% of Safety disabilities are service connected. There appears to be a

disconnect between these two assumptions. It would make sense logically that if all Safety disabilities are service connected, at least a portion of Safety pre-retirement deaths would be service connected as well.

According to a footnote in the 2019 experience study report, the plan actuary notes that if the benchmark Pub-2010 General table was used for healthy retirees **without any adjustment**, the proposed actual to expected ratio would be worse than the current assumption (110% A/E under current assumption versus 113% A/E under unadjusted Pub-2010, according to page 39 of the 2019 experience study report). Essentially, this would mean that the RP-2014 tables used under the prior assumption would be more successful at predicting deaths among healthy retirees at FCERA than the Pub-2010 tables. This is surprising, as the RP-2014 tables were built using only data from private pension plans, while the Pub-2010 tables were built using public-sector pension plan experience and should therefore in theory be more closely aligned to FCERA's plan experience. We are not necessarily recommending a change to this assumption or assumption-setting process; however, we would recommend that Segal confer with FCERA that this is consistent with their understanding of the covered population.

The plan actuary is using the same mortality assumption for healthy annuitants and beneficiaries. However, there are separate Pub-2010 mortality tables available for both healthy retirees and contingent annuitants. While the plan actuary did provide some commentary in the 2019 experience study report as to why the same table was used for both healthy annuitants and beneficiaries, we believe that it is best practice to use separate tables specific to healthy annuitants and contingent survivors. Athena would recommend reconsidering using separate tables for this assumption for future valuations.

In the 2019 experience study report, the plan actuary recommended to project mortality improvement generationally using the MP-2018 mortality improvement scale, as this was the latest improvement scale at the time of the study. Since the study, the plan actuary has continued to use the MP-2018 scale, although updated improvement scales have been published annually since then. According to the Mortality Improvement Scale MP-2015 report,

> *"RPEC's continuing work and ongoing monitoring of emerging data has shown that it is prudent to reflect recent experience as soon as possible after being reviewed."*

Athena recommends updating the improvement scale as new improvement scales are published, which most recently has been on an annual basis, or at least monitor future MP scale releases and mortality improvement reports to ensure that significant changes are reflected.

The plan actuary states in the 2019 experience study that at the time of the study, there were "administrative issues" that made it not possible to provide a recommendation for mortality tables for the optional forms of payment. Once the administrative issues are resolved and data becomes available, Athena recommends conducting an off-cycle analysis or applying the same fully generational mortality tables used in the valuation for conversion to optional forms when possible.

The plan actuary provides a mortality table specified for use for Member Contributions; however, they do not disclose the table's specific application within the valuation report. We have assumed that this mortality table was used to convert member contributions into equivalent annuities. The plan actuary should disclose the purpose of this assumption, including whether these mortality rates were used to convert contribution balances to an equivalent annuity or any other potential uses.

Athena's Recommendations:

1. Provide additional rationale for the updated pre-retirement mortality and disabled mortality assumptions, including actual amounts-weighted analysis for pre-retirement mortality.
2. Provide a credibility analysis which supports the blending of actual plan experiences with standard SOA base mortality tables.
3. Provide rationale explaining why 100% of Safety disabilities are assumed service connected, while no pre-retirement deaths are assumed service connected.
4. Consider using separate tables for healthy retirees and beneficiaries based on the provided healthy annuitant and contingent survivor Pub-2010 tables.
5. Consider updating the MP scale as improved scales become available, or monitor future MP scale releases and mortality improvement reports to ensure that significant changes are reflected.
6. Conduct an off-cycle analysis of the optional form of payment mortality assumption or apply same fully generational mortality tables used in valuation for conversion to optional forms when possible.
7. Clarify methodology for male/female blend of member contribution mortality and disclose the specific uses of this table in the valuation report.

Termination Rates

Applicable Standards:

ASOP No. 35, *Section 3.4.2 – Termination of Employment – The actuary should take into account factors that may affect rates of termination of employment, such as the following:*

a. employer-specific or job-related factors such as occupation, employment practices, work environment, unionization, hazardous conditions, and location of employment; and

b. plan provisions, such as early retirement benefits, vesting schedule, or payout options.

