PROPOSAL FOR
ACTUARIAL SERVICES FOR THE
NEBRASKA PUBLIC EMPLOYEES RETIREMENT SYSTEM

TECHNICAL PROPOSAL - ORIGINAL

Due Date:
January 24, 2019 by 2:00 P.M.

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

184 Shuman Blvd., Suite 305
Naperville, IL 60563
(630) 620-0200

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January 24, 2019

Annette Walton / Nancy Storant
State Purchasing Bureau
1526 K St Suite 130
Lincoln, NE 68508

Re: *Professional Actuarial Services for the Nebraska Public Employees Retirement Systems (RFP 5989 Z1)*

Dear Mss. Walton and Storant,

I am writing to provide a formal response to your search for a firm to provide professional actuarial services for the Nebraska Public Employees Retirement Systems (NPERS). This letter is our effort to emphasize what a pleasure it would be to serve as the Board's actuary. In this proposal, you will find details surrounding the services we would be providing and the fees associated with performing the work.

Foster & Foster Consulting Actuaries, Inc. d/b/a Foster & Foster, Inc., is an independent national actuarial consulting firm that was founded in 1979 and is structured to provide actuarial services to public pension programs. Currently, we provide actuarial services to public retirement programs in Illinois, Florida, Missouri, Georgia, Alabama, Texas, Louisiana, Oklahoma, and Arkansas. As the consulting actuaries to more than 350 public entities across the country, which include police, fire, and general employees, as well as cities, districts, school boards, and hospitals, we understand and are well qualified to perform the services required of the NPERS.

We are uniquely qualified and would be the best applicant to perform the services requested for the following reasons:

- **Firm's Expertise and Resources** – For over thirty-nine years we have been specializing in providing actuarial services of this nature to the public sector. Our firm has 21 credentialed actuaries with over 320 years of public sector experience. This includes nine Fellows of the Society of Actuaries (FSAs). Additionally, we have 10 consultants who are taking the exams to earn their credentials. The plethora of resources ensures that we meet the deadlines of all our clients.

- **Consultant's Credentials** – We will devote five credentialed actuaries, including four Fellows of the Society of Actuaries (FSAs), to assist the Board. This is the highest actuarial designation that an actuary can obtain.

- **Quality Control Procedures** – Foster & Foster has a formal peer review process that is unmatched by our competitors. Every report is reviewed by more than one credentialed actuary and nothing leaves our office without being reviewed by our senior quality control actuary. He reviews all of our work to ensure that it is consistent across the firm and conforms to the Actuarial Standards of Practice.

- **Active Consultants** – Our consultants do not just report the news. We prepare our clients for contingent risks and actively manage and provide services to our clients. Whether it is by providing innovate internet-based solutions or by holding interactive workshops with Boards and City Council members, our consultants are visible, articulate, and progressive.

- **Unbiased Advice** – We derive 100% of our revenues from our consulting and actuarial services. As we do not accept fees, commissions, or any other form of consideration from any source other than consulting fees, we provide our clients with unbiased advice.

I, Jason L. Franken, FSA and consulting actuary, am authorized to represent and contractually bind the firm. You may reach me at the address and telephone number listed below. Our firm understands the scope of services and would consider it a privilege to serve the Nebraska Public Employees Retirement Systems.

Foster & Foster acknowledges that it has received Addendums 1 & 2 for the RFP.

If you have any questions regarding this proposal response, our firm, or the services we are prepared to provide, please don't hesitate to contact me.

Sincerely,

Jason L. Franken, FSA, EA, MAAA
Authorized Officer
jason.franken@foster-foster.com

Form A – Bidder Contact Sheet

Bidder Contact Sheet
Request for Proposal Number 5989 Z1

Form A should be completed and submitted with each response to this RFP. This is intended to provide the State with information on the bidder's name and address, and the specific person(s) who are responsible for preparation of the bidder's response.

Preparation of Response Contact Information	
Bidder Name:	Foster & Foster, Inc.
Bidder Address:	184 Shuman Blvd., Suite 305 Naperville, IL 60563
Contact Person & Title:	Jason Franken, Principal
E-mail Address:	Jason.Franken@foster-foster.com
Telephone Number (Office):	(630) 620-0200
Telephone Number (Cellular):	(773) 412-8692
Fax Number:	(239) 481-0634

Each bidder should also designate a specific contact person who will be responsible for responding to the State if any clarifications of the bidder's response should become necessary. This will also be the person who the State contacts to set up a presentation/demonstration, if required.

Communication with the State Contact Information	
Bidder Name:	Foster & Foster, Inc.
Bidder Address:	184 Shuman Blvd., Suite 305 Naperville, IL 60563
Contact Person & Title:	Jason Franken, Principal
E-mail Address:	Jason.Franken@foster-foster.com
Telephone Number (Office):	(630) 620-0200
Telephone Number (Cellular):	(773) 412-8692
Fax Number:	(239) 481-0634

CONTRACTUAL SERVICES FORM

REQUEST FOR PROPOSAL FOR CONTRACTUAL SERVICES FORM

BIDDER MUST COMPLETE THE FOLLOWING

By signing this Request for Proposal for Contractual Services form, the bidder guarantees compliance with the procedures stated in this Request for Proposal, and agrees to the terms and conditions unless otherwise indicated in writing and certifies that bidder maintains a drug free work place.

Per Nebraska's Transparency in Government Procurement Act, Neb. Rev Stat § 73-603 DAS is required to collect statistical information regarding the number of contracts awarded to Nebraska Contractors. This information is for statistical purposes only and will not be considered for contract award purposes.

_____ NEBRASKA CONTRACTOR AFFIDAVIT: Bidder hereby attests that bidder is a Nebraska Contractor. "Nebraska Contractor" shall mean any bidder who has maintained a bona fide place of business and at least one employee within this state for at least the six (6) months immediately preceding the posting date of this RFP.

______I hereby certify that I am a Resident disabled veteran or business located in a designated enterprise zone in accordance with Neb. Rev. Stat. § 73-107 and wish to have preference, if applicable, considered in the award of this contract.

_____ I hereby certify that I am a blind person licensed by the Commission for the Blind & Visually Impaired in accordance with Neb. Rev. Stat. §71-8611 and wish to have preference considered in the award of this contract.

FORM MUST BE SIGNED USING AN INDELIBLE METHOD (NOT ELECTRONICALLY)

FIRM:	Foster & Foster, Inc.
COMPLETE ADDRESS:	184 Shuman Blvd., Suite 305 Naperville, IL 60563
TELEPHONE NUMBER:	(630) 620-0200
FAX NUMBER:	(239) 481-0634
DATE:	January 23, 2019
SIGNATURE:	Jason Franken
TYPED NAME & TITLE OF SIGNER:	Jason Franken, Principal

CORPORATE OVERVIEW

Responses to the Corporate Overview questions of RFP Section VI:

a. BIDDER IDENTIFICATION AND INFORMATION

The bidder should provide the full company or corporate name, address of the company's headquarters, entity organization (corporation, partnership, proprietorship), state in which the bidder is incorporated or otherwise organized to do business, year in which the bidder first organized to do business, and whether the name and form of organization has changed since first organized.

Foster & Foster Consulting Actuaries, Inc. d/b/a Foster & Foster, Inc., a Florida corporation, is a national independent actuarial consulting firm that was founded in Gainesville, FL in June 1979 and is currently headquartered in Fort Myers, FL at the address listed below:

Foster & Foster, Inc.
13420 Parker Commons Blvd., Suite 104
Fort Myers, FL 33912
(239) 433-5500

b. FINANCIAL STATEMENTS

The bidder should provide financial statements applicable to the firm. If publicly held, the bidder should provide a copy of the corporation's most recently audited financial reports and statements, and the name, address, and telephone number of the fiscally responsible representative of the bidder's financial or banking organization.

If the bidder is not a publicly held corporation, either the reports and statements required of a publicly held corporation, or a description of the organization, including size, longevity, client base, areas of specialization and expertise, and any other pertinent information, should be submitted in such a manner that proposal evaluators may reasonably formulate a determination about the stability and financial strength of the organization.

The bidder must disclose any and all judgments, pending or expected litigation, or other real or potential financial reversals, which might materially affect the viability or stability of the organization, or state that no such condition is known to exist.

The State may elect to use a third party to conduct credit checks as part of the corporate overview evaluation.

Foster & Foster is a privately-owned company; we would request that an executed confidentiality agreement be in place in order to disclose our annual financial statements. With that said, we are a profitable firm with over $10.0 million in annual revenues. Please contact our Chief Executive Officer Brad Heinrichs at (239) 433-5500 with any questions you may have.

Our firm is profitable with annual revenues of over $10.0 million from servicing clients in over ten states. Our firm is structured to provide actuarial services to public retirement and other postemployment benefit programs.

Our firm currently employs 64 consultants, of which 21 have obtained actuarial credentials. Brad Heinrichs, Jason Franken, Michael Merlob, Aimee Strickland, Heidi Andorfer, Pat McDonald, Paul Baugher, Pete McCloud, and Christine O'Neal are Fellows of the Society of Actuaries (FSA), the highest distinction an actuary can obtain. Our firm also has a strong support staff with teams devoted to data preparation/collection and asset reconciliation.

Our firm has been providing actuarial consulting services to public retirement programs for over 39 years and completes more than 350 actuarial valuations per year. This has allowed Foster & Foster to provide expert advice and support in all phases of the design and administration of retirement plans.

c. CHANGE OF OWNERSHIP

If any change in ownership or control of the company is anticipated during the twelve (12) months following the proposal due date, the bidder should describe the circumstances of such change and indicate when the change will likely occur. Any change of ownership to an awarded vendor(s) will require notification to the State.

No change in ownership is planned in the near future. Brad and Sandra Heinrichs have been the majority owners since 2005. Our firm understands that any change in ownership, the state is to be notified.

d. OFFICE LOCATION

The bidder's office location responsible for performance pursuant to an award of a contract with the State of Nebraska should be identified.

Office providing Services:

Foster & Foster, Inc.
184 Shuman Blvd., Suite 305
Naperville, IL 60563
(630) 620-0200

e. RELATIONSHIPS WITH THE STATE

The bidder should describe any dealings with the State over the previous ten (10) years. If the organization, its predecessor, or any Party named in the bidder's proposal response has contracted with the State, the bidder should identify the contract number(s) and/or any other information available to identify such contract(s). If no such contracts exist, so declare.

Foster & Foster has not had any dealings with the State of Nebraska.

f. BIDDER'S EMPLOYEE RELATIONS TO STATE

If any individual named in the bidder's proposal response is or was an employee of the State within the past twelve (12) months, identify the individual(s) by name, State agency with whom employed, job title or position held with the State, and separation date. If no such relationship exists or has existed, so declare.

If any employee of any agency of the State of Nebraska is employed by the bidder or is a subcontractor to the bidder, as of the due date for proposal submission, identify all such individuals by name, position held with the bidder, and position held with the State (including job title and agency). Describe the responsibilities of such persons within the proposing organization. If, after review of this information by the State, it is determined that a conflict of interest exists or may exist, the bidder may be disqualified from further consideration in this proposal. If no such relationship exists, so declare.

We are not aware of any such relationships existing with any of our staff members.

g. CONTRACT PERFORMANCE

If the bidder or any proposed subcontractor has had a contract terminated for default during the past ten (10) years, all such instances must be described as required below. Termination for default is defined as a notice to stop performance delivery due to the bidder's non-performance or poor performance, and the issue was either not litigated due to inaction on the part of the bidder or litigated and such litigation determined the bidder to be in default.

It is mandatory that the bidder submit full details of all termination for default experienced during the past ten (10) years, including the other Party's name, address, and telephone number. The response to this section must present the bidder's position on the matter. The State will evaluate the facts and will score the bidder's proposal accordingly. If no such termination for default has been experienced by the bidder in the past ten (10) years, so declare.

If at any time during the past ten (10) years, the bidder has had a contract terminated for convenience, non-performance, non-allocation of funds, or any other reason, describe fully all circumstances surrounding such termination, including the name and address of the other contracting Party.

Foster & Foster has never defaulted on a contract with a client in the 39 years of providing actuarial consulting services.

h. SUMMARY OF BIDDER'S CORPORATE EXPERIENCE

The bidder should provide a summary matrix listing the bidder's previous projects similar to this RFP in size, scope, and complexity. The State will use no more than three (3) narrative project descriptions submitted by the bidder during its evaluation of the proposal. Please provide this information on Attachment B. Technical Approach.

The bidder should address the following:

i. **Provide narrative descriptions to highlight the similarities between the bidder's experience and this RFP. These descriptions should include:**

a.) The time period of the project;
b.) The scheduled and actual completion dates;
c.) The Contractor's responsibilities;
d.) For reference purposes, a customer name (including the name of a contact person, a current telephone number, a facsimile number, and e-mail address); and
e.) Each project description should identify whether the work was performed as the prime Contractor or as a subcontractor. If a bidder performed as the prime Contractor, the description should provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) budget.

ii. **Contractor and subcontractor(s) experience should be listed separately. Narrative descriptions submitted for subcontractors should be specifically identified as subcontractor projects.**

iii. **If the work was performed as a subcontractor, the narrative description should identify the same information as requested for the Contractors above. In addition, subcontractors should identify what share of contract costs, project responsibilities, and time period were performed as a subcontractor.**

Our response is included with the responses to Attachment B, as requested. The Attachment can be found in Technical Approach section of this Technical Proposal.

i. SUMMARY OF BIDDER'S PROPOSED PERSONNEL/MANAGEMENT APPROACH

The bidder should present a detailed description of its proposed approach to the management of the project. Please provide your response on Attachment B Technical Approach.

The bidder should identify the specific professionals who will work on the State's project if their company is awarded the contract resulting from this RFP. The names and titles of the team proposed for assignment to the State project should be identified in full, with a description of the team leadership, interface and support functions, and reporting relationships. The primary work assigned to each person should also be identified.

The bidder should provide resumes for all personnel proposed by the bidder to work on the project. The State will consider the resumes as a key indicator of the bidder's understanding of the skill mixes required to carry out the requirements of the RFP in addition to assessing the experience of specific individuals.

Resumes should not be longer than three (3) pages. Resumes should include, at a minimum, academic background and degrees, professional certifications, understanding of the process, and at least three (3) references (name, address, and telephone number) who can attest to the competence and skill level of the individual. Any changes in proposed personnel shall only be implemented after written approval from the State.

Our response is included with the responses to Attachment B, as requested. The Attachment can be found in Technical Approach section of this Technical Proposal.

j. SUBCONTRACTORS

If the bidder intends to subcontract any part of its performance hereunder, the bidder should provide:

i. name, address, and telephone number of the subcontractor(s);
ii. specific tasks for each subcontractor(s);
iii. percentage of performance hours intended for each subcontract; and
iv. total percentage of subcontractor(s) performance hours.

We do not solicit any outside support or assistance with the performance of any task. We meet our contractual obligations and exceed our clients' expectations.

RESPONSE TO SECTIONS II - VI

RESPONSE TO SECTION II – TERMS AND CONDITIONS

Bidders should complete Sections II through VI as part of their proposal. Bidder is expected to read the Terms and Conditions and should initial either accept, reject, or reject and provide alternative language for each clause. The bidder should also provide an explanation of why the bidder rejected the clause or rejected the clause and provided alternate language. By signing the RFP, bidder is agreeing to be legally bound by all the accepted terms and conditions, and any proposed alternative terms and conditions submitted with the proposal. The State reserves the right to negotiate rejected or proposed alternative language. If the State and bidder fail to agree on the final Terms and Conditions, the State reserves the right to reject the proposal. The State of Nebraska is soliciting proposals in response to this RFP. The State of Nebraska reserves the right to reject proposals that attempt to substitute the bidder's commercial contracts and/or documents for this RFP.

The bidders should submit with their proposal any license, user agreement, service level agreement, or similar documents that the bidder wants incorporated in the contract. The State will not consider incorporation of any document not submitted with the bidder's proposal as the document will not have been included in the evaluation process. These documents shall be subject to negotiation and will be incorporated as addendums if agreed to by the Parties.

If a conflict or ambiguity arises after the Addendum to Contract Award have been negotiated and agreed to, the Addendum to Contract Award shall be interpreted as follows:

If only one Party has a particular clause then that clause shall control;
If both Parties have a similar clause, but the clauses do not conflict, the clauses shall be read together;
If both Parties have a similar clause, but the clauses conflict, the State's clause shall control.

A. GENERAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The contract resulting from this RFP shall incorporate the following documents:

Request for Proposal and Addenda;
Amendments to the RFP;
Questions and Answers;
Contractor's proposal (RFP and properly submitted documents);
The executed Contract and Addendum One to Contract, if applicable ; and,
Amendments/Addendums to the Contract.

These documents constitute the entirety of the contract.

Unless otherwise specifically stated in a future contract amendment, in case of any conflict between the incorporated documents, the documents shall govern in the following order of preference with number one (1) receiving preference over all other documents and with each lower numbered document having preference over any higher numbered document: 1) Amendment to the executed Contract with the most recent dated amendment having the highest priority, 2) executed Contract and any attached Addenda, 3) Amendments to RFP and any Questions and Answers, 4) the original RFP document and any Addenda, and 5) the Contractor's submitted Proposal.

Any ambiguity or conflict in the contract discovered after its execution, not otherwise addressed herein, shall be resolved in accordance with the rules of contract interpretation as established in the State of Nebraska.

B. NOTIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			**Jason Franken will serve as the contract manager. His contact information is included in the cover letter of this proposal.**

Contractor and State shall identify the contract manager who shall serve as the point of contact for the executed contract.

Communications regarding the executed contract shall be in writing and shall be deemed to have been given if delivered personally or mailed, by U.S. Mail, postage prepaid, return receipt requested, to the parties at their respective addresses set forth below, or at such other addresses as may be specified in writing by either of the parties. All notices, requests, or communications shall be deemed effective upon personal delivery or three (3) calendar days following deposit in the mail.

C. NOTICE (POC)

The State reserves the right to appoint a Buyer's Representative to manage [or assist the Buyer in managing] the contract on behalf of the State. The Buyer's Representative will be appointed in writing, and the appointment document will specify the extent of the Buyer's Representative authority and responsibilities. If a Buyer's Representative is appointed, the Contractor will be provided a copy of the appointment document, and is expected to cooperate accordingly with the Buyer's Representative. The Buyer's Representative has no authority to bind the State to a contract, amendment, addendum, or other change or addition to the contract.

JLF **Understood and accepted by Foster & Foster**

D. GOVERNING LAW (Statutory)

Notwithstanding any other provision of this contract, or any amendment or addendum(s) entered into contemporaneously or at a later time, the parties understand and agree that, (1) the State of Nebraska is a sovereign state and its authority to contract is therefore subject to limitation by the State's Constitution, statutes, common law, and regulation; (2) this contract will be interpreted and enforced under the laws of the State of Nebraska; (3) any action to enforce the provisions of this agreement must be brought in the State of Nebraska per state law; (4) the person signing this contract on behalf of the State of Nebraska does not have the authority to waive the State's sovereign immunity, statutes, common law, or regulations; (5) the indemnity, limitation of liability, remedy, and other similar provisions of the final contract, if any, are entered into subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity; and, (6) all terms and conditions of the final contract, including but not limited to the clauses concerning third party use, licenses, warranties, limitations of liability, governing law and venue, usage verification, indemnity, liability, remedy or other similar provisions of the final contract are entered into specifically subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity.

The Parties must comply with all applicable local, state and federal laws, ordinances, rules, orders, and regulations.

JLF **Understood and accepted by Foster & Foster**

E. BEGINNING OF WORK

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The bidder shall not commence any billable work until a valid contract has been fully executed by the State and the successful Contractor. The Contractor will be notified in writing when work may begin.

F. CHANGE ORDERS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The State and the Contractor, upon the written agreement, may make changes to the contract within the general scope of the RFP. Changes may involve specifications, the quantity of work, or such other items as the State may find necessary or desirable. Corrections of any deliverable, service, or work required pursuant to the contract shall not be deemed a change. The Contractor may not claim forfeiture of the contract by reasons of such changes.

The Contractor shall prepare a written description of the work required due to the change and an itemized cost sheet for the change. Changes in work and the amount of compensation to be paid to the Contractor shall be determined in accordance with applicable unit prices if any, a pro-rated value, or through negotiations. The State shall not incur a price increase for changes that should have been included in the Contractor's proposal, were foreseeable, or result from difficulties with or failure of the Contractor's proposal or performance.

No change shall be implemented by the Contractor until approved by the State, and the Contract is amended to reflect the change and associated costs, if any. If there is a dispute regarding the cost, but both parties agree that immediate implementation is necessary, the change may be implemented, and cost negotiations may continue with both Parties retaining all remedies under the contract and law.

G. NOTICE OF POTENTIAL CONTRACTOR BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

If Contractor breaches the contract or anticipates breaching the contract, the Contractor shall immediately give written notice to the State. The notice shall explain the breach or potential breach, a proposed cure, and may include a request for a waiver of the breach if so desired. The State may, in its discretion, temporarily or permanently waive the breach. By granting a waiver, the State does not forfeit any rights or remedies to which the State is entitled by law or equity, or pursuant to the provisions of the contract. Failure to give immediate notice, however, may be grounds for denial of any request for a waiver of a breach.

H. BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Either Party may terminate the contract, in whole or in part, if the other Party breaches its duty to perform its obligations under the contract in a timely and proper manner. Termination requires written notice of default and a thirty (30) calendar day (or longer at the non-breaching Party's discretion considering the gravity and nature of the default) cure period. Said notice shall be delivered by Certified Mail, Return Receipt Requested, or in person with proof of delivery. Allowing time to cure a failure or breach of contract does not waive the right to immediately terminate the contract for the same or different contract breach which may occur at a different time. In case of default of the Contractor, the State may contract the service from other sources and hold the Contractor responsible for any excess cost occasioned thereby.

The State's failure to make payment shall not be a breach, and the Contractor shall retain all available statutory remedies and protections.

I. NON-WAIVER OF BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The acceptance of late performance with or without objection or reservation by a Party shall not waive any rights of the Party nor constitute a waiver of the requirement of timely performance of any obligations remaining to be performed.

J. SEVERABILITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

If any term or condition of the contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the provision held to be invalid or illegal.

K. INDEMNIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

1. GENERAL

The Contractor agrees to defend, indemnify, and hold harmless the State and its employees, volunteers, agents, and its elected and appointed officials ("the indemnified parties") from and against any and all third party claims, liens, demands, damages, liability, actions, causes of action, losses, judgments, costs, and expenses of every nature, including investigation costs and expenses, settlement costs, and attorney fees and expenses ("the claims"), sustained or asserted against the State for personal injury, death, or property loss or damage, arising out of, resulting from, or attributable to the willful misconduct, negligence, error, or omission of the Contractor, its employees, subcontractors, consultants, representatives, and agents, resulting from this contract, except to the extent such

Contractor liability is attenuated by any action of the State which directly and proximately contributed to the claims.

2. **INTELLECTUAL PROPERTY**
The Contractor agrees it will, at its sole cost and expense, defend, indemnify, and hold harmless the indemnified parties from and against any and all claims, to the extent such claims arise out of, result from, or are attributable to, the actual or alleged infringement or misappropriation of any patent, copyright, trade secret, trademark, or confidential information of any third party by the Contractor or its employees, subcontractors, consultants, representatives, and agents; provided, however, the State gives the Contractor prompt notice in writing of the claim. The Contractor may not settle any infringement claim that will affect the State's use of the Licensed Software without the State's prior written consent, which consent may be withheld for any reason.

If a judgment or settlement is obtained or reasonably anticipated against the State's use of any intellectual property for which the Contractor has indemnified the State, the Contractor shall, at the Contractor's sole cost and expense, promptly modify the item or items which were determined to be infringing, acquire a license or licenses on the State's behalf to provide the necessary rights to the State to eliminate the infringement, or provide the State with a non-infringing substitute that provides the State the same functionality. At the State's election, the actual or anticipated judgment may be treated as a breach of warranty by the Contractor, and the State may receive the remedies provided under this RFP.

3. **PERSONNEL**
The Contractor shall, at its expense, indemnify and hold harmless the indemnified parties from and against any claim with respect to withholding taxes, worker's compensation, employee benefits, or any other claim, demand, liability, damage, or loss of any nature relating to any of the personnel, including subcontractor's and their employees, provided by the Contractor.

4. **SELF-INSURANCE**
The State of Nebraska is self-insured for any loss and purchases excess insurance coverage pursuant to Neb. Rev. Stat. § 81-8,239.01 (Reissue 2008). If there is a presumed loss under the provisions of this agreement, Contractor may file a claim with the Office of Risk Management pursuant to Neb. Rev. Stat. §§ 81-8,829 – 81-8,306 for review by the State Claims Board. The State retains all rights and immunities under the State Miscellaneous (Section 81-8,294), Tort (Section 81-8,209), and Contract Claim Acts (Section 81-8,302), as outlined in Neb. Rev. Stat. § 81-8,209 et seq. and under any other provisions of law and accepts liability under this agreement to the extent provided by law.

5. The Parties acknowledge that Attorney General for the State of Nebraska is required by statute to represent the legal interests of the State, and that any provision of this indemnity clause is subject to the statutory authority of the Attorney General.

L. ATTORNEY'S FEES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

In the event of any litigation, appeal, or other legal action to enforce any provision of the contract, the Parties agree to pay all expenses of such action, as permitted by law and if order by the court, including attorney's fees and costs, if the other Party prevails.

M. CONTRACTING WITH OTHER NEBRASKA POLITICAL SUB-DIVISIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor may, but shall not be required to, allow agencies, as defined in Neb. Rev. Stat. §81-145, to use this contract. The terms and conditions, including price, of the contract may not be amended. The State shall not be contractually obligated or liable for any contract entered into pursuant to this clause. A listing of Nebraska political subdivisions may be found at the website of the Nebraska Auditor of Public Accounts.

N. FORCE MAJEURE

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Neither Party shall be liable for any costs or damages, or for default resulting from its inability to perform any of its obligations under the contract due to a natural or manmade event outside the control and not the fault of the affected Party ("Force Majeure Event"). The Party so affected shall immediately make a written request for relief to the other Party, and shall have the burden of proof to justify the request. The other Party may grant the relief requested; relief may not be unreasonably withheld. Labor disputes with the impacted Party's own employees will not be considered a Force Majeure Event.

O. CONFIDENTIALITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

All materials and information provided by the Parties or acquired by a Party on behalf of the other Party shall be regarded as confidential information. All materials and information provided or acquired shall be handled in accordance with federal and state law, and ethical standards. Should said confidentiality be breached by a Party, the Party shall notify the other Party immediately of said breach and take immediate corrective action.

It is incumbent upon the Parties to inform their officers and employees of the penalties for improper disclosure imposed by the Privacy Act of 1974, 5 U.S.C. 552a. Specifically, 5 U.S.C. 552a (i)(1), which is made applicable by 5 U.S.C. 552a (m)(1), provides that any officer or employee, who by virtue of his/her employment or official position has possession of or access to agency records which contain individually identifiable information, the disclosure of which is prohibited by the Privacy Act or regulations established thereunder, and who knowing that disclosure of the specific material is prohibited, willfully discloses the material in any manner to any person or agency not entitled to receive it, shall be guilty of a misdemeanor and fined not more than $5,000.

P. EARLY TERMINATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The contract may be terminated as follows:

1. The State and the Contractor, by mutual written agreement, may terminate the contract at any time.
2. The State, in its sole discretion, may terminate the contract for any reason upon thirty (30) calendar day's written notice to the Contractor. Such termination shall not relieve the Contractor of warranty or other service obligations incurred under the terms of the contract. In the event of termination the Contractor shall be entitled to payment, determined on a pro rata basis, for products or services satisfactorily performed or provided.
3. The State may terminate the contract immediately for the following reasons:
    a. if directed to do so by statute;
    b. Contractor has made an assignment for the benefit of creditors, has admitted in writing its inability to pay debts as they mature, or has ceased operating in the normal course of business;

c. a trustee or receiver of the Contractor or of any substantial part of the Contractor's assets has been appointed by a court;
d. fraud, misappropriation, embezzlement, malfeasance, misfeasance, or illegal conduct pertaining to performance under the contract by its Contractor, its employees, officers, directors, or shareholders;
e. an involuntary proceeding has been commenced by any Party against the Contractor under any one of the chapters of Title 11 of the United States Code and (i) the proceeding has been pending for at least sixty (60) calendar days; or (ii) the Contractor has consented, either expressly or by operation of law, to the entry of an order for relief; or (iii) the Contractor has been decreed or adjudged a debtor;
f. a voluntary petition has been filed by the Contractor under any of the chapters of Title 11 of the United States Code;
g. Contractor intentionally discloses confidential information;
h. Contractor has or announces it will discontinue support of the deliverable; and,
i. In the event funding is no longer available.

Q. CONTRACT CLOSEOUT

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Upon contract closeout for any reason the Contractor shall within 30 business days, unless stated otherwise herein:

1. Transfer all completed or partially completed deliverables to the State;
2. Transfer ownership and title to all completed or partially completed deliverables to the State;
3. Return to the State all information and data, unless the Contractor is permitted to keep the information or data by contract or rule of law. Contractor may retain one copy of any information or data as required to comply with applicable work product documentation standards or as are automatically retained in the course of Contractor's routine back up procedures;
4. Cooperate with any successor Contactor, person or entity in the assumption of any or all of the obligations of this contract;
5. Cooperate with any successor Contactor, person or entity with the transfer of information or data related to this contract;
6. Return or vacate any state owned real or personal property; and,
7. Return all data in a mutually acceptable format and manner.

Nothing in this Section should be construed to require the Contractor to surrender intellectual property, real or personal property, or information or data owned by the Contractor for which the State has no legal claim.

RESPONSE TO SECTION III – CONTRACTOR DUTIES

A. INDEPENDENT CONTRACTOR / OBLIGATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

It is agreed that the Contractor is an independent contractor and that nothing contained herein is intended or should be construed as creating or establishing a relationship of employment, agency, or a partnership.

The Contractor is solely responsible for fulfilling the contract. The Contractor or the Contractor's representative shall be the sole point of contact regarding all contractual matters.

The Contractor shall secure, at its own expense, all personnel required to perform the services under the contract. The personnel the Contractor uses to fulfill the contract shall have no contractual or other legal relationship with the State; they shall not be considered employees of the State and shall not be entitled to any compensation, rights or benefits from the State, including but not limited to, tenure rights, medical and hospital care, sick and vacation leave, severance pay, or retirement benefits.

By-name personnel commitments made in the Contractor's proposal shall not be changed without the prior written approval of the State. Replacement of these personnel, if approved by the State, shall be with personnel of equal or greater ability and qualifications.

All personnel assigned by the Contractor to the contract shall be employees of the Contractor or a subcontractor, and shall be fully qualified to perform the work required herein. Personnel employed by the Contractor or a subcontractor to fulfill the terms of the contract shall remain under the sole direction and control of the Contractor or the subcontractor respectively.

With respect to its employees, the Contractor agrees to be solely responsible for the following:

1. Any and all pay, benefits, and employment taxes and/or other payroll withholding;
2. Any and all vehicles used by the Contractor's employees, including all insurance required by state law;
3. Damages incurred by Contractor's employees within the scope of their duties under the contract;
4. Maintaining Workers' Compensation and health insurance that complies with state and federal law and submitting any reports on such insurance to the extent required by governing law.
5. Determining the hours to be worked and the duties to be performed by the Contractor's employees; and,
6. All claims on behalf of any person arising out of employment or alleged employment (including without limit claims of discrimination alleged against the Contractor, its officers, agents, or subcontractors or subcontractor's employees)

If the Contractor intends to utilize any subcontractor, the subcontractor's level of effort, tasks, and time allocation should be clearly defined in the bidder's proposal. The Contractor shall agree that it will not utilize any subcontractors not specifically included in its proposal in the performance of the contract without the prior written authorization of the State.

The State reserves the right to require the Contractor to reassign or remove from the project any Contractor or subcontractor employee.

Contractor shall insure that the terms and conditions contained in any contract with a subcontractor does not conflict with the terms and conditions of this contract.

The Contractor shall include a similar provision, for the protection of the State, in the contract with any subcontractor engaged to perform work on this contract.

B. EMPLOYEE WORK ELIGIBILITY STATUS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor is required and hereby agrees to use a federal immigration verification system to determine the work eligibility status of employees physically performing services within the State of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program authorized by the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of an employee.

If the Contractor is an individual or sole proprietorship, the following applies:

1. The Contractor must complete the United States Citizenship Attestation Form, available on the Department of Administrative Services website at http://das.nebraska.gov/materiel/purchasing.html

   The completed United States Attestation Form should be submitted with the RFP response.

2. If the Contractor indicates on such attestation form that he or she is a qualified alien, the Contractor agrees to provide the US Citizenship and Immigration Services documentation required to verify the Contractor's lawful presence in the United States using the Systematic Alien Verification for Entitlements (SAVE) Program.

3. The Contractor understands and agrees that lawful presence in the United States is required and the Contractor may be disqualified or the contract terminated if such lawful presence cannot be verified as required by Neb. Rev. Stat. §4-108.

C. COMPLIANCE WITH CIVIL RIGHTS LAWS AND EQUAL OPPORTUNITY EMPLOYMENT / NONDISCRIMINATION (Statutory)

The Contractor shall comply with all applicable local, state, and federal statutes and regulations regarding civil rights laws and equal opportunity employment. The Nebraska Fair Employment Practice Act prohibits Contractors of the State of Nebraska, and their subcontractors, from discriminating against any employee or applicant for employment, with respect to hire, tenure, terms, conditions, compensation, or privileges of employment because of race, color, religion, sex, disability, marital status, or national origin (Neb. Rev. Stat. §48-1101 to 48-1125). The Contractor guarantees compliance with the Nebraska Fair Employment Practice Act, and breach of this provision shall be regarded as a material breach of contract. The Contractor shall insert a similar provision in all subcontracts for services to be covered by any contract resulting from this RFP.

JLF **Understood and accepted by Foster & Foster**

D. COOPERATION WITH OTHER CONTRACTORS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Contractor may be required to work with or in close proximity to other contractors or individuals that may be working on same or different projects. The Contractor shall agree to cooperate with such other contractors or individuals, and shall not commit or permit any act which may interfere with the performance of work by any other contractor or individual. Contractor is not required to compromise Contractor's intellectual property or proprietary information unless expressly required to do so by this contract.

E. PERMITS, REGULATIONS, LAWS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The contract price shall include the cost of all royalties, licenses, permits, and approvals, whether arising from patents, trademarks, copyrights or otherwise, that are in any way involved in the contract. The Contractor shall obtain and pay for all royalties, licenses, and permits, and approvals necessary for the execution of the contract. The Contractor must guarantee that it has the full legal right to the materials, supplies, equipment, software, and other items used to execute this contract.

F. OWNERSHIP OF INFORMATION AND DATA / DELIVERABLES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The State shall have the unlimited right to publish, duplicate, use, and disclose all information and data developed or obtained by the Contractor on behalf of the State pursuant to this contract.

The State shall own and hold exclusive title to any deliverable developed as a result of this contract. Contractor shall have no ownership interest or title, and shall not patent, license, or copyright, duplicate, transfer, sell, or exchange, the design, specifications, concept, or deliverable.

G. INSURANCE REQUIREMENTS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor shall throughout the term of the contract maintain insurance as specified herein and provide the State a current Certificate of Insurance/Acord Form (COI) verifying the coverage. The Contractor shall not commence work on the contract until the insurance is in place. If Contractor subcontracts any portion of the contract the Contractor must, throughout the term of the contract, either:

1. Provide equivalent insurance for each subcontractor and provide a COI verifying the coverage for the subcontractor;
2. Require each subcontractor to have equivalent insurance and provide written notice to the State that the Contractor has verified that each subcontractor has the required coverage; or,
3. Provide the State with copies of each subcontractor's Certificate of Insurance evidencing the required coverage.

The Contractor shall not allow any subcontractor to commence work until the subcontractor has equivalent insurance. The failure of the State to require a COI, or the failure of the Contractor to provide a COI or require subcontractor insurance shall not limit, relieve, or decrease the liability of the Contractor hereunder.

In the event that any policy written on a claims-made basis terminates or is canceled during the term of the contract or within five (5) years of termination or expiration of the contract, the Contractor shall obtain an extended discovery or reporting period, or a new insurance policy, providing coverage required by this contract for the term of the contract and five (5) years following termination or expiration of the contract.

If by the terms of any insurance a mandatory deductible is required, or if the Contractor elects to increase the mandatory deductible amount, the Contractor shall be responsible for payment of the amount of the deductible in the event of a paid claim.

Notwithstanding any other clause in this contract, the State may recover up to the liability limits of the insurance policies required herein.

1. **WORKERS' COMPENSATION INSURANCE**
The Contractor shall take out and maintain during the life of this contract the statutory Workers' Compensation and Employer's Liability Insurance for all of the contactors' employees to be engaged in work on the project under this contract and, in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation and Employer's Liability Insurance for all of the subcontractor's employees to be engaged in such work. This policy shall be written to meet the statutory requirements for the state in which the work is to be performed, including Occupational Disease. **The policy shall include a waiver of subrogation in favor of the State. The COI shall contain the mandatory COI subrogation waiver language found hereinafter**. The amounts of such insurance shall not be less than the limits stated hereinafter. For employees working in the State of Nebraska, the policy must be written by an entity authorized by the State of Nebraska Department of Insurance to write Workers' Compensation and Employer's Liability Insurance for Nebraska employees.

2. **COMMERCIAL GENERAL LIABILITY INSURANCE AND COMMERCIAL AUTOMOBILE LIABILITY INSURANCE**
The Contractor shall take out and maintain during the life of this contract such Commercial General Liability Insurance and Commercial Automobile Liability Insurance as shall protect Contractor and any subcontractor performing work covered by this contract from claims for damages for bodily injury, including death, as well as from claims for property damage, which may arise from operations under this contract, whether such operation be by the Contractor or by any subcontractor or by anyone directly or indirectly employed by either of them, and the amounts of such insurance shall not be less than limits stated hereinafter.

   The Commercial General Liability Insurance shall be written on an **occurrence basis**, and provide Premises/Operations, Products/Completed Operations, Independent Contractors, Personal Injury, and Contractual Liability coverage. **The policy shall include the State, and others as required by the contract documents, as Additional Insured(s). This policy shall be primary, and any insurance or self-insurance carried by the State shall be considered secondary and non-contributory. The COI shall contain the mandatory COI liability waiver language found hereinafter.** The Commercial Automobile Liability Insurance shall be written to cover all Owned, Non-owned, and Hired vehicles.

REQUIRED INSURANCE COVERAGE	
COMMERCIAL GENERAL LIABILITY	
General Aggregate	$2,000,000
Products/Completed Operations Aggregate	$2,000,000
Personal/Advertising Injury	$1,000,000 per occurrence
Bodily Injury/Property Damage	$1,000,000 per occurrence
Medical Payments	$10,000 any one person
Damage to Rented Premises (Fire)	$300,000 each occurrence
Contractual	Included
XCU Liability (Explosion, Collapse, and Underground Damage)	Included
Independent Contractors	Included
If higher limits are required, the Umbrella/Excess Liability limits are allowed to satisfy the higher limit.	
WORKER'S COMPENSATION	
Employers Liability Limits	$500K/$500K/$500K
Statutory Limits- All States	Statutory - State of Nebraska
Voluntary Compensation	Statutory
COMMERCIAL AUTOMOBILE LIABILITY	
Bodily Injury/Property Damage	$1,000,000 combined single limit
Include All Owned, Hired & Non-Owned Automobile liability	Included
Motor Carrier Act Endorsement	Where Applicable
UMBRELLA/EXCESS LIABILITY	
Over Primary Insurance	$5,000,000 per occurrence
PROFESSIONAL LIABILITY	
All Other Professional Liability (Errors & Omissions)	$10,000,000 Per Claim / Aggregate
COMMERCIAL CRIME	
Crime/Employee Dishonesty Including 3rd Party Fidelity	$1,000,000
CYBER LIABILITY	
Breach of Privacy, Security Breach, Denial of Service, Remediation, Fines and Penalties	$1,000,000
MANDATORY COI SUBROGATION WAIVER LANGUAGE	
"Workers' Compensation policy shall include a waiver of subrogation in favor of the State of Nebraska."	
MANDATORY COI LIABILITY WAIVER LANGUAGE	
"Commercial General Liability & Commercial Automobile Liability policies shall name the State of Nebraska as an Additional Insured and the policies shall be primary and any insurance or self-insurance carried by the State shall be considered secondary and non-contributory as additionally insured."	

If the mandatory COI subrogation waiver language or mandatory COI liability waiver language on the COI states that the waiver is subject to, condition upon, or otherwise limit by the insurance policy, a copy of the relevant sections of the policy must be submitted with the COI so the State can review the limitations imposed by the insurance policy.

3. **EVIDENCE OF COVERAGE**
The Contractor shall furnish the Contract Manager, with a certificate of insurance coverage complying with the above requirements prior to beginning work at:

Nebraska Retirement Systems
Attn: Controller
1526 K St. Ste. 400
Lincoln, NE 68508

These certificates or the cover sheet shall reference the RFP number, and the certificates shall include the name of the company, policy numbers, effective dates, dates of expiration, and amounts and types of coverage afforded. If the State is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall be responsible for all reasonable costs properly attributable thereto.

Reasonable notice of cancellation of any required insurance policy must be submitted to the contract manager as listed above when issued and a new coverage binder shall be submitted immediately to ensure no break in coverage.

4. **DEVIATIONS**
The insurance requirements are subject to limited negotiation. Negotiation typically includes, but is not necessarily limited to, the correct type of coverage, necessity for Workers' Compensation, and the type of automobile coverage carried by the Contractor.

H. ANTITRUST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor hereby assigns to the State any and all claims for overcharges as to goods and/or services provided in connection with this contract resulting from antitrust violations which arise under antitrust laws of the United States and the antitrust laws of the State.

I. CONFLICT OF INTEREST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

By submitting a proposal, bidder certifies that there does not now exist a relationship between the bidder and any person or entity which is or gives the appearance of a conflict of interest related to this RFP or project.

The bidder certifies that it shall not take any action or acquire any interest, either directly or indirectly, which will conflict in any manner or degree with the performance of its services hereunder or which creates an actual or an appearance of conflict of interest.

The bidder certifies that it will not knowingly employ any individual known by bidder to have a conflict of interest.

The Parties shall not knowingly, for a period of two years after execution of the contract, recruit or employ any employee or agent of the other Party who has worked on the RFP or project, or who had any influence on decisions affecting the RFP or project.

J. STATE PROPERTY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor shall be responsible for the proper care and custody of any State-owned property which is furnished for the Contractor's use during the performance of the contract. The Contractor shall reimburse the State for any loss or damage of such property; normal wear and tear is expected.

K. SITE RULES AND REGULATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor shall use its best efforts to ensure that its employees, agents, and subcontractors comply with site rules and regulations while on State premises. If the Contractor must perform on-site work outside of the daily operational hours set forth by the State, it must make arrangements with the State to ensure access to the facility and the equipment has been arranged. No additional payment will be made by the State on the basis of lack of access, unless the State fails to provide access as agreed to in writing between the State and the Contractor.

L. ADVERTISING

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor agrees not to refer to the contract award in advertising in such a manner as to state or imply that the company or its services are endorsed or preferred by the State. Any publicity releases pertaining to the project shall not be issued without prior written approval from the State.

M. NEBRASKA TECHNOLOGY ACCESS STANDARDS (Statutory)

Contractor shall review the Nebraska Technology Access Standards, found at http://nitc.nebraska.gov/standards/2-201.html and ensure that products and/or services provided under the contract are in compliance or will comply with the applicable standards to the greatest degree possible. In the event such standards change during the Contractor's performance, the State may create an amendment to the contract to request the contract comply with the changed standard at a cost mutually acceptable to the parties.

JLF **Understood and accepted by Foster & Foster**

N. DISASTER RECOVERY/BACK UP PLAN

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The Contractor shall have a disaster recovery and back-up plan, of which a copy should be provided upon request to the State, which includes, but is not limited to equipment, personnel, facilities, and transportation, in order to continue services as specified under the specifications in the contract in the event of a disaster.

O. DRUG POLICY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Contractor certifies it maintains a drug free work place environment to ensure worker safety and workplace integrity. Contractor agrees to provide a copy of its drug free workplace policy at any time upon request by the State.

RESPONSE TO SECTION IV – PAYMENT

A. PROHIBITION AGAINST ADVANCE PAYMENT (Statutory)

Payments shall not be made until contractual deliverable(s) are received and accepted by the State.

JLF **Understood and accepted by Foster & Foster**

B. TAXES (Statutory)

The State is not required to pay taxes and assumes no such liability as a result of this solicitation. Any property tax payable on the Contractor's equipment which may be installed in a state-owned facility is the responsibility of the Contractor.

JLF **Understood and accepted by Foster & Foster**

C. INVOICES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Invoices for payments must be submitted by the Contractor to the agency requesting the services with sufficient detail to support payment. Mail to Nebraska Retirement Systems, 1526 K Street Suite 400, Lincoln, NE 68508. The terms and conditions included in the Contractor's invoice shall be deemed to be solely for the convenience of the parties. No terms or conditions of any such invoice shall be binding upon the State, and no action by the State, including without limitation the payment of any such invoice in whole or in part, shall be construed as binding or estopping the State with respect to any such term or condition, unless the invoice term or condition has been previously agreed to by the State as an amendment to the contract.

D. INSPECTION AND APPROVAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

Final inspection and approval of all work required under the contract shall be performed by the designated State officials.

E. PAYMENT

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

State will render payment to Contractor when the terms and conditions of the contract and specifications have been satisfactorily completed on the part of the Contractor as solely determined by the State. (Neb. Rev. Stat. §73-506(1)) Payment will be made by the responsible agency in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2401 through 81-2408). The State may require the Contractor to accept payment by electronic means such as ACH deposit. In no event shall the State be responsible or liable to pay for any services provided by the Contractor prior to the Effective Date of the contract, and the Contractor hereby waives any claim or cause of action for any such services.

F. LATE PAYMENT (Statutory)

The Contractor may charge the responsible agency interest for late payment in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2401 through 81-2408).

JLF **Understood and accepted by Foster & Foster**

G. SUBJECT TO FUNDING / FUNDING OUT CLAUSE FOR LOSS OF APPROPRIATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The State's obligation to pay amounts due on the contract for a fiscal years following the current fiscal year is contingent upon legislative appropriation of funds. Should said funds not be appropriated, the State may terminate the contract with respect to those payments for the fiscal year(s) for which such funds are not appropriated. The State will give the Contractor written notice thirty (30) calendar days prior to the effective date of termination. All obligations of the State to make payments after the termination date will cease. The Contractor shall be entitled to receive just and equitable compensation for any authorized work which has been satisfactorily completed as of the termination date. In no event shall the Contractor be paid for a loss of anticipated profit.

H. RIGHT TO AUDIT (First Paragraph is Statutory)

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
JLF			

The State shall have the right to audit the Contractor's performance of this contract upon a thirty (30) business days' written notice. Contractor shall utilize generally accepted accounting principles, and shall maintain the accounting records, and other records and information relevant to the contract (Information) to enable the State to audit the contract. The State may audit and the Contractor shall maintain, the Information during the term of the contract and for a period of five (5) years after the completion of this contract or until all issues or litigation are resolved, whichever is later. The Contractor shall make the Information available to the State at Contractor's place of business or a location acceptable to both Parties during normal business hours. If this is not practical or the Contractor so elects, the Contractor may provide electronic or paper copies of the Information. The State reserves the right to examine, make copies of, and take notes on any Information relevant to this contract, regardless of the form or the Information, how it is stored, or who possesses the Information. Under no circumstance will the Contractor be required to create or maintain documents not kept in the ordinary course of Contractor's business operations, nor will Contractor be required to disclose any information, including but not limited to product cost data, which is confidential or proprietary to Contractor.

The Parties shall pay their own costs of the audit unless the audit finds a previously undisclosed overpayment by the State. If a previously undisclosed overpayment exceeds one-half of one percent (.5%) of the total contract billings, or if fraud, material misrepresentations, or non-performance is discovered on the part of the Contractor, the Contractor shall reimburse the State for the total costs of the audit. Overpayments and audit costs owed to the State shall be paid within ninety (90) business days of written notice of the claim. The Contractor agrees to correct any material weaknesses or condition found as a result of the audit.

RESPONSE TO SECTION V – PROJECT DESCRIPTION AND SCOPE OF WORK

This section of the RFP provided the following:

- An overview of the plans and the scope of services; no deliverable was requested for these items.
- Attachments A and B; both have been updated and are presented in the Technical Approach section of this proposal.
- Request for sample reports
  - Sample valuation and GASB 67 report is presented in Appendix A
  - Sample experience study report is presented in Appendix B

RESPONSE TO SECTION VI –PROPOSAL INSTRUCTIONS

This section of the RFP provided the following:

- Proposal submission information, including discussion of the "RFO for Contractual Services" form, which we have completed and included prior to this Technical Proposal.
- Corporate overview requests, which we have addressed in the Corporate Overview section of this Technical Proposal.
- Discussion of the Technical Approach section of our Technical Proposal, which starts on the next page.

TECHNICAL APPROACH

UNDERSTANDING OF PROJECT REQUIREMENTS

NPERS is looking for a consulting partner to help with the various actuarial functions in overseeing the state-wide plans. These functions include the annual actuarial valuation, GASB disclosure information, annual projections, periodic assumption reviews, a thorough review of the adequacy of benefits provided by the pension funds and general consulting. We provide these same services for public pensions of all sizes across the country. Our largest pension client has over $20 billion in assets so we are familiar with the requirements of this engagement. We have developed efficient processes to complete the annual actuarial work. We will use these processes to increase operational efficiencies and help ensure that we meet all of the Board's deadlines.

Due to our extensive experience with pension and OPEB programs across the country, we fully understand the scope of services and are equipped to provide all of the proposed services. Our experience has exposed us to a multitude of different client situations and challenges and equipped us with a broad array of ideas and solutions. Our approach will be to provide NPERS with a highly qualified consulting team with extensive knowledge of Nebraska retirement systems. The team assigned will consist of three Fellows of the Society of Actuaries (all with over 20 years of pension consulting experience), a dedicated peer review actuary who is also a Fellow, two additional Enrolled Actuaries and actuarial students. We anticipate providing over 1,000 hours of consulting services each year so we have staffed the team accordingly. The depth of this team will ensure that a lead consultant is always available to answer your questions and attend meetings.

RESPONSE TO ATTACHMENT A

Mandatory Qualification Certification and Questionnaire

Request for Proposal Number 5989 Z1

All bidders are required to complete this attachment.

The bidder hereby certifies that it meets all of the following mandatory qualifications:

1. As of December 31, 2018, the bidder has a minimum of three (3) public pension fund clients.

_X_ Yes. _____ No.

2. The bidder has a minimum of five (5) years of experience in providing actuarial consulting services to a public pension fund. This means that the bidder as an organization has been providing actuarial consulting services to a public pension fund for at least five (5) years. This requirement is not satisfied simply because its employees have at least five (5) years' experience in providing actuarial consulting services to a public pension fund.

_X_ Yes. _____ No.

3. The bidder's lead consultant on the account must have a minimum of ten (10) years of experience in providing actuarial consulting service to public pension funds. This experience shall include general consulting, experience analysis, and valuation assignments for such funds. This person shall also have experience in testifying before legislative and administrative bodies in support of actuarial positions and the principles used in valuing a public retirement system or pricing legislation, and an ability to discuss in laymen's terms the following: actuarial theory; basis for assumptions; and other actuarial matters. The lead consultant must be a member of the American Academy of Actuaries.

_X_ Yes. _____ No.

4. Professional staff assigned to the account shall have a minimum of five (5) years of experience in the field of actuarial science and will include persons with appropriate professional credentials such as Fellow or Associate of Society of Actuaries, and/or Fellow of the Conference of Actuaries in Public Practice, and/or Member of the American Academy of Actuaries, and/or meet standards of a qualified actuary under the provisions of the Employee Retirement Income Security Act of 1974.

_X_ Yes. _____ No.

5. All services to be provided on behalf of the account shall be in accordance with generally accepted actuarial principles.

_X_ Yes. _____ No.

6. The actuarial firm must carry liability insurance as set forth in this RFP for the duration the contract. (Section III, G Insurance Requirements)

_X_ Yes. _____ No.

January 24, 2019
Date

Foster & Foster, Inc.
Name of firm

Jason Franken, Principal
Name and title of individual signing for the firm.

Signature

RESPONSE TO ATTACHMENT B

Technical Approach

CORPORATE OVERVIEW
1. Qualification One: As of December 31, 2018, bidder has a minimum of three (3) public pension fund clients. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of at least three (3) public pension fund clients for whom the bidder currently provides actuarial consulting services. These descriptions should include: a. The time period of the project; b. The scheduled and actual completion dates; c. The Contractor's responsibilities; d. For reference purposes, a customer name (including the name of a contact person, a current telephone number, a facsimile number, and e-mail address); and, e. Each project description should identify whether the work was performed as the prime Contractor or as a subcontractor. If a bidder performed as the prime Contractor, the description should provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) budget.
Bidder Response: Foster & Foster annually performs actuarial valuations and other consulting services for over 350 public pension funds, ranging anywhere from 50 to 150,000 members. A majority of our clients are local plans in Florida and Illinois, but we also serve plans in other states, including Louisiana, Texas, and New York. Some of our consulting clients include: • New York City Patrolmen's Benevolence Association • City of Tampa (plans for Police/Fire and General Employees) • City of Fort Lauderdale Police and FIre • City of Cape Coral (plans for Police, Fire and General Employees) • Dallas Area Rapid Transit • Austin Firefighters' Relief and Retirement Fun • Omaha Police Officers Association Additionally, Foster & Foster has worked with the auditing firm CliftonLarsonAllen, LLP to provide GASB 67/68 audit services for many of the largest public pension plans in the country. The pension funds that we have audited include plans from 11 states, listed below. The reference for this relationship is Thomas Rey. He can be reached at (410) 453-5574, or at Thomas.Rey@CLAConnect.com. • Arizona State Retirement System • Colorado Public Employees' Retirement Association • Kansas Public Employees Retirement System • Minnesota PERA • New Mexico Educational Retirement Board • New Mexico Public Employees Retirement Association • Public Employees' Retirement System of the State of Nevada • North Dakota Public Employees Retirement System • North Dakota Teachers Fund • Ohio Public Employees Retirement System

- Ohio State Teachers
- Pennsylvania Public School Employees' Retirement System
- South Carolina Retirement System
- Washington State DRS

The following three clients provide a taste of the services we provide that are similar to those requested by NPERS.

Louisiana State Employees' Retirement System (LASERS)
Contract period: 2011-present
Services provided:
- Funding valuation as of June 30th each year (delivered in early October each year, as scheduled)
- GASB disclosure requirements
- Experience studies to determine actuarial assumptions
- Long-term projection to determine future contributions requirements, funded ratios, cash flows, etc.
- Analysis of the impact of proposed legislation on the pension fund
- Transfer calculations when service is moved from plan to plan

Client contact:
Dana Vicknair
Phone: (225) 922-2031
Email: crougeou@lasersonline.org
Delivery 2018: valuation reports delivered September 27, 2018
Budget: fixed fee of $172,000

Teachers' Retirement System of Louisiana (TRSL)
Contract period: 2011-present
Services provided:
- Funding valuation as of June 30th each year (delivered in early October each year, as scheduled)
- GASB disclosure requirements
- Experience studies to determine actuarial assumptions
- Long-term projection to determine future contributions requirements, funded ratios, cash flows, etc.
- Analysis of the impact of proposed legislation on the pension fund
- Transfer calculations when service is moved from plan to plan

Client contact:
Maureen Westgard
Phone: (225) 925-6454
Email: dir@trsl.org
Delivery 2018: valuation reports delivered October 4, 2018
Budget: fixed fee of $172,000

Metropolitan Water Reclamation District Retirement Fund
Contract period: 2012-present
Services provided:
- Funding valuation as of June 30th each year (delivered in early October each year, as scheduled)
- GASB disclosure requirements
- Experience studies to determine actuarial assumptions
- Long-term projection to determine future contributions requirements, funded ratios, cash flows, etc.
- Analysis of the impact of proposed legislation on the pension fund

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- Transfer calculations when service is moved from plan to plan

Client contact:
Sue Boutin
Phone: (312) 751-3230
Email: Sue.Boutin@mwrd.org
Delivery 2018: valuation reports delivered April 6, 2018
Budget: fixed fee of $48,000
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2. Qualification Two:
The bidder has a minimum of five (5) years of experience in providing actuarial consulting services to a public pension fund. This means that the bidder as an organization has been providing actuarial consulting services to a public pension fund for at least five (5) years. This requirement is not satisfied simply because its employees have at least five (5) years' experience in providing actuarial consulting services to a public pension fund. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the public pension fund clients for whom the actuarial consulting firm has provided actuarial consulting services for at least five (5) years.
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Bidder Response:

Our company has served public pension plans since 1979. Having started in Florida, we have a base of nearly 200 local plans from that state alone. A majority of these plans have been a client for over 20 years.

In other states, our business is less mature, so our relationships are younger as we grow. For instance in Illinois, we are approaching 100 local plans but we have transitioned many in the last two to three years as our business has expanded. We have no doubt that these relationships will continue to grow and be long-lasting like the ones in Florida. In the meantime, these younger cases can serve as an excellent source of information in terms of our ability to transition work and communicate to new Boards.

We can provide a list of clients where we have worked for over five years, but we would request that that information be shared separate from this formal (and eventually public) proposal process. Note that the references provided above in our answer to #1 as well as the three listed Florida (Tampa, Fort Lauderdale, and Cape Coral) are all members of our 5+ year club.
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3. Qualification Three:
The bidder's lead consultant on the account must have a minimum of ten (10) years of experience in providing actuarial consulting service to public pension funds. This experience shall include general consulting, experience analysis, and valuation assignments for such funds. This person shall also have experience in testifying before legislative and administrative bodies in support of actuarial positions and the principles used in valuing a public retirement system or pricing legislation, and an ability to discuss in laymen's terms the following: actuarial theory; basis for assumptions; and other actuarial matters. The lead consultant must be a member of the American Academy of Actuaries. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the lead consultant's experience in providing actuarial consulting services to public pension funds for at least ten (10) years, and showing past experience at testifying before legislative and administrative bodies.
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Bidder Response:

Jason Franken is a principal of Foster & Foster and will be the primary actuarial consultant for this project. He has over 20 years of actuarial consulting experience and has been with the firm since 2008. Jason is a Fellow of the Society of Actuaries and an Enrolled Actuary per ERISA. He is also a member of the American Academy of Actuaries. He consults clients on a wide range of retirement plan issues, including statutory funding requirements, Financial Accounting Standards Board (FASB) and Governmental Accounting Standards Board
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(GASB) accounting for pension and postretirement medical plans, plan administration, experience studies and plan design. Jason has spoken at national and statewide actuarial conferences and has testified several times to State legislatures across the country.

4. Qualification Four:
Professional staff assigned to the account shall have a minimum of five (5) years of experience in the field of actuarial science and will include persons with appropriate professional credentials such as Fellow or Associate of Society of Actuaries, and/or Fellow of the Conference of Actuaries in Public Practice, and/or Member of the American Academy of Actuaries, and/or meet standards of a qualified actuary under the provisions of the Employee Retirement Income Security Act of 1974. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the professional staffs' experience in providing actuarial consulting services to public pension funds for at least five (5) years, and showing the professional staffs' credentials.

Bidder Response:

The professional staff that we will use in preparing work for NPERS consists of two senior consultants, a junior consultant, a fully credentialed reviewing actuary, and one of our best actuarial students. A brief introduction to each member is provided below, along with personal references for our senior consultants. Resumes are provided in Appendix C.

Heidi Andorfer is a senior consultant with over 20 years of actuarial pension experience. She joined the firm in 2014 and has worked exclusively with public plan since that time. Her prior experience had been with a major pension consulting firm overseeing large clients and streamlining valuation processes. Heidi is both a Fellow of the Society of Actuaries, an Enrolled Actuary under ERISA, and a member of the American Academy of Actuaries. Her personal references are as follows:

- Jason Ostroski
  - CPA, Princpal, Clifton Larson Allen LLP
  - 1966 Greenspring Drive, Suite 300, Timonium, MD 21093
  - (410) 308-8029

- Molly Talkington
  - Finance Director, City of DeKalb
  - 200 South Fourth Street, DeKalb, IL 60115
  - (815) 748-2000

- Jodie K. Hartman
  - Director of Finance, Village of Lake Zurich
  - 70 E Main St, Lake Zurich, IL 60047
  - (310) 332-0157

Paul Baugher joined Foster & Foster in October 2017 as a senior consultant and has been providing actuarial consulting services for over 20 years. His experience has covered a variety of different plans, including public, corporate, church, and welfare. Paul is a Fellow of the Society of Actuaries, an Enrolled Actuary under ERISA, and a member of the American Academy of Actuaries. His personal references are as follows:

- Kevin Worley
  - Chief Financial Officer, State of Alaska Department of Administration Division of Retirement and Benefits
  - 6th Floor State Office Building, P.O. Box 110203, Juneau, AK 99811-0203

- (907) 465-5703

- C.F. Barnes
  - Executive Director, Missouri Sheriffs' Retirement System
  - P.O. Box 105257, Jefferson City, MO 65110-5257
  - (573) 634-3858

- William Branch
  - Northrop Grumman Corporation, Director of Benefit Analytics
  - (847) 540-1686

Drew Ballard is a consultant with over 9 years of actuarial pension experience. He is the lead consulting actuary for approximately 20 public safety funds. Drew is an Enrolled Actuary under ERISA and a member of the American Academy of Actuaries.

Pete McCloud is a senior consultant with over 23 years of experience in the actuarial consulting industry. He serves as the reviewing actuary for all wok products, providing an independent review of all deliverables before they are sent to clients so that we have further confidence in the results being provided and receive an additional vantage point for our conclusions. Pete is a Fellow of the Society of Actuaries, an Enrolled Actuary under ERISA, and a member of the American Academy of Actuaries.

Tyler Koftan is an actuarial student who joined our team in January 2013. He is awaiting approval of his credentials as an Enrolled Actuary under ERISA and is working towards achieving his ASA credentials.

TECHNICAL APPROACH

5. Describe bidder's understanding of the Scope of Work for this RFP.

Bidder response:

Please refer to the "Understanding of the Project Requirements" response at the beginning of this Technical Approach section.

6. Describe bidder's approach for providing Actuarial Consulting Services for public pension funds.

Bidder response:

An actuarial valuation provides a best estimate of a fund's liabilities and required contribution levels at a particular point in time. While single point measurements can be helpful in assessing the health of a fund, we do not believe this is the best indicator. First, every plan is different so two funds could have the exact same funded ratio but be in completely different financial situations. Secondly, the funded status of the plan can be manipulated by the selection of actuarial assumptions and methods. Determining the financial status of a fund simply by looking at a percentage without completely understanding how that number is developed is irresponsible.

The projects outlined in your RFP line up with what we consider the best approach to actuarial consulting, an approach that looks not only to today but to the future:

- Regular experience reviews to make sure that all results are our best expectation of what is to come
- Projection modeling to consider risks and identify potential issues that can be addressed in advance
- Benefit reviews to monitor the member need and the provision of the plan to meet those needs, while also considering the investment of the State to provide those benefits.

There are many factors that are important in a consulting relationship: experience, meeting demands, compatability with Board and staff. We find that the most important factor is communication. Communication is important in understanding the scope and timing of projects so that the proper information can be delivered. Further, communication is critical in summarizing results / action items and assisting Board members to make the necessary decisions for the future of the plans.

By having a single actuary addressing your plans holistically, we can form a partnership that truly benefits the membership and the State. What's more, it shows your strong leadership of the plans, giving confidence to the reporting you provide to the State.

7. Describe bidder's approach for providing Actuarial Valuation Services for defined benefit and cash balance public pension funds. Give examples.

Bidder response:

An actuarial valuation provides a best estimate of a fund's liabilities and contribution levels at a particular point in time. This estimate helps ensure that current assets and future contribution requirements will be sufficient to provide benefits promised to members. Future liabilities are determined by applying a set of actuarial assumptions to project the occurrence, amount and timing of benefits that will become payable according to current plan provisions. The extent to which an actuarial valuation accurately measures a plan's liabilities and contribution levels depends on how well the actuarial assumptions predict future plan experience.

Before any valuation can take place, a complete transition of the prior year's valuation must take place. Having transitioned over 70 clients since the beginning of 2016, we are very experienced in the transition process. You can expect the following:

1. Kickoff Meeting: our team will connect with staff and the prior actuary to discuss the transition, important history, and any open projects.
2. Data Request: a formal request of participant data and actuarial tables will be provided to the prior actuary. Participant data will include demographic (e.g., date of birth, date of hire, status) and financial (e.g., annual salary, annual benefit) for each participant. Actuarial tables will be needed for any table that is not fully outlined in the valuation report.
3. Replication: we will review the information provided and use it to replicate the prior year's valuation results within an acceptable range. This will include a data review, liability match, and review of current funding methods. As needed, additional questions will be raised of the prior actuary until we resolve any outstanding issues.
4. Results Presentation: final transition results will be formalized in a letter to document the work that was done and highlight any items that the Board may need to consider for the next valuation.

The annual valuation would naturally follow the transition, having many similar steps to complete:

1. Kickoff Meeting: brief annual meeting to discuss any changes to the process, changes to assumptions / methods, and other items that may impact the valuation. For the 2018 valuation, this will likely be completed with the transition kickoff meeting.
2. Data Collection: receive all participant data and trust statements from staff and/or vendors. If needed, a formal request letter can be sent to start this process.
3. Processing Results: data and assets will be compared to prior year information for consistency; questions will be raised, as needed, since this information will also be used to develop benefit statements. Once data is finalized, liabilities and results will be prepared and reviewed.
4. Prepare / Deliver Report: we feel that flooding a client with words is not effective communication. Being clear, concise, illustrative and articulate is a much better approach in our view. Our reports bear that out, as they are some of the clearest and easiest to read.
5. Present Reports: reports are only valuable if you understand what the results mean. It is only when

you understand their meaning that you are informed to make critical decisions to manage the plan. Our goal with each annual meeting is to present the information you need in layman's terms so that you are ready to act. Preliminary transition and valuation schedules are included under "Deliverable and Due Dates" of this Technical Approach section.
8. Describe bidder's approach for providing GASB Services for single and multiple employer public pension funds. Give examples.
Bidder response: We take that same approach with all GASB clients whether they are single or multiple employer. Our firm providing GASB 67/68/74/75 services to over 500 clients all over the country. Additionally, as outlined earlier in our response, we audit the GASB disclosure information for many of the largest pension funds in the country. During one of our reviews, we uncovered an error that increased the fund's net pension liability by more than $1.2 billion. Our experience in providing and reviewing GASB disclosure information has exposed us to a variety of unique situations and made us experts in GASB reporting.
9. Describe bidder's approach for providing Projection Services for public pension funds. Give examples.
Bidder Response: The actuarial valuation provides a snapshot of a pension fund's current financial position but it does not provide the reader with an understanding of where the fund is headed. Foster & Foster believes it is important for the Board to understand what the future holds so you they can make decisions now to put the fund on the appropriate course. To help attain this goal, we developed a pension modeler that allows the user to model various assumptions, plan experience, funding policies and plan provisions. This dynamic projection tool provides valuable information about the sensitivity of each fund's financial health to various factors. We have developed this tool for many of our clients including the Metropolitan Water Reclamation District. Once the tool is completed, we have meetings with the Board to demonstrate the modeler and to discuss the factors that are critical to the long-term financial health of the plan. In many cases, the Board has updated either its actuarial assumptions or funding policy based on these discussions to ensure that the fund is on a sustainable path. The tool is provided to the members of the Board so they are able to model various scenarios at their leisure. We believe it is vital for the Board to be educated and engaged. This tool has helped facilitate important discussions and changed the trajectory of many of our clients.
10. Describe bidder's approach for providing Actuarial Experience Studies for public pension funds. Give examples.
Bidder Response: Foster & Foster believes the actuarial assumptions should be set according to the actuarial standards of practice and reflect plan-specific experience. We recommend performing an Experience Study at least once every 5 years. Regarding the investment return assumption, we prefer to work closely with the investment professionals of the fund to set this assumption since they are most familiar with the investment portfolio. In determining the appropriate rate of return, a long-term perspective is required and recent short-term experience should not receive undue weight. Regardless, a building block approach outlined in the ASOP's will be followed. The investment consultant should be able to provide good long-term expectations for each asset class, or then when combined with

inflation, should be enough to derive a sound long-term rate of return. We feel that the investment consultant is best equipped to set the long-term expectations for each asset class.

As you may be aware, many actuarial firms have suggested lowering the long-term rate of return in the last several years. Before ever suggesting such a thing to our clients, we would first suggest having very serious conversations with our client, plan sponsor, and investment consultant. By lowering the assumed rate of return, the plan sponsor's contribution rates may increase or, in a fixed contribution rate plan, the amortization period will increase. This result may have a very negative consequence to the plan sponsor. The plan sponsor may opt to otherwise suggest to the Board that they increase their exposure to equities, thereby increasing their long-term return expectations to a level that would not warrant lowering the assumption.

One key assumption that will be largely discussed in your next study is mortality. The Society of Actuaries is in the process of finalizing mortality tables based on public plan experience. With over 90 variations of tables being published, including separate tables for teachers, public safety, and general employees, there is much to consider. Further, with a membership your size, it will be possible to determine which table best fits your experience with some certainty. We look forward to helping you with these discussions.

11. Describe bidder's approach for providing Benefit Adequacy Studies for public pension funds.

Bidder Response:

A study such as this can be very broad in nature. We recommend a multi-step approach to this project to evaluate the adequacy of the current program and determine if changes are needed to meet your objectives. A sample outline of your project plan is included below:

Step 1: Meeting with Stakeholders
Our first step is to meet with all the key stakeholders at the beginning of this project so that all perspectives can be reflected. We will walk the group through a number of key drivers (e.g., cost, risk tolerance, recruiting / retention) to get a thorough understanding of what your goals are.

Step 2: Initial Material Preparation and Analysis
After receiving direction from stakeholders, we will begin the process of preparing materials that will be used to guide future stakeholder discussions and ultimately be used for our presentation to the full Board. The topics to be covered include:

- Overview current retirement program
- Background on other types of retirement plans
- Trends occurring in the US with defined benefit and defined contribution plans
- Individual projections of replacement ratios provided by current program
- Financial projections to estimate expected cash outlay for current program for next 10 years

Step 3: Meeting with Stakeholders
We will reconvene with our advisors to walk through the materials prepared in Step 2. The goal here is twofold. First, we want to make sure that the materials are addressing the directives of the Board. Second, we want to discuss if, based on the preliminary analysis, any changes should be considered for the ongoing program.

Step 4: Preparing Alternatives
It is at this point that the project could go in a number of directions to follow the stakeholder's guidance.

- Option 1: No Changes
  The stakeholders could decide that the current program is adequate and no changes are needed.

- Option 2: Modify Benefit Levels in Current Program
  The stakeholders may be comfortable with the current programs but would like to adjust the benefits levels. This might be done to lower cost levels or to move risk to/from the fund. If this is the case, we would develop alternatives to be considered. Discussion materials would include updated replacement ratios, a chart showing winners / losers for each alternative, two hypothetical employees to personalize the changes, and a projection of financial costs.

- Option 3: Modify Benefit Design in Current Program for Future Hires
  The stakeholders may decide that changes are needed, but only apply them to employees to be hired prospectively. If this is the case, we would develop alternatives to be considered. Discussion materials would include updated replacement ratios, two hypothetical employees to personalize the changes, and a projection of financial costs.

- Option 4: Modify Benefit Design in Current Program for All Employees
  The stakeholders may decide that changes are needed for both current and future employees. If this is the case, we would develop alternatives to be considered. Discussion materials would include updated replacement ratios, a chart showing winners / losers for each alternative, two hypothetical employees to personalize the changes, and a projection of financial costs.

- Option 5: Changes in Areas Other than Benefit Design
  Even if there are no changes made to benefit design, there may be areas of our presentation that lead the stakeholders to consider change. These areas might include:

  - Funding Policy: how to manage the defined benefit plan's funded status while maintaining a responsible annual contribution approach.
  - Asset / liability management: how to better tie assets to move in tandem with plan liabilities, resulting in protection of the plan's strong funded status.

Step 5: Meeting with Stakeholders
Any actions taken in Step 4 will be reviewed with the stakeholders to determine if any the changes are on target.

Step 6: Final Adjustments
Any modifications from our meeting with stakeholders will be prepared and the Board package will be finalized.

Step 7: Meeting with Board
The final slides that were prepared under the guidance of the stakeholders will be presented to the full Board for consideration and reaction.

Step 8: Implementation
While we would like to assume that any recommendations would be unanimously accepted by the Board and the project would move to implementation, there are likely to be modifications that the Board suggests in one area or another. We will work with stakeholders to address those areas and meet with the Board again for final approval, as needed. Once there is agreement on the ongoing program, we will move to implementation.

12. Describe bidder's approach for providing Supplemental Services for public pension funds.
Bidder Response: Foster & Foster is a full-service actuarial consulting firm. As such, we know that requests do not always fit into the project buckets that have already been addressed in this proposal. Costings, administrative support, and technical questions are regular occurrences, especially in a system as big as NPERS. As with other projects, communication is the key. We will talk with staff to determine if work is needed and understand the scope and timing. Before work begins, we will first prepare a cost estimate and seek approval from the appropriate party(ies).
13. Describe bidder's experience at providing Legislative Expertise for public pension funds.
Bidder Response: Among our group of talented consultants, we have many who have specialized roles focused on the public sector. For example, we have one consultant, Judy O'Neill, whose entire focus is keeping up with the legislative process in each state, apprising our actuaries of any proposed bills that may impact our clients. She consistently prepares communications that can be distributed to Boards or even Members upon the Board's request. Additionally, our actuaries provide testimony before legislatures in many states across the country including Florida, Illinois, Louisiana and Texas. Typically, we testify before these bodies to discuss proposed changes to pension laws. Our actuaries are articulate and are able to help find solutions and identify any potential pitfalls in the changes.

DELIVERABLE AND DUE DATES

The following is a draft schedule of the tasks to be completed between contract award (April 1, 2019 per the RFP) and June 30, 2020. The schedule is preliminary based on the information that we have available. We will work with staff to refine the schedule at our kick-off meeting. Those discussions with staff will also allow us to build in timing for any meetings with the Board and determine the regularity of staff / actuary discussions, which we have found to be very helpful in coordinating services with other large systems.

Task	Project	Completion Date
Contract award	General	4/1/2019
Kick-off meeting to discuss transition	Transition	4/2/2019
Data request sent to prior actuary	Transition	4/4/2019
Requested data provided to Foster & Foster	Transition	4/19/2019
Replication finalized	Transition	6/21/2019
Transition letter issued	Transition	7/1/2019
July 1 valuation kick-off discussion (School, Judges, State Patrol)	Valuation	7/1/2019
Valuation data provided to Foster & Foster	Valuation	7/22/2019
Data questions submitted	Valuation	8/30/2019
Data answers provided to Foster & Foster	Valuation	9/13/2019
Final asset data provided to Foster & Foster	Valuation	9/30/2019
Draft reports submitted to staff	Valuation	10/21/2019
Discussion with staff on report review	Valuation	10/25/2019
Final reports delivered	Valuation	11/8/2019
Board presentation (with projections)	Valuation / Projection	11/??/2019
January 1 valuation kick-off discussion (State, County)	Valuation	1/6/2020
Valuation data provided to Foster & Foster	Valuation	1/24/2020
Data questions submitted	Valuation	2/28/2020
Data answers provided to Foster & Foster	Valuation	3/13/2020
Final asset data provided to Foster & Foster	Valuation	3/31/2020
Draft reports submitted to staff	Valuation	4/27/2020
Discussion with staff on report review	Valuation	4/30/2020
Information request for GASB 67/67 reporting	GASB	5/1/2020
Final reports delivered	Valuation	5/15/2020
Board presentation (with projections)	Valuation / Projection	5/??/2020
GASB information provided (State, County)	GASB	6/1/2020
GASB reports delivered (State, County)	GASB	6/30/2020

APPENDIX A: SAMPLE VALUATION REPORT

PLAN XYZ

JUNE 30, 2018

ACTUARIAL VALUATION

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

October 4, 2018

Board of Trustees
Plan XYZ
123 Main Street
Anywhere, USA 12345

Dear Board Members:

This report is prepared for the Board of Trustees of Plan XYZ to present the results of the actuarial valuation of assets and liabilities and funding requirements, as of June 30, 2018. The primary purpose of the report is to provide a measure of the plan's liability and funding levels and to determine the actuarially required contribution for fiscal year ending 2019 and the projected actuarially required contribution rate for fiscal year ending 2020. Section IV provides disclosures of the Fiduciary Net Position and Net Pension Liabilities required by the Governmental Accounting Standards Board Statements 67/68. Results should not be relied upon for other purposes.

In preparing this valuation, we have relied upon the information provided by the System regarding plan provisions, plan membership, plan assets and other matters as detailed in this report. In particular, we have relied upon the Statements of Fiduciary Net Position and Changes in Fiduciary Net Position as audited by Duplantier, Hrapmann, Hogan & Maher LLP, Certified Public Accountants. We did not audit the data or plan assets but reviewed for reasonableness and consistency with prior year data. Our review concluded that the data is reasonable and consistent with the prior year's data.

The liabilities and normal costs shown herein have been estimated on the basis of the actuarial cost method specified in ABC Revised Statutes Title 11 Section 22(13). All actuarial assumptions have been adopted by the Board of Trustees and are reasonable and appropriate for the purposes of this valuation, unless otherwise stated herein. However, other sets of assumptions and methods could also be reasonable and could produce materially different results. Actual results may vary from the assumptions used to prepare the valuation.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements and changes in plan provisions or applicable law. The scope of this report does not include an analysis of the range of such future measurements.

This report has been prepared in accordance with actuarial standards of practice, and to the best of our knowledge, fairly reflects the actuarial present value of accrued benefits of the Plan XYZ.

Shelley is an Associate in the Society of Actuaries and Pat is a Fellow in the Society of Actuaries. Shelley and Pat are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

FOSTER & FOSTER INC.

Shelley R. Johnson

D. Patrick McDonald

Shelley R. Johnson, ASA, MAAA

D. Patrick McDonald, FSA, EA, MAAA, FCA

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PRESENTATION OF VALUATION RESULTS

SUMMARY OF VALUATION RESULTS

			----- Prior Years -----	
		June 30, 2018	**June 30, 2017**	**June 30, 2016**
I.	Membership Census			
	Retirees	78,423	77,258	75,828
	Actives	85,045	84,228	84,068
	DROP	2,420	2,478	2,504
	Terminated Vested	7,211	6,941	6,687
II.	Annual Benefits	$1,986,400,248	$1,939,661,208	$1,887,454,080
III.	Current Payroll			
	Regular Members, Lunch Plans	3,373,253,993	3,316,780,178	3,310,391,256
	Higher Education	624,797,320	584,847,614	559,338,768
	Total	3,998,051,313	3,901,627,792	3,869,730,024
IV.	Market Value of Assets	21,046,702,165	19,513,345,675	17,537,950,955
	Valuation Assets	20,319,561,584	19,210,425,004	18,254,321,142
V.	Investment Yield			
	Market Value (Total Assets)	11.15%	15.19%	1.02%
	Market Value (Excl LaDROP Assets)	11.35%	15.55%	1.04%
	Actuarial Value	9.48%	9.15%	6.67%
	DROP	8.98%	8.65%	6.17%
VI.	Experience Account	85,129,775	37,154,395	24,977,477
VII.	Total Normal Cost	439,691,899	473,025,011	466,591,480
	Total Normal Cost % of Payroll	11.00%	12.12%	12.06%
	Employer Normal Cost % of Payroll	3.01%	4.14%	4.07%
VIII.	Unfunded Actuarial Accrued Liability	10,552,318,323	10,552,198,909	11,018,080,836
IX.	Funded Percentage	65.8%	64.5%	62.4%
X.	Funding Requirements (Mid-year Pmt)			
	1) Discount rate (Current Year)	7.65%	7.70%	7.75%
	Discount rate (Next Year)	7.60%	7.65%	7.70%
	2) Employee Contribution [1]	322,492,929	317,192,109	314,143,467
	3) Employer Contribution	1,194,312,374	1,172,121,854	1,137,651,636
	Aggregate Rate (Current Year) [2]	26.4%	26.4%	25.8%
	4) Projected Employer Contribution	1,177,630,721	1,211,871,889	1,199,029,516
	Aggregate Rate (Next Year) [3]	25.6%	26.5%	26.4%

The above funding requirements measure the cost of benefits that were in effect on June 30, 2018.

[1] Member Contributions: Regular and Higher Ed – 8.0%, Lunch Plan A – 9.10%, Lunch Plan B – 5.00%
[2] Reflects the restated aggregate employer contribution rate for the fiscal year following the valuation.
[3] Reflects the projected aggregate employer contribution rate for fiscal year that begins one year after the valuation date.

PROJECTED CONTRIBUTION RATES BY PLAN

Act 716 of 2012 requires the employer contribution rate to be individually determined for each plan type as defined within the Act beginning with Fiscal Year 2012/2013. Per Act 95 of 2016, the Lunch Plan contribution requirements are consolidated with the Regular Techers (K-12) employer contribution rate. The term "plan" refers to each employer group specified in the Act, rather than each plan referring to a separate plan of benefits. The normal cost portion of each plan's employer contribution rate varies based upon that plan's benefits, member demographics, and the rate contributed by employees. The shared UAL contribution rate is determined in aggregate for all plans. The UAL established for a specific plan or group of plans by specific legislation will be allocated entirely to that plan or those plans. The recommended employer rates by plan are as follows:

	Recommended Employer Rate for FY 2019/2020					
	Total Normal Cost Rate	Aggregate Employee Normal Cost Rate	Employer Normal Cost Rate	Administrative Expense Rate	Shared UAL Rate	**Total Employer Contribution Rate**
Regular Members, Lunch A & B	11.2%	7.9797%	3.2424%	0.45%	22.0%	**25.7%**
Higher Education	10.5%	8.0000%	2.5247%	0.45%	22.0%	**25.0%**
Aggregate Rate	11.1%	7.9829%	3.1302%	0.45%	22.0%	**25.6%**

The variation in normal cost by plan reflects differences in benefits, actuarial assumptions, and member demographics based on the entry age normal cost method.

CHANGES SINCE PRIOR VALUATION

The discount rate was reduced from 7.70% to 7.65%, effective July 1, 2018, in accordance with the Board's adopted plan to reduce the discount rate to 7.50% in 0.05% annual increments. This change was anticipated in the prior valuation when determining the projected contribution requirements for Fiscal Year 2018/2019. The discount rate used to determine the projected contribution requirements for Fiscal Year 2019/2020 was reduced to 7.60%.

CHANGE IN FUNDING REQUIREMENTS

The aggregate employer contribution rate established by the Public Retirement Systems' Actuarial Committee for the 2018/2019 plan year was 26.5%. The restated employer contribution rate determined by this valuation for the 2018/2019 plan year is 26.4%. Therefore, a minimal contribution surplus or deficit is expected next year.

Changes in the required contribution are generally the result of gains or losses resulting from actual experience differing from expected plan experience, expected changes in the UAL payment due to statutory requirements, and changes in actuarial assumptions or methods. Changes in the employer contribution rate are impacted by both the change in the total dollar required contribution and by the total aggregate payroll for active members.

The projected aggregate employer contribution rate decreased from 26.5% to 25.6% from Fiscal Year 2018/2019 to Fiscal Year 2019/2020. The reasons for the change are detailed below. The total of the items contributing to the contribution rate change may not exactly equal the actual contribution rate change due to rounding, and since the items impacting the rate are not additive and may overlap.

Demographic Shift	0.00%
Discount Rate Change (7.65% to 7.60%)	0.12%
Change in Other Aassumptions	-1.25%
Normal Cost Total Change	-1.13%
UAL Payment	
Investment Experience Gain	-0.16%
Other Experience Gain	-0.19%
Experience Account Allocation (10 year amortization)	0.13%
Statutory UAL Payment Increase *	-0.83%
Contribution Variance Payment Change	0.01%
Discount Rate Change (7.65% to 7.60%)	0.19%
Change in Other Assumptions	1.11%
Total UAL Payment Change	0.26%
Payroll Change	-0.06%
Administrative Expenses	0.00%
Total	-0.93%
Actual Contribution Rate Change	-0.9%

* Includes the roll-off of the 2014 investment gain credit and the projected impact of the reamortization of the OAB and EAAB

CHANGE IN UNFUNDED ACCRUED LIABILITY

The plan's unfunded accrued liability (UAL) increased mainly due to the increases resulting from the change in the discount rate and other assumptions, offset by a reduction in principal following receipt of the prior year's UAL payment and an experience gain from investment and non-investment actuarial assumptions.

Unfunded Liability - June 30, 2017		$ 10,552,198,909
Interest on Unfunded Liability	$ 812,519,316	
Employer Amortization Payment	(1,045,692,251)	
Act 59 of 2018 Appropriation	(8,585,163)	
Contribution Variance Surplus	(61,466,736)	
Investment Experience Gain	(319,679,363)	
Experience Account Allocation	44,451,679	
Other Experience Gain	(109,431,563)	
Change in Other Assumptions	550,022,780	
Discount Rate Change (7.75% to 7.70%)	137,980,715	
Total Change		$ 119,414
Unfunded Liability - June 30, 2018		$ 10,552,318,323

PLAN EXPERIENCE

The actuarial assumptions represent the best estimate of future experience in order to properly fund benefits. The results of the actuarial valuation are dependent on the actuarial assumptions used. These assumptions, which are adopted by the Board of Trustees, are detailed in Appendix D of the valuation report. A gain or loss occurs if the actual experience differs from the prior year's projected plan measurements. The funding policy, in Appendix D, describes how investment and non-investment gains are amortized or allocated for other purposes.

Demographic and Salary Assumption Experience

Demographic assumptions include rates of retirement/DROP, rates at which members become disabled, turnover rates, mortality rates, and several other assumptions. Salary assumptions anticipate future salary increases. During the 2017/2018 plan year, the system incurred an experience gain of $109,431,563 from plan experience differing from that anticipated by the demographic and salary assumptions. The experience gain includes a reduction for administrative expenses to the extent not directly funded. The gain is amortized over 30 years with level payments.

A breakdown of the non-investment experience gain/(loss) is provided below:

Active Member Decrements	($90,526,250)
Active Member Salaries	$157,854,237
Inactive Mortality	$32,593,912
Administrative Expenses	($29,064,944)
Other	$38,574,608
Total Change	$109,431,563

Investment Assumption Experience

The market value of assets and actuarial value of assets include funds from the DROP accounts created for members eligible for DROP after January 1, 2004, which are invested in money market accounts. The rate of return on the actuarial value of assets is determined for trust assts net of these accounts.

	Actuarial Value of Assets	Money Market DROP Accounts	Net Actuarial Value of Assets
Beginning Assets	19,250,178,299	421,400,830	18,828,777,469
Contributions	1,589,766,893	95,402,842	1,494,364,052
Benefits Payments and Expenses	2,197,108,376	155,358,487	2,041,749,889
Investment Income	1,764,639,455	5,293,354	1,759,346,101
Ending Asset Value	20,407,476,271	366,738,539	20,040,737,732
Net AVA Rate of Return			9.48%

For the plan year ending June 30, 2018, the System's actuarial rate of return of 9.48% exceeded the 7.70% discount rate, resulting in an investment experience gain of $319,679,363. Investment experience losses are amortized over 30 years with level payments. Investment experience gains up to the threshold amounts, are allocated to the Original Amortization Base and Experience Account Allocation Base. The remaining gain is amortized over 30 years with level payments. One-half of the remaining gain is allocated to the experience account, up to the statutory cap, to be used to fund future permanent benefit increases, when granted by the legislature, and is amortized over ten years as a loss. The development of investment gains/losses and any resulting allocations are shown below:

Development of Investment Gain/(Loss)		
A. Beginning Net Actuarial Value of Assets	$	18,828,777,469
B. Total Contributions		1,494,364,051
C. Benefits Payments and Expenses		2,041,749,889
D. Ending Net Actuarial Value of Assets		20,040,737,732
E. Investment Income (D - A - B + C)		1,759,346,101
Investment Rate of Return		9.48%
F. Expected Investment Income		1,439,666,738
Expected Rate of Return		7.70%
G. Investment Gain/(Loss) (E - F)		319,679,363
Current Allocation of Gain Threshold to OAB/EAAB		
H. $200,000,000 Indexed by AVA Increase	$	230,776,004
Allocation of Investment Gain		
I. Original Amortization Base (OAB) Credit (H * 1/2)	$	115,388,002
J. Experience Account Amortization Base (EAAB) Credit (H * 1/2)		115,388,002
K. 30-Year Amortized Gain (G - I - J)		88,903,359
L. 10-Year Amort. of Experience Account Credit (-K * 1/2)		(44,451,679)
M. Experience Account Credit (K * 1/2)		44,451,679
N. Total (I + J + K + L + M)		319,679,363

The historical geometric average rates of return on the total actuarial value of assets, net of investment expenses, for plan years ending June 30 are shown below. The discount rate reflects the expected return needed to fund regular plan benefits. The returns shown below are comparable to the discount rate plus returns expected to be allocated to the Experience Account and administrative expenses (when not directly funded), which is currently 8.05% for Fiscal Year 2018/2019 and 8.00% for Fiscal Year 2019/2020.