Plan Actuary's Assumption:

Termination Rates (Illustrative)

	Rate of Termination (%)	
Years of Service	General	Safety
Less than 1	18.00	13.00
1	11.00	8.00
5	6.00	3.25

10	4.00	2.00
15	3.50	1.50
20 & Over	2.25	1.00

Proportion of Terminations Assumed to Receive Refunds and Deferred Vested Benefit

Years of Service	General	Safety
0-4	50.00	50.00
5-9	30.00	70.00
10-14	25.00	75.00
15-19	15.00	85.00
20 & Over	10.00	90.00

No termination is assumed after a member is first assumed to retire.

Plan Actuary's Rationale:

Termination rates were analyzed and adjusted as a result of the 2019 experience study. The rates above have not been changed since adopted as a result of this experience study.

Previously, termination rates were determined as a function of a member's age for members with five or more years of service. For the 2019 experience study, the plan actuary analyzed termination experience based on age and years of service. Their review concluded that termination rates correlate better with years of service. It was therefore determined that the termination rate assumptions be structured solely as a function of years of service.

Observed termination rates based on actual experience over the three-year exposure period analyzed in the 2019 experience study were compared to the assumed termination rates, and revised rates were recommended as a result.

The plan actuary noted that not every service category had enough exposures and/or decrements such that the results in that category could be considered statistically credible (typically at the highest service categories).

Observed proportions of total termination assumed to receive refunds and deferred vested benefits based on actual experience over the three-year exposure period analyzed in the 2019 experience study were also compared to the assumed rates, and revised rates were recommended as a result.

Athena's Assessment of Reasonableness:

The plan actuary states that termination rates are better correlated with years of service versus age for the active member population. However, no analysis is shown in the 2019 experience study report validating this rationale. It would be beneficial to show both age and service as they relate to termination rates in the experience study report, rather than stating the results with no analysis provided as rationale.

The proportion of terminations assumed to receive refunds is based entirely on a member's years of service. The plan actuary did not mention considering other factors when recommending these rates. It could be interesting to consider studying whether this cash out assumption should be amounts-based. Logically, it would make sense that the amount

of the refund could influence whether or not a terminated vested member would elect to receive a refund rather than a deferred benefit. It is true that benefit amount is tied to service, so there may already be some accounting for this with the assumption being based on years of service, however the current assumption does not take into account different tiers, which have different formulas for the benefit they receive upon retirement. It would also be interesting to look into the year over year trends in proportion of total terminations assumed to receive a refund rather than just in aggregate.

Athena's Recommendations:

1. Demonstrate analysis of termination rates as a function of both age and service to support any conclusions made in the development of the assumption.
2. Consider additional factors that could influence the proportion of terminated members assumed to receive refund.

Disability Rates

Applicable Standards:

ASOP No. 35, *Section 3.4.5 – Disability and Disability Recovery – The actuary should take into account factors that may affect rates of disability and disability recovery, such as the following:*

a. *the plan's definition of disability (for example, whether the disabled person is eligible for Social Security benefits); and*
b. *the potential for recovery. For example, if the plan requires continued disability monitoring and if the plan's definition of disability is very liberal, an assumption for rates of recovery may be appropriate. Alternatively, the probability of recovery may be reflected by assuming a lower incidence of disability than the actuary might otherwise assume.*

Plan Actuary's Assumption:

	Rate of Disability (%)	
Age	General	Safety
20 – 24	0.01	0.05
25 – 29	0.01	0.11
30 – 34	0.02	0.24
35 – 39	0.04	0.42
40 – 44	0.11	0.65
45 – 49	0.21	0.90
50 – 54	0.28	1.30
55 – 59	0.33	1.80
60 – 64	0.44	2.60
65 – 69	0.65	3.00
70 – 74	0.75	3.00

50% of General disabilities are assumed to be service-connected disabilities (duty) and the other 50% are assumed to be non-service connected (ordinary) disabilities. 100% of Safety disabilities are assumed to be service connected (duty) disabilities.