	Actuarial Rate of Return		Geometric Average
2013	13.41%	5 Year	9.92%
2014	13.14%	10 Year	5.87%
2015	11.26%	15 Year	7.58%
2016	6.67%	20 Year	6.57%
2017	9.15%	25 Year	7.82%
2018	9.48%	30 Year	8.26%

DROP accounts for members eligible for DROP prior to January 1, 2004 are credited with interest following termination of DROP at the System's actuarial rate of return less a 0.5% expense adjustment, but not below zero. The DROP interest rate for the period July 1, 2017 through June 30, 2018 after the expense adjustment is 8.98%. DROP accounts for members eligible for DROP after are January 1, 2004 are invested in money market accounts.

ACTUARIAL ASSETS/VALUATION ASSETS

The gross actuarial value of assets, developed in Section II, are determined based on the market value of assets, with gradual recognition of gains and losses relative to the discount rate over a five-year period in order to smooth the effects of short-term market volatility. Valuation assets are determined as the gross actuarial value of assets less the assets held in side-fund accounts. Valuation assets are used to determine the employer contribution rate (see Section III).

The side-fund accounts excluded from valuation assets are as follows:

Employer Credit Account: This account, established by Act 588 of 2004, accumulates the excess contributions based on the statutory minimum employer contribution rate of 15.5% over the actuarially required employer contribution (ARC), as restated in the current valuation. The minimum rate is not currently applicable, and the account continues to have a zero balance.

LSU Agriculture and Extension Service Fund: Participants of the LSU Agriculture and Extension Service receive supplemental benefits from XYZ equal to the difference between the XYZ benefit formula and the Federal Civil Service formula. The funding is recorded separately in the side-fund with assets co-mingled with the XYZ assets. The current balance is $2,785,264.

Experience Account Fund: The account is used to fund permanent benefit increases for retirees. Fifty percent of any excess return above the statutory threshold will be credited to the Experience Account. The current year allocation is $43,350,009. The account was credited with interest based on the System's actuarial return. The current balance is $85,129,775.

LEGISLATIVE/PLAN CHANGES

Act 59 of 2018 provided a supplemental appropriation of $8,585,163 to XYZ to be applied to the IUAL, which is a component of the Original Amortization Base.

The following provisions of Act 95 of 2016 will be implemented in future valuations, once certain triggers are met:

- Accelerates the implementation of the reduction in amortization period for most actuarial changes, gains, or losses from 30 years to 20 years. The 20-year amortization will begin once the funded ratio reaches 70%, rather than 85%, as previously required.
- Provides for re-amortization of the OAB with level-dollar payments to 2029 in Fiscal Year 2020/2021 or later, when such re-amortization results in annual payments that are not more than the next annual payment otherwise required under prior law.
- Provides that the net remaining liability of the OAB and EAAB shall be re-amortized after application of the hurdle payments in the Fiscal Year 2019/2020 and in every fifth fiscal year thereafter until the system is 80% funded

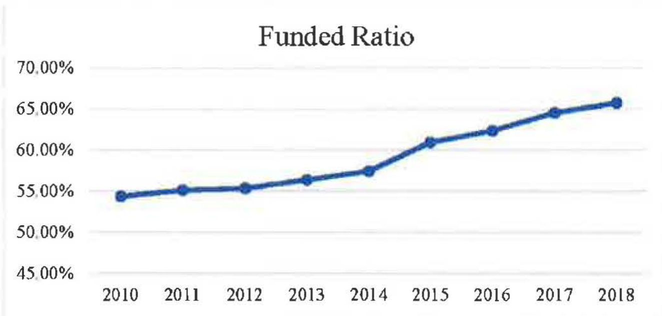
ACCELERATED REDUCTION OF OAB AND EAAB

Act 497 of 2009 established the OAB and EAAB and required the application of certain investment gains and contribution variance credits to these schedules. Act 399 of 2014 modified the provisions of Act 497 and specifies that until the System's funded ratio reaches 85%, the funds applied to these schedules will be used to pay off the schedules early, rather than to reduce employer contributions. Since 2009, $474,232,407 has been applied to the OAB and $754,566,995 has been applied to the EAAB. When combined with the surplus dollars appropriated to the System by the legislature, the result is acceleration of the payoff of the OAB to 2027, two years earlier than the 2029 payoff required by the State Constitution, and acceleration of the payoff of the EAAB by 2033, seven years earlier than the original pay-off date of 2040.

Per Act 94 of 2016, the projected OAB and EAAB payments for fiscal year 2019/2020 were determined by re-amortizing the schedules to their respective pay-off dates. A projection of future UAL and UAL payments based on the projected amortization schedules, after re-amortization, is shown in Appendix E. This projection assumes that the actuarially determined contributions will be paid when due and all actuarial assumptions will be realized.

FUNDED STATUS

The funded status is a measure of the plan's assets relative to the plan's obligations. The current funded ratio is 65.8%, as measured by the plan's valuation assets divided by the total actuarial accrued liability, based on the asset valuation method, actuarial cost method, and actuarial assumptions described in Appendix D. The funded ratio reflects the change in the discount rate to 7.65%. The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's obligations and for assessing the amount of future contributions. This measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets. The financial crisis of 2008, and gradual recognition of the losses, resulted in a funded ratio of 54.4% in 2010. The chart below shows the recovery to date as exhibited by the steady increase in the funded ratio through June 30, 2018, based on the actuarial value of assets.



ASSETS/FINANCIAL SUMMARY

STATEMENT OF REVENUES AND EXPENSES

	June 30, 2018	---- Prior Years ---- June 30, 2017	June 30, 2016
OPERATING REVENUES:			
1. **Contribution Income**			
Member	$ 337,928,752	$ 328,541,240	$ 330,773,316
Employer	1,110,943,147	1,037,915,514	1,066,521,193
Legis Appropriations	8,585,163	-	0
Other Appropriations	8,137	28,103	34,500
ORP - Unfunded	130,984,645	122,560,251	128,543,466
LSU Ag Center Coop. Ext.	1,873,303	1,754,855	1,830,995
Miscellaneous	(556,254)	536,662	995,292
TOTAL CONTRIBUTIONS	1,589,766,893	1,491,336,625	1,528,698,762
2. **Investment Income**			
Investments	2,177,985,187	2,650,391,172	216,567,366
Less Advisor Fees	(37,287,214)	(34,883,417)	(35,975,157)
TOTAL INVESTMENT INCOME	2,140,697,973	2,615,507,755	180,592,209
3. **Total Revenues**	3,730,464,866	4,106,844,380	1,709,290,971
OPERATING EXPENSES:			
1. General Administration [1]	29,064,944	17,762,132	17,025,314
Depreciation Expense	400,766	432,238	407,105
2. **Benefits Paid**			
Pension Benefits	2,116,953,537	2,061,454,295	1,999,272,395
LSU Ag Center Coop. Ext.	2,017,909	1,995,075	1,873,303
Refund of Contributions	48,671,220	49,805,920	49,141,575
TOTAL BENEFITS PAID	2,167,642,666	2,113,255,290	2,050,287,273
3. **Total Expenses**	2,197,108,376	2,131,449,660	2,067,719,692
NET MARKET VALUE INCREASE:	1,533,356,490	1,975,394,720	(358,428,721)

[1] The General Administration Operating Expense includes $(24,005), $586,166, and $13,633,156 for 2016, 2017, and 2018, respectively for Other Post-Employment Benefits (OPEB), and $1,773,559, $2,807,080, and $1,385,063 for 2016, 2017, and 2018 GASB 68 Pension Expense, respectively. The 2018 OPEB Expense includes a $13,190,993 adjusting entry related to GASB 75 implementation.

COMPARATIVE SUMMARY OF REVENUES BY SOURCE AND EXPENSES BY TYPE

Revenues by Source				
Fiscal Year	Members Contribution	Employer Contribution[1]	Investment Income	Total
2009	344,547,871	714,703,222	(3,287,852,517)	(2,228,601,424)
2010	347,114,632	726,567,699	1,289,304,693	2,362,987,024
2011	342,323,329	943,678,941	2,945,993,096	4,231,995,366
2012	333,908,454	1,084,637,731	(56,240,846)	1,362,305,339
2013	327,767,936	1,095,482,766	1,754,983,691	3,178,234,393
2014	326,007,091	1,218,017,295 [2]	2,818,063,134	4,362,087,520
2015	324,920,644	1,267,129,097	445,160,167	2,037,209,908
2016	330,773,315	1,197,925,446	180,592,209	1,709,290,970
2017	328,541,240	1,162,795,385	2,615,507,755	4,106,844,380
2018	337,928,752	1,251,838,141	2,140,697,973	3,730,464,866

Expenses by Type				
Fiscal Year	Benefits	Refunds	Administrative Expenses	Total
2009	1,464,106,312	33,939,436	19,321,250	1,517,366,998
2010	1,532,526,141	40,210,177	19,100,619	1,591,836,937
2011	1,615,778,191	42,248,487	18,189,491	1,676,216,169
2012	1,682,528,254	49,139,028	18,864,917	1,750,532,199
2013	1,800,166,804	59,152,481	17,661,969	1,876,981,254
2014	1,877,113,902	57,652,124	17,522,895	1,952,288,921
2015	1,956,857,437	51,545,762	19,265,221	2,027,668,420
2016	2,001,145,698	49,141,575	17,432,419	2,067,719,692
2017	2,063,449,370	49,805,920	18,194,370	2,131,449,660
2018	2,118,971,446	48,671,220	29,465,710	2,197,108,376

1 Includes Miscellaneous Contribution/Income in addition to direct employer contributions.
2 Includes $5,578,791 legislative appropriation from Act 55 of 2014.

STATEMENT OF ASSETS

ASSETS:	June 30, 2018	----Prior Years--- June 30, 2017	June 30, 2016
1. Short-term Assets			
Cash and Cash Equivalents	$ 277,091,189	$ 216,603,032	$ 5,279,450
Short Term Securities	1,076,810,833	1,033,090,820	1,307,428,499
2. Bonds			
Domestic Bonds	2,371,403,311	1,913,773,495	1,828,132,715
International Bonds	1,278,291,190	1,568,601,507	1,413,994,202
3. Equities			
Domestic Equities	6,321,369,477	5,927,969,405	5,161,381,152
International Equities	3,635,793,802	3,465,254,946	3,166,197,700
4. Other Assets			
Alternative Investments	6,465,934,316	5,296,424,434	4,573,041,477
Property and Equipment	3,402,044	3,430,912	3,710,875
Receivables less Payables	(384,369,200)	84,413,700	76,602,964
Deferred Outflows less Deferred Inflows	975,203	3,783,424	2,181,921
TOTAL ASSETS - Market Value	21,046,702,165	19,513,345,675	17,537,950,955

ACTUARIAL VALUE OF ASSETS

The actuarial value of assets (AVA) is determined as the market value of assets (MVA) adjusted to gradually recognize investment gains and losses relative to the net assumed investment return, over a 5-year period in 20% increments. The actuarial value of assets is subject to Corridor Limits of 80% to 120% of the Market Value of Assets. The tables below show the development of the actuarial value of assets and the amount of deferred gains and losses to be recognized in future years.

Plan Year	Asset G/L	Deferred %	Deferred $
2015	(923,787,158)	20%	(184,757,432)
2016	(1,185,490,155)	40%	(474,196,062)
2017	1,281,120,936	60%	768,672,562
2018	661,883,532	80%	529,506,826
			$ 639,225,894

Market Value of Assets	$ 21,046,702,165
Deferred Asset G/L	639,225,894
Preliminary Actuarial Value of Assets	$ 20,407,476,271
CORRIDOR LIMITS	
Minimum = 80% of Market Value	$ 16,837,361,732
Maximum = 120% of Market Value	25,256,042,598
Actuarial Value of Assets	$ 20,407,476,271

Plan Year	Deferred Gain/(Loss)	Deferred Gain/(Loss) to be Recognized in Future Years: 2019	2020	2021	2022
2015	(184,757,432)	(184,757,432)			
2016	(474,196,062)	(237,098,031)	(237,098,031)		
2017	768,672,562	256,224,188	256,224,187	256,224,187	
2018	529,506,826	132,376,707	132,376,706	132,376,707	132,376,706
	639,225,894	(33,254,569)	151,502,861	388,600,893	132,376,706

SIDE ACCOUNTS AND DEVELOPMENT OF VALUATION ASSETS

	June 30, 2018	---- Prior Years ---- June 30, 2017	June 30, 2016
EMPLOYER CREDIT ACCOUNT[1]:			
Prior Year Ending Balance	$ -	$ -	$ -
+ Contributions	-	-	-
- Disbursements	-	-	-
+ Accumulated Interest	-	-	-
Account Balance - Year End	-	-	-
LSU AG/EXT SERVICE:			
Prior Year Ending Balance	$ 2,598,899	$ 2,535,804	$ 2,360,090
+ Contributions	1,873,303	1,754,855	1,830,995
- Benefit Disbursements	2,017,909	1,995,075	1,873,303
+ Accumulated Interest	330,619	303,315	218,022
Account Balance - Year End	2,784,912	2,598,899	2,535,804
EXPERIENCE ACCOUNT FUND:			
Prior Year Ending Balance	$ 37,154,395	$ 24,977,477	$ 226,356,559
+ Experience Account Allocation	44,451,679	9,891,500	-
- Benefit Disbursements	-	-	216,473,124
+ Accumulated Interest	3,523,701	2,285,418	15,094,042
Fund Balance - Year End	85,129,775	37,154,395	24,977,477
DEVELOPMENT OF VALUATION ASSETS:			
Actuarial Value of Assets	$ 20,407,476,271	$ 19,250,178,299	$ 18,281,834,423
- Employer Credit Account	-	-	-
- LSU Ag/Ext Service Account	2,784,912	2,598,899	2,535,804
- Experience Account Fund	85,129,775	37,154,395	24,977,477
Valuation Assets	$ 20,319,561,584	$ 19,210,425,005	$ 18,254,321,142

[1] The Employer Credit Account was created by ACT 588 of 2004.

DEVELOPMENT OF COSTS, LIABILITIES AND CONTRIBUTIONS

Normal Costs and Accrued Liabilities are calculated in accordance with the Entry Age Normal cost method, based on the Provisions of the Plan as summarized in Appendix B and the Actuarial Assumptions outlined in Appendix D.

	June 30, 2018		---- Prior Year --- June 30, 2017	
	Dollar Amount	% of Salary	Dollar Amount	% of Salary
Discount Rate	7.65%		7.70%	
I. Normal Costs				
Active Members				
a) Retirement Benefits	260,824,572	6.52%	305,135,968	7.82%
b) Disability Benefits	14,630,889	0.37%	14,558,297	0.37%
c) Survivor Benefits	5,803,964	0.15%	11,324,442	0.29%
d) Voluntary Termination	158,432,474	3.96%	142,006,304	3.64%
e) Total	439,691,899	11.00%	473,025,011	12.12%
II. Actuarial Accrued Liability				
a) Active Members				
1) Retirement Benefits	7,825,644,336		7,725,929,420	
2) Disability Benefits	175,693,735		146,890,693	
3) Survivor Benefits	76,338,252		137,955,169	
4) Voluntary Termination	467,907,982		313,899,689	
	8,545,584,305		8,324,674,971	
b) Retired and Inactive Members				
1) Regular Retirees	17,208,468,188		16,459,826,669	
2) Disability Benefits	478,522,212		455,327,086	
3) Survivors	1,160,517,476		1,105,159,843	
4) Vested Deferred [1]	377,615,212		327,107,035	
5) Contributions Refunded [2]	147,388,316		135,466,985	
6) DROP Deferred Benefits	1,853,334,674		1,855,657,127	
7) DROP Account Balances	1,100,449,524		1,099,404,197	
	22,326,295,602		21,437,948,942	
c) Total	30,871,879,907		29,762,623,913	

1 Includes pending Retirement/DROP applications.
2 Includes terminated employee and rehired retiree contributions to be refunded.

Section III **XYZ Actuarial Valuation**
DEVELOPMENT OF COSTS, LIABILITIES, AND CONTRIBUTIONS **June 30, 2018**

	June 30, 2018	---- Prior Year ---- June 30, 2017
II. Actuarial Accrued Liability	30,871,879,907	29,762,623,913
Discount Rate	7.65%	7.70%
III. Valuation Assets	20,319,561,584	19,210,425,004
IV. Unfunded Actuarial Accrued Liabilitiy [1]	10,552,318,323	10,552,198,909
a) Change over prior year	119,414	(465,881,927)
b) Funded Percentage	65.8%	64.5%
V. Employer Contributions		
To Fund Current Plan Year [1]		
a) Employer Portion of Normal Cost	121,789,981	164,503,573
b) Administrative Expenses [2]	18,500,000	0
c) Amortization Payments	1,054,022,393	1,004,883,456
d) Prior Contribution Variance	0	2,734,825
Total Required Contribution	1,194,312,374	1,172,121,854
Total Contribution Rate	26.4%	26.4%
PRSAC Approved rate [1]	26.4%	26.4%
Aggregate Employer Normal Cost Rate	3.0148%	4.1404%
VI. Projected Employer Contributions		
Discount Rate	7.60%	7.65%
To Fund Next Plan Year [1]		
a) Employer Portion of Normal Cost	128,764,218	174,935,810
b) Administrative Expenses [2]	18,500,000	18,500,000
c) Amortization Payments	1,029,815,343	1,018,353,936
c) Prior Contribution Variance	551,160	82,143
Total Required Contribution	1,177,630,721	1,211,871,889
Total Contribution Rate	25.6%	26.5%
Projected Aggregate Employer Normal Cost Rate [3]	3.1302%	4.2653%
VII. Current Payroll	3,998,051,313	3,901,627,792
Projected Payroll - Mid Year	4,039,796,674	3,973,145,635
Projected Payroll - Next Year	4,113,668,781	4,101,385,050
Optional Retirement Plan (ORP) Salary Adjustment Factor [4]	1.13843	1.13883

[1] Dollar Amounts reflect estimated payments due mid-year on January 1st per Act 81. Constitutional Minimum is 11.8% without regard to the statutory minimum of 15.5%.
[2] Direct funding of administrative expenses begins in FY 2018/2019, per the provisions of Act 94 of 2016.
[3] Normal costs, normal cost rates, and UAL payments projected for FY 2018/2019 and FY 2019/2020 were determined using a discount rate of 7.65% and 7.60%, respectively.
[4] Amortization payments are paid as a percentage of plan member and ORP payroll. The ORP salary adjustment factor is used to convert amortization payments to percentage of payroll.

GASB STATEMENT NO. 67/68 REPORTING

The Governmental Accounting Standards Board Statements No. 67/68 establish financial reporting standards for state and local governmental pension plans and their plan sponsors that are administered through trusts or equivalent arrangements. The required actuarial disclosures are illustrated below. The Plan Fiduciary Net Position is the Market Value of Assets used for the funding valuation, excluding assets held for the LSU Agriculture and Extension Service. The Total Pension Liability was developed using the Entry Age Normal cost method.

SCHEDULE OF EMPLOYERS' NET PENSION LIABILITY

	June 30, 2018	June 30, 2017	June 30, 2016
Total Pension Liability	$ 30,871,936,837	$ 29,762,623,913	$ 29,272,401,978
Plan Fiduciary Net Position [1]	$ 21,043,916,901	$ 19,510,746,776	$ 17,535,415,151
Employers' Net Pension Liability	$ 9,828,019,936	$ 10,251,877,137	$ 11,736,986,827
Plan Fiduciary Net Position as a percentage of Total Pension Liability	68.2%	65.6%	59.9%
Covered Employee Payroll	$ 3,998,051,313	$ 3,901,627,792	$ 3,869,730,024
Net Pension Liability as a percentage of Covered Payroll	245.8%	262.8%	303.3%

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year	Actuarial Determined Contribution	Contributions in Relation to Actuarial Determined Contribution	Contribution Deficiency (Excess)	Covered Payroll	Contributions as a % of Covered Payroll
2009	697,190,561	741,595,487	(44,404,926)	3,912,326,326	19.0%
2010	904,382,657	755,446,587	148,936,070	3,977,819,262	19.0%
2011	1,086,319,774	980,393,924	105,925,850	3,902,646,534	25.1%
2012	1,120,095,898	1,127,265,199	(7,169,301)	3,808,760,594	29.6%
2013	1,149,134,132	1,137,733,532	11,400,600	3,726,325,750	30.5%
2014	1,218,397,771	1,258,687,418	(40,289,647)	3,764,954,727	33.4%
2015	1,212,285,929	1,303,570,582	(91,284,653)	3,815,648,662	34.2%
2016	1,177,993,580	1,242,445,786	(64,452,206)	3,869,730,024	32.1%
2017	1,188,962,275	1,204,634,319	(15,672,044)	3,901,627,792	30.9%
2018	1,227,397,115	1,288,863,851	(61,466,736)	3,998,051,313	32.2%

[1] Plan Fiduciary Net Position excludes side-fund assets held for the LSU Agriculture and Extension Service

SCHEDULE OF CHANGES IN EMPLOYERS' NET PENSION LIABILITY

	June 30, 2018	June 30, 2017	June 30, 2016
Total Pension Liability			
Service Cost	473,025,011	466,591,480	463,783,246
Interest	2,244,768,414	2,222,960,660	2,176,626,375
Changes of Benefit Terms	-	-	216,473,124
Diff. Between Expected and Actual	(130,859,239)	(223,202,835)	(181,620,615)
Changes of Assumptions	688,003,495	135,132,845	-
Retirement Benefits [1]	(2,116,953,537)	(2,061,454,295)	(1,999,272,395)
Refunds/Transfers of Member Contributions	(48,671,220)	(49,805,920)	(49,884,654)
Net Change in Total Pension Liability	1,109,312,924	490,221,935	626,105,081
Total Pension Liability - Beginning	29,762,623,913	29,272,401,978	28,646,296,897
Total Pension Liability - Ending (a)	$ 30,871,936,837	$ 29,762,623,913	$ 29,272,401,978
Plan Fiduciary Net Position			
Employer Contributions [1]	1,201,829,353	1,122,277,562	1,157,901,123
Non-Employer Contributions	39,550,321	38,762,968	38,193,328
Employee Contributions	337,928,752	328,541,240	330,773,316
Net Investment Income [1]	2,137,541,062	2,612,231,923	177,422,752
Other Income	11,411,104	2,972,517	2,951,433
Retirement Benefits [1]	(2,116,953,537)	(2,061,454,295)	(1,999,272,395)
Refunds/Transfers of Member Contributions	(48,671,220)	(49,805,920)	(49,884,654)
Administrative Expense	(15,431,788)	(17,175,966)	(16,306,240)
Other Postemployment Benefit Expenses [2]	(13,633,156)	(586,166)	24,005
Depreciation and Amortization Expenses	(400,766)	(432,238)	(407,105)
Accounting Principle Change	-	-	-
Net Change in Plan Fiduciary Net Position	1,533,170,125	1,975,331,625	(358,604,437)
Plan Fiduciary Net Position - Beginning	19,510,746,776	17,535,415,151	17,894,019,588
Plan Fiduciary Net Position - Ending (b)	$ 21,043,916,901	$ 19,510,746,776	$ 17,535,415,151
Net Pension Liability - Ending (a) - (b)	$ 9,828,019,936	$ 10,251,877,137	$ 11,736,986,827
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	68.2%	65.6%	59.9%
Covered Employee Payroll	$ 3,998,051,313	$ 3,901,627,792	$ 3,869,730,024
Net Pension Liability as a Percentage of Covered Employee Payroll	245.8%	262.8%	303.3%

[1] Amounts shown exclude side-fund assets held for the LSU Agriculture and Extension Service and associated contributions and benefits.

[2] The 2018 OPEB Expense includes a $13,190,993 adjusting entry related to GASB 75 implementation.

Actuarial Assumptions:

All assumptions used for purposes of GASB Statement 67/68 reporting requirements are described in Appendix D. Administrative expenses will be directly reflected in the employer pension expense in the year incurred in the Statement 67/68 reporting, rather than with an explicit reduction in the discount rate. A description of the discount rate used for GASB Statement 67/68 reporting is provided below.

Discount Rate:

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expenses and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, and by adding expected inflation and an adjustment for the effect of rebalancing/ diversification. The resulting long-term geometrical nominal expected return is 8.07%. Best estimates of real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2018, are summarized in the following table:

Asset Class	Long Term Expected Real Rate of Return
Domestic Equity	4.01%
International Equity	4.90%
Domestic Fixed Income	1.36%
International Fixed Income	2.35%
Private Equity	8.39%
Other Private Assets	3.57%

The discount rate used to measure the total pension liability was 7.65 percent.

The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that sponsor contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate:

The following presents the net pension liability calculated using the discount rate of 7.65%, and what the net pension liability would be if it were calculated using a discount rate that is 1% lower or 1% higher.

	1% Decrease 6.65%	Current Discount Rate 7.65%	1% Increase 8.65%
Employers' Net Pension Liability	13,019,747,254	9,828,019,936	7,135,631,690

The Schedule of Pension Amounts, that follows, provides employers with amounts to be recognized in the financial statements and note disclosures for GASB 68 reporting. In accordance with GASB Statement 68, changes in total pension liability due to differences between actual and expected experience and changes in assumptions are amortized over a period equal to the average of the expected remaining service lives of all employees that are provided with pensions through the pension plan (active and inactive employees) determined as of the beginning of the measurement period. The current average remaining service life, when rounded up to the next higher whole number, remains at 5 years. Differences between projected and actual investment returns are amortized over a closed 5-year period.

SCHEDULE OF PENSION AMOUNTS

	Net Pension Liability	Deferred Inflows	Deferred Outflows	Pension Expense
Beginning balance	(10,251,877,137)	(1,685,398,924)	1,191,722,011	
Total Pension Liability Factors:				
Service cost	(473,025,011)			473,025,011
Interest	(2,244,768,414)			2,244,768,414
Changes in benefit terms	-			-
Differences between expected and actual experience	130,859,239	(130,859,239)	-	
Amortization of current year		26,171,848	-	(26,171,848)
Amortization of prior years		117,927,925	-	(117,927,925)
Changes in assumptions	(688,003,495)	-	688,003,495	
Amortization of current year		-	(137,600,699)	137,600,699
Amortization of prior years		-	27,026,569	(27,026,569)
Benefit payments	2,116,953,537			
Refunds/Transfers of Member Contributions	48,671,220			
Net Change in Total Pension Liability	(1,109,312,924)	13,240,534	577,429,365	2,684,267,782
Plan Fiduciary Net Position:				
Contributions - Employer	1,201,829,353			
Contributions - Non-Empl. Contributing Entities	39,550,321			
Contributions - Employees	337,928,752			(337,928,752)
Expected earnings on pension plan investments	1,478,398,163			(1,478,398,163)
Diff. between projected and actual investment earnings	659,142,899	(659,142,899)	-	
Amortization of current year		131,828,580	-	(131,828,580)
Amortization of prior years		581,652,931	(422,948,596)	(158,704,335)
Retirement Benefits	(2,116,953,537)			
Administrative Expense	(29,064,944)			29,064,944
Refunds/Transfers of Member Contributions	(48,671,220)			
Other	11,010,338			(11,010,338)
Net Change in Plan Fiduciary Net Position	1,533,170,125	54,338,612	(422,948,596)	(2,088,805,224)
Ending Balance	(9,828,019,936)	(1,617,819,778)	1,346,202,780	595,462,558

MEMBERSHIP DATA

XYZ provides the data for individual members of the system as of the valuation date. The validity of the results of any actuarial valuation is dependent upon the accuracy of the data provided. Our review of submitted data is limited to validation of reasonableness and consistency in several areas, such as age, service, salary, and current benefits. Our review includes checks for duplicate records and a comparison of the current year records to those submitted in prior years. Records identified as containing suspicious data were assigned values based on information from similar records or based on historical averages for similarly situated members. Suspicious data are not necessarily errors, but data which fall outside the normal parameters. Notwithstanding our efforts to review both census and financial data for apparent errors, we must rely upon the system's administrative staff and accountants to provide accurate information.

The data contained in this valuation is summarized on the following pages. The data summarized in the tables that follow serve as the basis for determining costs and liabilities. Salary data contained in the profiles and valuation report exceed the amount reported by internal audit for members with less than one year of service. In the valuation process, salaries are annualized for members with fractional service in the first year of employment. Disability retirees who have reached normal retirement eligibility requirements are considered regular retirees by XYZ but are classified as disability retirees for purposes of the actuarial valuation. Liabilities are calculated accordingly.

	2018		2017	
Active Members	Members	Avg. Salary	Members	Avg. Salary
Regular Members	71,986	45,043	71,458	44,531
Higher Education	9,633	62,883	9,186	61,466
Lunch Plan A	4	24,320	6	24,731
Lunch Plan B	1,138	19,612	1,121	18,898
Subtotal Actives	82,761	46,769	81,771	46,080
Post DROP	2,284	55,784	2,457	54,376
Total Active	85,045	47,011	84,228	46,322

	2018	2017
Retired and Inactive Members	Members	Members
Regular Retirees	66,760	65,749
Disability Retirees	4,248	4,280
Survivors	7,415	7,229
DROP Participants	2,420	2,478
Vested & Reciprocals	7,211	6,941
Inactive Non-Vested (Due Refunds)	22,364	20,980
Total Retired and Inactive	110,418	107,657
Total Members	195,463	191,885
Less Inactive Non-Vested (Due Refunds)	-22,364	-20,980
Total Active and Vested Inactive Members	173,099	170,905

Appendix A XYZ Actuarial Valuation
MEMBERSHIP DATA June 30, 2018

MEMBER RECONCILIATION

	Active (Pre-DROP)	Active after DROP	Terminated Vested	In DROP	Retired, Disabled, Survivor	Total
June 30, 2017	81,771	2,457	6,941	2,478	77,258	170,905
Additions to Census						
Newly Hired Members	8,470					8,470
Change in Status						
New Regular Retirees	(1,559)		(183)		1,742	0
New Disability Retirees	(122)		(8)		130	0
New Survivors	(35)		(3)		38	0
Active to Terminated Vested	(1,334)		1,334			0
Active to DROP	(905)			905		0
Terminated Vested to Active	474		(474)			0
Disability to Active/TV	4				(4)	0
DROP to Active After DROP		399		(399)		0
Act aft DROP to Ret/Srv		(567)			567	0
Terminated Vested to DROP			(3)	3		0
DROP to Ret/Srv				(557)	557	0
Eliminated from Census						
Refunded or Due Refund	(3,946)		(391)			(4,337)
Deceased	(41)	(6)	(19)	(7)	(1,918)	(1,991)
No Further Survivor Ben Due					(14)	(14)
Data Revisions	(16)	1	17	(3)	67	66
June 20, 2018	82,761	2,284	7,211	2,420	78,423	173,099

XYZ MEMBERSHIP PROFILE
ALL ACTIVE MEMBERS (PRE-DROP)

CELLS DEPICT - MEMBER COUNT
TOTAL SALARY

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 25	783 $32,959,670	1,086 $43,536,807								1,869 $76,496,477
25 - 29	1,194 $49,365,496	5,241 $220,283,901	1,182 $54,748,147	5 $165,141						7,622 $324,562,685
30 - 34	978 $42,828,553	3,937 $164,421,474	3,753 $178,263,488	1,149 $57,494,515	2 $64,295					9,819 $443,072,325
35 - 39	856 $36,933,232	3,355 $139,364,286	2,927 $135,711,915	3,869 $198,254,287	1,074 $59,306,622	2 $59,453				12,083 $569,629,795
40 - 44	607 $25,968,134	2,543 $100,955,846	2,211 $103,228,301	2,709 $131,982,510	3,181 $179,047,758	760 $45,217,617				12,011 $586,400,166
45 - 49	500 $21,218,314	2,002 $80,516,921	1,900 $83,110,378	2,366 $107,399,042	2,275 $120,629,352	2,750 $163,156,208	752 $47,237,073			12,545 $623,267,288
50 - 54	393 $16,097,231	1,558 $59,548,542	1,467 $62,171,243	1,945 $81,644,061	1,820 $84,609,196	1,713 $91,214,707	2,027 $122,695,287	98 $6,786,481	1 $42,000	11,022 $524,808,748
55 - 59	279 $11,482,345	1,200 $46,187,870	1,144 $47,522,474	1,539 $63,836,117	1,657 $71,838,007	1,666 $78,662,799	330 $17,565,557	117 $8,184,859	21 $1,321,592	7,953 $346,601,620
60 - 64	182 $7,561,426	714 $29,229,456	700 $28,283,894	934 $39,388,943	908 $40,912,927	1,018 $48,134,637	318 $16,714,316	113 $7,277,572	98 $8,400,940	4,985 $225,904,111
65 - 69	56 $2,641,470	250 $9,894,156	272 $12,903,983	352 $16,917,387	307 $15,870,476	312 $15,111,450	290 $14,882,455	94 $6,930,082	84 $7,993,296	2,017 $103,144,755
70+	27 $1,502,792	99 $4,137,380	100 $4,899,501	146 $6,579,980	110 $5,556,428	79 $3,868,282	88 $4,384,284	100 $7,438,641	86 $8,384,437	835 $46,751,725
Total	5,855 $248,558,664	21,985 $898,076,639	15,656 $710,843,324	15,014 $703,661,983	11,334 $577,835,061	8,300 $445,425,153	3,805 $223,478,972	522 $36,617,635	290 $26,142,265	82,761 $3,870,639,696

AVERAGES	---	Attained Age	44.39
		Service Years	10.57
		Active Salary	$46,769

XYZ MEMBERSHIP PROFILE
ACTIVE - REGULAR K-12

CELLS DEPICT - MEMBER COUNT
TOTAL SALARY

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 25	671 $28,215,157	1,000 $40,677,369								1,671 $68,892,526
25 - 29	869 $34,752,245	4,716 $198,896,828	1,134 $52,586,128	5 $165,141						6,724 $286,400,342
30 - 34	689 $26,675,443	3,279 $131,881,770	3,408 $160,411,271	1,100 $55,133,455	1 $18,266					8,477 $374,120,205
35 - 39	613 $22,696,203	2,796 $106,583,757	2,497 $110,418,174	3,586 $182,262,323	1,036 $56,850,403	2 $59,453				10,530 $478,870,313
40 - 44	471 $18,031,515	2,108 $76,570,069	1,877 $81,736,908	2,418 $114,469,141	3,027 $169,159,508	745 $44,174,827				10,646 $504,141,968
45 - 49	389 $14,953,099	1,686 $62,734,117	1,620 $66,058,527	2,097 $91,106,285	2,114 $109,484,755	2,659 $156,615,558	730 $45,775,025			11,295 $546,727,366
50 - 54	290 $10,534,910	1,294 $45,205,088	1,224 $48,237,780	1,682 $66,777,622	1,661 $75,520,771	1,600 $84,101,400	1,950 $117,205,093	92 $6,319,733	1 $42,000	9,794 $453,944,397
55 - 59	209 $7,705,441	930 $30,960,193	905 $33,547,852	1,286 $48,629,173	1,463 $60,612,756	1,532 $71,452,105	270 $14,110,195	101 $6,905,680	17 $1,112,057	6,713 $275,035,452
60 - 64	140 $4,958,429	524 $17,953,624	515 $17,596,149	764 $29,146,323	806 $33,974,313	935 $43,075,810	262 $12,455,506	77 $3,981,982	65 $5,259,877	4,088 $168,402,013
65 - 69	39 $1,628,028	181 $5,780,637	181 $7,035,349	270 $10,759,382	237 $10,791,167	268 $12,090,334	254 $12,157,565	56 $3,042,731	39 $2,766,633	1,525 $66,051,826
70+	15 $474,134	64 $1,981,572	67 $2,304,423	93 $3,298,369	71 $2,720,600	59 $2,504,744	66 $2,736,175	56 $2,481,877	32 $1,385,747	523 $19,887,641
Total	4,395 $170,624,603	18,578 $719,225,024	13,428 $579,932,561	13,301 $601,747,214	10,416 $519,132,539	7,800 $414,074,231	3,532 $204,439,559	382 $22,732,003	154 $10,566,314	71,986 $3,242,474,048

AVERAGES --- Attained Age 44.15
Service Years 10.89
Active Salary $45,043

Appendix A | **XYZ Actuarial Valuation**
Membership Data | **June 30, 2018**

XYZ MEMBERSHIP PROFILE
ACTIVE - HIGHER EDUCATION

CELLS DEPICT - MEMBER COUNT
TOTAL SALARY

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 25	109 $4,694,555	79 $2,756,332								188 $7,450,887
25 - 29	314 $14,411,301	505 $21,033,942	46 $2,125,169							865 $37,570,412
30 - 34	276 $15,920,322	629 $31,970,931	337 $17,684,268	48 $2,343,526	1 $46,029					1,291 $67,965,076
35 - 39	230 $13,993,529	526 $32,142,556	409 $24,867,875	273 $15,783,384	37 $2,424,949					1,475 $89,212,293
40 - 44	124 $7,688,914	397 $23,727,526	314 $21,149,328	276 $17,178,024	149 $9,769,134	14 $1,026,226				1,274 $80,539,152
45 - 49	94 $5,890,383	282 $17,145,060	249 $16,413,133	236 $15,632,856	152 $10,944,164	87 $6,436,692	21 $1,443,940			1,121 $73,906,228
50 - 54	82 $5,178,174	206 $13,341,687	184 $12,872,502	213 $13,783,272	111 $8,070,943	91 $6,570,443	72 $5,372,349	2 $347,138		961 $65,536,508
55 - 59	56 $3,493,305	214 $14,191,723	194 $13,160,458	210 $14,402,121	147 $10,304,420	89 $6,215,504	36 $2,921,192	14 $1,212,004	2 $159,922	962 $66,060,649
60 - 64	34 $2,439,456	152 $10,582,684	139 $9,902,230	145 $9,775,792	93 $6,748,301	67 $4,615,629	52 $4,176,697	33 $3,233,891	31 $3,088,498	746 $54,563,178
65 - 69	14 $953,855	58 $3,939,507	82 $5,717,437	72 $5,973,490	68 $5,030,281	44 $3,021,116	33 $2,604,590	37 $3,872,981	45 $5,226,663	453 $36,339,920
70+	12 $1,028,658	31 $2,090,364	29 $2,525,647	49 $3,211,529	37 $2,800,111	20 $1,363,538	21 $1,630,266	44 $4,956,764	54 $6,998,690	297 $26,605,567
Total	1,345 $75,692,453	3,079 $172,922,312	1,983 $126,418,047	1,522 $98,083,994	795 $56,138,332	412 $29,249,148	235 $18,149,034	130 $13,622,778	132 $15,473,773	9,633 $605,749,871

AVERAGES --- Attained Age 45.40
Service Years 8.31
Active Salary $62,883

Appendix A **XYZ Actuarial Valuation**
MEMBERSHIP DATA **June 30, 2018**

XYZ MEMBERSHIP PROFILE
ACTIVE - LUNCH PLAN A

CELLS DEPICT - MEMBER COUNT
TOTAL SALARY

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 25										
25 - 29										
30 - 34										
35 - 39										
40 - 44										
45 - 49										
50 - 54										
55 - 59									1 $24,426	1 $24,426
60 - 64								1 $16,378	1 $29,657	2 $46,035
65 - 69							1 $26,817			1 $26,817
70+										
Total							1 $26,817	1 $16,378	2 $54,083	4 $97,278

AVERAGES --- Attained Age 62.65
Service Years 35.33
Active Salary $24,320

XYZ MEMBERSHIP PROFILE
ACTIVE - LUNCH PLAN B

CELLS DEPICT - MEMBER COUNT / TOTAL SALARY

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 25	3 $49,957	7 $103,106								10 $153,063
25 - 29	11 $201,950	20 $353,131	2 $36,850							33 $591,931
30 - 34	13 $232,788	29 $568,773	8 $167,949	1 $17,534						51 $987,044
35 - 39	13 $243,501	33 $637,973	21 $425,866	10 $208,580	1 $31,270					78 $1,547,190
40 - 44	12 $247,705	38 $658,251	20 $342,065	15 $335,345	5 $119,116	1 $16,564				91 $1,719,046
45 - 49	17 $374,832	34 $637,744	31 $638,718	33 $659,901	9 $200,433	4 $103,958	1 $18,108			129 $2,633,694
50 - 54	21 $384,148	58 $1,001,767	59 $1,060,961	50 $1,083,167	48 $1,017,482	22 $542,864	5 $117,845	4 $119,610		267 $5,327,844
55 - 59	14 $283,599	56 $1,035,954	45 $814,164	43 $804,823	47 $920,831	45 $995,190	24 $534,170	2 $67,175	1 $25,187	277 $5,481,093
60 - 64	8 $163,541	38 $693,148	46 $785,515	25 $466,828	9 $190,313	16 $443,198	4 $82,113	2 $45,321	1 $22,908	149 $2,892,885
65 - 69	3 $59,587	11 $174,012	9 $151,197	10 $184,515	2 $49,028		2 $93,483	1 $14,370		38 $726,192
70+		4 $65,444	4 $69,431	4 $70,082	2 $35,717		1 $17,843			15 $258,517
Total	115 $2,241,607	328 $5,929,303	245 $4,492,716	191 $3,830,775	123 $2,564,190	88 $2,101,774	37 $863,562	9 $246,476	2 $48,095	1,138 $22,318,498

AVERAGES ---

Attained Age	51.48
Service Years	9.17
Active Salary	$19,612

XYZ MEMBERSHIP PROFILE
DROP PARTICIPANTS

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20+	Total
< 40										
40 - 44										
45 - 49	2 $55,200									2 $55,200
50 - 54	245 $10,689,876	206 $8,899,800	97 $4,282,680	5 $250,920						553 $24,123,276
55 - 59	479 $17,494,416	472 $17,468,244	408 $15,555,372	15 $712,272						1,374 $51,230,304
60 - 64	130 $2,744,604	181 $4,115,484	156 $3,526,248	6 $176,088						473 $10,562,424
65 - 69	6 $37,536	7 $51,012	2 $16,452							15 $105,000
70 - 74	1 $3,384	1 $9,024								2 $12,408
75 - 79	1 $3,420									1 $3,420
80 - 84										
85 - 89										
90+										
Total	864 $31,028,436	867 $30,543,564	663 $23,380,752	26 $1,139,280						2,420 $86,092,032

AVERAGES --- Attained Age 57.05
Years Retired 1.31
Annual Benefit $35,575

XYZ MEMBERSHIP PROFILE
ACTIVE AFTER DROP

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS
DROP BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20+	Total
< 44										
45 - 49										
50 - 54	18 $782,311 $726,564	5 $277,502 $188,268								23 $1,059,813 $914,832
55 - 59	199 $8,636,070 $7,552,716	167 $10,290,235 $6,631,116	70 $4,853,427 $3,229,764	41 $2,986,017 $1,986,156	31 $1,719,714 $1,114,992	16 $718,956 $485,664				524 $29,204,419 $21,000,408
60 - 64	158 $4,659,160 $3,522,324	144 $7,048,661 $3,728,268	127 $7,325,212 $4,286,256	120 $6,517,733 $3,881,184	81 $4,430,555 $2,757,720	288 $19,232,055 $11,130,240	8 $455,566 $236,448			926 $49,668,942 $29,542,440
65 - 69	8 $145,614 $44,568	6 $369,756 $139,500	47 $2,443,020 $928,392	56 $2,304,889 $940,344	61 $2,813,351 $1,258,104	258 $14,689,980 $6,946,368	100 $7,755,063 $3,538,092			536 $30,521,673 $13,795,368
70+			2 $138,179 $101,544	4 $129,306 $23,964	2 $31,908 $13,824	90 $3,991,027 $1,262,496	110 $6,771,949 $2,617,704	55 $4,667,651 $1,635,324	12 $1,226,751 $424,644	275 $16,956,771 $6,079,500
Total	383 $14,223,155 $11,846,172	322 $17,986,154 $10,687,152	246 $14,759,838 $8,545,956	221 $11,937,945 $6,831,648	175 $8,995,528 $5,144,640	652 $38,632,018 $19,824,768	218 $14,982,578 $6,392,244	55 $4,667,651 $1,635,324	12 $1,226,751 $424,644	2284 $127,411,618 $71,332,548

AVERAGES ...

Attained Age	63 92
Post Drop Years	4 88
Active Salary	$55,784
Annual Benefit	$31,231

Appendix A **XYZ Actuarial Valuation**
MEMBERSHIP DATA **June 30, 2018**

XYZ MEMBERSHIP PROFILE
REGULAR RETIREES

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20+	Total
< 40										
40 - 44	34 $774,084	21 $426,432	8 $142,392	2 $50,592						65 $1,393,500
45 - 49	96 $2,320,416	97 $2,389,056	80 $1,723,836	60 $1,374,888	66 $1,365,948	105 $2,172,096				504 $11,346,240
50 - 54	163 $5,671,224	128 $3,902,052	111 $3,087,792	110 $2,831,784	105 $2,419,272	384 $8,641,212	69 $1,098,600	2 $19,836	1 $1,416	1,073 $27,673,188
55 - 59	624 $21,840,732	565 $21,444,948	434 $16,160,544	433 $15,779,796	377 $13,078,344	713 $20,497,548	381 $6,922,632	117 $1,526,388	1 $8,028	3,645 $117,258,960
60 - 64	823 $21,991,236	916 $25,185,432	871 $25,954,992	882 $27,922,668	1,091 $36,474,156	3,644 $126,916,368	1,158 $25,419,156	641 $9,000,204	239 $2,486,160	10,265 $301,350,372
65 - 69	485 $12,287,376	603 $16,196,376	742 $20,586,696	813 $22,036,248	970 $26,891,376	5,236 $158,813,700	4,752 $149,243,916	1,034 $21,130,272	1,020 $13,644,552	15,655 $440,830,512
70 - 74	126 $3,966,156	188 $6,103,428	216 $5,797,356	296 $8,990,448	380 $11,285,160	2,913 $82,010,412	4,872 $131,429,088	3,173 $90,313,872	1,511 $23,998,668	13,675 $363,894,588
75 - 79	42 $989,532	57 $1,826,556	61 $2,247,612	85 $2,442,396	88 $3,099,816	821 $25,148,232	2,175 $53,531,148	3,280 $81,307,716	3,136 $75,739,980	9,745 $246,332,988
80 - 84	6 $190,212	9 $177,108	9 $441,108	21 $648,156	18 $438,372	176 $6,273,624	603 $17,623,752	1,455 $33,862,536	4,119 $95,222,604	6,416 $154,877,472
85 - 89	3 $228,624		1 $13,740	7 $287,664	4 $82,680	42 $1,368,384	121 $4,050,456	365 $9,568,740	3,281 $70,384,020	3,824 $85,984,308
90+						7 $375,084	16 $515,220	43 $1,382,004	1,827 $33,095,268	1,893 $35,367,576
Total	2,402 $70,259,592	2,584 $77,651,388	2,533 $76,156,068	2,709 $82,364,640	3,099 $95,135,124	14,041 $432,216,660	14,147 $389,833,968	10,110 $248,111,568	15,135 $314,580,696	66,760 $1,786,309,704

AVERAGES --- Attained Age 71.54
Years Retired 13.34
Annual Benefit $26,757

XYZ MEMBERSHIP PROFILE
DISABILITY RETIREES

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20+	Total
< 40	6 $98,760	9 $159,024	11 $159,984	5 $85,788	2 $33,396	5 $70,908				38 $607,860
40 - 44	12 $287,208	16 $307,008	10 $190,956	7 $112,128	12 $244,008	27 $419,868	5 $55,248			89 $1,616,424
45 - 49	19 $432,216	19 $437,184	28 $699,888	22 $530,400	17 $337,560	40 $727,704	22 $257,400	7 $61,044	1 $9,528	175 $3,492,924
50 - 54	26 $446,196	45 $768,324	37 $613,296	37 $790,344	23 $396,432	93 $1,693,728	51 $633,228	21 $215,880	8 $71,520	341 $5,628,948
55 - 59	34 $532,776	41 $583,212	61 $1,006,848	42 $632,760	27 $427,236	150 $2,295,672	77 $950,916	62 $623,244	34 $357,288	528 $7,409,952
60 - 64	16 $240,972	33 $472,668	37 $511,404	34 $519,708	48 $718,416	173 $2,488,512	166 $2,066,016	136 $1,614,888	102 $962,832	745 $9,595,416
65 - 69	2 $18,072	10 $136,620	11 $130,044	15 $227,160	14 $232,308	136 $2,033,148	220 $2,678,052	149 $1,636,560	223 $2,724,552	780 $9,816,516
70 - 74	1 $13,500	4 $54,588	3 $46,632	9 $136,116	2 $30,840	38 $544,068	153 $1,812,288	193 $1,957,188	280 $3,041,256	683 $7,636,476
75 - 79	1 $5,256					5 $76,536	18 $245,652	110 $1,118,760	325 $3,277,140	459 $4,723,344
80 - 84		1 $10,428			1 $11,484		5 $43,728	17 $169,620	234 $2,333,508	258 $2,568,768
85 - 89							1 $6,456	2 $12,600	107 $1,146,372	110 $1,165,428
90+								1 $8,820	41 $403,956	42 $412,776
Total	117 $2,074,956	178 $2,929,056	198 $3,359,052	171 $3,034,404	146 $2,431,680	667 $10,350,144	718 $8,748,984	698 $7,418,604	1,355 $14,327,952	4,248 $54,674,832

AVERAGES ---

Attained Age	66.12
Years Retired	15.41
Annual Benefit	$12,871

XYZ MEMBERSHIP PROFILE
SURVIVOR BENEFITS

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20+	Total
< 40	23 $255,168	40 $539,244	36 $344,040	35 $353,004	28 $351,660	86 $901,176	45 $478,260	19 $132,312	5 $58,512	317 $3,413,376
40 - 44	16 $180,648	9 $72,192	7 $91,344	6 $63,540	6 $88,596	35 $527,892	18 $266,280	9 $116,772	4 $46,884	110 $1,454,148
45 - 49	18 $290,556	22 $290,724	22 $325,716	18 $202,584	18 $206,112	61 $876,696	41 $538,920	20 $232,020	19 $220,884	239 $3,184,212
50 - 54	16 $305,544	22 $344,172	18 $274,392	21 $278,364	19 $215,628	68 $1,131,852	51 $520,560	36 $508,200	24 $276,264	275 $3,854,976
55 - 59	28 $494,316	28 $526,908	31 $571,368	20 $355,956	21 $309,324	103 $1,413,636	69 $878,244	51 $649,848	35 $560,520	386 $5,760,120
60 - 64	33 $815,508	45 $1,004,604	38 $731,520	38 $934,164	50 $950,388	175 $3,008,604	103 $1,914,024	58 $771,900	71 $814,764	611 $10,945,476
65 - 69	65 $1,779,564	55 $1,402,428	59 $1,583,532	52 $1,250,952	56 $1,797,024	221 $5,432,520	126 $2,742,552	97 $1,775,592	120 $1,606,644	851 $19,370,808
70 - 74	85 $2,221,644	83 $2,292,060	61 $1,785,396	78 $1,745,376	67 $1,827,828	242 $5,406,144	193 $4,365,000	135 $2,808,912	173 $2,545,116	1,117 $24,997,476
75 - 79	80 $2,002,248	91 $2,211,000	73 $1,838,664	58 $1,553,376	64 $1,648,680	248 $5,985,672	184 $4,030,524	132 $2,950,404	234 $4,126,140	1,164 $26,346,708
80 - 84	58 $1,459,896	71 $1,691,748	80 $1,728,972	68 $1,633,920	65 $1,646,508	224 $5,062,524	206 $4,341,768	136 $2,797,416	261 $4,514,532	1,169 $24,877,284
85 - 89	35 $738,132	42 $835,260	40 $610,296	33 $775,260	33 $608,424	162 $2,777,256	116 $2,389,200	88 $1,710,012	180 $3,277,188	729 $13,721,028
90+	11 $269,616	18 $282,876	16 $446,316	19 $406,692	23 $314,640	81 $1,388,580	74 $1,069,692	62 $965,808	143 $2,345,880	447 $7,490,100
Total	468 $10,812,840	526 $11,493,216	481 $10,331,556	446 $9,553,188	450 $9,964,812	1,706 $33,912,552	1,226 $23,535,024	843 $15,419,196	1,269 $20,393,328	7,415 $145,415,712

AVERAGES — Attained Age 71.44
Years Retired 11.20
Annual Benefit $19,611

XYZ MEMBERSHIP PROFILE
TERM-VESTED/RECIPROCAL

CELLS DEPICT - MEMBER COUNT
TOTAL BENEFITS

VALUATION DATE 6/30/2018

Age/Years	<1	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	Total
< 20										
20 - 24										
25 - 29			49 $301,985							49 $301,985
30 - 34		1 $4,224	563 $4,265,752	20 $252,900						584 $4,522,876
35 - 39		1 $4,491	891 $7,141,340	244 $3,523,225	11 $248,287					1,147 $10,917,343
40 - 44		4 $11,769	707 $5,553,224	344 $5,152,720	84 $1,933,924	4 $168,484				1,143 $12,820,122
45 - 49	1 $672	4 $15,352	758 $5,549,574	357 $4,911,468	124 $2,740,830	26 $821,910	4 $202,159			1,274 $14,241,965
50 - 54		6 $17,647	657 $4,542,359	345 $4,267,030	143 $2,382,943	20 $561,525	11 $438,103	1 $48,015		1,183 $12,257,621
55 - 59		6 $13,346	604 $4,221,260	420 $4,828,768	176 $2,849,317	24 $521,229	4 $91,508	2 $108,583		1,236 $12,634,010
60 - 64		2 $3,503	204 $1,213,593	120 $1,278,102	42 $547,381	13 $328,978	5 $147,235			386 $3,518,792
65 - 69	1 $388	4 $4,919	69 $374,590	30 $276,505	13 $209,890	5 $86,493	6 $163,246	1 $51,283		129 $1,167,314
70+			33 $170,066	24 $185,344	9 $72,821	6 $169,561	2 $65,390	4 $98,026	2 $66,894	80 $828,101
Total	2 $1,059	28 $75,252	4,535 $33,333,743	1,904 $24,676,062	602 $10,985,392	98 $2,658,179	32 $1,107,641	8 $305,907	2 $66,894	7,211 $73,210,128

AVERAGES --- Attained Age 47.79
Service Years 9.52
Annual Benefit $10,153

SUMMARY OF PLAN PROVISIONS

EFFECTIVE DATE:

August 1, 1936

EMPLOYER:

The State of ABC, the parish school board, the city school board, the State Board of Education, the State Board of Supervisors, University or any other agency of and within the State by which a member is paid.

ELIGIBILITY FOR PARTICIPATION:

Condition of employment for all members.

CREDITABLE SERVICE:

Service as a member while a member of the system.

ADDITIONAL SERVICE:

1. Credit for service canceled by withdrawal of accumulated contributions may be restored by member by paying the amount withdrawn plus interest.
2. Service rendered in public school system of another state may be purchased at the actuarial cost of the additional retirement benefit, or at the member's option receive service credit based on the funds actually transferred.
3. Credit for service in non-public or parochial schools may be purchased at the actuarial cost of the additional retirement benefit, or at the member's option receive service credit based on the funds actually transferred.
4. Maximum of 4 years of credit for military service may be obtained for each member, contingent on payment of actuarial cost.
5. Credit for legislative service of former member, now legislator, may be purchased at the actuarial cost.
6. Conversion of Sick Leave to Membership Service: At retirement, or at death before retirement of member with surviving spouse or dependent or both who are entitled to benefits, unused accumulated sick leave will be added to membership service. Conversion of unused sick and annual leave cannot be used to obtain retirement eligibility. Leave accumulated after January 30, 1990, can be converted to a maximum one-year service credit. Leave is converted on the following basis:

Leave Earned Prior to 6/30/88

Accumulated Sick Days	Fraction of Year Credit
25-45	0.25 year
46-90	0.50 year
91-135	0.75 year
136-180	1.00 year
181-225	1.25 years
226-270	1.50 years
271-315	1.75 years
316-360	2.00 years

Leave Earned After 6/29/88

Accumulated Sick Days (by Member Classification)				Fraction of Year Credit
9 Month	10 Month	11 Month	12 Month	
10-18	11-20	12-22	13-24	0.1
19-36	21-40	23-44	25-48	0.2
37-54	41-60	45-66	49-72	0.3
55-72	61-80	67-88	73-96	0.4
73-90	81-100	89-110	97-120	0.5
91-108	101-120	111-132	121-144	0.6
109-126	121-140	133-154	145-168	0.7
127-144	141-160	155-176	169-192	0.8
145-162	161-180	177-198	193-216	0.9
163-180	181-200	199-220	217-240	1.0

EARNABLE COMPENSATION:

The compensation earned by a member for qualifying service.

FINAL AVERAGE COMPENSATION

For members whose first employment makes them eligible for membership in a ABC state retirement system on or after January 1, 2011, the average annual earnable compensation is the highest 60 successive months of employment. The average compensation for purposes of computing benefits cannot increase more than 15% per year.

For all other members, the average annual earnable compensation is the highest 36 successive months of employment; the average compensation for purposes of computing benefits cannot increase more than 10% per year.

Per R.S.11:892, if the maximum benefit accrual (100%) is reached, employee contributions are discontinued, average final compensation is not limited to the years for which employee contributions were made. Compensation is limited by the Internal Revenue Code Section 401(a)(17) compensation limit.

Includes workmen's compensation, and PIP's program in accordance with the following:

Years of Participation	% of Earnings to be Included
3	60%
4	80%
5	100%

However, if member completed at least two years and subsequently becomes disabled, he shall receive 40% of such earnings. If he has completed one year and becomes disabled, he shall receive 20% of such earnings.

ACCUMULATED CONTRIBUTIONS:

Sum of all amounts deducted from compensation of members.

EMPLOYEE CONTRIBUTIONS:

8% of earnable compensation. Prior to July 1, 1989, 7% of earnable compensation.

EMPLOYER CONTRIBUTIONS:

Determined in accordance with ABC Revised Statutes, Sections 11:102 and 11:102.2, which require the employer rate to be actuarially determined and set annually, based on the Public Retirement Systems' Actuarial Committee's recommendation to the Legislature.

NORMAL RETIREMENT ELIGIBILITY AND BENEFIT:

Retirement Eligibility:

1. Members whose first employment making them eligible for membership in one of the state systems occurred on or after July 1, 2015 are eligible for a regular retirement benefit at age 62 with five years of service credit. These members may also retire with an actuarial reduction with 20 years of service credit at any age.

2. Members whose first employment makes them eligible for membership in a ABC state retirement system on or after January 1, 2011 and before July 1, 2015 may retire with a 2.5% accrual rate after attaining age 60 with at least 5 years of service credit. Members are eligible for an actuarially reduced benefit with 20 years of service at any age.

3. For all other members:

   If hired on or after July 1, 1999, members are eligible for a 2.5% accrual rate at the earliest of age 60 with five years of service, age 55 with 25 years of service, or at any age with 30 years of service. Members may retire with an actuarially reduced benefit with 20 years of service at any age.

If hired before July 1, 1999, members are eligible for a 2% accrual rate at the earliest of age 60 with five years of service, or at any age with 20 years of service and are eligible for a 2.5% accrual rate at the earliest of age 65 with 20 years of service, age 55 with 25 years of service, or at any age with 30 years of service.

Benefit:

Annuity which shall be the actuarial equivalent of accumulated employee contributions at retirement date, and annual pension, which, together with annuity, provides total allowance equal to the applicable accrual rate times final average compensation times years of creditable service (including unused sick leave). Members hired before June 30, 1986 receive an additional $300 annual supplemental benefit (Act 608 of 1986).

1. Annual benefit may not exceed 100% of average earnable compensation.

2. For Members employed on or after July 1, 1999, the annual pension cannot exceed the maximum benefit provided under Section 415(b) of the Internal Revenue Code and related Federal Regulations as adjusted for inflation and form of benefit other than life annuity or qualified joint and survivor annuity.

POST RETIREMENT INCREASES:

The provisions regarding future permanent benefit increases (PBIs) were substantially changed by Act 399 of 2014. PBIs may be granted, if requested by the Board and approved with a two-thirds vote of both houses of the legislature, provided there are sufficient funds in the Experience Account to fully fund the increase on an actuarial basis.

Experience Account Credits/Debits: After allocation of the first $200,000,000 to the unfunded accrued liability, the Experience Account is credited with up to 50% of the remaining excess investment income, up to a maximum balance as described below. The $200,000,000 threshold is indexed based upon the increase in the actuarial value of assets. Excess investment income is investment income for the prior fiscal year in excess of the expected income based on the actuarial valuation rate for that fiscal year. Balances in the Experience Account accrue interest at the actuarial rate of return during the prior year. All credits are limited as follows:

If the system's funded ratio is less than 80%, the Experience Account is limited to the reserve necessary to grant one PBI. If the funded ratio is at least 80%, the Experience Account is limited to the reserve necessary to fund two PBI's. The Experience Account is debited for the increase in actuarial accrued liability resulting from the increases.

Permanent Benefit Increases: No increase can be granted if the legislature granted an increase in the preceding fiscal year, unless the system is 85% funded or greater. Additionally, PBIs are limited to the lesser of the increase in the Consumer Price Index, U.S. city average for all urban consumers (CPI-U) for the twelve-month period ending on the system's valuation date, or by a percentage increase determined by the system's funded ratio:

Funded Ratio	PBI Increase Limit
< 55%	0%
55% to <65%	1.5%
65% to <75%	2.0%
75% to <80%	2.5%
80% +	3.0%

Beginning July 1, 2015, any increase is limited to the first $60,000 of a retiree's annual benefit, increased annually by the CPI-U for the 12-month period ending in June. If the actuarial rate of return for the prior plan year is less than 8.25%, regardless of the discount rate, the increase is limited to the lesser of 2% or the amount described above.

Eligibility Requirements: Benefits are restricted to those retirees who have attained age 60 and have been retired for at least one year. The minimum age of 60 for the receipt of a benefit increase does not apply to disability retirees.

DISABILITY RETIREMENT:

Eligibility:

Members whose first employment makes them eligible for membership in a ABC state retirement system on or after January 1, 2011 are eligible with 10 years of service credit. All other members are eligible with 5 years of service; certification of disability by medical board (medical examination required once in every year for the first 5 years of disability retirement, and once in every 3 years thereafter, until age 60 if first employment making member eligible for membership in a state retirement system occurred before July 1, 2015 or until age 62 otherwise).

Benefit: Act 572 of 1995

1. If ineligible for service retirement at disability, disability pension will be 2.5% of average compensation multiplied by years of service. Benefit is limited to 50% of average compensation and will not be less than the lesser of 40% of the state minimum salary for a beginning member with a bachelor's degree or 75% of average compensation.

2. Additional 50% of member's benefit payable if minor child is present, but total amount to family limited to 75% of final average compensation.

3. Member will become a regular retiree upon attainment of the earliest age for retirement eligibility as if the member continued in service, without further change in compensation. Benefit is based on years of creditable service but not less than the disability benefit. Benefit for minor children continue as long as the retiree has a minor child.

4. Upon death of a disability retiree, surviving spouse, married to retiree at least two years prior to death of the disability retiree, shall receive 75% of disability benefit. Upon death of an unmarried retiree with minor children, the benefit shall equal 50% of disability benefit.

5. Upon recovery of disability as determined by the board of trustees, upon advice of the medical board, members returning to active membership for at least three years, starting no later than one year after recovery, shall be credited with one year of service for each year disabled for purposes of establishing benefit eligibility, but not for computation of benefits.

SURVIVOR'S BENEFITS:

Eligibility and Benefit:

1. Surviving Spouse with minor children of an active member with 5 years of service with at least 2 years earned immediately prior to death; or a member with 20 years of service regardless of when earned or whether in active service at time of death will receive the greater of:

A.) $600 per month, or

B.) 50% of benefit that would have been payable upon service retirement at age 60 had member continued in service to age 60 without change in compensation. 50% of spouse's benefit payable for each minor child (up to two), with total benefit to family at least equal to the Option 2 accrued benefit based on actual service credit. Benefits to spouse cease upon remarriage and resume upon subsequent divorce or death of new spouse; however, if the member was eligible to retire or had reached age 55 on the date of his death, benefits shall not cease upon remarriage. When minor children are no longer present and the deceased member had at least 10 years of service, the spouse's benefit reverts to the Option 2 retirement benefit for the eligible spouse. If a deceased member had less than 10 years, then the spouse will receive a refund of any remaining member contributions and monthly survivor benefits will cease.

2. Surviving Spouse without minor children of an active member with 10 years of creditable service will receive the greater of:

   A.) $600 per month, or

   B.) Option 2 equivalent of accrued benefit based on actual service. Spouse's benefit payable for life. Benefits to spouse cease upon remarriage and resume upon subsequent divorce or death of new spouse; however, if the member was eligible to retire on the date of his death, benefits shall not cease upon remarriage.

3. Beneficiaries not eligible for survivor benefits described above will receive a lump-sum refund of the member's accumulated contributions.

REFUND OF CONTRIBUTIONS:

Members who terminate employment in all positions eligible for XYZ membership are entitled to a full refund of member contributions. If membership ceases due to death prior to retirement, accumulated member contributions are returnable to a designated beneficiary, if any; or to the member's estate.

TERMINATION WITH VESTED SERVICE:

Any member with credit for 5 years of service who withdraws from service may elect to leave accumulated contributions in system until age 60, when he may apply for retirement and begin receiving a retirement benefit based on the credits he had at date of withdrawal.

OPTIONAL FORMS OF BENEFIT:

In lieu of receiving normal retirement benefit, member may elect to receive actuarial equivalent of retirement allowance in a reduced form as follows:

<u>Option 1</u> - If a member dies before receiving present value of annuity in monthly payments, balance paid to designated beneficiary.

<u>Option 2</u> - Reduced retirement allowance, if member dies, to be continued to designated beneficiary for his lifetime.

<u>Option 3</u> - One-half of reduced retirement allowance, if member dies, to be continued to designated beneficiary for his lifetime.

<u>Option 4</u> - Other benefits of equal actuarial value may be elected with approval of the Board of Trustees.

Options 2A, 3A, 4A - Same as Options 2, 3, and 4, except that reduced benefit reverts to maximum if beneficiary predeceases retiree.

Automatic COLA Option – Members may choose an irrevocable election at retirement to receive an actuarially reduced benefit which increases 2.5% annually. The increase begins on the first retirement anniversary date, but not before the retiree attains age 55 or would have attained age 55 in the case of a surviving spouse. This option can be chosen in combination with the above options. (Per Act 270 of 2009, effective July 1, 2009.)

Initial Lump Sum Benefit Option - Members who did not participate in DROP may elect an actuarially reduced pension and receive a lump-sum equal to not more than 36 months of the maximum monthly pension.

DEFERRED RETIREMENT OPTION PLAN:

Instead of terminating employees and accepting a service retirement allowance, any member who has met the eligibility requirements described below may elect to participate in the Deferred Retirement Option Plan (DROP).

Normal Eligibility:

Members whose first employment making him eligible for membership in one of the state retirement systems occurred on or before December 31, 2010, and who is not covered by Lunch Plan A or Lunch Plan B and who has 30 years of service (YOS) at any age, 25 YOS at 55, or 20 YOS (exclusive of military service other than qualified military service as provided in 26 U.S.C. 414(u) earned on or after December 12, 1994), and is at least age 65 may elect to participate in DROP. A member with 10 YOS, exclusive of military service other than qualified military service as provided in 26 U.S.C. 414(u) earned on or after December 12, 1994, and who is at least age 60 may elect to participate in DROP, but all benefits payable at any time shall be calculated using only a 2% benefit formula.

Members whose first employment making him eligible for membership in one of the state retirement systems occurred between January 1, 2011 and June 30, 2015, and not in Lunch Plan A or Lunch Plan B, and who has 5 years of service at age 60 may participate in DROP.

Members whose first employment making him eligible for membership in one of the state retirement systems occurred on or before June 30, 2015, who has 30 years of service at age 55 or 10 years of service at age 60 may participate in DROP.

Members whose first employment making him eligible for membership in one of the state retirement systems occurred on or after July 1, 2015, who has at least 5 years of service at age 60 may participate in DROP.

An election to participate may only be made once, for a period not to exceed three years beginning within 60 days of reaching the eligibility described above.

Benefit:

Upon termination of employment, a participant will receive, at his option:

(1) Lump sum payment (equal to the payments to the account)
(2) A true annuity based upon his account, or
(3) Other methods of payment approved by the Board of Trustees.

If a participant dies during the period of participation in the program, his account balance shall be paid to the beneficiary, or if none, to his estate in any form approved by the Board of Trustees.

If employment is not terminated at the end of DROP participation, payments into the account cease and account earns interest. The participant resumes active contributing membership and earns an additional retirement benefit based on additional service rendered. The method of computation of the additional benefit is subject to the following:

(1) If additional service was less than the period used to determine Final Average Compensation, average compensation figure to calculate the additional benefit will be the same as used to calculate initial benefit.
(2) If additional service was earned for a period greater than the number of months used to determine Final Average Compensation, the average compensation figure used to calculate the additional benefit will be based on compensation during the period of additional service.

DROP Accounts established prior to January 1, 2004, earn interest following termination of DROP at a rate 0.5% below the actuarial rate of the System's investment portfolio. DROP accounts established on or after January 1, 2004 are credited with money market rates.

DESCRIPTION OF BENEFITS FOR MERGED LSU EMPLOYEES

GENERAL:

Eligibility for benefits is based on the eligibility requirements of the Members' plan, except for deaths and disabilities before 1984. All service, funded and non-funded, is used in determining eligibility.

Final Average Salary was the average of the three highest years, except for academic year employees who retired within three years after January 1, 1979. For this group, any salary used in the Final Average Salary calculation, which was earned before January 1, 1979, was increased by 2/9ths.

The Social Security breakpoint average, for service under the funded LSU plan, was frozen at the December 31, 1978 level. That is, the breakpoint average for funded service was calculated as of December 31, 1978 and kept constant. This produced the following breakpoint averages:

Social Security Breakpoint Average
(for LSU funded service)

Calendar Year of Entry	Breakpoint Average
1971 or before	13,400
1972	13,800
1973	14,600
1974	15,360
1975	15,900
1976	16,500
1977	17,100
1978	17,700

RETIREMENT BENEFITS:

Retirement benefits are calculated using LSU funded service with the LSU formula and service after December 31, 1978, with the Teacher's formula. Thus, the "funded" benefit is the sum of (1) 1.33% of final average salary under the Social Security breakpoint average plus 2.5% of final average salary over the Social Security breakpoint average, times years of "funded" service with LSU before December 31, 1978; (2) 2.5% (or 2% if total service less than 20 years) of final average salary for years since January 1, 1979; and (3) $300.

SURVIVOR'S BENEFITS:

For deaths after 1983, the provisions of the Members' plan apply. However, the benefit is calculated using all service, funded and non-funded, then prorated by service between the funded and non-funded portions. Children's benefits are also prorated into the funded and non-funded portions.

DISABILITY BENEFITS:

For disabilities after 1983, the provisions of the Members' plan apply. However, the benefit is calculated using all service, then prorating by service between the funded and non-funded portions. Children's benefits are also prorated.

VESTING BENEFITS:

Benefits for terminated vested members was determined as outlined under "Retirement Benefits."

REFUND OF CONTRIBUTIONS:

Terminated members are allowed a refund of accumulated contributions as described by the Members' plan.

COOPERATIVE EXTENSION PERSONNEL:

The LSU employees are eligible for the supplemental benefit described in Section 700.2 of Act 643 of 1978. The benefit is equal to 1% for the first five years of service, 3/4% for the next five years, and 1/2% thereafter. The funded benefit is the benefit based on service after September 12, 1975.

OPTIONAL FORMS OF BENEFITS:

Retiring members may elect options as described by the Members' plan.

DEFERRED RETIREMENT OPTION PLAN:

Eligible members may participate under same requirements as described by the Members' plan.

DESCRIPTION OF BENEFITS FOR MERGED SCHOOL LUNCH EMPLOYEES

EFFECTIVE DATE:

The School Lunch Employees' Retirement System was originally established on January 1, 1953.

On July 1, 1980, the School Lunch Employees' Retirement System was restructured. All individuals who become employed after July 1, 1980, shall become members of Plan A or Plan B as determined by the agreement in effect for each employer.

Plan A: Parishes which had withdrawn from Social Security coverage became known as Plan A parishes. Those participating in both the regular and the supplemental plan or only in the supplemental plan shall become members of Plan A.

Plan B: Parishes which had not withdrawn from Social Security coverage became known as Plan B parishes. Those participating only in the regular plan shall become members of Plan B.

Effective July 1, 1983 Plan A and Plan B were merged into XYZ.

CREDITABLE SERVICE:

Service as an employee while member of the system.

MILITARY SERVICE:

Maximum of 4 years of credit may be purchased.

ADDITIONAL CREDITABLE SERVICE:

Credit for service canceled by withdrawal of accumulated contributions may be restored by paying into system the amount withdrawn plus regular interest.

EMPLOYEE CONTRIBUTIONS:

Plan A: 9.10% of monthly earnings
Plan B: 5% of monthly earnings

EMPLOYER CONTRIBUTIONS:

Plan A and Plan B: Actuarial Required Amount (Effective July 1, 1989)

SCHOOL LUNCH PLAN A

RETIREMENT BENEFIT:

Members hired after June 30, 1983 earn regular Members benefits. The benefit description below applies to members hired prior to July 1, 1983.

NORMAL RETIREMENT:

Eligibility:

1. Age 60 and 5 years of creditable service.
2. Age 55 and 25 years of creditable service.
3. 30 years of creditable service, regardless of age.

Benefit:

3% of average final compensation times years of creditable service.

Members of only the supplemental plan prior to July 1, 1980 who were age 60 or older at the time the member's employer terminated its agreement with the Department of Health, Education and Welfare, and who became a member of the retirement system because of this termination earned 1% of average final compensation plus $2 per month for each year of service credited prior to July 1, 1980, plus 3% of average final compensation for each year of service credited after July 1, 1980.

Members hired before June 30, 1986 receive an additional $300 annual supplemental benefit.

Benefits are limited to 100% of average final compensation.

DISABILITY RETIREMENT:

Eligibility:

Five years of creditable service; certification of disability by the State Medical Disability Board.

Benefit:

Normal retirement allowance if eligible; otherwise, an amount equal to the normal retirement allowance to which the member would have been entitled had he met eligibility requirements; provided the amount is subject to a minimum of 60% and a maximum of 100% of average final compensation, in the event no optional selection is chosen.

SURVIVOR'S BENEFITS:

Eligibility:

1. Surviving spouse with minor children of a member with 5 years of service credit with at least 2 years earned immediately prior to death, or 20 years of service credit regardless of when earned or whether the deceased member was in active service at the time of death.

2. Surviving spouse with no minor children of member with 10 or more years of service credit with at least 2 years earned immediately prior to death, or 20 years of service credit regardless of when earned or whether the deceased member was in active service at the time of death.

3. Beneficiary not eligible for 1 or 2.

Benefit:

1. Greater of:

   A. $600 per month, or

   B. 50% of benefit that would have been payable upon retirement at age 60 had member continued in service to age 60 without change in compensation. 50% of spouse's benefit payable for each minor child (maximum two children), with total benefit to family at least equal to the Option 2 benefit. Accrued Benefit based on actual service credit. Benefits to spouse cease upon remarriage and will resume upon subsequent death or divorce of new spouse. When minor children are no longer present, spouse's benefit reverts to benefit in (2), if spouse is eligible for such benefit.

2. Greater of:

   A. $600 per month, or

   B. Option 2 equivalent of accrued benefit based on actual service. Surviving spouse must have been married to the deceased member at least one year prior to death. If the member had not been eligible for retirement upon date of death, benefits to spouse cease upon remarriage, and resume upon subsequent death or divorce of new spouse.

3. Return of member's accumulated contributions.

SCHOOL LUNCH PLAN B

NORMAL RETIREMENT:

Eligibility:

1. Age 60 and 5 years of creditable service.
2. Age 55 and 30 years of creditable service.

Benefit:

Annual pension which provides total allowance equal to 2% of average final compensation times years of creditable service. Members hired before June 30, 1986 receive an additional $300 annual supplemental benefit.

DISABILITY RETIREMENT:

Eligibility:

Five years of creditable service; certification of disability by the State Medical Disability Board.

Benefit:

Normal retirement allowance if eligible; otherwise 2% of average final compensation times years of creditable service; provided amount not less than 30%, nor more than 75% of average final compensation, in the event no optional selection is made.

SURVIVOR'S BENEFITS:

Eligibility: Twenty or more years of creditable service.

Benefit: Option 2 benefit.

SCHOOL LUNCH PLAN A and PLAN B

OPTIONAL FORMS OF BENEFIT:

Retiring members may elect options as described by the Members' plan.

RETURN OF CONTRIBUTIONS:

Should a member not eligible to retire cease to be an employee, he shall be paid the amount of his accumulated contributions upon demand. Should a member's death occur prior to retirement with no survivors eligible for benefits, his accumulated contributions are returnable to a designated beneficiary, if any; otherwise, to his estate.

TERMINATION WITH VESTED SERVICE:

Any member with credit for 5 years of service who withdraws from service may elect to leave accumulated contributions in system until his earliest normal retirement date, when he may apply for retirement and begin receiving a retirement benefit based on average final compensation and creditable service at date of withdrawal.

DEFERRED RETIREMENT OPTION PLAN:

Retiring members may elect options as described by the Members' plan.

FUNDING POLICY

TRSL's funding policy is established by Sections 102 and 102.2 of Title 11 of the ABC Revised Statutes. XYZ is funded by employee and employer contributions, as a percentage of payroll, plus investment earnings. The basic elements of the annual required contribution are the normal cost, which is the cost of benefits earned by current active employees that is allocated to the current year, plus amortization of the unfunded accrued liability (UAL). Act 55 of 2014, Section 1, appropriates a percentage of nonrecurring revenue in accordance with the Constitution Article VII, Section 10(D)(2)(b)(ii) and requires the funds to be used to reduce the Initial UAL (IUAL). The funds are used to reduce the Original Amortization Base (OAB), which includes the IUAL.

Per State constitutional provisions, the employer contribution rate cannot drop below 11.8%, without regard to employer credits, and without a corresponding adjustment to the employee contribution rate. Per statutory provisions, the employer contribution rate cannot drop below 15.5% until the UAL that existed on June 30, 2004 is fully funded. Amounts paid to the system due to the minimum will be accumulated in the employer credit account to be used exclusively to reduce any UAL created before July 1, 2004.

Employee contribution rates are fixed and established by statutes. Employer contributions are determined using the Entry Age Normal actuarial cost method, as required by statute, and actuarial assumptions regarding future plan experience, such as long-term expected investment rates of return, future salary increases, and demographic assumptions such as rates of retirement, termination, disability, and mortality. The actuarial assumptions utilized in this valuation can be found in Appendix D. The cost method is used to determine the normal cost, which is divided into the employee and employer portion, both expressed as a percentage of payroll. The cost method also determines the plan's total actuarial accrued liability. The UAL is determined as the total actuarial accrued liability less the plan's valuation assets, which are developed in Section II. The UAL changes annually due to gains or losses that develop as actual plan experience differs from that assumed by the actuarial assumptions, and if applicable, changes in benefits, or actuarial methods and/or assumptions. Statutes provide for the amortization of changes in the UAL.

Benefit changes resulting in an actuarial cost can only be enacted by a two-thirds vote of the legislature and must be paid within 10 years. Non-investment experience gains and losses and investment losses are amortized over 30 years with level payments. Investment gains are first allocated to the OAB and EAAB, without re-amortization, up to the $200 million threshold amounts, indexed to increases in the actuarial value of assets, beginning June 30, 2016, as required by Act 399 of 2014. By not re-amortizing, gains applied to these schedules result in earlier pay-off of these schedules. One-half of any remaining gains are credited to the Experience Account up to the statutory cap. Any remaining gains are then amortized over 30 years with level payments. Beginning in 2016, the full investment gain remaining after the allocation to the OAB and EAAB will be amortized over 30 years, and any gains credited to the Experience Account will be amortized as an offsetting loss over a 10-year period. Once the fund attains a funded ratio of 70%, future gains or losses that would have otherwise been amortized over 30 years will be amortized over 20 years. The OAB will be re-amortized with level-dollar payments to 2029 in Fiscal Year 2020/2021 or later, when such re-amortization results in annual payments that are not more than the next annual payment otherwise required. If the System is less than 80% funded, the net remaining liability of the OAB and EAAB shall be re-amortized after application of the "threshold allocations" in Fiscal Year 2019/2020 and in every fifth fiscal year thereafter. Once the system attains an 80% funded ratio, the OAB and EAAB will be re-amortized following allocations of "threshold allocations" or contribution variance surpluses.

If aggregate payroll increases at the same rate as the percentage increase in total amortization payments, the employer contribution rate attributable to the amortization payments would maintain a level percentage of payroll. If future aggregate payroll increases at a higher rate than total amortization payments, the employer contribution rate will decrease. Future total UAL amortization payments for all current schedules and the annual percentage change are shown in Appendix E.

Employers pay the full required employer contribution rate, as recommended to the legislature by the Public Retirement Systems' Actuarial Committee (PRSAC). This rate is determined as the projected actuarially determined contribution divided by the projected payroll. The actual actuarially determined contribution and actual payroll will vary from the projected amounts, resulting in a contribution variance. Per statutory requirements, contribution surpluses through Fiscal Year 2039/2040 will be allocated to the EAAB and contribution deficits will be amortized over a five-year period with level payments.

The funding policy described above is consistent with the plan accumulating adequate assets to make benefit payments when due and improving the funded status of the plan by fully amortizing the unfunded accrued liability, assuming the actuarially determined contributions will be paid when due and all actuarial assumptions will be realized.

ACTUARIAL ASSUMPTIONS AND METHODS

ACTUARIAL COST METHOD:

ABC, R.S. 11:22, prescribes the Entry Age Normal cost method for funding valuation purposes. This cost method generally produces normal costs that are level as a percentage of the member's projected pay if the composition of the active group with regard to age, sex, and service is stable. Normal costs are attributed from the first period in which a member accrues benefits through all assumed exit ages until retirement.

ASSET VALUATION:

The market value of assets is adjusted to gradually recognize investment gains and losses relative to the discount rate, over a 5-year period in 20% increments. The adjusted asset value is subject to Corridor Limits of 80% to 120% of the Market Value of Assets.

ACCOUNTING DISCLOSURE:

The Statements of Fiduciary Net Position and Changes in Fiduciary Net Position provided by the accounting staff were the final drafts prior to publication. Should these Statements differ from the final audited report, a revised actuarial valuation will be issued, but only to the extent that any difference in reporting affects the employer's contribution rate or the yield to the Actuarial Value of Assets.

ADMINISTRATIVE EXPENSES:

Prior to July 1, 2018, administrative expenses were not explicitly assumed but rather funded in accordance with ABC R.S. 11:102, which by omission of language regarding the funding of administrative expenses precludes funding of these expenses by a direct allocation through the employer contribution rate. These expenses were instead funded through the employer rate as part of the total experience gain/loss which is amortized over a 30-year period. In accordance with Actuarial Standard of Practice Statement 27, (paragraph 3.8.3.e.), the investment return assumption was reduced by 10 basis points to reflect administrative expenses that are paid from plan assets and not otherwise recognized. Therefore, these expenses and the resulting experience losses were expected to be offset by long-term investment earnings.

Act 94 of 2016 requires direct funding of administrative expenses to begin in the first fiscal year in which the projected aggregate employer contribution rate does not increase, without regard to any changes in the board-approved actuarial valuation rate. The projected aggregate employer rate for Fiscal Year 2018/2019 met the requirements provided by Act 94. Therefore, the projected funding requirements beginning with Fiscal Year 2018/2019 include expected projected administrative expenses.

POST RETIREMENT BENEFIT INCREASES:

The actuarial accrued liability includes previously granted post-retirement benefit increases. ABC law pertaining to XYZ retiree benefit increases provides for the funding of future increases by requiring the automatic transfer of a portion of excess investment earnings to the Experience Account. The law does not provide for automatic benefit increases. Many conditions must be met before an increase can be granted, as described in the Post Retirement Increases section of the Summary of Plan Provisions in Appendix B of this report. The legislature and governor have the ultimate authority as to whether a future increase will be granted. Since a portion of investment earnings will be used to fund these benefits, which are not accrued benefits of the plan, the accrued benefits are discounted using a net discount rate. The net discount rate is determined as the gross expected long-term return less investment and administrative expenses and the expected return used to provide for future retiree benefit increases. This adjustment is made in accordance with Actuarial Standards of Practice No. 27 regarding the selection of economic assumptions, which states that it is appropriate to adjust the economic assumptions to provide for plan provisions that are difficult to measure, such as gain-sharing provisions.

The adjustment for gain-sharing reflects TRSL's specific statutory provisions which require 50% of investment gains, determined using the actuarial value of assets, above the statutory threshold of $200 million, indexed to increases in the actuarial value of assets. Transfers to the Experience Account are limited based upon the maximum balance of this account, which has been significantly decreased by Act 399 of 2014. The liabilities in this report were not developed to include future ad hoc retiree benefit increases. However, the assumptions include an adjustment to recognize that investment earnings will be allocated to the Experience Account to fund potential future increases, in accordance with Actuarial Standard of Practice No. 27 (paragraph 3.5.1).

ACTUARIAL ASSUMPTIONS:

Demographic and salary assumptions used in the valuation were adopted by the Board of Trustees following the most recent experience study, effective July 1, 2018. The study was based on an observation period of July 1, 2012-June 30, 2017. The Retirement System is required to conduct an experience study every five years, but the scope of such a study is not necessarily limited to a five-year period. The experience was reviewed separately for Regular Members, Higher Education, and the School Lunch Plans (Plan A and Plan B). The experience study report, dated March 1, 2018, provides further information regarding the rationale for these assumptions. The prior and revised rate tables are illustrated at the end of this appendix.

INFLATION ASSUMPTION:

The salary and expected investment earnings were developed using a 2.50% inflation assumption, as adopted by the Board of Trustees. This rate remained unchanged following the most recent Experience Study.

DISCOUNT RATE / INVESTMENT EARNINGS:

A discount rate of 7.65% was used for the June 30, 2018 valuation. The Board adopted a plan to reduce the discount rate in 0.05% increments beginning July 1, 2017. Therefore, the discount rate was reduced from 7.70% to 7.65%. The projected contribution requirements for Fiscal Year 2019/2020 were determined using a discount rate of 7.60%. Investment manager fees are treated as a direct offset to investment income.

June 30, 2018 Funding Valuation Assumptions: The discount rate for funding purposes reflects the assumed investment rate of return, net of investment expenses, and net of investment gains expected to be allocated to the Experience Account to fund future permanent benefit increases. Therefore, by excluding returns expected to be used for purposes other than funding plan benefits, the discount rate represents the expected returns to be used to fund regular plan benefits.

A long-term (30-year) average of approximately 40 basis points is assumed to be transferred to the Experience Account annually. Therefore, the gross expected return inherent in the valuation, which is the sum of the discount rate and investment returns expected to be allocated to the experience account, is 8.05%. The expected return inherent in the valuation is supported by capital market assumptions provided by the Board's investment consultants and by the average expected returns provided in the Horizon Actuarial Services Survey of Capital Market Assumptions, 2018 edition.

June 30, 2018 GASB Assumptions: A discount rate of 7.65% is used for GASB reporting purposes. Section IV of this report provides expected real rates of return by asset class. Using an inflation assumption of 2.50%, the corresponding long-term nominal rate of return is 8.07%, which supports the 7.65% long-term expected rate of return used for GASB reporting purposes.