Plan Actuary's Rationale:

Disability rates were analyzed and adjusted as a result of the 2019 experience study. The rates above have not been changed since adopted as a result of this experience study.

The plan actuary recommended combining the experiences for male and female General disability into one set of disability incidence rates (previously they were broken into male and female rates).

Observed disability incidence rates based on actual experience over the three-year exposure period analyzed in the 2019 experience study were compared to the assumed disability incidence rates, and revised rates were recommended as a result. The new recommended rates reflected increases in most disability incidence rates for both General and Safety members.

The plan actuary also noted that FCERA was working to reduce the amount of time it takes to review applications for disabilities at the time of the experience study. As a result of their efforts, average processing time for disability applications had been cut in half (down from 18 months to 9 months). Because of this, the plan actuary suggests that the lag time that was previously included in the count of disability incidences be re-examined. Specifically, in the past, members who changed status from terminated vested or retired to disability retirement would count as a disability incidence, regardless of whether their actual dates of disability would have fallen during the three-year period. The plan actuary suggests monitoring the lag time for disabilities and re-assessing its relevance during the next experience study. For the current study, the plan actuary assumed there would still be a two-year lag in the disability application process and has reflected this in the actual disability incidence rates that were used to develop the revised rates under the new assumption.

Based on actual experience over the three years of data analyzed in the 2019 experience study, 48.9% of disabled General members and 95.8% of Safety members received a service-connected disability. Because of this, the plan actuary recommended maintaining the assumptions that 50% of disabled General members receive a service-connected disability, and 100% of disabled Safety members receive a service-connected disability.

Athena's Assessment of Reasonableness:

Due to the short time frame of the study (3-year exposure period), credibility is a concern regarding the reasonableness of the disability rates proposed by the plan actuary. There did not appear to be enough disability incidences in the exposure period studied to justify altering the assumption based on this experience alone.

In addition, the plan actuary states that based on experience it was decided that General rates would no longer be split by male versus female. There is no data or analysis included in the 2019 experience study report to support this conclusion.

The 2019 experience study report contains a detailed discussion regarding disability lag time and how it is being utilized in the disability assumption. No information regarding disability lag time was disclosed in the 6/30/2021 valuation report.

Athena's Recommendations:

1. Consider studying additional years of data such that plan experience analysis is considered credible OR consider relying on a state system disability assumption (i.e., CalPERS).
2. Demonstrate analysis of disability incidence rates as a function of both gender and age to support any conclusions made in the development of the assumption.
3. Disclose assumptions regarding disability lag time in future valuation reports.

Annual Leave Conversion

Applicable Standards:

ASOP No. 35, *Section 3.5.4 – Hours of Service – Assumptions for hours of service are generally plan- or industry-specific. Separate assumptions may also be needed for such purposes as benefit accrual and total employer plan contributions.*

Plan Actuary's Assumption:

Plan	Hours of Leave
New Annual Leave Plan (5Y)	40
Annual Leave Plan II (5Y)	25
Vacation/Sick Leave Plan (General: 5Q, 5S and 5W)	35
Vacation/Sick Leave Plan (Safety: 5Q, 5S and 5W)	45
Annual Leave Plan IV (5P)	Based on member specific frozen Time Off hours
Annual Leave Plan V (5N)	Based on member specific frozen Time Off hours

Plan Actuary's Rationale:

Annual leave conversion hours were analyzed and adjusted as a result of the 2019 experience study. The hours above have not been changed since adopted as a result of this experience study.

According to the plan actuary, at retirement, members can convert their unused annual leave to increase the service credit used in the calculation of their retirement benefit. An assumption must be determined to estimate the number of hours of annual leave that will be converted at retirement.