MORTALITY ASSUMPTIONS:

The mortality tables for active, non-disabled retirees, and disabled retirees, were revised effective June 30, 2018, based on the most recent experience study.

Active Members Mortality Table: RP-2014 White Collar Employee tables for males and females, adjusted by 1.010 for males and by 0.997 for females.

Non-Disabled Retiree/Inactive Members: RP-2014 White Collar Healthy Annuitant tables for males and females, adjusted by 1.366 for males and by 1.189 for females.

Disability Retiree Mortality: RP-2014 Disability tables for males and females, adjusted by factors of 1.111 for males and by 1.134 for females.

The base tables for active members, non-disabled retirees, and disabled retirees are adjusted from 2014 to 2018 using the MP-2017 generational improvement table, with continued future mortality improvement projected using the MP-2017 generational mortality improvement tables.

DISABILITY ASSUMPTION:

Rates for total and permanent disability are based on attained age and were revised effective June 30, 2018, based on the most recent experience study.

RETIREMENT/DROP ASSUMPTION:

Eligibility for normal retirement benefits and DROP participation is based on age and service requirements that vary by plan. Retirement and DROP rates are developed in combination and include an age and service component. The rates were revised effective June 30, 2018, based on the most recent experience study.

TERMINATION ASSUMPTIONS:

Voluntary termination or withdrawal rates were revised effective June 30, 2018, based on the most recent experience study. Rates for Regular Members and Higher Education members are based on a combination of age and service. Rates for Lunch Plans A and B are based on service. For members terminating with vested benefits, it is assumed that 20% will elect to withdraw their accumulated employee contribution, and 80% will receive a benefit beginning at age 60.

SALARY GROWTH:

The rates of annual salary growth are based upon the member's years of service were revised effective June 30, 2018, based on the most recent experience study. The rates were developed as the inflation assumption plus the assumed real rates of wage growth, which include increases due to promotion and longevity (often called merit increases) which are generally service related. For valuation purposes, current salaries and projected future salaries are limited to the Section 401(a)(17) limit of the Internal Revenue Code, with future indexed increases.

CONVERTED LEAVE:

Converted Leave is assumed to increase the accrued benefit at retirement according to the following table, based on the most recent experience study. The reduction from the prior rates for regular Members and the lunch plans to current rates shown below is due to statutory limits placed on the amount of leave earned after June 30, 1990 that can be converted to service credit. In the most recent experience study, higher education experience was reviewed independently from regular Members. The study showed that higher education members convert significantly more leave to service credit at retirement.

	Prior Rates	Current Rates
Regular Members	1.5%	0.9%
Higher Education	1.5%	3.0%
Lunch Plans A & B	1.0%	0.9%

FAMILY STATISTICS:

The composition of the family is based on Current Population Reports published by the United States Census Bureau. Seventy-five percent of the membership is assumed to be married with the wife assumed to be three (3) years younger than the husband. Sample rates are as follows:

Member Age	Number of Minor Children	Years for Youngest Child to Attain Majority
25	1.2	17
30	1.4	15
35	1.7	13
40	1.7	10
45	1.4	8
50	1.1	4

Prior Actuarial Assumptions,
effective July 1, 2013 Regular Members

	DEATH RATES			TERMINATION RATES				RETIREMENT/DROP RATES				
AGE	MALE	FEMALE	DISABILITY RATES	< 1 YEAR	1-2 YEARS	2-3 YEARS	4+ YEARS	< 25 YOS	25-29 YOS	30+ YOS	DUR	SALARY INCREASE
18	0.00020	0.00013	0.0000	0.200	0.200	0.095	0.180	0.000	0.000	0.000	0	0.0575
19	0.00021	0.00013	0.0000	0.200	0.200	0.095	0.180	0.000	0.000	0.000	1	0.0575
20	0.00021	0.00013	0.0000	0.200	0.200	0.095	0.180	0.000	0.000	0.000	2	0.0575
21	0.00023	0.00013	0.0000	0.200	0.200	0.095	0.180	0.000	0.000	0.000	3	0.0575
22	0.00024	0.00013	0.0000	0.200	0.200	0.095	0.180	0.000	0.000	0.000	4	0.0575
23	0.00026	0.00013	0.0001	0.200	0.200	0.095	0.180	0.000	0.000	0.000	5	0.0500
24	0.00027	0.00014	0.0001	0.200	0.200	0.095	0.180	0.000	0.000	0.000	6	0.0500
25	0.00029	0.00015	0.0001	0.180	0.126	0.095	0.090	0.000	0.000	0.000	7	0.0500
26	0.00033	0.00016	0.0001	0.180	0.126	0.095	0.060	0.000	0.000	0.000	8	0.0500
27	0.00034	0.00017	0.0001	0.190	0.126	0.095	0.060	0.000	0.000	0.000	9	0.0500
28	0.00035	0.00017	0.0001	0.190	0.126	0.095	0.055	0.000	0.000	0.000	10	0.0475
29	0.00036	0.00018	0.0001	0.190	0.126	0.095	0.053	0.000	0.000	0.000	11	0.0475
30	0.00039	0.00021	0.0001	0.190	0.120	0.109	0.053	0.000	0.000	0.000	12	0.0475
31	0.00044	0.00025	0.0003	0.190	0.120	0.109	0.050	0.000	0.000	0.000	13	0.0475
32	0.00050	0.00029	0.0003	0.190	0.120	0.109	0.045	0.000	0.000	0.000	14	0.0475
33	0.00056	0.00031	0.0003	0.190	0.120	0.109	0.045	0.000	0.000	0.000	15	0.0450
34	0.00062	0.00034	0.0003	0.190	0.120	0.109	0.045	0.000	0.000	0.000	16	0.0450
35	0.00068	0.00036	0.0006	0.180	0.117	0.095	0.040	0.000	0.000	0.000	17	0.0450
36	0.00074	0.00038	0.0010	0.180	0.117	0.095	0.040	0.000	0.000	0.000	18	0.0450
37	0.00080	0.00040	0.0007	0.180	0.117	0.095	0.040	0.000	0.000	0.000	19	0.0450
38	0.00083	0.00042	0.0007	0.180	0.117	0.095	0.040	0.050	0.000	0.000	20	0.0400
39	0.00086	0.00044	0.0011	0.180	0.117	0.095	0.040	0.040	0.000	0.000	21	0.0400
40	0.00088	0.00048	0.0011	0.165	0.123	0.090	0.037	0.040	0.000	0.000	22	0.0400
41	0.00091	0.00053	0.0013	0.165	0.123	0.090	0.037	0.025	0.000	0.000	23	0.0400
42	0.00095	0.00058	0.0016	0.165	0.123	0.090	0.037	0.025	0.000	0.000	24	0.0400
43	0.00099	0.00064	0.0016	0.165	0.123	0.090	0.037	0.025	0.000	0.000	25	0.0375
44	0.00103	0.00071	0.0016	0.165	0.123	0.090	0.040	0.025	0.000	0.000	26	0.0375
45	0.00109	0.00075	0.0022	0.163	0.099	0.090	0.040	0.025	0.020	0.000	27	0.0375
46	0.00114	0.00080	0.0022	0.163	0.099	0.090	0.040	0.025	0.020	0.000	28	0.0375
47	0.00119	0.00084	0.0022	0.163	0.099	0.090	0.040	0.025	0.020	0.000	29	0.0375
48	0.00124	0.00091	0.0022	0.163	0.099	0.090	0.040	0.030	0.020	0.700	30	0.0425
49	0.00130	0.00098	0.0022	0.163	0.099	0.090	0.040	0.030	0.020	0.600	31	0.0425
50	0.00136	0.00109	0.0025	0.175	0.112	0.090	0.040	0.030	0.050	0.300	32	0.0425
51	0.00152	0.00124	0.0025	0.175	0.112	0.090	0.040	0.030	0.170	0.600	33	0.0425
52	0.00161	0.00142	0.0025	0.175	0.112	0.090	0.040	0.030	0.280	0.600	34	0.0425
53	0.00176	0.00163	0.0030	0.175	0.112	0.090	0.040	0.100	0.280	0.500	35	0.0425
54	0.00193	0.00189	0.0030	0.175	0.112	0.090	0.040	0.150	0.450	0.400	36	0.0425
55	0.00224	0.00222	0.0040	0.175	0.106	0.090	0.040	0.150	0.750	0.300	37	0.0425
56	0.00267	0.00266	0.0050	0.175	0.106	0.090	0.040	0.150	0.330	0.200	38	0.0425
57	0.00306	0.00307	0.0055	0.155	0.106	0.090	0.040	0.150	0.250	0.200	39	0.0425
58	0.00352	0.00346	0.0055	0.200	0.106	0.090	0.040	0.250	0.250	0.200	40	0.0425
59	0.00397	0.00392	0.0055	0.200	0.106	0.090	0.040	0.250	0.300	0.200	41	0.0425
60	0.00451	0.00446	0.0055	0.200	0.106	0.090	0.040	0.250	0.300	0.200	42	0.0425
61	0.00526	0.00513	0.0050	0.200	0.106	0.090	0.040	0.150	0.300	0.200	43	0.0425
62	0.00600	0.00587	0.0050	0.200	0.106	0.090	0.040	0.150	0.220	0.250	44	0.0425
63	0.00704	0.00675	0.0050	0.200	0.106	0.090	0.040	0.150	0.170	0.150	45	0.0425
64	0.00793	0.00760	0.0035	0.200	0.106	0.090	0.040	0.200	0.200	0.300	46	0.0425
65	0.00895	0.00856	0.0035	0.200	0.106	0.090	0.040	0.200	0.200	0.300	47	0.0425
66	0.01039	0.00966	0.0020	0.200	0.106	0.090	0.040	0.200	0.200	0.300	48	0.0425
67	0.01159	0.01073	0.0020	0.200	0.106	0.090	0.040	0.200	0.200	0.200	49	0.0425
68	0.01256	0.01186	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.300	50	0.0425
69	0.01392	0.01311	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.300	51	0.0425
70	0.01522	0.01477	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.400	52	0.0425
71	0.01684	0.01598	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.200	53	0.0425
72	0.01870	0.01778	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.250	54	0.0425
73	0.02083	0.01927	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.250	55	0.0425
74	0.02323	0.02136	0.0020	0.200	0.106	0.090	0.040	0.200	0.300	0.250	56	0.0425

Prior Actuarial Assumptions, effective July 1, 2013
Higher Education

	DEATH RATES		DISABILITY RATES	TERMINATION RATES				RETIREMENT/DROP RATES				SALARY INCREASE
AGE	MALE	FEMALE		< 1 YEAR	1-2 YEARS	2-3 YEARS	4+ YEARS	< 25 YOS	25-29 YOS	30+ YOS	DUR	
18	0.00020	0.00013	0.0000	0.250	0.250	0.170	0.120	0.000	0.000	0.000	0	0.100
19	0.00021	0.00013	0.0000	0.250	0.250	0.170	0.120	0.000	0.000	0.000	1	0.100
20	0.00021	0.00013	0.0000	0.250	0.250	0.170	0.120	0.000	0.000	0.000	2	0.090
21	0.00023	0.00013	0.0000	0.250	0.250	0.170	0.120	0.000	0.000	0.000	3	0.080
22	0.00024	0.00013	0.0000	0.250	0.250	0.170	0.120	0.000	0.000	0.000	4	0.040
23	0.00026	0.00013	0.0001	0.250	0.250	0.170	0.120	0.000	0.000	0.000	5	0.070
24	0.00027	0.00014	0.0001	0.250	0.250	0.170	0.120	0.000	0.000	0.000	6	0.050
25	0.00029	0.00015	0.0001	0.250	0.250	0.170	0.120	0.000	0.000	0.000	7	0.070
26	0.00033	0.00016	0.0001	0.210	0.250	0.170	0.120	0.000	0.000	0.000	8	0.070
27	0.00034	0.00017	0.0001	0.210	0.220	0.170	0.120	0.000	0.000	0.000	9	0.045
28	0.00035	0.00017	0.0001	0.220	0.220	0.170	0.120	0.000	0.000	0.000	10	0.045
29	0.00036	0.00018	0.0001	0.240	0.220	0.170	0.120	0.000	0.000	0.000	11	0.045
30	0.00039	0.00021	0.0001	0.250	0.160	0.170	0.180	0.000	0.000	0.000	12	0.045
31	0.00044	0.00025	0.0001	0.220	0.178	0.170	0.100	0.000	0.000	0.000	13	0.045
32	0.00050	0.00029	0.0001	0.220	0.190	0.160	0.100	0.000	0.000	0.000	14	0.040
33	0.00056	0.00031	0.0001	0.190	0.170	0.150	0.120	0.000	0.000	0.000	15	0.040
34	0.00062	0.00034	0.0001	0.230	0.155	0.100	0.120	0.000	0.000	0.000	16	0.040
35	0.00068	0.00036	0.0001	0.220	0.175	0.130	0.120	0.000	0.000	0.000	17	0.040
36	0.00074	0.00038	0.0001	0.220	0.160	0.150	0.120	0.000	0.000	0.000	18	0.040
37	0.00080	0.00040	0.0001	0.220	0.108	0.150	0.120	0.000	0.000	0.000	19	0.040
38	0.00083	0.00042	0.0001	0.190	0.180	0.150	0.100	0.100	0.080	0.600	20	0.040
39	0.00086	0.00044	0.0001	0.190	0.140	0.150	0.100	0.100	0.080	0.600	21	0.040
40	0.00088	0.00048	0.0001	0.230	0.185	0.150	0.100	0.100	0.080	0.600	22	0.040
41	0.00091	0.00053	0.0001	0.165	0.108	0.150	0.100	0.100	0.080	0.600	23	0.040
42	0.00095	0.00058	0.0001	0.230	0.115	0.150	0.100	0.100	0.080	0.600	24	0.040
43	0.00099	0.00064	0.0001	0.155	0.168	0.150	0.100	0.070	0.080	0.600	25	0.040
44	0.00103	0.00071	0.0001	0.195	0.135	0.150	0.100	0.070	0.080	0.600	26	0.040
45	0.00109	0.00075	0.0001	0.190	0.116	0.150	0.100	0.070	0.080	0.600	27	0.035
46	0.00114	0.00080	0.0008	0.162	0.170	0.150	0.080	0.070	0.080	0.600	28	0.035
47	0.00119	0.00084	0.0008	0.210	0.140	0.150	0.090	0.070	0.080	0.600	29	0.035
48	0.00124	0.00091	0.0008	0.135	0.180	0.150	0.090	0.070	0.080	0.600	30	0.035
49	0.00130	0.00098	0.0008	0.135	0.125	0.150	0.090	0.070	0.080	0.600	31	0.035
50	0.00136	0.00109	0.0008	0.185	0.108	0.060	0.090	0.070	0.080	0.600	32	0.035
51	0.00152	0.00124	0.0008	0.145	0.070	0.050	0.090	0.070	0.160	0.600	33	0.035
52	0.00161	0.00142	0.0008	0.155	0.110	0.095	0.090	0.070	0.160	0.600	34	0.035
53	0.00176	0.00163	0.0008	0.220	0.130	0.125	0.090	0.070	0.160	0.600	35	0.035
54	0.00193	0.00189	0.0008	0.220	0.075	0.017	0.090	0.150	0.280	0.400	36	0.035
55	0.00224	0.00222	0.0008	0.200	0.104	0.140	0.090	0.150	0.350	0.200	37	0.035
56	0.00267	0.00266	0.0020	0.135	0.122	0.100	0.080	0.150	0.200	0.050	38	0.035
57	0.00306	0.00307	0.0020	0.250	0.055	0.140	0.080	0.150	0.130	0.050	39	0.035
58	0.00352	0.00346	0.0020	0.100	0.115	0.200	0.100	0.150	0.130	0.050	40	0.035
59	0.00397	0.00392	0.0005	0.100	0.210	0.125	0.080	0.150	0.130	0.050	41	0.035
60	0.00451	0.00446	0.0005	0.150	0.160	0.090	0.060	0.150	0.130	0.050	42	0.035
61	0.00526	0.00513	0.0005	0.150	0.160	0.090	0.060	0.120	0.120	0.120	43	0.035
62	0.00600	0.00587	0.0005	0.150	0.160	0.090	0.060	0.120	0.120	0.120	44	0.035
63	0.00704	0.00675	0.0005	0.150	0.160	0.090	0.060	0.120	0.120	0.120	45	0.035
64	0.00793	0.00760	0.0005	0.150	0.160	0.090	0.060	0.120	0.120	0.120	46	0.035
65	0.00895	0.00856	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.200	47	0.035
66	0.01039	0.00966	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.180	48	0.035
67	0.01159	0.01073	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.180	49	0.035
68	0.01256	0.01186	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.180	50	0.035
69	0.01392	0.01311	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.280	51	0.035
70	0.01522	0.01477	0.0005	0.150	0.160	0.090	0.060	0.120	0.160	0.280	52	0.035
71	0.01684	0.01598	0.0000	0.150	0.160	0.090	0.060	0.120	0.160	0.200	53	0.035
72	0.01870	0.01778	0.0000	0.150	0.160	0.090	0.060	0.120	0.160	0.200	54	0.035
73	0.02083	0.01927	0.0000	0.150	0.160	0.090	0.060	0.120	0.160	0.200	55	0.035
74	0.02323	0.02136	0.0000	0.150	0.160	0.090	0.060	0.120	0.160	0.200	56	0.035

Prior Actuarial Assumptions, effective July 1, 2013
Lunch Plan A

AGE	DEATH RATES MALE	DEATH RATES FEMALE	DISABILITY RATES	RETIREMENT/DROP RATES < 30 YOS	RETIREMENT/DROP RATES >= 30 YOS
18	0.00020	0.00013	0.0000	0.000	0.000
19	0.00021	0.00013	0.0000	0.000	0.000
20	0.00021	0.00013	0.0000	0.000	0.000
21	0.00023	0.00013	0.0000	0.000	0.000
22	0.00024	0.00013	0.0000	0.000	0.000
23	0.00026	0.00013	0.0000	0.000	0.000
24	0.00027	0.00014	0.0000	0.000	0.000
25	0.00029	0.00015	0.0000	0.000	0.000
26	0.00033	0.00016	0.0000	0.000	0.000
27	0.00034	0.00017	0.0000	0.000	0.000
28	0.00035	0.00017	0.0000	0.000	0.000
29	0.00036	0.00018	0.0000	0.000	0.000
30	0.00039	0.00021	0.0000	0.000	0.000
31	0.00044	0.00025	0.0001	0.000	0.000
32	0.00050	0.00029	0.0001	0.000	0.000
33	0.00056	0.00031	0.0001	0.000	0.000
34	0.00062	0.00034	0.0001	0.000	0.000
35	0.00068	0.00036	0.0001	0.000	0.000
36	0.00074	0.00038	0.0001	0.000	0.000
37	0.00080	0.00040	0.0001	0.000	0.000
38	0.00083	0.00042	0.0001	0.600	0.300
39	0.00086	0.00044	0.0001	0.600	0.300
40	0.00088	0.00048	0.0001	0.600	0.300
41	0.00091	0.00053	0.0001	0.600	0.300
42	0.00095	0.00058	0.0001	0.600	0.300
43	0.00099	0.00064	0.0001	0.600	0.300
44	0.00103	0.00071	0.0001	0.600	0.300
45	0.00109	0.00075	0.0001	0.600	0.300
46	0.00114	0.00080	0.0001	0.600	0.300
47	0.00119	0.00084	0.0001	0.600	0.300
48	0.00124	0.00091	0.0001	0.600	0.300
49	0.00130	0.00098	0.0100	0.600	0.300
50	0.00136	0.00109	0.0100	0.600	0.300
51	0.00152	0.00124	0.0100	0.600	0.300
52	0.00161	0.00142	0.0150	0.600	0.700
53	0.00176	0.00163	0.0175	0.600	0.700
54	0.00193	0.00189	0.0175	0.600	0.700
55	0.00224	0.00222	0.0175	0.800	0.700
56	0.00267	0.00266	0.0002	0.350	0.700
57	0.00306	0.00307	0.0002	0.350	0.700
58	0.00352	0.00346	0.0002	0.350	0.700
59	0.00397	0.00392	0.0002	0.600	0.700
60	0.00451	0.00446	0.0002	0.450	0.700
61	0.00526	0.00513	0.0002	0.200	0.500
62	0.00600	0.00587	0.0002	0.200	0.500
63	0.00704	0.00675	0.0002	0.350	0.500
64	0.00793	0.00760	0.0002	0.100	0.500
65	0.00895	0.00856	0.0002	0.100	0.500
66	0.01039	0.00966	0.0002	0.100	0.250
67	0.01159	0.01073	0.0002	0.200	0.250
68	0.01256	0.01186	0.0002	0.200	0.250
69	0.01392	0.01311	0.0000	0.200	0.250
70	0.01522	0.01477	0.0000	0.200	0.250
71	0.01684	0.01598	0.0000	0.200	0.250
72	0.01870	0.01778	0.0000	0.200	0.250
73	0.02083	0.01927	0.0000	0.200	0.250
74	0.02323	0.02136	0.0000	0.200	0.250

DUR	TERMINATION RATES	SALARY INCREASE
0	0.14	0.06
1	0.14	0.06
2	0.14	0.06
3	0.14	0.06
4	0.14	0.06
5	0.14	0.06
6	0.14	0.06
7	0.14	0.06
8	0.14	0.06
9	0.14	0.06
10	0.14	0.06
11	0.14	0.06
12	0.14	0.05
13	0.14	0.05
14	0.14	0.05
15	0.14	0.06
16	0.14	0.06
17	0.14	0.07
18	0.14	0.07
19	0.14	0.04
20	0.14	0.04
21	0.14	0.04
22	0.14	0.04
23	0.14	0.06
24	0.14	0.06
25	0.14	0.04
26	0.14	0.04
27	0.14	0.04
28	0.14	0.04
29	0.14	0.04
30	0.14	0.04
31	0.14	0.04
32	0.14	0.04
33	0.14	0.04
34	0.14	0.04
35	0.14	0.04
36	0.14	0.04
37	0.14	0.04
38	0.14	0.04
39	0.14	0.04
40	0.14	0.04
41	0.14	0.04
42	0.14	0.04
43	0.14	0.04
44	0.14	0.04
45	0.14	0.04
46	0.14	0.04
47	0.14	0.04
48	0.14	0.04
49	0.14	0.04
50	0.14	0.04
51	0.14	0.04
52	0.14	0.04
53	0.14	0.04
54	0.14	0.04
55	0.14	0.04
56	0.14	0.04

Prior Actuarial Assumptions, effective July 1, 2013
Lunch Plan B

	DEATH RATES		DISABILITY	RETIREMENT/
AGE	MALE	FEMALE	RATES	DROP RATES
18	0.00020	0.00013	0.0000	0.00
19	0.00021	0.00013	0.0000	0.00
20	0.00021	0.00013	0.0000	0.00
21	0.00023	0.00013	0.0000	0.00
22	0.00024	0.00013	0.0000	0.00
23	0.00026	0.00013	0.0000	0.00
24	0.00027	0.00014	0.0000	0.00
25	0.00029	0.00015	0.0000	0.00
26	0.00033	0.00016	0.0000	0.00
27	0.00034	0.00017	0.0000	0.00
28	0.00035	0.00017	0.0000	0.00
29	0.00036	0.00018	0.0000	0.00
30	0.00039	0.00021	0.0000	0.00
31	0.00044	0.00025	0.0000	0.00
32	0.00050	0.00029	0.0000	0.00
33	0.00056	0.00031	0.0000	0.00
34	0.00062	0.00034	0.0000	0.00
35	0.00068	0.00036	0.0000	0.00
36	0.00074	0.00038	0.0010	0.00
37	0.00080	0.00040	0.0010	0.00
38	0.00083	0.00042	0.0010	0.00
39	0.00086	0.00044	0.0010	0.00
40	0.00088	0.00048	0.0050	0.00
41	0.00091	0.00053	0.0050	0.00
42	0.00095	0.00058	0.0050	0.00
43	0.00099	0.00064	0.0050	0.00
44	0.00103	0.00071	0.0050	0.00
45	0.00109	0.00075	0.0050	0.00
46	0.00114	0.00080	0.0050	0.00
47	0.00119	0.00084	0.0050	0.00
48	0.00124	0.00091	0.0050	0.00
49	0.00130	0.00098	0.0050	0.00
50	0.00136	0.00109	0.0130	0.00
51	0.00152	0.00124	0.0130	0.00
52	0.00161	0.00142	0.0130	0.00
53	0.00176	0.00163	0.0130	0.00
54	0.00193	0.00189	0.0130	0.00
55	0.00224	0.00222	0.0175	0.80
56	0.00267	0.00266	0.0175	0.80
57	0.00306	0.00307	0.0225	0.80
58	0.00352	0.00346	0.0225	0.80
59	0.00397	0.00392	0.0150	0.60
60	0.00451	0.00446	0.0050	0.50
61	0.00526	0.00513	0.0050	0.25
62	0.00600	0.00587	0.0050	0.25
63	0.00704	0.00675	0.0050	0.25
64	0.00793	0.00760	0.0010	0.25
65	0.00895	0.00856	0.0010	0.15
66	0.01039	0.00966	0.0010	0.15
67	0.01159	0.01073	0.0010	0.30
68	0.01256	0.01186	0.0010	0.45
69	0.01392	0.01311	0.0010	0.20
70	0.01522	0.01477	0.0010	0.20
71	0.01684	0.01598	0.0010	0.20
72	0.01870	0.01778	0.0010	0.20
73	0.02083	0.01927	0.0010	0.20
74	0.02323	0.02136	0.0010	0.20

DUR	TERMINATION RATES	SALARY INCREASE
0	0.100	0.055
1	0.090	0.055
2	0.080	0.055
3	0.070	0.055
4	0.060	0.055
5	0.050	0.055
6	0.050	0.055
7	0.045	0.055
8	0.045	0.055
9	0.045	0.055
10	0.045	0.055
11	0.045	0.045
12	0.040	0.045
13	0.030	0.045
14	0.030	0.045
15	0.030	0.045
16	0.050	0.050
17	0.050	0.050
18	0.050	0.050
19	0.030	0.040
20	0.040	0.040
21	0.040	0.040
22	0.040	0.040
23	0.040	0.040
24	0.040	0.040
25	0.040	0.040
26	0.040	0.040
27	0.040	0.040
28	0.040	0.040
29	0.040	0.040
30	0.040	0.040
31	0.040	0.040
32	0.040	0.040
33	0.040	0.040
34	0.040	0.040
35	0.040	0.040
36	0.040	0.040
37	0.040	0.040
38	0.040	0.040
39	0.040	0.040
40	0.040	0.040
41	0.040	0.040
42	0.040	0.040
43	0.040	0.040
44	0.040	0.040
45	0.040	0.040
46	0.040	0.040
47	0.040	0.040
48	0.040	0.040
49	0.040	0.040
50	0.040	0.040
51	0.040	0.040
52	0.040	0.040
53	0.040	0.040
54	0.040	0.040
55	0.040	0.040
56	0.040	0.040

Actuarial Assumptions,
effective July 1, 2018 Regular Members

AGE	DISABILITY RATES	TERMINATION RATES < 1 YEAR	TERMINATION RATES 1-2 YEARS	TERMINATION RATES 2-3 YEARS	TERMINATION RATES 4+ YEARS	RETIREMENT/DROP RATES < 25 YOS	RETIREMENT/DROP RATES 25-29 YOS	RETIREMENT/DROP RATES 30+ YOS	DUR	SALARY INCREASE
18	0.0001	0.250	0.250	0.165	0.170	0.000	0.000	0.000	1	0.048
19	0.0001	0.250	0.250	0.165	0.170	0.000	0.000	0.000	2	0.039
20	0.0001	0.250	0.250	0.165	0.170	0.000	0.000	0.000	3	0.039
21	0.0001	0.250	0.250	0.165	0.170	0.000	0.000	0.000	4	0.039
22	0.0001	0.250	0.250	0.165	0.170	0.000	0.000	0.000	5	0.039
23	0.0001	0.180	0.200	0.165	0.170	0.000	0.000	0.000	6	0.037
24	0.0001	0.180	0.200	0.165	0.170	0.000	0.000	0.000	7	0.037
25	0.0001	0.180	0.135	0.165	0.090	0.000	0.000	0.000	8	0.037
26	0.0001	0.180	0.135	0.125	0.090	0.000	0.000	0.000	9	0.037
27	0.0001	0.180	0.135	0.122	0.090	0.000	0.000	0.000	10	0.037
28	0.0001	0.180	0.135	0.119	0.085	0.000	0.000	0.000	11	0.037
29	0.0001	0.180	0.135	0.116	0.080	0.000	0.000	0.000	12	0.037
30	0.0003	0.180	0.135	0.113	0.070	0.000	0.000	0.000	13	0.037
31	0.0003	0.180	0.135	0.110	0.070	0.000	0.000	0.000	14	0.034
32	0.0003	0.165	0.135	0.107	0.060	0.000	0.000	0.000	15	0.034
33	0.0003	0.165	0.135	0.104	0.060	0.000	0.000	0.000	16	0.034
34	0.0003	0.165	0.130	0.101	0.050	0.000	0.000	0.000	17	0.034
35	0.0007	0.165	0.130	0.098	0.050	0.000	0.000	0.000	18	0.034
36	0.0008	0.165	0.120	0.095	0.045	0.000	0.000	0.000	19	0.034
37	0.0009	0.165	0.120	0.095	0.045	0.000	0.000	0.000	20	0.034
38	0.0010	0.165	0.120	0.095	0.042	0.035	0.000	0.000	21	0.034
39	0.0011	0.165	0.120	0.092	0.042	0.035	0.000	0.000	22	0.034
40	0.0012	0.165	0.120	0.090	0.042	0.035	0.000	0.000	23	0.034
41	0.0013	0.165	0.120	0.090	0.042	0.035	0.000	0.000	24	0.034
42	0.0014	0.150	0.120	0.090	0.042	0.035	0.000	0.000	25	0.034
43	0.0015	0.150	0.120	0.090	0.042	0.035	0.000	0.000	26	0.034
44	0.0016	0.150	0.120	0.090	0.042	0.035	0.000	0.000	27	0.034
45	0.0019	0.150	0.120	0.090	0.042	0.035	0.020	0.000	28	0.034
46	0.0020	0.150	0.120	0.090	0.042	0.035	0.020	0.000	29	0.034
47	0.0022	0.150	0.120	0.090	0.042	0.035	0.020	0.000	30	0.034
48	0.0023	0.150	0.120	0.090	0.042	0.035	0.025	0.450	31	0.034
49	0.0025	0.150	0.120	0.090	0.042	0.035	0.025	0.450	32	0.034
50	0.0030	0.150	0.120	0.090	0.042	0.035	0.045	0.450	33	0.034
51	0.0035	0.150	0.120	0.090	0.042	0.035	0.140	0.600	34	0.034
52	0.0040	0.150	0.120	0.090	0.042	0.035	0.240	0.600	35	0.034
53	0.0045	0.150	0.120	0.090	0.042	0.040	0.240	0.450	36	0.034
54	0.0050	0.150	0.120	0.090	0.042	0.100	0.470	0.360	37	0.034
55	0.0050	0.150	0.120	0.090	0.042	0.180	0.760	0.270	38	0.034
56	0.0050	0.150	0.120	0.090	0.042	0.180	0.350	0.210	39	0.034
57	0.0050	0.150	0.120	0.090	0.042	0.180	0.310	0.220	40	0.034
58	0.0050	0.150	0.120	0.090	0.042	0.190	0.310	0.230	41	0.034
59	0.0050	0.150	0.120	0.090	0.100	0.235	0.250	0.230	42	0.034
60	0.0048	0.150	0.120	0.090	0.100	0.235	0.250	0.230	43	0.034
61	0.0046	0.150	0.120	0.090	0.100	0.145	0.250	0.230	44	0.034
62	0.0044	0.150	0.120	0.090	0.100	0.145	0.240	0.230	45	0.034
63	0.0042	0.150	0.120	0.090	0.100	0.145	0.220	0.210	46	0.034
64	0.0040	0.150	0.120	0.090	0.100	0.180	0.240	0.290	47	0.034
65	0.0034	0.150	0.120	0.090	0.100	0.250	0.235	0.270	48	0.034
66	0.0029	0.150	0.120	0.090	0.100	0.200	0.220	0.225	49	0.034
67	0.0024	0.150	0.120	0.090	0.100	0.200	0.220	0.225	50	0.034
68	0.0022	0.150	0.120	0.090	0.100	0.200	0.220	0.225	51	0.034
69	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	52	0.034
70	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	53	0.034
71	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	54	0.034
72	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	55	0.034
73	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	56	0.034
74	0.0020	0.150	0.120	0.090	0.100	0.200	0.220	0.225	57	0.034

Actuarial Assumptions, effective July 1, 2018
Higher Education

AGE	DISABILITY RATES	TERMINATION RATES <1 YEAR	1-2 YEARS	2-3 YEARS	4+ YEARS	RETIREMENT/DROP RATES <25 YOS	25-29 YOS	30+ YOS
18	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
19	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
20	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
21	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
22	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
23	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
24	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
25	0.0000	0.230	0.250	0.170	0.250	0.000	0.000	0.000
26	0.0000	0.230	0.210	0.230	0.250	0.000	0.000	0.000
27	0.0000	0.230	0.210	0.220	0.200	0.000	0.000	0.000
28	0.0001	0.230	0.210	0.215	0.120	0.000	0.000	0.000
29	0.0001	0.230	0.210	0.210	0.120	0.000	0.000	0.000
30	0.0001	0.230	0.210	0.205	0.120	0.000	0.000	0.000
31	0.0001	0.230	0.180	0.200	0.120	0.000	0.000	0.000
32	0.0001	0.210	0.180	0.195	0.120	0.000	0.000	0.000
33	0.0001	0.210	0.180	0.190	0.120	0.000	0.000	0.000
34	0.0001	0.210	0.180	0.185	0.100	0.000	0.000	0.000
35	0.0002	0.210	0.180	0.180	0.100	0.000	0.000	0.000
36	0.0002	0.210	0.180	0.175	0.090	0.000	0.000	0.000
37	0.0002	0.195	0.180	0.170	0.090	0.000	0.000	0.000
38	0.0002	0.195	0.180	0.165	0.090	0.080	0.050	0.400
39	0.0003	0.195	0.180	0.160	0.080	0.080	0.050	0.400
40	0.0003	0.195	0.180	0.155	0.080	0.080	0.050	0.400
41	0.0004	0.195	0.200	0.153	0.080	0.080	0.050	0.400
42	0.0004	0.195	0.200	0.151	0.080	0.080	0.050	0.400
43	0.0005	0.195	0.200	0.149	0.080	0.070	0.050	0.400
44	0.0006	0.195	0.200	0.147	0.080	0.045	0.050	0.400
45	0.0007	0.195	0.200	0.145	0.080	0.045	0.050	0.400
46	0.0008	0.195	0.190	0.143	0.080	0.033	0.050	0.400
47	0.0008	0.195	0.180	0.141	0.080	0.033	0.050	0.400
48	0.0008	0.195	0.170	0.139	0.080	0.033	0.050	0.400
49	0.0008	0.195	0.160	0.137	0.080	0.033	0.050	0.400
50	0.0008	0.195	0.150	0.135	0.080	0.033	0.050	0.400
51	0.0008	0.195	0.140	0.133	0.080	0.033	0.100	0.500
52	0.0008	0.195	0.140	0.131	0.080	0.033	0.100	0.250
53	0.0008	0.195	0.140	0.129	0.080	0.033	0.100	0.250
54	0.0008	0.195	0.140	0.127	0.080	0.100	0.320	0.400
55	0.0008	0.195	0.140	0.125	0.080	0.125	0.500	0.155
56	0.0008	0.195	0.140	0.123	0.080	0.125	0.250	0.155
57	0.0008	0.195	0.140	0.121	0.080	0.100	0.200	0.155
58	0.0008	0.195	0.140	0.119	0.080	0.145	0.120	0.155
59	0.0006	0.195	0.140	0.117	0.080	0.160	0.135	0.155
60	0.0004	0.195	0.140	0.115	0.080	0.200	0.180	0.155
61	0.0003	0.195	0.140	0.115	0.080	0.120	0.150	0.155
62	0.0002	0.195	0.140	0.115	0.080	0.120	0.150	0.155
63	0.0001	0.195	0.140	0.115	0.080	0.080	0.150	0.155
64	0.0001	0.195	0.140	0.115	0.080	0.130	0.120	0.155
65	0.0001	0.195	0.140	0.115	0.080	0.180	0.165	0.155
66	0.0001	0.195	0.140	0.115	0.080	0.180	0.180	0.155
67	0.0001	0.195	0.140	0.115	0.080	0.140	0.100	0.155
68	0.0001	0.195	0.140	0.115	0.080	0.140	0.100	0.155
69	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155
70	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155
71	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155
72	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155
73	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155
74	0.0001	0.195	0.140	0.115	0.080	0.140	0.160	0.155

DUR	SALARY INCREASE
1	0.048
2	0.048
3	0.045
4	0.039
5	0.039
6	0.039
7	0.039
8	0.039
9	0.039
10	0.036
11	0.036
12	0.036
13	0.036
14	0.036
15	0.036
16	0.036
17	0.036
18	0.036
19	0.033
20	0.033
21	0.033
22	0.033
23	0.033
24	0.033
25	0.033
26	0.033
27	0.033
28	0.033
29	0.033
30	0.033
31	0.033
32	0.033
33	0.033
34	0.033
35	0.033
36	0.033
37	0.033
38	0.033
39	0.033
40	0.033
41	0.033
42	0.033
43	0.033
44	0.033
45	0.033
46	0.033
47	0.033
48	0.033
49	0.033
50	0.033
51	0.033
52	0.033
53	0.033
54	0.033
55	0.033
56	0.033
57	0.033

Appendix D
ACTUARIAL ASSUMPTIONS AND METHODS

XYZ Actuarial Valuation
June 30, 2018

Actuarial Assumptions, effective July 1, 2018
Lunch Plans A and B

AGE	DISABILITY RATES	RETIREMENT/ DROP RATES
18	0.0000	0.000
19	0.0000	0.000
20	0.0000	0.000
21	0.0000	0.000
22	0.0000	0.000
23	0.0000	0.000
24	0.0000	0.000
25	0.0000	0.000
26	0.0000	0.000
27	0.0000	0.000
28	0.0000	0.000
29	0.0000	0.000
30	0.0000	0.000
31	0.0000	0.000
32	0.0000	0.000
33	0.0000	0.000
34	0.0000	0.000
35	0.0001	0.000
36	0.0003	0.000
37	0.0005	0.000
38	0.0007	0.500
39	0.0009	0.500
40	0.0011	0.500
41	0.0015	0.500
42	0.0019	0.500
43	0.0024	0.500
44	0.0029	0.500
45	0.0037	0.500
46	0.0045	0.500
47	0.0050	0.500
48	0.0056	0.500
49	0.0064	0.500
50	0.0074	0.500
51	0.0084	0.500
52	0.0094	0.500
53	0.0098	0.500
54	0.0098	0.500
55	0.0100	0.700
56	0.0100	0.430
57	0.0100	0.390
58	0.0100	0.350
59	0.0100	0.330
60	0.0030	0.430
61	0.0025	0.230
62	0.0020	0.230
63	0.0015	0.230
64	0.0011	0.300
65	0.0009	0.280
66	0.0008	0.240
67	0.0007	0.240
68	0.0006	0.240
69	0.0005	0.240
70	0.0005	0.240
71	0.0005	0.240
72	0.0005	0.240
73	0.0005	0.240
74	0.0005	0.240

DUR	TERMINATION RATES	SALARY INCREASE
0	0.150	4.60%
1	0.135	4.60%
2	0.120	3.60%
3	0.105	3.30%
4	0.090	3.30%
5	0.075	3.30%
6	0.060	3.30%
7	0.045	3.30%
8	0.045	3.30%
9	0.045	3.30%
10	0.045	3.30%
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48	0.045	3.30%
49	0.045	3.30%
50	0.045	3.30%
51	0.045	3.30%
52	0.045	3.30%
53	0.045	3.30%
54	0.045	3.30%
55	0.045	3.30%
56	0.045	3.30%

Actuarial Assumptions, effective July 1, 2018
Mortality Tables

Active Member Mortality

Adjusted RP-2014 Base Table			Projected 2020 Table			Projected 2050 Table		
Age	Male	Female	Age	Male	Female	Age	Male	Female
20	0.000288	0.000137	20	0.000266	0.000132	20	0.000195	0.000099
30	0.000320	0.000183	30	0.000329	0.000190	30	0.000243	0.000142
40	0.000444	0.000333	40	0.000462	0.000346	40	0.000357	0.000267
50	0.001194	0.000927	50	0.001115	0.000889	50	0.000849	0.000679
60	0.003321	0.002054	60	0.003312	0.002093	60	0.002448	0.001567

Non-Disabled Retiree Mortality

Adjusted RP-2014 Base Table			Projected 2020 Table			Projected 2050 Table		
Age	Male	Female	Age	Male	Female	Age	Male	Female
50	0.003776	0.002468	50	0.003525	0.002367	50	0.002685	0.001807
60	0.007137	0.004626	60	0.007118	0.004714	60	0.005261	0.003530
70	0.016941	0.012549	70	0.016409	0.011871	70	0.012455	0.009030
80	0.050961	0.036168	80	0.048168	0.034546	80	0.035915	0.025595
90	0.172376	0.119146	90	0.164979	0.115535	90	0.125508	0.088364

Disabled Mortality

Adjusted RP-2014 Base Table			Projected 2020 Table			Projected 2050 Table		
Age	Male	Female	Age	Male	Female	Age	Male	Female
30	0.008794	0.003405	30	0.009051	0.003535	30	0.006678	0.002650
40	0.012218	0.006185	40	0.012703	0.006419	40	0.009821	0.004966
50	0.022659	0.013503	50	0.021153	0.012952	50	0.016114	0.009884
60	0.029557	0.019277	60	0.029479	0.019645	60	0.021788	0.014709
70	0.044824	0.031982	70	0.043417	0.030254	70	0.032955	0.023015
80	0.085120	0.069215	80	0.080455	0.066111	80	0.059989	0.048982

AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY
June 30, 2018 (7.65% discount rate)

Date	Description	Notes	Amtz. Period	Initial Liability	Years Remain	Remaining Balance	Mid-Year Payment
2018	OAB	Note 1	11	1,865,658,900	11	1,865,658,900	282,605,097
2018	EAAB	Note 2,3	22	3,212,415,138	22	3,212,415,138	364,395,689
2018	2009 Experience G/L		21	2,649,671,932	21	2,649,671,932	248,135,823
2018	2010 Experience G/L		22	1,041,795,143	22	1,041,795,143	95,724,314
2018	2011 Experience G/L		23	(161,187,360)	23	(161,187,360)	(14,555,880)
2018	2012 Experience G/L		24	117,430,241	24	117,430,241	10,437,714
2018	2013 Experience G/L		25	(235,227,303)	25	(235,227,303)	(20,607,080)
2018	2013 Assump/Method Chg		25	800,613,800	25	800,613,800	70,137,746
2018	2014 Investment Experience		1	(97,884,609)	1	(97,884,609)	(101,559,704)
2018	2014 Assump/Method Change		26	1,391,743,126	26	1,391,743,126	120,314,857
2018	2014 Other Experience G/L		26	(155,613,842)	26	(155,613,842)	(13,452,667)
2018	2015 Experience G/L		27	(365,419,456)	27	(365,419,456)	(31,207,645)
2018	2016 Experience G/L		28	26,099,311	28	26,099,311	2,204,147
2018	2017 DR Change		29	133,872,677	29	133,872,677	11,190,233
2018	2017 Experience G/L		29	(214,968,532)	29	(214,968,532)	(17,968,924)
2018	2017 Experience Acct Allocation		9	9,198,905	9	9,198,905	1,398,683
2018	2018 DR Change		30	137,980,715	30	137,980,715	11,425,078
2018	2018 Assump Change		30	550,022,780	30	550,022,780	45,542,980
2018	2018 Change in Liability		30	(198,334,922)	30	(198,334,922)	(16,422,526)
2018	2018 Experience Acct Allocation		10	44,451,679	10	44,451,679	6,284,458
	Total Outstanding Balance					**10,552,318,323**	**$ 1,054,022,393**
Employers Credit Balance							
2018	2014 Contribution Variance	Note 3	-	-	-	-	-
2018	2015 Contribution Variance	Note 3	-	-	-	-	-
2018	2016 Contribution Variance	Note 3	-	-	-	-	-
2018	2017 Contribution Variance	Note 3	-	-	-	-	-
2018	2018 Contribution Variance	Note 3	-	-	-	-	-
	Total Credit Balance					**$ -**	**$ -**
	Total Unfunded Actuarial Accrued Liability					**$ 10,552,318,323**	**$ 1,054,022,393**

See UAL Amortization Schedule Notes within this Appendix.

AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY
Projected June 30, 2019 (7.60% discount rate)

Date	Description	Notes	Amtz. Period	Initial Liability	Years Remain	Remaining Balance	Mid-Year Payment
2019	OAB	Note 1	10	1,715,166,249	10	1,715,166,249	223,646,152
2019	EAAB	Note 2,3	21	3,080,087,905	21	3,080,087,905	287,385,677
2019	2009 Experience G/L		20	2,594,919,708	20	2,594,919,708	247,256,595
2019	2010 Experience G/L		21	1,022,174,170	21	1,022,174,170	95,373,322
2019	2011 Experience G/L		22	(158,415,810)	22	(158,415,810)	(14,500,778)
2019	2012 Experience G/L		23	115,584,054	23	115,584,054	10,397,007
2019	2013 Experience G/L		24	(231,841,415)	24	(231,841,415)	(20,524,443)
2019	2013 Assump/Method Chg		24	789,089,675	24	789,089,675	69,856,483
2019	2014 Investment Experience		0	-	0	-	-
2019	2014 Assump/Method Change		25	1,373,379,375	25	1,373,379,375	119,819,627
2019	2014 Other Experience G/L		25	(153,560,551)	25	(153,560,551)	(13,397,295)
2019	2015 Experience G/L		26	(360,994,702)	26	(360,994,702)	(31,076,013)
2019	2016 Experience G/L		27	25,809,006	27	25,809,006	2,194,635
2019	2017 DR Change		28	132,503,564	28	132,503,564	11,140,886
2019	2017 Experience G/L		28	(212,770,054)	28	(212,770,054)	(17,889,685)
2019	2017 Experience Acct Allocation		8	8,451,424	8	8,451,424	1,396,335
2019	2018 DR Change		29	136,682,205	29	136,682,205	11,373,665
2019	2018 Assump Change		29	544,846,623	29	544,846,623	45,338,036
2019	2018 Change in Liability		29	(196,468,431)	29	(196,468,431)	(16,348,625)
2019	2018 Experience Acct Allocation		9	41,331,823	9	41,331,823	6,272,750
2019	2019 DR Change		30	146,817,363	30	146,817,363	12,101,012
	Total Outstanding Balance					**$ 10,412,792,181**	**$ 1,029,815,343**
Employers Credit Balance							
2019	2015 Contribution Variance	Note 3	-	-	-	-	-
2019	2016 Contribution Variance	Note 3	-	-	-	-	-
2019	2017 Contribution Variance	Note 3	-	-	-	-	-
2019	2018 Contribution Variance	Note 3	-	-	-	-	-
2019	2019 Contribution Variance	Note 3	5	2,306,984	5	2,306,984	551,160
	Total Credit Balance					**$ 2,306,984**	**$ 551,160**
Total Unfunded Actuarial Accrued Liability						**$ 10,415,099,165**	**$ 1,030,366,503**

See UAL Amortization Schedule Notes within this Appendix.

UAL Amortization Schedule Notes

Act 497 of 2009 consolidated all schedules established prior to 2009 into two amortization schedules, the Original Amortization Base (OAB) and the Experience Account Amortization Base (EAAB). The OAB consists of the outstanding balance of the Initial Unfunded Accrued Liability and schedules with negative outstanding balances. The outstanding balance of this schedule was credited with funds from the Initial UAL account, excluding the subaccount of this fund, and the balance of the Employer Credit Account. The OAB payment schedule is prescribed by statute, as described in Note 1 below. The EAAB consists of the 2004 schedule and all remaining schedules. The outstanding balance of this schedule was credited with the balance of funds from the Initial UAL subaccount, which were transferred from the Employee Experience Account on June 30, 2009. The EAAB payment schedule is prescribed by statute, as described in Note 2 below.

All schedules were re-amortized effective July 1, 2018, using a discount rate of 7.65%. Projected July 1, 2019 schedules are based on a 7.60% discount rate and include the re-amortization of the OAB and EAAB to the originally statutory pay-off dates, per Act 94 of 2016.

Note 1: Act 497 of 2009 created the Original Amortization Base, effective July 1, 2010, which combined the following schedules: 1993-1996, 1998-2000, and 2005-2008. The combined balance was reduced by applying funds from the IUAL Fund, excluding the subaccount of this fund. In addition to regular payments and contribution variance credits, the schedule was reduced by investment gains up to the annual "thresholds" created by Act 497 of 2009 and Act 399 of 2014. The schedule was credited appropriations from Act 55 of 2014, Act 56 of 2015 and Act 59 of 2018. Future payments will increase by 2.0% until paid off in or before 2029.

Note 2: Act 497 of 2009 created the Experience Account Amortization Base, which combined the following schedules: 1997, 2001-2003, 2004 (the liability resulting from Act 588 of 2004 which zeroed out the Experience Account), and 2008. The combined balance was reduced by applying funds from the subaccount of the IUAL Fund, which were transferred from the Experience Account on June 30, 2009. In addition to regular payments and contribution variance credits, the schedule was reduced by investment gains up to the annual "thresholds" created by Act 497 of 2009 and Act 399 of 2014. Future payments will be level until paid off in or before 2040.

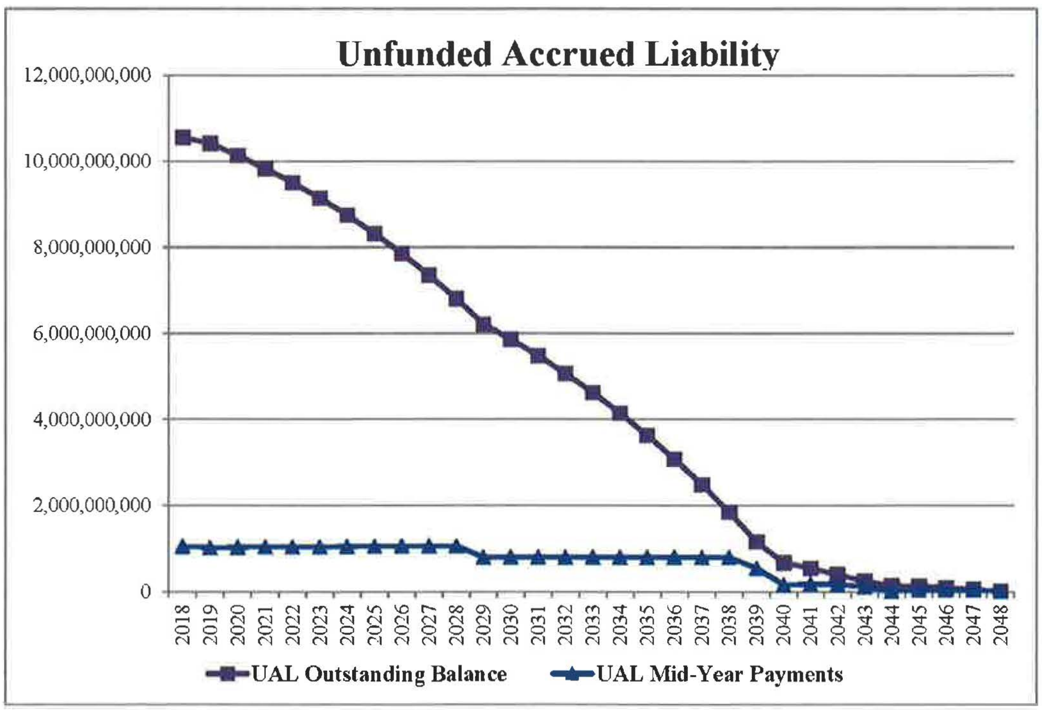
Note 3: The 2012 contribution variance surplus of $7,169,301 was used to reduce and re-amortize the EAAB, per Act 497 of 2009. The 2014, 2015, 2016, 2017, and 2018 contribution variance surpluses of $40,289,648, $91,284,653, $64,452,206, $15,672,044, and $61,466,736 respectively, per Act 399 of 2014.

Appendix E **XYZ Actuarial Valuation**
AMORTIZATION SCHEDULES **June 30, 2018**

UAL Outstanding Balance and Payment Schedule
Based on June 30, 2019 Projected UAL Schedules*

FY Beginning	UAL Outstanding Balance (Millions)	UAL Mid-Year Payments (Millions)	Payment % Change	FY Beginning	UAL Outstanding Balance (Millions)	UAL Mid-Year Payments (Millions)	Payment % Change
2018	10,552	1,054	0.0%	2034	4,146	799	0.0%
2019	10,415	1,030	-2.2%	2035	3,632	799	0.0%
2020	10,138	1,035	0.4%	2036	3,080	799	0.0%
2021	9,835	1,039	0.4%	2037	2,486	799	0.0%
2022	9,504	1,044	0.4%	2038	1,846	799	0.0%
2023	9,143	1,049	0.5%	2039	1,159	551	-31.0%
2024	8,750	1,053	0.4%	2040	675	168	-69.4%
2025	8,323	1,058	0.5%	2041	551	183	8.6%
2026	7,858	1,063	0.5%	2042	403	173	-5.7%
2027	7,353	1,067	0.4%	2043	255	123	-28.6%
2028	6,805	1,066	-0.1%	2044	147	17	-86.3%
2029	6,216	799	-25.1%	2045	140	48	184.6%
2030	5,861	799	0.0%	2046	101	46	-4.6%
2031	5,478	799	0.0%	2047	61	52	14.8%
2032	5,066	799	0.0%	2048	12	12	-76.9%
2033	4,622	799	0.0%	2049	0	0	-100.0%

* Based on projected 2019 schedules to show UAL payments after re-amortization of the OAB and EAAB.



Appendix E **XYZ Actuarial Valuation**

AMORTIZATION SCHEDULES **June 30, 2018**

Components of Original Amortization Base
(Dollar amounts in millions)

	Annual Outstanding Balance					Annual Payments				
	IUAL	Other Schedules	IUAL Acct	Employer Credit Account	Total OAB	IUAL	Other Schedules	IUAL Acct	Employer Credit Account	Total OAB
2018	5,578.5	(3,272.6)	(351.9)	(88.2)	1,865.7	845.0	(495.7)	(53.3)	(13.4)	282.6
2019	5,128.5	(3,008.7)	(323.6)	(81.1)	1,715.2	861.9	(505.6)	(54.4)	(13.6)	288.3
2020	4,626.6	(2,714.2)	(291.9)	(73.2)	1,547.3	879.1	(515.7)	(55.5)	(13.9)	294.0
2021	4,068.4	(2,386.7)	(256.7)	(64.3)	1,360.7	896.7	(526.1)	(56.6)	(14.2)	299.9
2022	3,449.2	(2,023.5)	(217.6)	(54.5)	1,153.6	914.7	(536.6)	(57.7)	(14.5)	305.9
2023	2,764.1	(1,621.6)	(174.4)	(43.7)	924.4	932.9	(547.3)	(58.9)	(14.8)	312.0
2024	2,007.6	(1,177.8)	(126.7)	(31.7)	671.4	951.6	(558.3)	(60.0)	(15.0)	318.3
2025	1,173.8	(688.6)	(74.1)	(18.6)	392.6	970.6	(569.4)	(61.2)	(15.4)	324.6
2026	256.6	(150.5)	(16.2)	(4.1)	85.8	266.2	(156.2)	(16.8)	(4.2)	89.0
2027	-	-	-	-	-	-	-	-	-	-
2028	-	-	-	-	-	-	-	-	-	-
2029	-	-	-	-	-	-	-	-	-	-

This table has changed from previously published tables due to legislative appropriation allocated to the IUAL and the change in discount rate from 7.70% to 7.65%. Note, the OAB will be re-amortized on June 30, 2019 to 2029, the originally scheduled payoff date of the IUAL.

GLOSSARY

Accrued Benefit – The pension benefit that an individual has earned as of a specific date based on the provisions of the plan and the individual's age, service, and salary as of that date.

Actuarial Accrued Liability – Computed differently under different funding methods, the actuarial accrued liability generally represents the portion of the actuarial present value of benefits attributable to service credit earned (or accrued) as of the valuation date.

Actuarial Present Value of Benefits – Amount which, together with future interest, is expected to be sufficient to pay all benefits to be paid in the future, regardless of when earned, as determined by the application of a particular set of actuarial assumptions; equivalent to the actuarial accrued liability plus the present value of future normal costs attributable to the members.

Actuarial Assumptions – Assumptions as to the occurrence of future events affecting pension costs. These assumptions include rates of investment earnings, changes in compensation, rates of mortality, withdrawal, disablement, and retirement as well as statistics related to marriage and family composition.

Actuarial Cost Method – A method of determining the portion of the cost of a pension plan to be allocated to each year; sometimes referred to as the "actuarial funding method." Each cost method allocates a certain portion of the actuarial present value of benefits between the actuarial accrued liability and future normal costs.

Actuarial Equivalence – Series of payments with equal actuarial present values on a given date when valued using the same set of actuarial assumptions.

Actuarial Present Value - The amount of funds required as of a specified date to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payments between the specified date and the expected date of payment.

Actuarial Value of Assets – The value of cash, investments, and other property belonging to the pension plan as used by the actuary for the purpose of the actuarial valuation. This may correspond to market value of assets, or some modification using an asset valuation method to reduce the volatility of asset values.

Actuarially Reduced – The method of adjusting a benefit received at an early date or paid in a form other than the lifetime of the member so that the expected total cost to the retirement system is equivalent to the cost if the benefit did not begin until later, or was paid for the lifetime of the member.

Asset Gain (Loss) – That portion of the actuarial gain attributable to investment performance above (below) the expected rate of return in the actuarial assumptions.

Amortization – Paying off an interest-discounted amount with periodic payments of interest and (generally) principal, as opposed to paying off with a lump sum payment.

Amortization Payment – That portion of the pension plan contribution designated to pay interest and reduce the outstanding principal balance of unfunded actuarial accrued liability. If the amortization payment is less than the accrued interest on the unfunded actuarial accrued liability the outstanding principal balance will increase.

Contribution Variance – The difference between actuarially required contribution and the actual amount received based upon a projected contribution rate. Results in an increase or decrease to future required contributions.

Discount Rate – The interest rate used in developing present values to reflect the time value of money.

Decrements – Events which result in the termination of membership such as retirement, disability, withdrawal, or death.

Employer Normal Cost – Portion of the normal cost, excluding administrative expenses, not paid by employee contributions.

Entry Age Normal (EAN) Funding Method – A standard actuarial funding method whereby each member's normal costs (service costs) are generally level as a percentage of pay from entry age until retirement. The annual cost of benefits is comprised of the normal cost plus an amortization payment to reduce the UAL.

Experience Gain (Loss) – The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities during the period between two valuation dates. It is a measurement of the difference between actual and expected experience and may be related to investment earnings above (or below) those expected or changes in the liability due to fewer (or greater) than expected numbers of retirements, deaths, disabilities, or withdrawals, or variances in pay increases relative to assumed pay increases. The effect of such gains (or losses) is to decrease (or increase) future costs.

Experience Account Amortization Base (EAAB) – Amortization base created in 2010 by Act 497 of 2009. Consolidated and re-amortized schedules created in the following valuation years, which existed prior to Act 497: 1997, 2001-2003, 2004 (the liability resulting from Act 588 of 2004 which zeroed out the Experience Account), and 2008. The new combined balance was credited with funds from the sub-account of the IUAL Fund, which were transferred from the Experience Account on June 30, 2009. See Note 2 in Appendix D for additional details.

Funded Ratio – A measure of the ratio of the actuarial value of assets to liabilities of the system. Typically, the assets used in the measure are the actuarial value of assets as determined by the asset valuation method adopted by the Board of Trustees; the liabilities are determined using the actuarial funding method specified by ABC statute. Thus, the funded ratio depends not only on the financial strength of the plan but also on the asset valuation method used to determine the assets and on the actuarial cost method used to determine the liabilities.

Governmental Accounting Standards Board (GASB) – Governmental agency that sets the accounting standards for state and local government operations.

Market Value of Assets (MVA) – The value of assets as they would trade on an open market.

Normal Cost – Computed differently under different funding methods, generally that portion of the actuarial present value of benefits allocated to the current plan year.

Original Amortization Base (OAB) – Amortization base created in 2010 by Act 497 of 2009. Consolidated and re-amortized schedules created in the following valuation years, which existed prior to Act 497: 1993 (Initial Unfunded Accrued Liability), 1993 (Change in Liability), 1994-1996, 1998-2000, and 2005-2008. See Note 1 in Appendix D for additional details.

Permanent Benefit Increase – An increase in specified current retiree benefits authorized by statutes.

Projected Benefits – The benefits expected to be paid in the future based on the provisions of the plan and the actuarial assumptions. The projected values are based on anticipated future advancement in age and accrual of service as well as increases in salary paid to the participant.

Projected Unit Credit (PUC) Funding Method – A standard actuarial funding method whereby the actuarial present value of projected benefits of each individual is accumulated from the participant's attained age to anticipated retirement. The portion attributable to current year benefit accruals is called the normal cost. The actuarial present value of future benefits in proportion to service accrued on the date of valuation is called the actuarial accrued liability. The annual cost of benefits is comprised of the normal cost plus an amortization payment to reduce the unfunded actuarial accrued liability.

Public Retirement Systems' Actuarial Committee (PRSAC) – A committee created by state law within the ABC Department of the Treasury to ensure orderly and consistent strategies for continuing development and growth that will attain and maintain the soundness of the public retirement systems, plans and funds and to report all findings and recommendations to the House and Senate committees on retirement and the Joint Legislative Committee on the Budget.

Side-Fund Assets – Assets held in the trust for purposes other than for paying the accrued benefits or administrative expenses of the plan.

Unfunded Actuarial Accrued Liability (UAAL or UAL) – The excess of the actuarial accrued liability over the valuation assets; sometimes referred to as "unfunded past service liability". UAL increases (decreases) each time an actuarial loss (gain) occurs and when new benefits are added without being fully funded initially.

Valuation Assets – The actuarial value of assets less side-fund assets; represents the portion of the actuarial value of assets available to pay the accrued benefits of the plan.

Vested Benefit – Benefits that the members are entitled to regardless of employment status.

APPENDIX B: SAMPLE EXPERIENCE STUDY REPORT

PLAN XYZ

ACTUARIAL EXPERIENCE STUDY
July 1, 2012 – June 30, 2017

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

March 1, 2018

Board of Trustees
Plan XYZ
123 Main Street
Anywhere, USA 12345

Dear Board Members:

The following report presents the results of our experience study of the actuarial assumptions of the Plan XYZ for the period July 1, 2012 and ending June 30, 2017. The report includes a review of demographic and economic experience, a comparison of this experience to current actuarial assumptions, our recommendations regarding changes in assumptions or methods to be effective for the June 30, 2018 actuarial valuation, and the estimated actuarial impact of these recommended changes, determined as the impact the changes would have had on the June 30, 2017 valuation.

In preparing this report, we compiled experience for the Plans using data furnished by the retirement system. While we have not audited the information provided, the supplied information was reviewed for consistency and reasonableness. We have no reason to doubt the substantial accuracy of the information and believe it has produced appropriate results.

Future actuarial measurements may differ significantly from current measurements due to such factors as: plan experience differing from that anticipated by the assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used (such as the end of an amortization period); changes in plan provisions or applicable law.

The study was prepared in accordance with the applicable Actuarial Standards of Practice issued by the Actuarial Standards Board. Shelley is an Associate in the Society of Actuaries and Pat is a Fellow in the Society of Actuaries. Shelley and Pat are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We would like to thank the executive director and staff for their assistance with this report. We look forward to presenting the conclusions and recommendations contained in this report to XYZ and are available to answer any questions concerning its contents.

Respectfully submitted,

FOSTER & FOSTER INC.

Shelley R. Johnson, ASA, MAAA

D. Patrick McDonald, FSA, EA, MAAA, FCA

TABLE OF CONTENTS

INTRODUCTION

The purpose of this study is to review the current economic and demographic assumptions used in the actuarial valuations of the System's Plans to determine which changes, if any, are necessary in order to achieve the objective of developing costs that are stable, predictable, and represent our best estimate of anticipated future experience.

The ultimate cost of any defined benefit pension plan is the sum of the benefits paid from the plan and the administrative expenses incurred, less any net investment gains received. Therefore, the actual cost of plan will only be known after all benefits accrued by the members are paid to the members or their beneficiaries. Since members who retire, become disabled, terminate or die are continuously replaced by new employees, the exact cost to the System cannot be determined at any one point in time. To assure that adequate assets will accumulate to meet current and future benefit obligations, the actuary must make certain demographic and economic assumptions about future contingent events in order to determine the funding requirements necessary to meet the actual cost. Economic assumptions include salary growth and investment growth, both of which include inflation as a component. The demographic assumptions include rates of retirement, withdrawal, disability, and mortality.

Although the ultimate cost is independent of the actuarial assumptions used to determine funding requirements, the assumptions should reflect the actuary's best estimate of future plan experience. If the assumptions are inappropriate or do not reflect the long-term plan experience, the plan will incur experience gains (over-funding) or experience losses (under-funding) which will exceed or fall short of the actual long-term plan cost. If the contributions determined based upon these assumptions are paid as required, and if the assumptions are in accordance with the actual experience of the plan, then sufficient assets will accumulate to pay the actual cost.

In accordance with State Statutes, XYZ conducts an experience study every five years. The current observation period (July 1, 2012 - June 30, 2017) includes the most recent experience available. The experience study reviews the demographic and economic assumptions currently being used for valuing the following system Plans. "Plan" or "Plans" for purposes of this study is a subgroup within the System characterized by the following employee classifications:

- Regular Teachers
- Higher Education
- Lunch Plan A and B

Note the Higher Education Plan benefit structure is the same as the Regular Teachers Plan, but the experience for this group of members warrants separate assumptions. Current assumptions for Lunch Plans A and B were developed separately for each Plan. Lunch Plan A is a closed plan with only six remaining active members as of June 30, 2017. Therefore, Lunch Plan A and B experience was combined for purposes of this study, and the recommended assumptions were developed to apply to both Plans.

This report presents details of the experience analysis by Plan, the proposed assumptions, and the expected impact of the proposed changes on funding requirements. The assumptions investigated as part of this study are as follows:

- Inflation
- Investment Return and Discount Rate
- Salary and Real Wage Growth Rates
- Retirement Rates
- Withdrawal/Termination Rates
- Mortality Rates

- Disability Rates
- Other Assumptions

Please keep in mind that while the recommended assumption set represents our best estimate, other reasonable assumption sets could be supported. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods.

ACTUARIAL STANDARDS OF PRACTICE

The Actuarial Standards Board has provided coordinated guidance through of a series of Actuarial Standards of Practice (ASOP) for measuring pension obligations and determining pension plan costs or contributions. The ASOPs that apply specifically to valuing pensions are as follows:

- ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, which ties together the standards shown below, provides guidance on actuarial cost methods, and addresses overall considerations for measuring pension obligations and determining plan costs or contributions
- ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*
- ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*

Please note that the contents of this report are in compliance and consistent with the above mentioned Actuarial Standards of Practice. When applicable, further details of the ASOP associated with the reviewed actuarial assumption will be provided in the discussion of the Economic Assumptions and Demographic Assumptions sections of this report.

EXPERIENCE REVIEW SUMMARY

Below is a summary of our key findings and proposed changes. The remainder of the document outlines our analysis and documents our recommendations.

ECONOMIC ASSUMPTIONS

- **Inflation:** We recommend retaining the current 2.5% inflation assumption.

- **Investment Return and Discount Rate:** The Board recently adopted a plan to reduce the discount rate in 0.05% increments from 7.75% to 7.50%. We recommend at a minimum that the Board continue this plan. Based on the Board's target asset allocation and 2018 capital market assumptions provided by Aon Hewitt, TRSL's Investment Consultant, and Hamilton Lane, TRSL's manager for alternative investments, the target portfolio produces an expected return of 8.47%. When excluding Aon Hewitt's additional expected return due to active management and lower investment expenses due to the plan's size, the expected return is 8.07%. A review of average capital market assumptions of twelve investment consulting firms using TRSL's target portfolio allocation resulted in an expected return of 8.33%.

  We currently recognize the gain-sharing provisions by using a discount rate that is net of expected investment returns to be allocated to the experience account to potentially fund future benefit increases. This margin was recently determined to be 40 basis points using a stochastic analysis Subtracting 40 basis points for gain sharing from the returns stated above results in a discount rate of 7.67% based on Aon Hewitt and Hamilton Lane assumptions and 7.93% based on the Horizon Actuarial Services report on the average of twelve investment consulting firms. We believe the Board's current plan to reduce the discount rate incrementally results in reasonable assumptions relative to current market expectations. Should the Board act to accelerate its planned reduction of the discount rate, resulting in more conservative assumptions, we believe this action would also be reasonable.

- **Salary Increases:** We recommend reducing the salary increase assumptions for Regular Teachers, Higher Education, and the Lunch Plans. The experience analysis shows that salary increases during the current and prior study period are significantly less than anticipated by the current assumptions. This is most likely attributable to employer budgetary constraints and may not be representative of long-term expected salary increases. Therefore, we recommend reducing the assumed increases to a level similar the increases anticipated by the Social Security Administration but not to the level observed during the study period.

DEMOGRAPHIC ASSUMPTIONS

- **Mortality Rates:** The current mortality assumptions for XYZ Plans are the RP-2000 Combined Healthy Mortality Table for healthy lives with projection for mortality improvement to 2025 using Scale AA and the RP-2000 Disabled Retiree Mortality Table for disabled lives. The experience shows that the XYZ population has experienced mortality improvements since the last study was completed. Therefore, we recommend updating the mortality tables to represent current experience. We recommend the RP-2014 White Collar Employee table for active members, with male rates adjusted by a multiple of 1.010 and female rates adjusted by a multiple of 0.997. We recommend the RP-2014 White Collar Healthy Annuitant table for inactive members and retirees with the male rates adjusted by a multiple of 1.366 and female rates adjusted by a multiple of 1.189. We recommend the RP-2014 Disability table for disability retirees with male rates adjusted by a multiple of 1.111 and female rates adjusted by a multiple of 1.134. All tables are adjusted from 2014 to 2018 using Improvement Scale MP-2017. In addition, we recommend projecting future mortality improvement using Improvement Scale MP-2017 applied on a fully generational basis to reflect future mortality improvement.

- **Retirement Rates**: We recommend updating the retirement rates to reflect experience since 2012. Prior assumptions were age and service based for Regular Teachers, Higher Education, and Lunch Plan A and age-based for Lunch Plan B. The experience for the Lunch Plans was combined and we propose using a single age-based table for both Plans.

- **Disability Rates**: We recommend updating the disability rates to reflect experience since 2012.

- **Withdrawal/Termination Rates**: We recommend minor changes to the withdrawal rate assumptions for Regular Teachers, Higher Education, and the Lunch Plans to better reflect withdrawal experience. We recommend retaining the current structure of age-based tables for four service categories for Regular Teachers and Higher Education: less than two years of service, two years of service, three years of service, and four or more years of service. We recommend consolidating the Lunch Plan A and Lunch Plan B experience into a single service-based table.

- **Other Assumptions:** Based on experience during the study period, we recommend decreasing the current assumed benefit increase resulting from converted sick and annual leave for Regular Teachers and Lunch Plans and increasing the current assumed benefit increase for Higher Education.

EXPECTED ACTUARIAL COST IMPACT

Adoption of the proposed assumption changes will alter future funding requirements. The total change in liability and funding requirements if they had been applied for the June 30, 2017 actuarial valuation would have been an overall reduction in aggregate funding requirements of 0.2% of payroll. If adopted, the new assumptions will be used in the June 30, 2018 actuarial valuation and will be reflected in employer rates beginning July 1, 2019.

The changes for each assumption change and in aggregate are summarized as follows:

Valuation Impact		
	Change in Accrued Liability	Change in Normal Cost
Salary growth rates	$ (194,299,528)	$ (50,705,472)
Retirement rates	2,316,567	360,943
Termination rates	(2,559,924)	(7,070,522)
Disability rates	(2,699,027)	56,490
Mortality rates	731,625,430	16,645,963
Other Assumptions	(30,940,607)	(1,278,409)
TOTAL	$ 503,442,911	$ (41,991,007)
Aggregate Valuation Change *	$ 489,782,745	$ (43,217,112)
Aggregate Amortization Payments	40,741,238	
Payroll Percentage **	0.9%	-1.1%
Aggregate Contribution Rate Change	-0.2%	

Estimated Employer Rate Impact			
	UAL Payment Change (%)**	Normal Cost Change (%)	Total Change (%)
Regular Teachers and Lunch Plans	+0.9%	-1.2%	-0.3%
Higher Education	+0.9%	-0.4%	+0.5%
Aggregate Change	+0.9%	-1.1%	-0.2%

* The Aggregate Valuation Change does not equal the sum of the individual changes because the decrements do not operate in isolation of each other. Changes to one decrement will alter the effects of changes to another decrement.

** The payroll used to determine the UAL payment as a percentage of payroll includes ORP.

ECONOMIC ASSUMPTIONS

OVERVIEW

ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations,* provides guidance to actuaries in selecting (including giving advice on selecting) economic assumptions – primarily inflation, investment return, discount rate, and salary scale – for measuring obligations under defined benefit pension plans.

Throughout the remainder of this section, we have used the standards set forth in ASOP No. 27 as a guideline for reviewing and if applicable, selecting proposed changes to the following economic actuarial assumption:

- Inflation
- Investment Return and Discount Rate
- Salary Increases

Please keep in mind that ASOP No. 27 states that "the best an actuary can do is to use professional judgment to estimate possible future economic outcomes based on past experience and future expectations, and to select assumptions based upon that application of professional judgment."

INFLATION

Inflation refers to general economic inflation, defined as price changes over the whole of the economy. The assumed inflation rate is the basis for the other economic assumptions, such as assumed investment returns, the discount rate, and salary increase assumptions.

In order to assess the reasonableness of the inflation assumption, we review historical inflation, applicable inflation forecasts to the extent available, inflation assumptions used by the system's investment consultant and other investment consultants, and assumptions currently used by similar plans.

Following ASOP No. 27, which provides guidance on the selection of economic assumptions, such as inflation, our determination of an appropriate inflation assumption includes a review of recent and long-term historical inflation, without giving undue weight to recent experience. We note that, long-term historical experience, beyond 35 or so years, is less meaningful given that the Federal Reserve Board's monetary policy changed in the 1980's toward more vigilance in preventing high inflation.

Historical Inflation

Inflation has been relatively low over the past 20 years, particularly over the last five years. The table below shows the average annual historical change in the CPI-U, over various periods.

Periods Ending Dec. 2017	Average Annual Increase in CPI-U
Last 5 years	1.4%
Last 10 years	1.6%
Last 20 years	2.1%
Last 30 years	2.6%
Last 40 years	3.5%

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

The current assumption would appear to be high based on recent increases but is consistent with the average increase over the last 20-30 years.

Yields on Government Securities of Various Maturities

The spread between the nominal yield on treasury securities and the inflation indexed nominal yield on inflation protected treasury bills (TIPS) of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. Current estimate reported at Bloomberg.com on February 16, 2018 are as follows:

Years to Maturity	Bond Nominal Yield	TIPS Nominal Yield	Breakeven Rate of Inflation
10 Years	2.87%	0.77%	2.10%
30 Years	3.13%	1.00%	2.13%

The current assumption is about 35-40 points higher than the above market data.

Forecasts of Inflation

The Federal Reserve Bank of Philadelphia conducts a quarterly survey of the Society of Professional Forecasters and publishes a mid-term expectation. Their most recent forecast (fourth quarter of 2017) predicts average inflation over the next ten years (2017-2026) will be 2.20%. The Philadelphia Fed's Livingston Survey summarizes the forecasts of economists from industry, government, banking, and academia. The December 2017 report shows an average 10-year inflation expectation of 2.34%.

The Social Security Administration's 2017 Trustees Report includes the Office of the Chief Actuary's projection of ultimate long-term (75 year) average annual inflation. The intermediate cost assumption is 2.60%. The report provides a low-to-high range of 2.00% to 3.20%.

Forecasts from Investment Consulting Firms

Aon Hewitt, TRSL's investment consultant currently uses an inflation assumption of 2.25%.

Horizon Actuarial Services, LLC, compiles and summarizes expected returns and volatility by asset class for 35 different investment consulting firms. The results of the survey are provided in a report titled Survey of Capital Market Assumptions: 2017 Edition. Twelve of the participating firms provided short-term and long-term assumptions. The report defines the short-term horizon as 10 years and the long-term horizon as 20-years. The average inflation assumption utilized by these 12 firms for the short-term horizon is 2.32%, while the average inflation assumption utilized for the long-term horizon is 2.44%, with a range from 2.2% to 2.8%.

Recommendation

The Federal Reserve forecaster survey responses would appear to support an inflation assumption of 20 to 30 basis points below the current assumption. However, these are 10-year forecasts and longer-term forecasts (25-30 years) would likely result in forecasts closer to the current assumption. This is supported by the much higher inflation assumption used by the Social Security administration in their intermediate cost projection, as well as the short-term and long-term assumptions from the Horizon Actuarial Services survey. Therefore, we recommend retaining the 2.50% long-term inflation assumption.

INVESTMENT RETURN & DISCOUNT RATE

The investment return and discount rate are among the most significant assumptions in the annual actuarial valuation process. Minor changes in the discount rate can have a major impact on valuation results. Investment earnings are used to fund plan benefits and a portion of investment experience gains are allocated to the experience account to fund future permanent benefit increases. The discount rate is used to discount the expected benefit payments for all active, inactive, and retired members of the System. Therefore, the discount rate is representative of expected investment earnings less earnings expected to be allocated to the experience account.

Investment and Administrative Expenses

Investment return assumptions are typically net of investment expenses. The capital market assumptions developed by investment consulting firms used to develop our recommendations are net of investment expenses, therefore no further adjustments for these expenses are necessary.

Prior to July 1, 2018, administrative expenses were precluded from being directly funded as a percentage of payroll, therefore the investment return assumption was reduced by 0.10%, in order to offset these expenses. The triggers provided by Act 94 of 2016 were met in the June 30, 2017 actuarial valuation, therefore, this adjustment is no longer necessary. Since investment returns are no longer assumed to cover administrative expenses, this change in method for recognizing administrative expenses will lessen the burden on the investment portfolio.

Gain-sharing

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions includes gain-sharing in its description of "provisions that are difficult to measure." ASOP No. 27, paragraph 3.5.1 states that "the actuary may determine that it is appropriate to adjust the economic assumptions to provide for considerations such as … plan provisions that are difficult to measure." We interpret this as guidance providing support to the method of reducing the investment return assumption for returns that will be used for gain-sharing, rather than used to fund regular plan benefits.

In order to determine an appropriate adjustment for gain-sharing, we use a forward-looking model based upon 300 random samples of five-thousand 30-year projections of annual market returns (provided by Aon Hewitt.) These projections were developed based upon TRSL's current target portfolio allocation, and Aon Hewitt's 2016 capital market assumptions. We then projected the annual investment gains and losses in each scenario and the resulting returns to be allocated to the experience account, according to current statutory provisions. The model accounts for TRSL's projected increasing funded ratio over the 30-year period, and subsequent increasing permanent benefit increases (PBIs) and experience account caps (the cap increases as the funded ratio of the plan increases. In addition, the model recognizes the statutory indexed "threshold allocation", which requires a higher dollar amount of investment experience gains to be achieved, in proportion to increases in the actuarial value of assets, before any funds are allocated to the experience account. We assume that the full PBI will always be granted when funds are sufficient to grant a full PBI, and when the other requirements of current law are satisfied.

The 30-year projection showed that a mean 41 basis points of investment earnings is expected to be allocated to the experience account. Eliminating the five highest and five lowest results resulted in a minimum of 13 and a maximum of 77 basis points allocated to the experience account.

Note the provisions described above for funding the experience account are prescribed in statue, but the availability of funds is only one of many requirements that must be met before a PBI can be granted. Once sufficient funds are available to grant a full PBI, as allowed by law, the Board may request the PBI, then it must be approved by two-thirds both the House and Senate. Even with this approval, the governor can veto the bill. The PBI provisions have been modified by the legislature several times in recent years to allocate less earnings to the experience account, to reduce the amount of PBI allowed, and to strengthen the legislature's ability to not approve the increase. Also, the legislature has previously required that some of the money credited to the experience account be redirected to pay down the system's UAL rather than fund a PBI. Given these reasons, we believe that our model's assumption that the PBI will always be granted when funds are available, and the statutory provisions are met is a conservative assumption. Therefore, we believe the current assumption of 40 basis points is reasonable and we recommend retaining this assumption.

Historical Returns

ASOP No. 27 states that the actuary should evaluate relevant data, such as recent and long-term historical economic data, without giving undue weight to recent experience. Historical experience is not a reliable indicator of future experience. Future performance by asset class may vary significantly from historical performance and the current (and target) asset allocation of the trust, which significantly impacts future performance, is likely different than prior allocations.

TRSL's historical annualized returns determined based on the market value of assets and the actuarial value of assets are shown in the chart below. Note these returns are net of investment expenses, but not net of administrative expenses or allocations to the experience account, so are comparable to the expected investment return before adjusting for these other expenses.

		Market	Actuarial
3 Year	2015 - 2017	6.19%	9.01%
5 Year	2013 - 2017	9.94%	10.70%
10 Year	2008 - 2017	5.17%	5.44%
20 Year	1998 - 2017	6.86%	7.09%
30 Year	1988 – 2017	8.24%	8.08%

Asset Allocation

The actual asset allocation of the trust will significantly impact the overall performance. XYZ investment consultant, Aon Hewitt, completed an asset allocation study in 2016. The Board adopted the following target asset allocation:

Asset Class	Target Asset Allocation
Large Cap U.S. Equity	20.00%
Small Cap U.S. Equity	5.00%
Non-U.S. Equity (Developed)	11.00%
Emerging Markets Equity	8.00%
U. S. REITs	2.00%
Core U.S. Fixed Income (Market Duration)	9.00%
High Yield Bonds	4.00%
Non-US Developed Bond (0% Hedged)	2.00%
Emerging Market Bonds (Sovereign; Local)	3.50%
Private Real Estate (Core)	5.00%
Private Real Estate (Non-Core)	5.00%

Asset Class	Target Asset Allocation
Private Equity	22.00%
Commodities	1.00%
Infrastructure	1.50%
Farmland	1.00%
	100.00%

XYZ Investment Consultant's Expected Return

We generally look to the system's investment consultant as the starting point in determining our recommended long-term expected return assumption. We compare the investment consultant's capital market assumptions by asset class to those utilized by other investment advisors. In discussions with XYZ investment staff, we found Aon Hewitt's buyout assumption for private equity to be low at 7.7%. Since XYZ utilizes Hamilton Lane as its investment manager for alternative investments, we sought their opinion regarding this assumption. Hamilton Lane expects a 12% return for this asset category. This compares to TRSL's historical (14-year) return for this asset category of 14.7%. Using TRSL's target portfolio allocation, Aon Hewitt's 2018 30-year capital market assumptions for all but Private Equity Buyouts, and Hamilton Lane's assumption for Private Equity Buyouts, and the 2.50% inflation assumption, the long-term (30-year) expected return of the portfolio is 8.47%. Aon Hewitt includes 40 basis points as additional expected returns based on TRSL's underlying active managers along with consideration for lower fees achieved by XYZ through its large plan size. While we believe it is possible for active management to result in additional returns above that of passive management, we have adjusted the Aon Hewitt/Hamilton Lane expected return to exclude the additional return expected due to active management and lower fees as a conservative measure. The resulting expected return is 8.07%. After deducting an additional 40 basis points for gain-sharing, the comparable discount rate is 7.67%.

Other Investment Consultants

We utilized the Horizon Actuarial Services, LLC, 2017 survey of other consulting firms (which includes Aon Hewitt) to assess how Aon Hewitt's return expectations compare to other consulting firms. The 2017 survey is based upon the capital market assumptions of 35 investment advisors participating in the survey. Of the participating advisors, 23 provided one set of assumptions for varying terms of 10 to 15 years. The remaining 12 advisors provided assumptions over both shorter-term (five to 10 years) and longer-term (20 years or more) horizons. The survey refers to the longer term returns as 20-year assumptions and states that the longer-term horizon is more appropriate for mature ongoing pension plans without solvency issues.

We mapped TRSL's target portfolio allocation to the average 20-year survey assumptions. Using the survey's average expected returns for all asset categories, and the associated standard deviation and covariance matrix, but substituting TRSL's inflation assumption of 2.50%, the resulting expected long-term nominal return is 8.33%. The returns in the survey are generally considered to be indexed and net of fees, so are comparable to the assumptions used to determine the expected return of 8.07% described above. Therefore, the 8.07% expected return assumption is less than assumptions used by other investment advisors for TRSL's specific portfolio allocation.

Recommended Discount Rate for Funding

The Board is currently following a plan to reduce the discount rate in 0.05% increments to 7.50%. Based on this plan, the discount rate used in the June 30, 2018 valuation would be 7.65% and the projected contribution rate for fiscal year ending June 30, 2020 would be 7.60%. This plan was discussed at length in the June 2016 PRSAC committee meeting and was ultimately unanimously adopted by the committee.

Therefore, our focus has been on the reasonableness of the current discount rate of 7.65% and the goal of 7.50% by June 30, 2021. These discount rates correspond to assumed rates of return of 8.05% for the June 30, 2018 valuation and 7.90% by June 30, 2021. Based on the above analysis, we believe the Board's assumptions are currently reasonable.

Recommended Discount Rate for GASB Reporting

GASB statements 67 and 68 generally require the discount rate to be determined based on the long-term expected rate of return. In discussions with TRSL's executive and investment staff, and external auditor, it was agreed that it was preferable to use the same discount rate for funding and GASB reporting, as long as the assumptions used are reasonable for each purpose, despite the inherent differences in the total return expectation of each. There is no reason to require that each be based on a single overall long-term expected rate of return. The XYZ Board agreed and has maintained the same discount rate for funding and GASB reporting.

ASOP 27 regarding the Selection of Economic Assumptions for Measuring Pension Obligations specifically addresses this in paragraph 3.6.2. which addresses the "Range of Reasonable Assumptions". The paragraph states "The actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice."

We continue to believe this is a reasonable approach. Given that staff and external auditors are comfortable with this approach, and actuarial standards of practice specifically allow it, we recommend continued use of the same discount rate as that used for funding purposes to be used for GASB reporting purposes. Specifically, we believe that a 7.65% discount rate with the goal of reducing the discount rate to 7.50% by June 30, 2021 to be reasonable for GASB reporting purposes.

SALARY AND REAL WAGE GROWTH

The salary increase assumption is used to project a member's annual salary each year from the valuation date through the assumed retirement age. This assumption plays an important role in measuring individual pension costs and obligations. The salary increase assumption includes the inflation assumption and an assumption for the real rate of wage increases. The real rate of wage increase includes increases due to promotion and longevity, often called merit increases, which are generally service related. The sum of inflation and the real wage growth components comprise the recommended salary increase assumption.

We previously addressed the inflation assumption and recommended retaining the current 2.50% inflation assumption. We address the real wage growth assumption below.

Current Assumptions

The current salary increase assumptions vary by Plan and are based upon the member's years of service, as detailed below.

Regular Teachers – Rates are 5.75% at each of the first five years of service and generally decrease from 5.0% to 3.75% as years of service increase.

Higher Education – Rates are 10% for the first two years of service, 9% for the third year and vary from 3.5% to 8% for all remaining years of service.

Lunch Plan A and B – Plan A currently varies from 4% to 7% and Plan B varies from 4.0% to 5.5% depending on years of service.

Experience and Recommended Assumptions

To assess the current assumed annual increases and provide a basis for updated assumptions, we reviewed the actual salary experience over the study period. Not surprisingly, we found that salary increases during the study period were significantly lower than current assumptions would have predicted. This is undoubtedly due to budget restrictions experienced by school boards and universities in recent years. It is important to keep in mind that salary increase assumptions are used to project a member's salary from the valuation date until the assumed retirement age. For newly hired members, this projection could be for 40 or more years. Therefore, the recent past should not be considered in isolation. In addition to recent experience, we reviewed the experience from the two prior experience studies and long-term wage growth assumptions utilized by the social security administration.