As a part of the 2019 experience study, the plan actuary collected information on the actual amount of annual leave balance for actives as of June 30, 2018. Rates for each annual leave plan were adjusted based on the actual hours of

accumulated annual leave available. The following table shows the original assumption, the data as of June 30, 2018, and the proposed new assumption:

	Plan			
	New Annual Leave (5Y)	Annual Leave II (5Y)	Vacation/Sick Leave (General: 5Q, 5S and 5W)	Vacation/Sick Leave (Safety: 5Q, 5S and 5W)
Original Assumption	35.00	25.00	35.00	40.00
Data as of 6/30/2018	42.38	22.35	32.23	47.33
Revised Assumption	40.00	25.00	35.00	45.00

Because the hours in the Time Off Bank are frozen, and members in the Annual Leave Plan IV (5P) and Annual Leave Plan V (5N) are allowed to transfer hours to their Time Off Bank, the plan actuary chose to continue the assumption of no future addition to the Time Off Bank hours, and that a member will only convert their frozen Time Off hours to service credit.

Athena's Assessment of Reasonableness:

The annual leave conversion assumptions were changed based solely on data as of 6/30/2018. It would be beneficial to look at the hours of annual leave for the past three years of data as of June 30, rather than just a single point in time when determining adjustments to the assumptions. This could be accomplished in a manner similar to how the plan actuary analyzed the marital percentage assumption as described in the Marital Percentage, Sex, and Age Assumptions section above. It would also be interesting to look into the year over year trends in annual leave conversion to see if there have been any notable changes over time. Given the effects on the workforce due to COVID-19 over the past 18 months and into the future, it will be important in future experiences studies to look at multiple years of data rather than a singular point in time. It was noted that the plan actuary conducts an internal review of any changes over a three-year period to identify potential anomalies or trends.

Athena's Recommendations:

1. Disclose details of ongoing analysis performed to develop annual leave conversion assumptions and consider using the past three years of data as of June 30 to develop annual leave conversion assumptions rather than just data as of 6/30/2018 for future experience studies.
2. Analyze year over year data on annual leave amounts to determine any potential trends for future experience studies.

Review of Methods

Actuarial methods are selected based on applicable accounting standards and ASOPs. We have reviewed the methods selected by the actuary and evaluated their consistency with applicable standards and industry best practice.

Actuarial Cost Method

Applicable Standards:

ASOP No. 4, *Section 3.13 – Actuarial Cost Method – When selecting an actuarial cost method to assign periodic costs or actuarially determined contributions to time periods in advance of the time benefit payments are due, the actuary should select an actuarial cost method that meets the following criteria:*

a. *the period over which normal costs are allocated for a participant begins no earlier than the date of employment and does not extend beyond the last assumed retirement age. The period may be applied to each individual participant or to groups of participants on an aggregate basis.*
b. *When a plan has no active participants and no participants are accruing benefits, a reasonable actuarial cost method will not produce a normal cost for benefits. For purposes of this standard, an employee does not cease to be an active participant merely because he or she is no longer accruing benefits under the plan;*
c. *the attribution of normal costs bears a reasonable relationship to some element of the plan's benefit formula or the participant's compensation or service. The attribution basis may be applied on an individual or group basis. For example, the actuarial present value of projected benefits for each participant may be allocated by that participant's own compensation or may be allocated by the aggregated compensation for a group of participants;*
d. *expenses are considered when assigning periodic costs or actuarially determined contributions to time periods. For example, the expenses for a period may be added to the normal cost for benefits or expenses may be reflected as an adjustment to the investment return assumption or the discount rate. As another example, expenses may be reflected as a percentage of pension obligation or normal cost; and*
e. *the sum of the actuarial accrued liability and the actuarial present value of future normal costs equals the actuarial present value of projected benefits and expenses, to the extent expenses are included in the actuarial accrued liability and normal cost. For purposes of this criterion, under a spread gain actuarial cost method, the sum of the actuarial value of assets and the unfunded actuarial accrued liability, if any, shall be considered to be the actuarial accrued liability.*

When disclosing a funded status measurement using a spread gain actuarial cost method, the actuary should also calculate and disclose a funded status measurement using an immediate gain actuarial cost method.