In the pages at the end of this section, we have included a service-based chart for each of the XYZ Plans that compares the actual experience to the current assumptions. The rates illustrated are unisex and represent the actual, expected, and proposed salary increase for a given duration of service. Historically, members received higher average salary increases toward the beginning of their careers and lower average salary increases later in their careers. Salary increase assumptions are typically represented as a flat salary scale assumption or as a service-based assumption. A flat salary scale assumption assumes that a member will get the same rate of salary increase for all years, whereas a service-based table assumes different rates based on the member's longevity with the Plan. XYZ experience continues to support the use of a service-based table for all Plans.

Regular Teachers – Actual salary increases by duration of service were less than expected at all service levels. As shown in the following pages, the aggregate expected average annual increase over the five-year study period was 4.81%. The actual average aggregate increase was significantly lower at 1.95%. With an average annual inflation of 1.4% over this period, the aggregate real wage increase was only about 0.6%.

We recommend a real salary growth rate of 0.8% plus a small merit component that varies by years of service. The recommended merit component blends actual experience with an assumed long-term assumption. The aggregate real wage growth based on the recommended assumptions and the current distribution of salary by years of service is 1.18%.

Higher Education – In total, actual salary increases were less than expected. The aggregate expected average annual increase over the five-year study period was 5.83%. The actual average aggregate increase was significantly lower at 2.54%. With an average annual inflation of 1.4% over this period, the aggregate real wage increase was only about 1.1%. We recommend a real salary growth rate of 0.8% plus a small merit component that varies by years of service, based on experience as noted for Regular Teachers. The aggregate real wage growth based on the recommended assumptions and the current distribution of salary by years of service is 1.4%.

Lunch Plans – In total, actual salary increases were less than expected. The aggregate expected average annual increase over the five-year study period was 5.02%. The actual average aggregate increase was significantly lower at 0.95%. With an average annual inflation of 1.4% over this period, the aggregate real wage increase was negative at about -0.5%. We recommend a real salary growth rate of 0.8% plus a small merit component that varies by years of service, based on experience as noted for Regular Teachers. The aggregate real wage growth based on the recommended assumptions and the current distribution of salary by years of service is 1.2%.

Actual Aggregate Salary Increase Experience							
	Actual Inflation	Regular Teachers		Higher Education		Lunch Plans	
		Real	Total	Real	Total	Real	Total
2003-2007	3.0%	2.7%	5.6%	2.5%	5.4%	2.5%	5.5%
2007-2012	2.0%	2.0%	3.9%	1.2%	3.2%	2.1%	4.0%
2012-2017	1.4%	0.6%	1.9%	1.1%	2.5%	-0.5%	1.0%

Salary Increase Assumptions – Current and Proposed							
	Inflation	Regular Teachers		Higher Education		Lunch Plans	
		Real	Total	Real	Total	Real	Total
Current Aggregate Assumed Annual Increase	2.5%	2.3%	4.8%	3.3%	5.8%	2.5%	5.0%
Proposed Aggregate Assumed Annual Increase	2.5%	1.2%	3.7%	1.4%	3.9%	1.2%	3.7%

Social Security Administration

The Social Security Administration's (SSA) 2017 Trustees Report includes the Office of the Chief Actuary's projection of real wage inflation, which are used in their 75-year projections. These assumptions are based on data derived predominantly from the private sector so should not be considered in isolation. However, given the volatility of XYZ actual salary increase experience in recent years relative to historical increases, this provides a basis to help determine the reasonableness of the recommended long-term real increases shown above.

The annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.8%, with a range from 2.50% to 5.02%. With the SSA's inflation assumption of 2.60%, the SSA's best estimate of the current long-term real wage inflation is 1.20%, with a range of 0.50% to 1.82% per year. Using our recommended inflation assumption of 2.50%, we believe that our recommended real wage inflation rate of 1.2% for Regular Teachers and Lunch Plans and 1.4% for Higher Education is reasonable.

Impact on Valuation Results

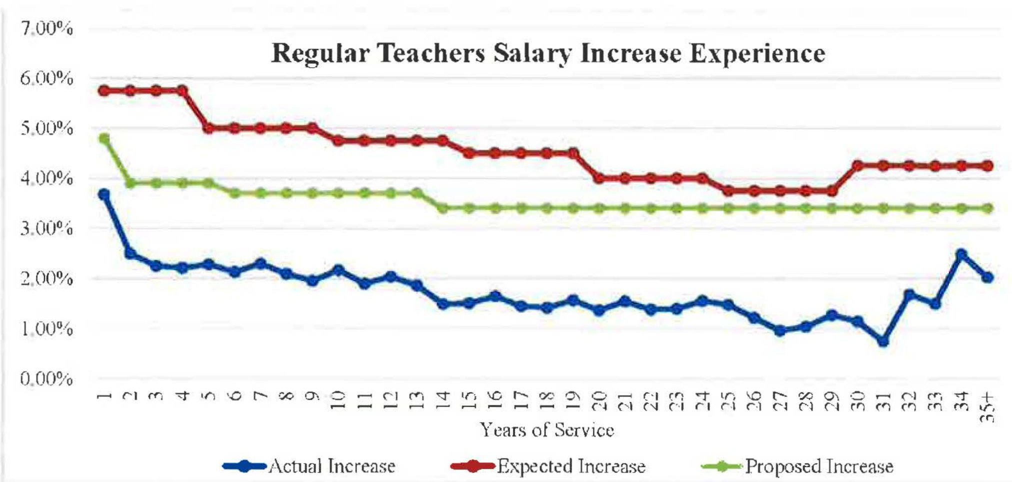
The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	(188,457,356)	(44,327,824)
Higher Education	(5,027,953)	(6,073,681)
Lunch Plan A and B	(814,219)	(303,967)
TOTAL	(194,299,528)	(50,705,472)

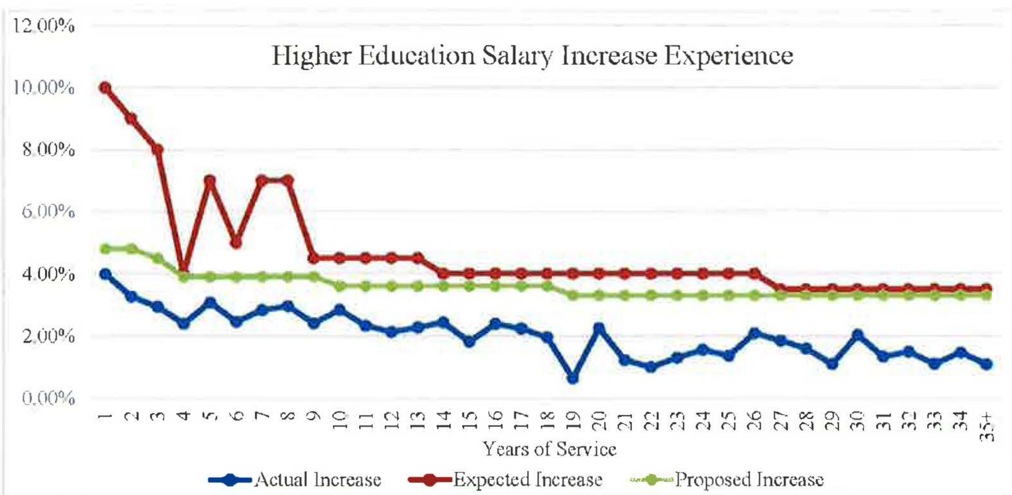
The proposed salary increase rates for each Plan by duration of service are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed salary increase rates compared to the current assumptions.

Regular Teachers Salary Increase Experience

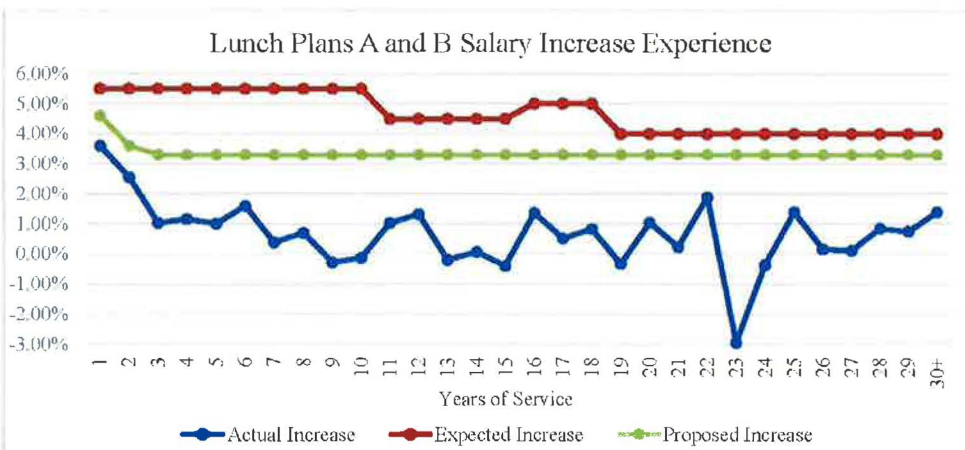
Service	Eligible Members	Prior Year Salaries	Actual Salaries	Expected Salaries	Actual Increase	Expected Increase	Proposed Increase
1	20,965	774,876,164	803,362,077	819,429,869	3.68%	5.75%	4.8%
2	18,110	693,441,106	710,718,287	733,313,660	2.49%	5.75%	3.9%
3	15,751	614,068,448	627,882,612	649,376,869	2.25%	5.75%	3.9%
4	15,304	598,203,787	611,412,846	632,599,038	2.21%	5.75%	3.9%
5	15,830	619,233,525	633,330,922	650,195,651	2.28%	5.00%	3.9%
6	15,981	630,816,007	644,258,597	662,355,856	2.13%	5.00%	3.7%
7	15,749	631,507,115	645,988,563	663,080,021	2.29%	5.00%	3.7%
8	15,214	622,469,468	635,469,974	653,592,042	2.09%	5.00%	3.7%
9	13,808	578,057,072	589,316,135	606,960,376	1.95%	5.00%	3.7%
10	12,774	547,446,520	559,307,961	573,450,947	2.17%	4.75%	3.7%
11	12,209	536,595,568	546,773,808	562,082,179	1.90%	4.75%	3.7%
12	11,793	530,017,799	540,794,958	555,194,750	2.03%	4.75%	3.7%
13	11,528	529,115,984	538,926,973	554,248,836	1.85%	4.75%	3.7%
14	11,203	523,271,157	531,063,822	548,128,537	1.49%	4.75%	3.4%
15	10,686	505,337,242	512,934,936	528,076,728	1.50%	4.50%	3.4%
16	10,326	492,608,106	500,676,243	514,777,695	1.64%	4.50%	3.4%
17	10,020	484,067,346	491,045,722	505,850,626	1.44%	4.50%	3.4%
18	9,601	468,770,806	475,388,566	489,865,627	1.41%	4.50%	3.4%
19	8,544	422,414,849	429,018,464	441,422,752	1.56%	4.50%	3.4%
20	7,832	394,448,866	399,829,995	410,226,940	1.36%	4.00%	3.4%
21	7,390	376,127,211	381,923,912	391,171,620	1.54%	4.00%	3.4%
22	6,970	358,989,647	363,944,130	373,350,513	1.38%	4.00%	3.4%
23	6,570	342,386,939	347,158,616	356,082,096	1.39%	4.00%	3.4%
24	4,603	249,867,441	253,739,409	259,863,138	1.55%	4.00%	3.4%
25	3,880	215,169,673	218,335,063	223,235,086	1.47%	3.75%	3.4%
26	3,323	188,454,774	190,738,744	195,521,691	1.21%	3.75%	3.4%
27	2,916	166,594,752	168,190,600	172,840,818	0.96%	3.75%	3.4%
28	2,364	136,273,752	137,682,998	141,385,405	1.03%	3.75%	3.4%
29	666	38,839,064	39,331,329	40,295,154	1.27%	3.75%	3.4%
30+	1,893	119,079,502	120,998,892	124,142,986	1.61%	4.25%	3.4%
Total	303,803	13,388,549,690	13,649,545,154	14,032,117,506	1.95%	4.81%	3.7%



Higher Education Salary Increase Experience							
Service	Eligible Members	Prior Year Salaries	Actual Salaries	Expected Salaries	Actual Increase	Expected Increase	Proposed Increase
1	3,704	190,776,801	198,384,456	209,854,482	3.99%	10.00%	4.8%
2	2,988	162,036,818	167,334,444	176,620,132	3.27%	9.00%	4.8%
3	2,550	142,539,466	146,733,854	153,942,624	2.94%	8.00%	4.5%
4	2,397	135,166,454	138,399,921	140,573,112	2.39%	4.00%	3.9%
5	2,230	124,731,714	128,573,148	133,462,933	3.08%	7.00%	3.9%
6	2,083	118,487,602	121,402,694	124,411,983	2.46%	5.00%	3.9%
7	1,940	112,813,414	116,003,123	120,710,352	2.83%	7.00%	3.9%
8	1,782	102,845,681	105,886,887	110,044,878	2.96%	7.00%	3.9%
9	1,605	96,736,966	99,062,257	101,090,129	2.40%	4.50%	3.9%
10	1,379	85,455,516	87,873,851	89,301,016	2.83%	4.50%	3.6%
11	1,198	76,196,404	77,966,799	79,625,242	2.32%	4.50%	3.6%
12	1,036	65,499,312	66,892,409	68,446,781	2.13%	4.50%	3.6%
13	893	56,782,592	58,071,311	59,337,807	2.27%	4.50%	3.6%
14	730	46,215,817	47,336,360	48,064,449	2.42%	4.00%	3.6%
15	634	39,114,823	39,822,253	40,679,416	1.81%	4.00%	3.6%
16	557	35,008,888	35,842,681	36,409,244	2.38%	4.00%	3.6%
17	531	33,435,299	34,180,541	34,772,709	2.23%	4.00%	3.6%
18	481	30,886,231	31,488,930	32,121,681	1.95%	4.00%	3.6%
19	456	29,395,968	29,582,493	30,571,807	0.63%	4.00%	3.3%
20	432	27,660,582	28,281,783	28,767,005	2.25%	4.00%	3.3%
21	428	28,172,683	28,517,764	29,299,589	1.22%	4.00%	3.3%
22	412	27,030,207	27,299,265	28,111,413	1.00%	4.00%	3.3%
23	408	28,001,139	28,364,302	29,121,184	1.30%	4.00%	3.3%
24	300	21,188,288	21,515,895	22,035,820	1.55%	4.00%	3.3%
25	262	19,862,585	20,132,301	20,657,088	1.36%	4.00%	3.3%
26	235	18,662,060	19,050,008	19,408,542	2.08%	4.00%	3.3%
27	238	19,753,523	20,116,517	20,444,896	1.84%	3.50%	3.3%
28	236	21,104,919	21,440,293	21,843,591	1.59%	3.50%	3.3%
29	189	18,328,613	18,527,791	18,970,114	1.09%	3.50%	3.3%
30+	1,299	138,651,189	140,501,900	143,507,087	1.33%	3.50%	3.3%
Total	33,613	2,052,544,554	2,104,586,231	2,172,207,106	2.54%	5.83%	3.91%



Lunch Plans A and B Salary Increase Experience							
Service	Eligible Members	Prior Year Salaries	Actual Salaries	Expected Salaries	Actual Increase	Expected Increase	Proposed Increase
1	463	7,395,560	7,661,747	7,802,315	3.60%	5.50%	4.6%
2	361	5,980,137	6,132,711	6,309,043	2.55%	5.50%	3.6%
3	308	5,212,063	5,265,596	5,498,726	1.03%	5.50%	3.3%
4	308	5,287,774	5,349,218	5,578,603	1.16%	5.50%	3.3%
5	331	5,748,044	5,805,948	6,064,187	1.01%	5.50%	3.3%
6	289	5,150,209	5,232,475	5,433,471	1.60%	5.50%	3.3%
7	297	5,352,237	5,373,010	5,646,609	0.39%	5.50%	3.3%
8	280	5,222,242	5,258,994	5,509,466	0.70%	5.50%	3.3%
9	230	4,371,294	4,359,172	4,611,715	-0.28%	5.50%	3.3%
10	185	3,555,601	3,550,833	3,751,160	-0.13%	5.50%	3.3%
11	184	3,547,333	3,583,846	3,706,963	1.03%	4.50%	3.3%
12	173	3,364,647	3,409,269	3,516,055	1.33%	4.50%	3.3%
13	167	3,275,313	3,268,837	3,422,701	-0.20%	4.50%	3.3%
14	157	3,148,101	3,150,102	3,289,766	0.06%	4.50%	3.3%
15	157	3,200,922	3,187,985	3,344,964	-0.40%	4.50%	3.3%
16	138	2,859,736	2,898,470	3,002,723	1.35%	5.00%	3.3%
17	137	2,963,639	2,978,885	3,111,820	0.51%	5.00%	3.3%
18	127	2,807,444	2,830,413	2,947,816	0.82%	5.00%	3.3%
19	109	2,467,468	2,459,104	2,566,167	-0.34%	4.00%	3.3%
20	83	1,872,347	1,891,791	1,947,239	1.04%	4.00%	3.3%
21	68	1,516,280	1,519,782	1,576,932	0.23%	4.00%	3.3%
22	58	1,329,659	1,354,697	1,382,845	1.88%	4.00%	3.3%
23	59	1,375,661	1,335,035	1,430,687	-2.95%	4.00%	3.3%
24	61	1,368,021	1,363,025	1,422,742	-0.37%	4.00%	3.3%
25	54	1,206,314	1,223,102	1,254,566	1.39%	4.00%	3.3%
26	54	1,216,746	1,218,679	1,265,416	0.16%	4.00%	3.3%
27	52	1,187,835	1,189,209	1,235,349	0.12%	4.00%	3.3%
28	39	874,059	881,401	909,021	0.84%	4.00%	3.3%
29	21	468,476	471,966	487,215	0.74%	4.00%	3.3%
30+	82	1,784,562	1,809,384	1,855,945	1.39%	4.00%	3.3%
Total	5,032	95,109,724	96,014,686	99,882,227	0.95%	5.02%	3.42%



DEMOGRAPHIC ASSUMPTIONS

OVERVIEW

ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries in selecting (including giving advice on selecting) demographic and other noneconomic assumptions for measuring obligations under defined benefit pension plans.

Over the following pages, the following demographic assumptions will be reviewed:

- Retirement Rates
- Withdrawal/Termination Rates
- Mortality Rates
- Disability Rates

Generally, demographic assumptions are based on actual plan experience with additional considerations for current trends. ASOP No. 35 states "the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment." ASOP No. 35 also states that "a reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses...the actuary should not give undue weight to past experience when selecting demographic assumptions."

Demographic assumptions generally remain consistent over time, absent significant changes in plan provisions or economic conditions. Therefore, the best true indicator of future experience is often past experience. For each assumption, the study compares actual experience for that time period to assumptions used in the valuations.

Note that actuarial assumptions reflect average experience over long periods of time. A change in actuarial assumptions generally results when experience over a period of years indicates a consistent pattern. Proposed changes to the demographic assumptions are made to better reflect actual plan experience over the studied time period. The proposed changes also meet the objective of developing costs that are stable, predictable, and represent our best estimate of anticipated future experience.

RETIREMENT RATES

Retirement rates represent the probability that a member will retire or enter DROP at a given age and/or service, if they have attained the eligibility requirements. Higher rates of retirement at earlier ages generally result in higher costs to the plan.

The current normal retirement eligibility requirements are as follows:

Plan	Hire Date	Accrual Rate	Retirement/DROP Eligibility
Regular Teachers and Higher Education	Members hired prior to 7/1/1999	2.0%	Age 60 and 5 years of service; or 20 years of service
		2.5%	Age 55 and 25 years of service; or Age 65 and 20 years of service; or 30 years of service
	Members hired between 7/1/1999 and 12/31/2010	2.5%	Age 60 and 5 years of service; or Age 55 and 25 years of service, or 30 years of service Actuarially reduce benefit with 20 years of service
	Members hired 1/1/2011 -6/30/2015	2.5%	Age 60 and 5 years of service Actuarially reduce benefit with 20 years of service
	Members hired 7/1/2015 and after	2.5%	Age 62 and 5 years of service Actuarially reduce benefit with 20 years of service
Lunch Plan A	All	3.0%	Age 60 and 5 years of service, or Age 55 and 25 years of service, or 30 years of service
Lunch Plan B	Members hired before 7/1/2015	2.0%	Age 60 and 5 years of service, or Age 55 and 30 years of service
	Members hired 7/1/2015 and after	2.0%	Age 62 and 5 years of service Actuarially reduce benefit with 20 years of service

Current Assumptions

Regular Teachers and Higher Education - Current assumptions for both Regular Teachers and Higher Education are age-based tables with separate tables for less than 25 years of service, 25-29 years of service, and 30 or more years of service.

Lunch Plans - Current assumptions for Lunch Plan A are age-based tables with separate tables for members with less than 30 years of service and greater than 30 years of service. Current assumptions for Lunch Plan B are age-based tables.

Experience and Proposed Assumptions

The charts and graphs at the end of this section illustrate the actual retirement experience over the last five years. The rates illustrated are unisex and represent the probability of retirement, given the member had met the eligibility requirements. If the member did not meet the eligibility requirements at a given age, the member's exposure was excluded for that age.

Regular Teachers: In the last experience study, we recommended retirement/DROP rate tables that vary based upon three categories of service: less than 25 years, 25-29 years, and 30 or more years of service. The pattern of actual experience by age over the last five years for each of these service categories was remarkably close to the previously recommended assumptions. We recommend retaining the current structure with minor changes to the retirement/DROP rates to more closely mirror recent experience.

We also reviewed retirement experience for members hired on or after January 1, 2011 to determine whether a different table would be appropriate for these members. Actual experience is not sufficient to yield a credible pattern of retirement rates for these members. We recommend continuing to use a single set of assumptions for all tiers.

Higher Education: As with Regular Teachers, we recommended in the last experience study retirement/DROP rate tables that vary based upon three categories of service: less than 25 years, 25-29 years, and 30 or more years of service. There were more retirements than expected for eligible members with less than 25 years of service and 25-29 years of service, but there were fewer retirements than expected for members with 30 or more years of service. In aggregate, we recommend retaining the current structure and recommend minor changes to the retirement/DROP rates to more closely mirror recent experience. Also, as with Regular Teachers, we recommend continuing to use a single set of assumptions for all tiers.

Lunch Plan A and B: The actual rates of retirement were less than the assumed rates at almost all ages, therefore we are recommending reducing the retirement rates for almost all ages. We also recommend using the same rates for Lunch Plan A as are being proposed for Lunch Plan B, since there are so few remaining Lunch Plan A members.

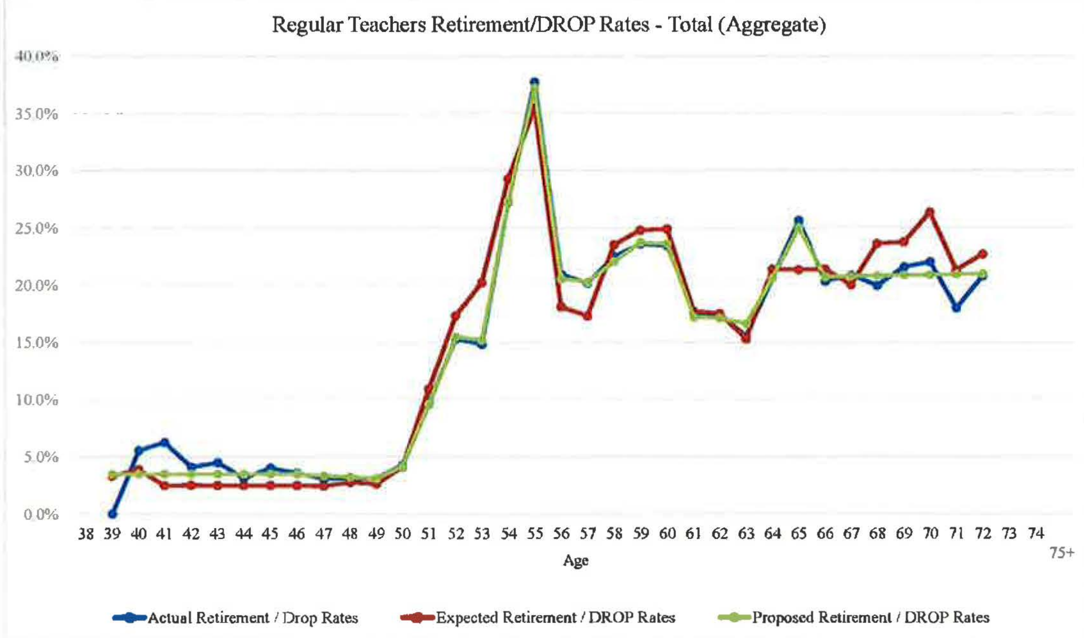
Impact on Valuation Results

The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	(2,682,499)	(207,176)
Higher Education	5,483,466	570,277
Lunch Plan A and B	(484,400)	(2,158)
TOTAL	(2,316,567)	(360,943)

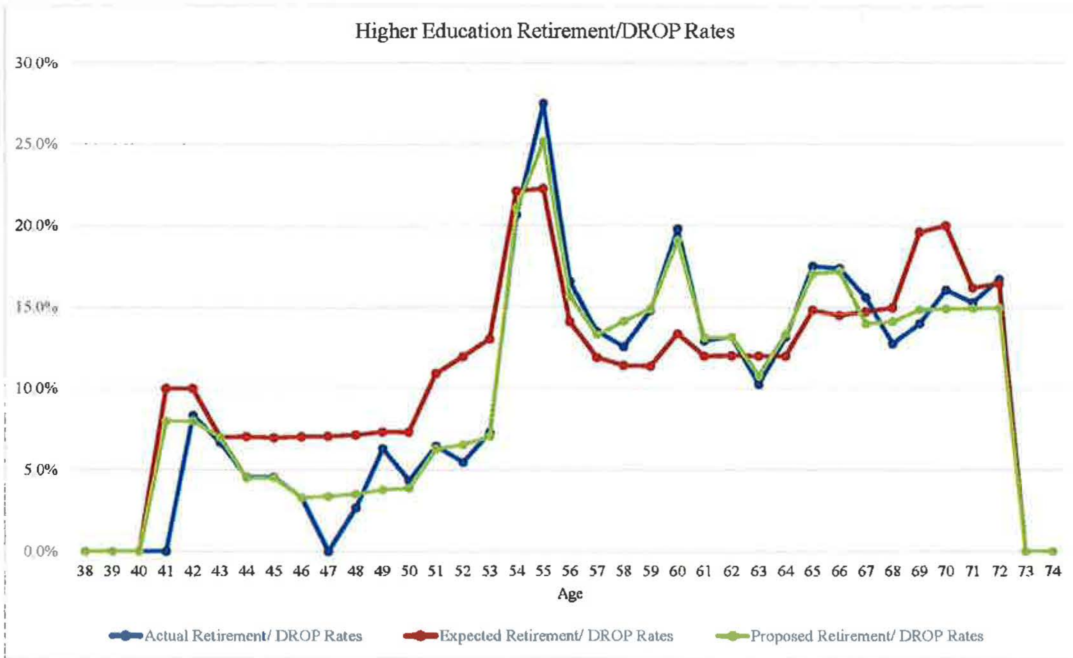
The actual, expected, and proposed retirement rates for each Plan by age and duration of service are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed retirement rates compared to the current assumptions.

Regular Teacher Retirement Experience												
	<25 Years of Service			25-29 Years of Service			30+ Years of Service			Total (Aggregate)		
Age	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates
38	N/A	5.0%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	N/A	N/A	3.5%
39	0.0%	4.0%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	3.3%	3.5%
40	5.6%	4.0%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	5.6%	3.9%	3.5%
41	6.3%	2.5%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	6.3%	2.5%	3.5%
42	4.1%	2.5%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	4.1%	2.5%	3.5%
43	4.5%	2.5%	3.5%	N/A	0.0%	0.0%	N/A	0.0%	0.0%	4.5%	2.5%	3.5%
44	3.1%	2.5%	3.5%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	3.1%	2.5%	3.5%
45	4.0%	2.5%	3.5%	7.7%	2.0%	2.0%	N/A	0.0%	0.0%	4.0%	2.5%	3.5%
46	3.6%	2.5%	3.5%	1.7%	2.0%	2.0%	N/A	0.0%	0.0%	3.6%	2.5%	3.5%
47	3.2%	2.5%	3.5%	1.8%	2.0%	2.0%	N/A	0.0%	0.0%	3.1%	2.4%	3.3%
48	3.3%	3.0%	3.5%	2.5%	2.0%	2.5%	50.0%	70.0%	45.0%	3.1%	2.8%	3.2%
49	3.8%	3.0%	3.5%	2.1%	2.0%	2.5%	33.3%	60.0%	45.0%	3.1%	2.6%	3.1%
50	3.9%	3.0%	3.5%	4.3%	5.0%	4.5%	46.2%	30.0%	45.0%	4.2%	4.1%	4.1%
51	4.4%	3.0%	3.5%	13.7%	17.0%	14.0%	62.1%	60.0%	60.0%	9.8%	10.9%	9.5%
52	3.3%	3.0%	3.5%	23.9%	28.0%	24.0%	57.7%	60.0%	60.0%	15.3%	17.3%	15.5%
53	3.9%	10.0%	4.0%	23.3%	28.0%	24.0%	44.7%	50.0%	45.0%	14.8%	20.2%	15.2%
54	9.5%	15.0%	10.0%	47.6%	45.0%	47.0%	35.2%	40.0%	36.0%	27.2%	29.3%	27.3%
55	18.7%	15.0%	18.0%	76.5%	75.0%	76.0%	26.5%	30.0%	27.0%	37.7%	35.5%	37.2%
56	18.4%	15.0%	18.0%	35.7%	33.0%	35.0%	21.1%	20.0%	21.0%	20.9%	18.1%	20.5%
57	17.5%	15.0%	18.0%	31.9%	25.0%	31.0%	22.4%	20.0%	22.0%	20.2%	17.3%	20.3%
58	19.3%	25.0%	19.0%	31.7%	25.0%	31.0%	23.6%	20.0%	23.0%	22.5%	23.5%	22.0%
59	23.4%	25.0%	23.5%	24.8%	30.0%	25.0%	22.9%	20.0%	23.0%	23.6%	24.8%	23.7%
60	23.2%	25.0%	23.5%	24.6%	30.0%	25.0%	23.4%	20.0%	23.0%	23.4%	24.9%	23.6%
61	14.3%	15.0%	14.5%	28.3%	30.0%	25.0%	23.5%	20.0%	23.0%	17.5%	17.7%	17.2%
62	14.9%	15.0%	14.5%	24.0%	22.0%	24.0%	22.9%	25.0%	23.0%	17.4%	17.5%	17.1%
63	13.0%	15.0%	14.5%	21.2%	17.0%	22.0%	21.2%	15.0%	21.0%	15.5%	15.3%	16.7%
64	17.8%	20.0%	18.0%	24.3%	20.0%	24.0%	29.5%	30.0%	29.0%	20.6%	21.4%	20.6%
65	25.9%	20.0%	25.0%	23.7%	20.0%	23.5%	27.0%	30.0%	27.0%	25.6%	21.3%	25.0%
66	19.5%	20.0%	20.0%	20.8%	20.0%	22.0%	23.8%	30.0%	22.5%	20.3%	21.4%	20.7%
67	20.7%	20.0%	20.0%	20.8%	20.0%	22.0%	21.5%	20.0%	22.5%	20.9%	20.0%	20.8%
68	18.5%	20.0%	20.0%	25.3%	30.0%	22.0%	20.1%	30.0%	22.5%	20.0%	23.6%	20.8%
69	20.3%	20.0%	20.0%	23.5%	30.0%	22.0%	23.9%	30.0%	22.5%	21.6%	23.7%	20.9%
70	22.1%	20.0%	20.0%	23.0%	30.0%	22.0%	21.3%	40.0%	22.5%	22.0%	26.4%	20.9%
71	18.4%	20.0%	20.0%	16.4%	30.0%	22.0%	18.0%	20.0%	22.5%	18.0%	21.3%	20.9%
72	20.2%	20.0%	20.0%	18.5%	30.0%	22.0%	22.9%	25.0%	22.5%	20.8%	22.7%	21.0%
73-74	N/A	20.0%	20.0%	N/A	30.0%	22.0%	N/A	25.0%	22.5%	N/A	N/A	21.0%
75+	N/A	100.0%	100.0%	N/A	100.0%	100.0%	N/A	100.0%	100.0%	N/A	N/A	21.0%
Total	12.4%	12.5%	12.4%	22.5%	23.4%	22.5%	24.4%	24.2%	24.3%	16.0%	16.3%	16.0%

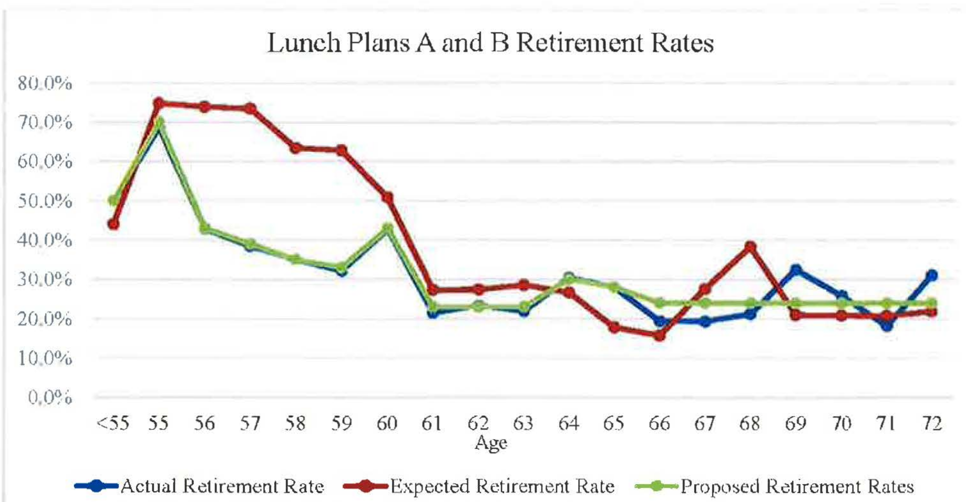

Regular Teachers Retirement/DROP Rates - Total (Aggregate)
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
75+
Age
Actual Retirement / Drop Rates
Expected Retirement / DROP Rates
Proposed Retirement / DROP Rates

Higher Education Retirement Experience

	< 25 Years of Service			25-29 Years of Service			30+ Years of Service			Total (Aggregate)		
Age	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates	Actual Retirement / Drop Rates	Expected Retirement / DROP Rates	Proposed Retirement / DROP Rates
38	N/A	10.0%	8.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	0.0%	0.0%	0.0%
39	N/A	10.0%	8.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	0.0%	0.0%	0.0%
40	N/A	10.0%	8.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	0.0%	0.0%	0.0%
41	0.0%	10.0%	8.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	0.0%	10.0%	8.0%
42	8.3%	10.0%	8.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	8.3%	10.0%	8.0%
43	6.7%	7.0%	7.0%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	6.7%	7.0%	7.0%
44	4.5%	7.0%	4.5%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	4.5%	7.0%	4.5%
45	4.5%	7.0%	4.5%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	4.5%	7.0%	4.5%
46	3.3%	7.0%	3.3%	N/A	8.0%	5.0%	N/A	60.0%	40.0%	3.3%	7.0%	3.3%
47	0.0%	7.0%	3.3%	0.0%	8.0%	5.0%	N/A	60.0%	40.0%	0.0%	7.1%	3.4%
48	3.1%	7.0%	3.3%	0.0%	8.0%	5.0%	N/A	60.0%	40.0%	2.7%	7.1%	3.5%
49	6.6%	7.0%	3.3%	5.6%	8.0%	5.0%	N/A	60.0%	40.0%	6.3%	7.3%	3.8%
50	4.3%	7.0%	3.3%	4.3%	8.0%	5.0%	N/A	60.0%	40.0%	4.3%	7.3%	3.9%
51	4.1%	7.0%	3.3%	9.1%	16.0%	10.0%	50.0%	60.0%	50.0%	6.5%	10.9%	6.3%
52	1.1%	7.0%	3.3%	10.4%	16.0%	10.0%	25.0%	60.0%	25.0%	5.5%	11.9%	6.5%
53	3.9%	7.0%	3.3%	9.9%	16.0%	10.0%	25.0%	60.0%	25.0%	7.3%	13.0%	7.0%
54	9.2%	15.0%	10.0%	32.5%	28.0%	32.0%	37.5%	40.0%	40.0%	20.7%	22.1%	21.1%
55	12.4%	15.0%	12.5%	56.5%	35.0%	50.0%	17.2%	20.0%	15.5%	27.5%	22.3%	25.2%
56	12.5%	15.0%	12.5%	25.6%	20.0%	25.0%	19.4%	5.0%	15.5%	16.6%	14.1%	15.7%
57	9.2%	15.0%	10.0%	20.0%	13.0%	20.0%	17.9%	5.0%	15.5%	13.5%	11.9%	13.3%
58	14.3%	15.0%	14.5%	11.4%	13.0%	12.0%	11.1%	5.0%	15.5%	12.5%	11.4%	14.1%
59	16.8%	15.0%	16.0%	13.9%	13.0%	13.5%	13.7%	5.0%	15.5%	14.8%	11.4%	14.9%
60	21.1%	15.0%	20.0%	18.2%	13.0%	18.0%	14.5%	5.0%	15.5%	19.8%	13.4%	19.1%
61	12.6%	12.0%	12.0%	15.2%	12.0%	15.0%	12.2%	12.0%	15.5%	12.9%	12.0%	13.1%
62	12.1%	12.0%	12.0%	15.5%	12.0%	15.0%	14.8%	12.0%	15.5%	13.2%	12.0%	13.2%
63	7.0%	12.0%	8.0%	15.5%	12.0%	15.0%	15.4%	12.0%	15.5%	10.3%	12.0%	10.8%
64	13.6%	12.0%	13.0%	12.4%	12.0%	12.0%	12.5%	12.0%	15.5%	13.2%	12.0%	13.4%
65	18.8%	12.0%	18.0%	16.8%	16.0%	16.5%	15.4%	20.0%	15.5%	17.5%	14.8%	17.1%
66	19.0%	12.0%	18.0%	18.4%	16.0%	18.0%	14.2%	18.0%	15.5%	17.4%	14.5%	17.2%
67	15.2%	12.0%	14.0%	9.1%	16.0%	10.0%	18.6%	18.0%	15.5%	15.6%	14.7%	14.0%
68	12.0%	12.0%	14.0%	9.6%	16.0%	10.0%	14.5%	18.0%	15.5%	12.7%	15.0%	14.1%
69	15.3%	12.0%	14.0%	12.1%	16.0%	16.0%	13.0%	28.0%	15.5%	14.0%	19.6%	14.9%
70	14.1%	12.0%	14.0%	13.8%	16.0%	16.0%	18.3%	28.0%	15.5%	16.1%	20.0%	14.9%
71	14.7%	12.0%	14.0%	15.4%	16.0%	16.0%	15.8%	20.0%	15.5%	15.3%	16.2%	14.9%
72	13.9%	12.0%	14.0%	17.5%	16.0%	16.0%	18.8%	20.0%	15.5%	16.7%	16.5%	15.0%
73-74	N/A	12.0%	14.0%	N/A	16.0%	16.0%	N/A	20.0%	15.5%	0.0%	0.0%	0.0%
75+	N/A	100.0%	100.0%	N/A	100.0%	100.0%	N/A	100.0%	15.5%	0.0%	0.0%	0.0%
Total	12.7%	11.9%	12.4%	16.4%	15.3%	16.1%	15.8%	16.8%	15.7%	14.1%	13.7%	13.9%


Higher Education Retirement/DROP Rates
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
Age
Actual Retirement/ DROP Rates
Expected Retirement/ DROP Rates
Proposed Retirement/ DROP Rates

Lunch Plans A and B – Retirement Rates						
Age	Eligible Members	Actual Retirements	Expected Retirements	Actual Retirement Rate	Expected Retirement Rate	Proposed Retirement Rates
<55	18	9	7.92	50.0%	44.0%	50.0%
55	16	11	11.97	68.8%	74.8%	70.0%
56	14	6	10.35	42.9%	73.9%	43.0%
57	13	5	9.55	38.5%	73.5%	39.0%
58	20	7	12.69	35.0%	63.5%	35.0%
59	28	9	17.6	32.1%	62.9%	33.0%
60	208	89	105.94	42.8%	50.9%	43.0%
61	121	26	33.08	21.5%	27.3%	23.0%
62	90	21	24.64	23.3%	27.4%	23.0%
63	96	21	27.37	21.9%	28.5%	23.0%
64	102	31	27.24	30.4%	26.7%	30.0%
65	75	21	13.35	28.0%	17.8%	28.0%
66	67	13	10.57	19.4%	15.8%	24.0%
67	57	11	15.72	19.3%	27.6%	24.0%
68	47	10	18.01	21.3%	38.3%	24.0%
69	37	12	7.78	32.4%	21.0%	24.0%
70	31	8	6.48	25.8%	20.9%	24.0%
71	22	4	4.57	18.2%	20.8%	24.0%
72	74	23	16.21	31.1%	21.9%	24.0%
73	0	0	0	N/A	N/A	24.0%
74	0	0	0	N/A	N/A	24.0%
75+	0	0	0	N/A	N/A	24.0%
Total	1,136	337	380.84	29.67%	33.52%	29.89%



WITHDRAWAL/TERMINATION RATES

The withdrawal rate, or sometimes referred to as the termination rate, is the probability that a member will separate employment from a cause other than disability, death, or retirement.

Current Assumptions

Regular Teachers and Higher Education - Current assumptions for each vary based on the age of the member and four distinct levels of service based on prior experience: less than two years of service, two years of service, three years of service, and four or more years of service.

Lunch Plans A and B – Current assumptions are based on years of service and are based on the prior experience for each.

Experience and Proposed Assumptions

All active members during the observation period were included in the exposure unless the member had met the retirement eligibility requirements. If a member was eligible for retirement at a given age, the member's exposure was excluded for that age.

Regular Teachers – Actual withdrawal experience was fairly close to current assumptions. The aggregate withdrawal rate for all age and service levels was 7.7% compared to an expected rate of 7.3%. We are recommending changes to the rates for many ages in each of the current service-level tables to more closely match recent experience. Members with less than 2 years of service experienced fewer withdrawals than expected. Members with 2 and 3 years of service experienced more withdrawals than expected. The majority of members are in the service category of four or more years. The aggregate withdrawal rate for all ages in this service group was 4.8% compared to an expected withdrawal rate of 4.1%. The increase was observed for almost all ages; therefore, we are recommending increasing most of the rates in this service category.

Higher Education – Actual withdrawal experience was fairly close to current assumptions. The withdrawal rate in aggregate for all age and service levels was 13.8% compared to an expected rate of 13.9%. We are recommending changes to the rates in each of the current service-level tables. Actual rates of withdrawal in aggregate were greater than assumed rates of withdrawal for members with less than 2 years of service. Our recommended assumptions slightly increase expected rates. Members with 2 and 3 years of service experienced more withdrawals than assumed at most ages, therefore our recommended assumptions increase expected rates and smooth the pattern of expected withdrawals by age. The majority of members are in the service category of four or more years. The aggregate withdrawal rate for all ages in this service group was 8.8% compared to an expected withdrawal rate of 10.0%. The decrease was observed for almost all ages; therefore, we are recommending decreasing most of the rates in this service category.

Lunch Plan A and B – Expected withdrawal experience is a blend of Plan A and Plan B assumptions based on the eligible members in each Plan. The aggregate actual withdrawal rate of 8.1% exceeded the expected aggregate withdrawal rate of 5.7%. The increase was observed at almost all durations of service; therefore, we recommend increasing the assumptions for nearly all durations of service.