GASB Statement No. 67 *– Attribution of the actuarial present value of projected benefit payments to periods – 46. The entry age actuarial cost method should be used to attribute the actuarial present value of projected benefit payments of each plan member to periods in conformity with the following:*

a. *Attribution should be made on an individual plan-member-by-plan-member basis.*
b. *Each plan member's service costs should be level as a percentage of that member's projected pay. For purposes of this calculation, if a member does not have projected pay, the projected inflation rate should be used in place of the projected rate of change in salary.*
c. *The beginning of the attribution period should be the first period in which the member's service accrues pensions under the benefit terms, notwithstanding vesting or other similar terms.*
d. *The service costs of all pensions should be attributed through all assumed exit ages, through retirement. In pension plans in which the benefit terms include a DROP, for purposes of this Statement, the date of entry into the DROP should be considered to be the plan member's retirement date.*
e. *Each plan member's service costs should be determined based on the same benefit terms reflected in that member's actuarial present value of projected benefit payments.*

Plan Actuary's Approach:

The Plan Actuary uses the Entry Age Actuarial Cost Method. The method requires the calculation of Normal Cost and Actuarial Accrued Liability based on each individual member's date of hire, and costs are allocated as a level percentage of compensation. Normal Cost is determined as if the current benefit formula for each individual has always been in effect.

We note that the plan actuary has separated "regular" benefits from "settlement" benefits when preparing the funding valuation. While that separate treatment is not required by the Entry Age Cost Method, it appears that it addresses special circumstances for this plan. We understand that FCERA may intend to utilize "excess earnings" in the future to provide contribution rate offsets and additional settlement and non-statutory benefits. The plan actuary indicates that the potential impact of applying future excess earnings in that manner has not been explicitly measured in the valuation.

Plan Actuary's Rationale:

None stated.

Athena's Assessment of Reasonableness:

The plan actuary's method is consistent with applicable GASB standards and ASOPs. In addition, use of Entry Age Normal Cost method is supported by the California Actuarial Advisory Panel (CAAP) which lists it as a "Model Practice." The Government Finance Officers Association (GFOA) lists it as a "Best Practice" in its *Core Elements of a Funding Policy.*

Athena's Recommendations:

1. We understand that the Entry Age Normal Cost Method is prescribed by GASB. We recommend noting that it is a prescribed method in the accounting valuation report, to comply with ASOP 4.

Asset Smoothing Method

Applicable Standards:

ASOP No. 44 *Section 3.3 – Relationship to Market Value – If the considerations in section 3.2 have led the actuary to conclude that an asset valuation method other than market value may be appropriate, the actuary should select an asset valuation method that is designed to produce actuarial values of assets that bear a reasonable relationship to the corresponding market values. The qualities of such an asset valuation method include the following:*

a. Given the inherent volatility of markets, the asset valuation method is likely to produce actuarial values of assets that are sometimes greater than and sometimes less than the corresponding market values.

b. The asset valuation method is likely to produce actuarial values of assets that, in the actuary's professional judgment, satisfy both of the following:

1. The asset values fall within a reasonable range around the corresponding market values. For example, there might be a corridor centered at market value, outside of which the actuarial value of assets may not fall, in order to assure that the difference from market value is not greater than the actuary deems reasonable.

2. Any differences between the actuarial value of assets and the market value are recognized within a reasonable period of time. For example, a formula addresses differences between the actuarial value of assets and the market value in a manner that, in the actuary's professional judgment, is rational, systematic, and produces an actuarial value of assets that is expected to converge toward market value at a pace that the actuary deems reasonable, assuming constant asset returns in future periods.

Plan Actuary's Approach:

Market value of assets 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 is further adjusted, if necessary, to be within 30% of the market value of assets.

Plan Actuary's Rationale:

None stated.

Athena's Assessment of Reasonableness:

The asset smoothing method appears reasonable based on ASOP 44. In addition, the smoothing method described by Segal conforms to the CAAP's "Model Practices" as described in *Actuarial Funding Policies and Practices for Public Pension and OPEB Plans. A comprehensive funding policy for FCERA can be found on their website*[1].

Athena's Recommendations:

None.

Amortization Policy

Applicable Standards:

ASOP No. 4 *Section 3.14– Amortization Method – When selecting an amortization method, the actuary should select an amortization method for each amortization base that is expected to produce amortization payments that fully amortize the amortization base within a reasonable time period or reduce the outstanding balance by a reasonable amount each year.*

For purposes of determining a reasonable time period or a reasonable amount, the actuary should take into account factors including, but not limited to, the following, if applicable:

a. *whether the amortization method is open or closed;*
b. *the source of the amortization base;*
c. *the anticipated pattern of the amortization payments, including the length of time until amortization payments exceed nominal interest on the outstanding balance;*
d. *whether the amortization base is positive or negative;*
e. *the duration of the actuarial accrued liability;*
f. *the average remaining service lifetime of active plan participants; and*
g. *the funded status of the plan or period to plan insolvency.*

When selecting an amortization method, the actuary should select an amortization method that is expected to produce total amortization payments that are expected to fully amortize the unfunded actuarial accrued liability within a reasonable time period or reduce the unfunded actuarial accrued liability by a reasonable amount within a sufficiently short period.

The actuary should assess whether the unfunded actuarial accrued liability is expected to be fully amortized.

For purposes of this section, the actuary should assume that all assumptions will be realized and actuarially determined contributions will be made when due.

[1] https://fresnocountyretirement.org/wp-content/uploads/2020/02/20200219-4C-ApprovalofPolicies-1fFunding.pdf

Plan Actuary's Approach:

The UAAL, (i.e., the difference between the Actuarial Accrued Liability and the Valuation Value of Assets), as of June 30, 2003 valuation is being amortized over a declining period with 12 years remaining as of June 30, 2021. Any new UAAL as a result of assumption changes, method changes and actuarial gains or losses identified in the annual valuation as of June 30, 2011 and later will be amortized over a period of 15 years. Any new UAAL as a result of plan amendments will be amortized over a period of 15 years. Any new UAAL as a result of Golden Handshakes or Early Retirement Incentive Programs (ERIP) will be amortized over a period of up to 5 years. The UAAL shall be amortized over "closed" amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation. The 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. If the AAL is overfunded (i.e., the Valuation Value of Assets exceeds 120% of the Actuarial Accrued Liability so that there is a surplus), 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 15 years as the first of a new series of amortization layers.

Plan Actuary's Rationale:

None stated.

Athena's Assessment of Reasonableness:

It is apparent that Segal has worked closely with the client to develop an amortization policy that responsibly amortizes the plan's gains and losses over time. This is supported by the California Actuarial Advisory Panel (CAAP) which demonstrates that the adopted amortization policy is consistent with "Model Practice." We believe that the method is reasonable, and that Segal should continue to work closely with FCERA to ensure that the policy aligns with the plan sponsor's goals. While the current average future working lifetime for active participants may be 15 years or more, we also noted during our review that the proportion of the total liability attributable to the active population has been declining. As a result of that and recent ASOP revisions, it appears to be an appropriate time to review the plan's amortization policy. We recommend that Segal work with FCERA to illustrate the impact of different scenarios on the anticipated contribution rates, including active headcount decline or alternative amortization periods. An amortization period which reflects a combination of the average future working lifetime for actives and a shorter period for inactives (similar to the amortization period required by GASB) may be useful in illustrating alternative scenarios and any potential risk stemming from the current amortization policy.

Currently, gains and losses are amortized over 15 years, regardless of the source. In doing the review we discussed above, you may wish to consider an approach which varies the amortization period based on the source of gain/loss. For example, asset gains and losses are amortized over 15 years for the purpose of calculating contribution rates, but investment gains and losses are smoothed over five years in the calculation of the AVA. Perhaps, a shorter

amortization period for investment gain/loss should be considered given the declining proportion of liability attributable to the active population. We recommend that Segal consider discussing the potential impact of alternative amortization periods for different sources of gains and losses.

Athena's Recommendations:

1. Perform analysis to demonstrate potential impact of adverse scenarios on the plan and understand effect of possible changes to the amortization policy.

Review of Report Communications

The role of the actuary includes performing necessary calculations to be used as the basis for ongoing plan funding, and communicating the results, risks and opportunities in a manner that clients can understand and take necessary action. There are three standards that we consider when evaluating the communication of actuarial information: ASOP No. 41 – Actuarial Communications, ASOP No. 51 – Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, and ASOP No. 56 – Modeling.

Applicable Standards:

ASOP No. 41 – *Section 3.1.2 – Clarity – The actuary should take appropriate steps to ensure that each actuarial communication is clear and uses language appropriate to the particular circumstances, taking into account the intended users.*

3.4.1 – Uncertainty or Risk – The actuary should consider what cautions regarding possible uncertainty or risk in any results should be included in the actuarial report.

3.4.4 – Responsibility for Assumptions and Methods - An actuarial communication should identify the party responsible for each material assumption and method. Where the communication is silent about such responsibility, the actuary who issued the communication will be assumed to have taken responsibility for that assumption or method. The actuary's obligation when identifying the other party who selected the assumption or method depends upon how the assumption or method was selected.

4.1.3 – Disclosures in Actuarial Reports – In addition to the information necessary to satisfy section 3.2, any actuarial report should disclose the following information, unless the actuary determines that it is inappropriate to do so:

- *a. the intended users of the actuarial report;*
- *b. the scope and intended purpose of the engagement or assignment;*
- *c. the acknowledgement of qualification as specified in the Qualification Standards;*
- *d. any cautions about risk and uncertainty (see section 3.4.1);*
- *e. any limitations or constraints on the use or applicability of the actuarial findings contained within the actuarial communication including, if appropriate, a statement that the communication should not be relied upon for any other purpose;*
- *f. any conflict of interest as described in section 3.4.2;*
- *g. any information on which the actuary relied that has a material impact on the actuarial findings and for which the actuary does not assume responsibility (see section 3.4.3);*
- *h. the information date as described in section 3.4.5;*
- *i. subsequent event(s) (if any) as described in section 3.4.6.; and*
- j. *if appropriate, the documents comprising the actuarial report.*

ASOP 51 – *Section 3.2 – Identification of Risks to Be Assessed – The actuary should identify risks that, in the actuary's professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition. Examples of risks include the following:*

a. *investment risk (i.e., the potential that investment returns will be different than expected);*
b. *asset/liability mismatch risk (i.e., the potential that changes in asset values are not matched by changes in the value of liabilities);*
c. *interest rate risk (i.e., the potential that interest rates will be different than expected);*
d. *longevity and other demographic risks (i.e., the potential that mortality or other demographic experience will be different than expected); and*
e. *contribution risk.*

ASOP 56 – *Section 3.7 – Documentation - The actuary should consider preparing and retaining documentation to support compliance with the requirements of section 3 and the disclosure requirements of section 4. If preparing documentation, the actuary should prepare such documentation in a form such that another actuary qualified in the same practice area could assess the reasonableness of the actuary's work. The degree of such documentation should be based on the professional judgment of the actuary and may vary with the complexity and purpose of the actuarial services. In addition, the actuary should refer to ASOP No. 41, section 3.8, for guidance related to the retention of file material other than that which is to be disclosed under section 4.*

4.1 Required Disclosures in an Actuarial Report – When issuing an actuarial report under this standard, the actuary should refer to ASOP Nos. 23 and 41. In addition, the actuary should disclose the following in such actuarial reports:

a. the intended purpose of the model, as discussed in section 3.1;

b. material inconsistencies, if any, among assumptions, and known reasons for such inconsistencies, as discussed in section 3.1.6(c);

c. unreasonable output resulting from the aggregation of assumptions, if material, as discussed in section 3.1.6(e);

d. material limitations and known weaknesses, as discussed in section 3.2;

e. extent of reliance on models developed by others, if any, as discussed in section 3.4; and

f. extent of reliance on experts, if any, as discussed in section 3.5.

4.2 Additional Disclosures in an Actuarial Report – The actuary should include the following, as applicable, in an actuarial report:

a. the disclosure in ASOP No. 41, section 4.2, if any material assumption or method was prescribed by applicable law;

b. the disclosure in ASOP No. 41, section 4.3, if the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and

c. the disclosure in ASOP No. 41, section 4.4, if, in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

Athena's Assessment of Reasonableness:

It is our opinion that the three actuarial communications included in the scope of this actuarial audit were prepared in compliance with the ASOPs, in a manner which is transparent and informative to the plan sponsor. The necessary and required exhibits and disclosures are included in the report, as well as some supplementary charts and graphics intended to add insight to the risks faced by the plan. We would note that certain graphs, such as Exhibit I: Projection of UAAL Balances and Payments on page 74-75 of the valuation report, may be difficult to understand without context. We acknowledge that it is typical and likely that Segal has provided additional context to the client such that these graphs are familiar and helpful to them. It may be worth clarifying that these graphs do not indicate that payments will eventually trend towards $0 as new gains and losses will arise over time.

For ASOP No. 51, it appears that Segal has adequately explained applicability of the ASOP in the executive summary, with a qualitative description of risks tailored towards FCERA on page 42 and supplementary maturity measures on page 16 and page 41.

For ASOP No. 56, it appears that Segal has adequately disclosed the necessary information related to their actuarial valuation model on page 14.

Athena's Recommendations:

1. Add qualitative description of context to the graphs on page 74-75.

Appendix A: Glossary

Brief explanations of terms used in this report or the accompanying GASB 67 results:

Actuarial Accrued Liability (AAL)

The difference between the present value of all future system benefits and the present value of total future normal costs. Represents the budgeted costs

Actuarially Determined Contributions

Target or recommended contribution to a retirement plan for the reporting period, determined based on the funding policy and most recent measurement available when the contribution for the reporting period was adopted

Actuarial Present Value

The current calculation of amounts expected to be paid out in the future, discounted using an interest rate and taking into account various actuarial assumptions to predict the likelihood of payout.

Annual Expense

The amount recognized by an employer in each accounting period for contributions to a defined benefit pension plan on the modified accrual basis of accounting. Collective deferred outflows of resources and deferred inflows of resources related to pension. Deferred outflows of resources and deferred inflows of resources related to pension arising from certain changes in the collective net OPEB liability or collective total OPEB liability.

Covered Payroll

Annual compensation paid (or expected to be paid) to active employees covered by an OPEB plan, in aggregate.

Deferred Inflows/Outflows of Resources

Portion of changes in net pension liability that is not immediately recognized in expense. These changes include the differences between expected and actual experience, changes in assumptions, and differences between expected and actual earnings on plan investments

Discount Rate

Single rate of return that, when applied to all projected benefit payments would result in an actuarial present value of projected benefit payments that is equal to the sum of:

1. The actuarial present value of benefit payments projected to be made in future periods where the plan assets are projected to be sufficient to meet benefit payments, calculated using the long-term expected rate of return, and
2. The actuarial present value of projected benefit payments not included in (1), calculated using the current municipal bond rate

Long-Term Expected Rate of Return

Long-term expected rate of return on pension plan investments, calculated by multiplying the target asset allocation by asset class by the expected return by asset class, net of investment expenses; expected return by asset class is determined based on review of publicly available capital market assumptions as published by major advisory firms

Market Value of Assets

The fair value of the Plan's assets assuming liquidation on measurement date

Municipal Bond Rate

Yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher

Normal Cost or Service Cost

The portion of the Total Present Value of Future Benefits attributed to employee service during the current fiscal year by the actuarial cost method. These terms are used interchangeably.

Present Value of Future Benefits (PVFB)

The value, as of the valuation date, of the projected benefits payable to all members for their accrued service and their expected future service, discounted to reflect the time value (present value) of money and adjusted for the probabilities of retirement, withdrawal, death, and disability.

Projected Benefit Payments

All benefits estimated to be payable through the plan to current active and inactive employees as a result of their past service and expected future service

Total Pension Liability

The portion of actuarial present value of projected benefit payments that is attributable to past periods of member service using the Entry Age Normal cost method based on the requirements of the GASB.

Unfunded Actuarial Accrued Liability (UAAL)

Difference between Actuarial Accrued Liability and Actuarial Value of Assets. The shortfall of assets in the trust compared to the amount needed to fulfill benefit obligations. When negative, this represents a surplus.