Impact on Valuation Results

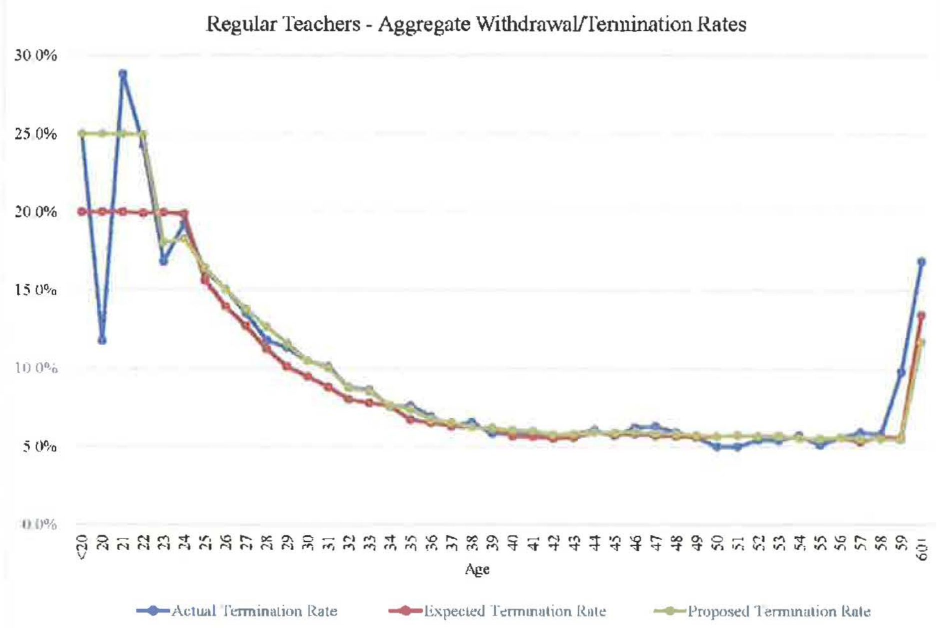
The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	(10,659,221)	(7,864,451)
Higher Education	7,881,538	915,386
Lunch Plans A and B	217,759	(121,457)
TOTAL	(2,559,924)	(7,070,522)

The actual, expected, and proposed withdrawal rates for each Plan by age and duration of service are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed withdrawal rates compared to the current assumptions.

Regular Teachers – Withdrawal/Termination Rates

	< 2 Years of Service			2-3 Years of Service			3-4 Years of Service			4+ Years of Service		
Age	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate
<20	25.0%	20.0%	25.0%	N/A	20.0%	25.0%	N/A	9.5%	16.5%	N/A	18.0%	17.0%
20	11.8%	20.0%	25.0%	N/A	20.0%	25.0%	N/A	9.5%	16.5%	N/A	18.0%	17.0%
21	28.8%	20.0%	25.0%	N/A	20.0%	25.0%	N/A	9.5%	16.5%	N/A	18.0%	17.0%
22	24.0%	20.0%	25.0%	37.5%	20.0%	25.0%	0.0%	9.5%	16.5%	N/A	18.0%	17.0%
23	16.7%	20.0%	18.0%	19.6%	20.0%	20.0%	16.7%	9.5%	16.5%	16.7%	18.0%	17.0%
24	18.6%	20.0%	18.0%	23.0%	20.0%	20.0%	15.4%	9.5%	16.5%	18.2%	18.0%	17.0%
25	17.0%	18.0%	18.0%	14.8%	12.6%	13.5%	17.1%	9.5%	16.5%	7.5%	9.0%	9.0%
26	17.8%	18.0%	18.0%	13.6%	12.6%	13.5%	12.3%	9.5%	12.5%	10.8%	6.0%	9.0%
27	18.2%	19.0%	18.0%	12.9%	12.6%	13.5%	11.1%	9.5%	12.2%	9.1%	6.0%	9.0%
28	18.0%	19.0%	18.0%	13.7%	12.6%	13.5%	9.3%	9.5%	11.9%	7.3%	5.5%	8.5%
29	17.1%	19.0%	18.0%	13.1%	12.6%	13.5%	11.3%	9.5%	11.6%	8.0%	5.3%	8.0%
30	17.4%	19.0%	18.0%	14.8%	12.0%	13.5%	10.0%	10.9%	11.3%	7.2%	5.3%	7.0%
31	19.1%	19.0%	18.0%	13.7%	12.0%	13.5%	11.6%	10.9%	11.0%	6.7%	5.0%	7.0%
32	15.5%	19.0%	16.5%	14.3%	12.0%	13.5%	9.8%	10.9%	10.7%	6.3%	4.5%	6.0%
33	16.7%	19.0%	16.5%	13.3%	12.0%	13.5%	9.4%	10.9%	10.4%	6.2%	4.5%	6.0%
34	15.0%	19.0%	16.5%	12.0%	12.0%	13.0%	12.7%	10.9%	10.1%	5.1%	4.5%	5.0%
35	16.5%	18.0%	16.5%	14.1%	11.7%	13.0%	8.8%	9.5%	9.8%	5.3%	4.0%	5.0%
36	16.1%	18.0%	16.5%	11.6%	11.7%	12.0%	11.1%	9.5%	9.5%	4.7%	4.0%	4.5%
37	16.0%	18.0%	16.5%	12.8%	11.7%	12.0%	12.9%	9.5%	9.5%	4.0%	4.0%	4.5%
38	14.8%	18.0%	16.5%	12.5%	11.7%	12.0%	10.8%	9.5%	9.5%	4.8%	4.0%	4.2%
39	16.3%	18.0%	16.5%	8.1%	11.7%	12.0%	7.7%	9.5%	9.2%	4.1%	4.0%	4.2%
40	14.4%	16.5%	16.5%	13.0%	12.3%	12.0%	8.8%	9.0%	9.0%	4.1%	3.7%	4.2%
41	17.5%	16.5%	16.5%	11.7%	12.3%	12.0%	10.5%	9.0%	9.0%	3.9%	3.7%	4.2%
42	14.0%	16.5%	15.0%	11.7%	12.3%	12.0%	11.2%	9.0%	9.0%	3.9%	3.7%	4.2%
43	15.0%	16.5%	15.0%	12.9%	12.3%	12.0%	9.6%	9.0%	9.0%	4.1%	3.7%	4.2%
44	15.0%	16.5%	15.0%	8.0%	12.3%	12.0%	8.3%	9.0%	9.0%	4.7%	4.0%	4.2%
45	13.5%	16.3%	15.0%	11.1%	9.9%	12.0%	8.7%	9.0%	9.0%	4.2%	4.0%	4.2%
46	17.6%	16.3%	15.0%	10.1%	9.9%	12.0%	8.5%	9.0%	9.0%	4.4%	4.0%	4.2%
47	17.4%	16.3%	15.0%	10.0%	9.9%	12.0%	9.6%	9.0%	9.0%	4.6%	4.0%	4.2%
48	14.4%	16.3%	15.0%	9.2%	9.9%	12.0%	13.4%	9.0%	9.0%	4.3%	4.0%	4.2%
49	16.2%	16.3%	15.0%	12.2%	9.9%	12.0%	10.5%	9.0%	9.0%	3.8%	4.0%	4.2%
50	12.6%	17.5%	15.0%	11.0%	11.2%	12.0%	7.0%	9.0%	9.0%	3.8%	4.0%	4.2%
51	13.8%	17.5%	15.0%	11.4%	11.2%	12.0%	9.1%	9.0%	9.0%	3.5%	4.0%	4.2%
52	14.4%	17.5%	15.0%	11.1%	11.2%	12.0%	5.5%	9.0%	9.0%	4.1%	4.0%	4.2%
53	14.9%	17.5%	15.0%	11.6%	11.2%	12.0%	7.3%	9.0%	9.0%	4.0%	4.0%	4.2%
54	12.3%	17.5%	15.0%	12.0%	11.2%	12.0%	7.7%	9.0%	9.0%	4.7%	4.0%	4.2%
55	12.0%	17.5%	15.0%	14.0%	10.6%	12.0%	8.5%	9.0%	9.0%	3.9%	4.0%	4.2%
56	12.6%	17.5%	15.0%	13.7%	10.6%	12.0%	8.6%	9.0%	9.0%	4.4%	4.0%	4.2%
57	13.5%	15.5%	15.0%	12.2%	10.6%	12.0%	13.8%	9.0%	9.0%	4.6%	4.0%	4.2%
58	14.7%	20.0%	15.0%	8.8%	10.6%	12.0%	9.0%	9.0%	9.0%	4.7%	4.0%	4.2%
59	17.4%	20.0%	15.0%	10.5%	10.6%	12.0%	6.3%	9.0%	9.0%	9.2%	4.0%	4.2%
60+	19.8%	20.0%	15.0%	15.4%	10.6%	12.0%	13.0%	9.0%	9.0%	16.4%	4.0%	4.2%
Total	16.6%	18.3%	16.8%	13.0%	12.1%	13.0%	10.4%	9.6%	10.4%	4.8%	4.1%	4.7%


Regular Teachers - Aggregate Withdrawal/Termination Rates
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
<20
20
21
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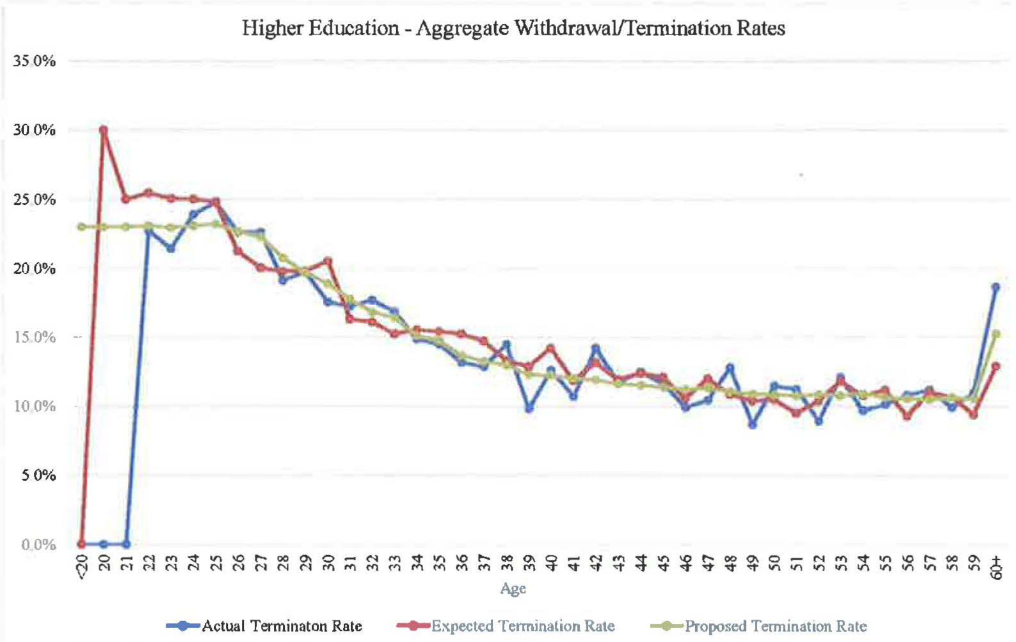
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60+
Age
Actual Termination Rate
Expected Termination Rate
Proposed Termination Rate

Higher Education – Withdrawal/Termination Rates												
	< 2 Years of Service			2-3 Years of Service			3-4 Years of Service			4+ Years of Service		
Age	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate	Actual Rate	Expected Rate	Proposed Rate
<20	0.0%	25.0%	23.0%	N/A	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
20	0.0%	25.0%	23.0%	N/A	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
21	0.0%	25.0%	23.0%	N/A	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
22	23.8%	25.0%	23.0%	0.0%	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
23	21.0%	25.0%	23.0%	0.0%	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
24	23.1%	25.0%	23.0%	33.3%	25.0%	25.0%	N/A	17.0%	17.0%	N/A	12.0%	25.0%
25	24.7%	25.0%	23.0%	26.1%	25.0%	25.0%	12.5%	17.0%	17.0%	50.0%	12.0%	25.0%
26	23.0%	21.0%	23.0%	21.9%	25.0%	21.0%	20.0%	17.0%	23.0%	25.0%	12.0%	25.0%
27	22.8%	21.0%	23.0%	20.1%	22.0%	21.0%	27.6%	17.0%	22.0%	20.4%	12.0%	20.0%
28	22.2%	22.0%	23.0%	20.8%	22.0%	21.0%	15.1%	17.0%	21.5%	10.5%	12.0%	12.0%
29	24.2%	24.0%	23.0%	21.4%	22.0%	21.0%	15.1%	17.0%	21.0%	12.7%	12.0%	12.0%
30	21.5%	25.0%	23.0%	22.0%	16.0%	21.0%	17.1%	17.0%	20.5%	10.7%	18.0%	12.0%
31	24.5%	22.0%	23.0%	9.7%	17.8%	18.0%	19.0%	17.0%	20.0%	12.3%	10.0%	12.0%
32	19.7%	22.0%	21.0%	16.7%	19.0%	18.0%	23.4%	16.0%	19.5%	14.7%	10.0%	12.0%
33	22.2%	19.0%	21.0%	21.4%	17.0%	18.0%	15.0%	15.0%	19.0%	12.2%	12.0%	12.0%
34	21.9%	23.0%	21.0%	14.6%	15.5%	18.0%	17.1%	10.0%	18.5%	10.1%	12.0%	10.0%
35	20.1%	22.0%	21.0%	18.3%	17.5%	18.0%	19.2%	13.0%	18.0%	9.7%	12.0%	10.0%
36	19.3%	22.0%	21.0%	24.2%	16.0%	18.0%	14.6%	15.0%	17.5%	8.3%	12.0%	9.0%
37	18.6%	22.0%	19.5%	25.2%	10.8%	18.0%	15.6%	15.0%	17.0%	7.6%	12.0%	9.0%
38	21.9%	19.0%	19.5%	16.2%	18.0%	18.0%	22.3%	15.0%	16.5%	10.1%	10.0%	9.0%
39	14.9%	19.0%	19.5%	12.3%	14.0%	18.0%	7.0%	15.0%	16.0%	7.8%	10.0%	8.0%
40	22.6%	23.0%	19.5%	12.3%	18.5%	18.0%	17.5%	15.0%	15.5%	8.1%	10.0%	8.0%
41	18.2%	16.5%	19.5%	20.7%	10.8%	20.0%	11.9%	15.0%	15.3%	6.8%	10.0%	8.0%
42	21.8%	23.0%	19.5%	21.3%	11.5%	20.0%	15.3%	15.0%	15.1%	10.7%	10.0%	8.0%
43	21.1%	15.5%	19.5%	20.2%	16.8%	20.0%	14.9%	15.0%	14.9%	7.7%	10.0%	8.0%
44	21.3%	19.5%	19.5%	20.7%	13.5%	20.0%	19.2%	15.0%	14.7%	8.4%	10.0%	8.0%
45	15.9%	19.0%	19.5%	21.9%	11.6%	20.0%	18.6%	15.0%	14.5%	8.8%	10.0%	8.0%
46	13.0%	16.2%	19.5%	16.7%	17.0%	19.0%	18.2%	15.0%	14.3%	7.6%	8.0%	8.0%
47	19.1%	21.0%	19.5%	13.0%	14.0%	18.0%	11.9%	15.0%	14.1%	7.6%	9.0%	8.0%
48	22.2%	13.5%	19.5%	26.2%	18.0%	17.0%	12.5%	15.0%	13.9%	9.0%	9.0%	8.0%
49	16.7%	13.5%	19.5%	9.6%	12.5%	16.0%	13.7%	15.0%	13.7%	6.2%	9.0%	8.0%
50	22.9%	18.5%	19.5%	12.3%	10.8%	15.0%	20.3%	6.0%	13.5%	7.5%	9.0%	8.0%
51	21.4%	14.5%	19.5%	10.3%	7.0%	14.0%	12.3%	5.0%	13.3%	8.7%	9.0%	8.0%
52	16.4%	15.5%	19.5%	23.9%	11.0%	14.0%	11.5%	9.5%	13.1%	5.5%	9.0%	8.0%
53	20.4%	22.0%	19.5%	13.2%	13.0%	14.0%	20.5%	12.5%	12.9%	9.3%	9.0%	8.0%
54	19.0%	22.0%	19.5%	14.3%	7.5%	14.0%	6.2%	1.7%	12.7%	7.1%	9.0%	8.0%
55	16.5%	20.0%	19.5%	14.5%	10.4%	14.0%	16.7%	14.0%	12.5%	7.6%	9.0%	8.0%
56	25.0%	13.5%	19.5%	13.2%	12.2%	14.0%	16.1%	10.0%	12.3%	6.8%	8.0%	8.0%
57	18.0%	25.0%	19.5%	18.2%	5.5%	14.0%	11.5%	14.0%	12.1%	9.0%	8.0%	8.0%
58	18.4%	10.0%	19.5%	8.9%	11.5%	14.0%	7.0%	20.0%	11.9%	8.1%	10.0%	8.0%
59	16.4%	10.0%	19.5%	22.7%	21.0%	14.0%	9.5%	12.5%	11.7%	8.8%	8.0%	8.0%
60+	21.5%	15.0%	19.5%	14.6%	16.0%	14.0%	17.7%	9.0%	11.5%	16.9%	6.0%	8.0%
Total	20.9%	20.4%	20.9%	17.9%	16.2%	18.0%	16.4%	13.7%	16.3%	8.8%	10.0%	8.7%


Higher Education - Aggregate Withdrawal/Termination Rates
35.0%
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25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
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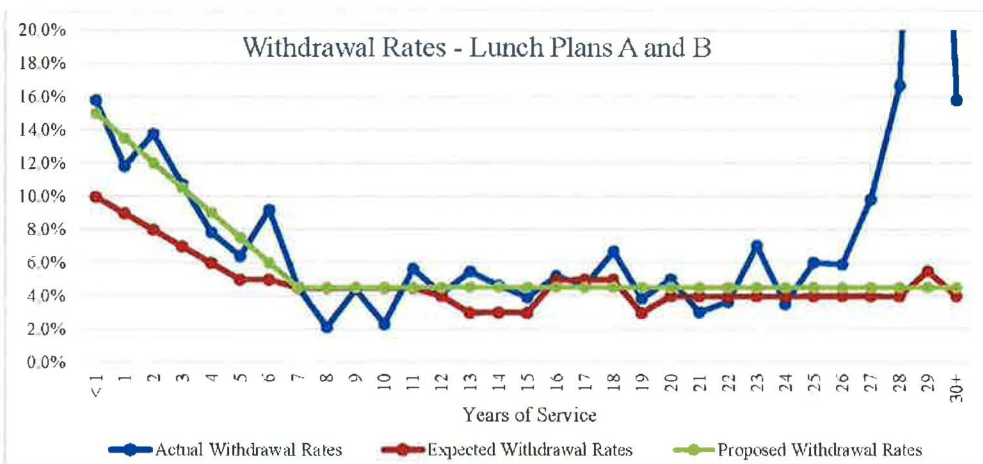
59
60+
Age
Actual Terminaton Rate
Expected Termination Rate
Proposed Termination Rate

Lunch Plans A and B - Withdrawal/Termination Rates						
Service	Eligible Members	Actual Withdrawals	Expected Withdrawals	Actual Withdrawal Rates	Expected Withdrawal Rates	Proposed Withdrawal Rates
< 1	380	60	37.84	15.8%	10.0%	15.0%
1	525	62	47.04	11.8%	9.0%	13.5%
2	422	58	33.6	13.7%	8.0%	12.0%
3	345	37	24.02	10.7%	7.0%	10.5%
4	320	25	19.09	7.8%	6.0%	9.0%
5	313	20	15.58	6.4%	5.0%	7.5%
6	262	24	13.03	9.2%	5.0%	6.0%
7	265	12	11.85	4.5%	4.5%	4.5%
8	236	5	10.55	2.1%	4.5%	4.5%
9	206	9	9.22	4.4%	4.5%	4.5%
10	174	4	7.78	2.3%	4.5%	4.5%
11	178	10	7.97	5.6%	4.5%	4.5%
12	170	7	6.75	4.1%	4.0%	4.5%
13	165	9	4.9	5.5%	3.0%	4.5%
14	152	7	4.52	4.6%	3.0%	4.5%
15	154	6	4.57	3.9%	3.0%	4.5%
16	135	7	6.69	5.2%	5.0%	4.5%
17	130	6	6.45	4.6%	5.0%	4.5%
18	120	8	5.95	6.7%	5.0%	4.5%
19	104	4	3.09	3.8%	3.0%	4.5%
20	80	4	3.18	5.0%	4.0%	4.5%
21	66	2	2.62	3.0%	4.0%	4.5%
22	55	2	2.18	3.6%	4.0%	4.5%
23	57	4	2.26	7.0%	4.0%	4.5%
24	57	2	2.26	3.5%	4.0%	4.5%
25	50	3	1.99	6.0%	4.0%	4.5%
26	51	3	2.03	5.9%	4.0%	4.5%
27	51	5	2.03	9.8%	4.0%	4.5%
28	42	7	1.67	16.7%	4.0%	4.5%
29	27	15	1.48	55.6%	5.5%	4.5%
30+	19	3	0.76	15.8%	4.0%	4.5%
Total	5,311	430	302.92	8.1%	5.7%	7.6%



MORTALITY RATES

XYZ normal cost and actuarial accrued liabilities depend in part on how long retirees will live. If retirees live longer than anticipated by the assumptions, benefits will be paid longer than expected and experience losses will develop. If retirees do not live as long as anticipated by the assumptions, experience gains will develop. Mortality rates represent the probability of death at a given age. The choice of mortality rates impacts active member and retiree costs and liabilities and has the greatest impact on the liabilities for retirees.

The actuarial profession has increasingly become more focused on the issue of future mortality improvement. Mortality rates have declined over time as advances in medical care have evolved. The extent of future mortality improvement will impact the magnitude of pension costs and liabilities for future benefit commitments. ASOP No. 35 discusses the importance of actuaries considering mortality improvements when measuring pension obligations. Specifically, an actuary should make and disclose a specific recommendation with respect to future mortality improvement after the measurement date. Mortality improvement can be accounted for with static or generational mortality tables. A static table includes a projection of the base mortality rates to a specific date or equivalently for a specific number of years. The same mortality rates at any given age apply to everyone. A generational table anticipates future improvements in mortality by using a different static mortality table for each year of birth, with the tables for later years of birth assuming lower mortality than the tables of earlier years of birth.

Credibility procedures employed in our analysis used a statistical approach to combine actual mortality experience with standard mortality tables to improve the estimate of future mortality.

Current Assumptions

The current mortality assumption for active members and regular retirees for all Plans are a variation of the RP-2000 Combined Healthy Mortality Table. Mortality rates are adjusted to reflect mortality improvement through 2025 using Scale AA.

For Disabled retirees, the current assumption for all Plans is the RP-2000 Disabled Retiree Mortality Table with no projection for mortality improvement.

Experience and Recommended Assumptions

Experience was reviewed separately for active members, non-disabled retirees, and disabled retirees. We reviewed mortality experience for Regular Teachers, Higher Education, and the Lunch Plans in total. The mortality experienced by the XYZ Plans for the 2012 to 2017 plan years reflects the trend of mortality improvement seen among the general population.

In order for a plan to develop a mortality table based solely on its own experience it must have hundreds of thousands of lives and thousands of deaths at each age and sex. However, many plans provide enough fully credible experience to develop a custom mortality table by multiplying the mortality rates in a published table by the ratio of actual to expected deaths. We employed this methodology by first identifying a standard table with mortality rates that are similar to those shown by the actual plan membership. Since the rate at each age in the custom mortality table will be a multiple of the rate at that age from the standard table, close attention was given to the shape of the standard table in making the selection.

Once the appropriate standard table was selected, we determined the multiple using the limited fluctuation approach to credibility, as described in the Society of Actuaries Credibility Educational Resource for Pension Actuaries, issued in August 2017. Using this approach, 1082 deaths are needed to provide full credibility based on a 90% confidence level and a 5% margin of error. If the experience data is fully credible, then the rates from the standard table are multiplied by the ratio of the actual to expected deaths from the standard table. Where there are fewer than the 1,082 deaths needed for full credibility, the limited fluctuations approach allows some of the plan's actual experience to be used to adjust the standard table.

Based on the analysis noted above, we recommend updating the mortality assumptions as described below.

Active Mortality:

Mortality rates for active members are much less significant to the valuation since mortality rates are significantly lower for active members than for retirees. The low number of active member deaths results in an insufficient number of deaths needed to provide fully credible experience on which to develop the system's mortality rates. Using the credibility approach identified above, we found that with only 130 deaths for males, the XYZ experience was only 34.7% credible (credibility factor). The number of female deaths during the study period was 318, which resulted in a credibility factor of 54.2%. In selecting a standard table, we considered the RP-2014 Total Dataset Employee tables and the RP-2014 White Collar Employee tables for males and females.

We found that the RP-2014 White Collar mortality tables provided a closer match to the limited experience of current active members. The A/E ratio for males was 103.0% and the A/E ratio for females was 99.4%. By comparison, we found that the Total Dataset table resulted in an A/E ratio of 73.6% for males and 84.1% for females.

Using the limited fluctuation approach, the recommended mortality tables for active members are the RP-2014 White Collar Employee tables for males and females, with the rates at each age adjusted by factors of 1.010 for males and by 0.997 for females.

Non-Disabled Retirees:

Mortality rates for retirees are much more significant to the valuation since mortality rates are significantly higher for retirees. Using the credibility approach described above, we found that with 2,866 male deaths and 6,578 female deaths, the total XYZ experience was 100% credible for both males and females. However, the number of deaths by age category was not fully credible so the limited fluctuation approach requires the use of a standard table with a multiple to adjust the table to reflect plan specific experience. In selecting a standard table, we considered the RP-2014 Total Dataset Healthy Annuitant tables, the RP-2014 White Collar Healthy Annuitant tables, and the RP-2014 Blue Collar Healthy Annuitant tables for males and females.

We found that the Blue Collar and Total Dataset tables provided a closer match to the total A/E ratio, but after adjusting all three standard tables with the multiple determined using the credibility method, the RP-2014 White Collar Healthy Annuitant table provided the closest overall fit to actual plan experience. Therefore, the recommended mortality tables for non-disabled retirees and inactive members are the RP-2014 White Collar Healthy Annuitant tables for males and females, with the rates at each age adjusted by factors of 1.366 for males and by 1.189 for females.

Disability Retiree Mortality:

Mortality rates for disability retirees are generally higher than for regular retirees. Using the credibility approach identified above, we found that with only 105 male deaths and 641 female deaths, the XYZ experience was 31.2% credible for males and 77.0% credible for females. In selecting a standard table, we found that the RP-2014 Disability mortality table provided an A/E ratio of 136% for males and 117% for females. Using the limited fluctuation approach, the recommended mortality tables for disabled retirees are the RP-2014 Disability tables for males and females, with the rates at each age adjusted by factors of 1.111 for males and by 1.134 for females.

Future Mortality Improvement:

To address expected future mortality improvement, we recommend adjusting the above base tables from 2014 to 2018 using the MP-2017 generational improvement table, with continued future mortality improvement projected using the MP-2017 generational mortality improvement tables for active members, non-disabled retirees and disabled retirees.

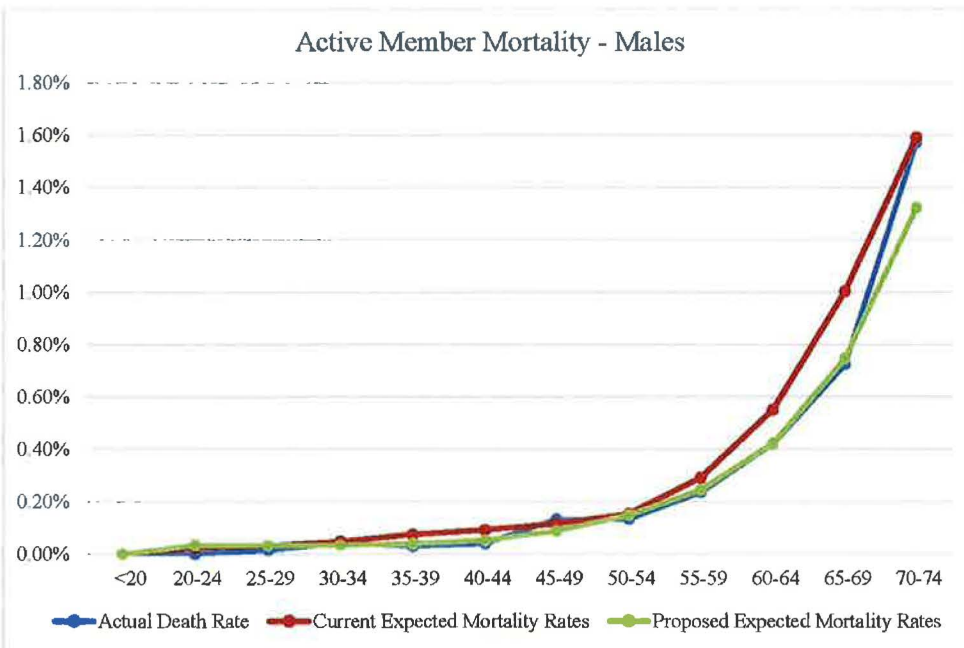
Impact on Valuation Results

The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

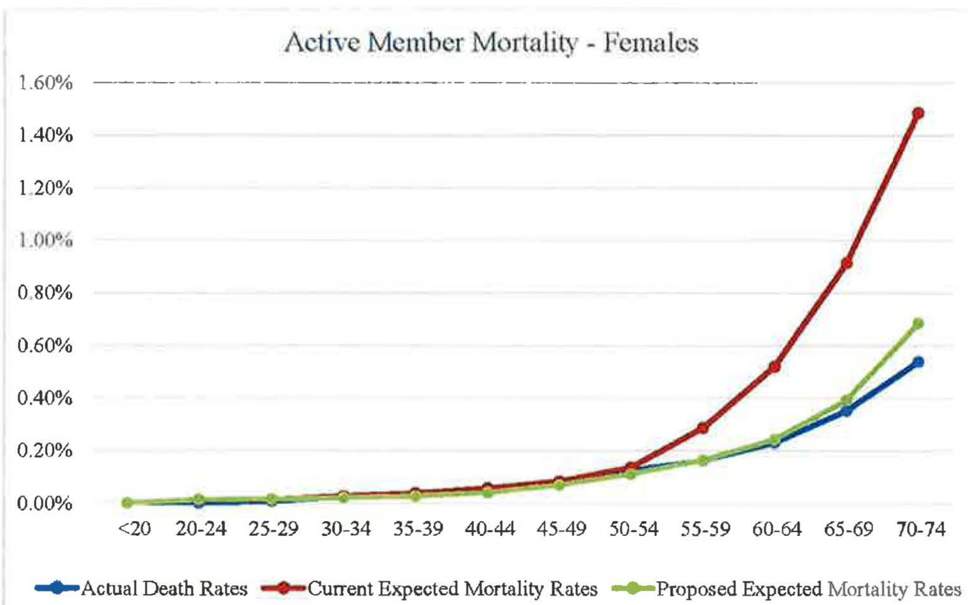
	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	259,914,665	14,610,423
Higher Education	35,429,813	1,908,984
Lunch Plans A and B	1,866,866	126,556
Retirees/Inactive Members	434,414,086	0
TOTAL	731,625,430	16,645,963

The actual, expected, and proposed mortality rates for active members, non-disabled retirees, and disabled retirees for males and females are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed mortality rates compared to the current assumptions.

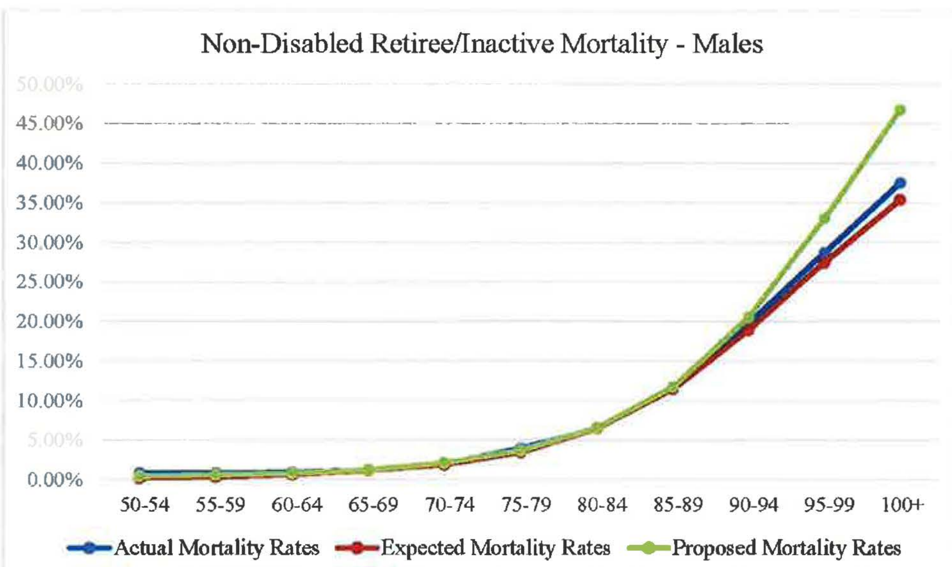
Active Member Mortality - Males						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Death Rate	Current Expected Mortality Rates	Proposed Expected Mortality Rates
<20	1	0	0	0.00%	0.00%	0.00%
20-24	1,153	0	0.28	0.00%	0.02%	0.03%
25-29	6,759	1	2.12	0.01%	0.03%	0.03%
30-34	9,566	4	4.55	0.04%	0.05%	0.03%
35-39	9,916	3	7.41	0.03%	0.07%	0.04%
40-44	10,234	4	9.41	0.04%	0.09%	0.05%
45-49	9,847	13	11.32	0.13%	0.11%	0.09%
50-54	8,990	12	13.76	0.13%	0.15%	0.15%
55-59	7,224	17	20.99	0.24%	0.29%	0.24%
60-64	6,183	26	34.03	0.42%	0.55%	0.42%
65-69	3,453	25	34.63	0.72%	1.00%	0.75%
70-74	1,590	25	25.3	1.57%	1.59%	1.32%
75-79	0	0	0	N/A	N/A	2.34%
80-84	0	0	0	N/A	N/A	3.26%
Total	74,916	130	163.85	0.17%	0.22%	0.17%



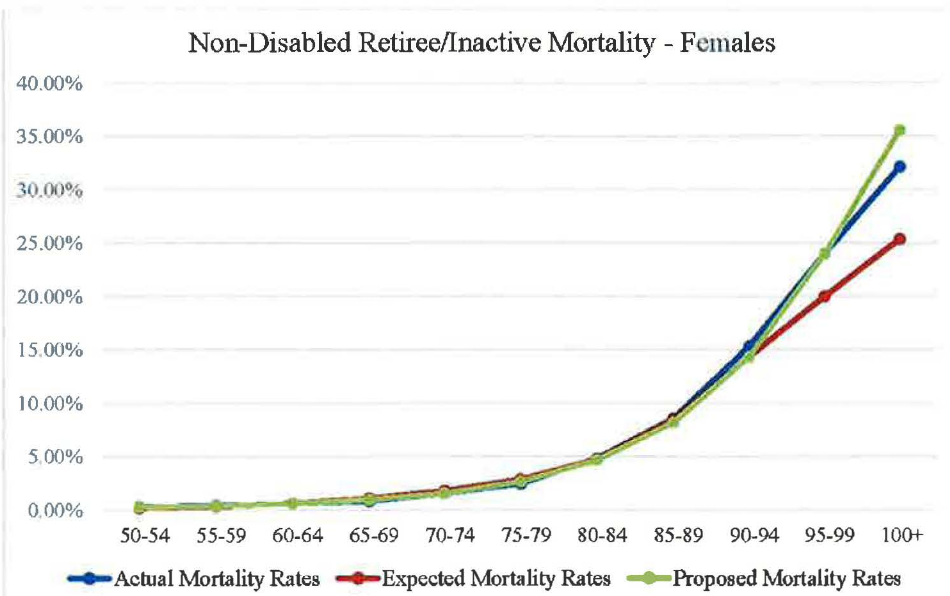
Active Member Mortality - Females						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Death Rate	Current Expected Mortality Rates	Proposed Expected Mortality Rates
<20	7	0	0	0.00%	0.00%	0.00%
20-24	5,074	0	0.62	0.00%	0.01%	0.01%
25-29	27,049	2	4.22	0.01%	0.02%	0.02%
30-34	40,208	10	10.87	0.02%	0.03%	0.02%
35-39	45,362	15	17.55	0.03%	0.04%	0.03%
40-44	49,370	21	28.36	0.04%	0.06%	0.04%
45-49	49,536	36	41.32	0.07%	0.08%	0.07%
50-54	49,084	62	67.21	0.13%	0.14%	0.11%
55-59	39,298	64	112.3	0.16%	0.29%	0.16%
60-64	25,243	58	131.22	0.23%	0.52%	0.24%
65-69	9,665	34	88.33	0.35%	0.91%	0.39%
70-74	2,974	16	44.17	0.54%	1.49%	0.68%
75-79	0	0	0	N/A	N/A	1.19%
80-84	0	0	0	N/A	N/A	1.64%
Total	342,870	318	546.18	0.09%	0.16%	0.09%



Non-Disability Retiree/Inactive Mortality - Males						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Death Rate	Current Expected Mortality Rates	Proposed Expected Mortality Rates
50-54	2,237	19	4	0.85%	0.17%	0.44%
55-59	5,863	48	19	0.82%	0.32%	0.60%
60-64	11,564	109	73	0.94%	0.63%	0.82%
65-69	16,977	207	196	1.22%	1.15%	1.26%
70-74	15,995	324	301	2.03%	1.88%	2.12%
75-79	12,772	500	436	3.91%	3.41%	3.67%
80-84	9,626	621	621	6.45%	6.45%	6.57%
85-89	4,763	555	545	11.65%	11.43%	11.74%
90-94	1,669	329	316	19.71%	18.91%	20.55%
95-99	272	78	75	28.68%	27.43%	33.00%
100+	24	9	8	37.50%	35.33%	46.74%
Total	**81,762**	**2,799**	**2,593**	**3.42%**	**3.17%**	**3.42%**

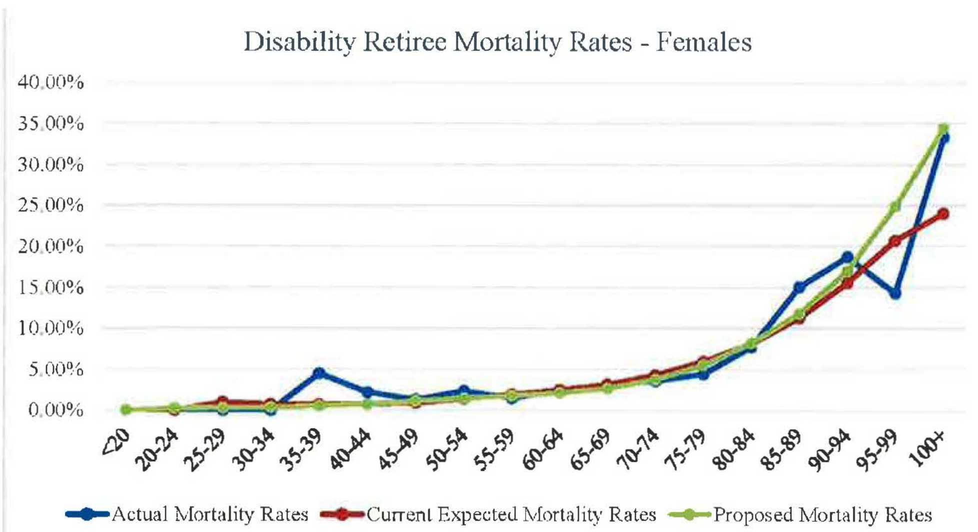


Non-Disabled Retiree/Inactive Mortality - Females						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Death Rate	Current Expected Mortality Rates	Proposed Expected Mortality Rates
50-54	11,853	36	18	0.30%	0.15%	0.27%
55-59	29,417	119	93	0.40%	0.32%	0.37%
60-64	53,021	299	323	0.56%	0.61%	0.58%
65-69	59,164	480	633	0.81%	1.07%	0.95%
70-74	45,358	683	801	1.51%	1.77%	1.55%
75-79	33,794	819	957	2.42%	2.83%	2.63%
80-84	25,114	1,209	1,182	4.81%	4.71%	4.62%
85-89	14,666	1,254	1,240	8.55%	8.45%	8.13%
90-94	6,668	1,022	955	15.33%	14.32%	14.33%
95-99	2,035	488	406	23.98%	19.96%	23.97%
100+	280	90	71	32.14%	25.35%	35.59%
Total	281,370	6,499	6,679	2.31%	2.37%	2.31%



Disability Retiree Mortality – Males						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Mortality Rates	Current Expected Mortality Rates	Proposed Mortality Rates
<20	0	0	0	0.00%	0.00%	0.00%
20-24	0	0	0	0.00%	0.00%	0.92%
25-29	1	0	0.02	0.00%	2.00%	0.89%
30-34	4	1	0.09	25.00%	2.25%	0.93%
35-39	14	1	0.33	7.14%	2.36%	1.08%
40-44	19	0	0.44	0.00%	2.32%	1.44%
45-49	79	6	1.99	7.59%	2.52%	2.05%
50-54	94	1	2.96	1.06%	3.15%	2.40%
55-59	260	7	10.01	2.69%	3.85%	2.73%
60-64	374	10	16.92	2.67%	4.52%	3.16%
65-69	393	26	21.38	6.62%	5.44%	3.87%
70-74	254	18	17.53	7.09%	6.90%	5.05%
75-79	190	15	17.4	7.89%	9.16%	6.93%
80-84	97	8	11.59	8.25%	11.95%	9.98%
85-89	36	9	5.58	25.00%	15.50%	14.66%
90-94	18	3	3.84	16.67%	21.33%	21.66%
95-99	9	0	2.6	0.00%	28.89%	30.07%
Total	1,842	105	112.65	5.70%	6.12%	4.67%

Disability Retiree Mortality - Females						
Age	Exposed Members	Actual Deaths	Expected Deaths	Actual Mortality Rates	Current Expected Mortality Rates	Proposed Mortality Rates
<20	0	0	0	0.00%	0.00%	0.00%
20-24	0	0	0	0.00%	0.00%	0.26%
25-29	1	1	0.01	100.00%	1.00%	0.29%
30-34	20	0	0.15	0.00%	0.75%	0.38%
35-39	134	6	0.99	4.48%	0.74%	0.50%
40-44	321	7	2.39	2.18%	0.74%	0.76%
45-49	754	10	6.94	1.33%	0.92%	1.16%
50-54	1,498	35	20.61	2.34%	1.38%	1.47%
55-59	2,511	36	47.34	1.43%	1.89%	1.75%
60-64	3,566	85	86.49	2.38%	2.43%	2.08%
65-69	3,615	106	113.27	2.93%	3.13%	2.66%
70-74	2,761	98	117.87	3.55%	4.27%	3.72%
75-79	1,830	80	108.2	4.37%	5.91%	5.49%
80-84	1,029	79	83.48	7.68%	8.11%	8.15%
85-89	413	62	46.39	15.01%	11.23%	11.79%
90-94	171	32	26.58	18.71%	15.54%	17.01%
95-99	21	3	4.35	14.29%	20.71%	24.88%
100+	3	1	0.72	33.33%	24.00%	34.46%
Total	18,648	641	665.75	3.44%	3.57%	3.32%



DISABILITY INCIDENCE RATES

The disability incidence assumption is the probability that a member will become disabled while actively participating in the plan. A review of past experience compared to the current assumption will provide the basis for examining the assumption.

Current Assumptions

Regular Teachers, Higher Education, Lunch Plan A and Lunch Plan B currently each have distinct tables of disability assumptions that vary by member age.

Experience and Proposed Assumptions

The rates illustrated are unisex and represent the probability of disability, given the member had met the eligibility requirements. If the member did not meet the eligibility requirements at a given age, the member's exposure was excluded for that age. As shown on the tables following the end of this section, the overall disability experience varies by Plan.

Regular Teachers – The rate of disability incidence was higher than expected for most ages. The actual aggregate rate of disabilities was 0.224% compared to an expected aggregate rate of 0.193%. Therefore, we are recommending small increases in the disability assumptions at most ages.

Higher Education – This group has a relatively low incidence of disabilities. The actual aggregate rate of disabilities equaled the expected aggregate rate of disabilities of 0.04%. However, we are recommending small changes in the assumptions to better match the pattern of disability rates by age.

Lunch Plans A and B – The Lunch Plans have a higher incidence of disability than Regular Teachers and Higher Education. The aggregate rate of disability retirements was 0.51% compared to the expected aggregate rate of 0.88%. Therefore, we recommend lowering the disability rates for most ages.

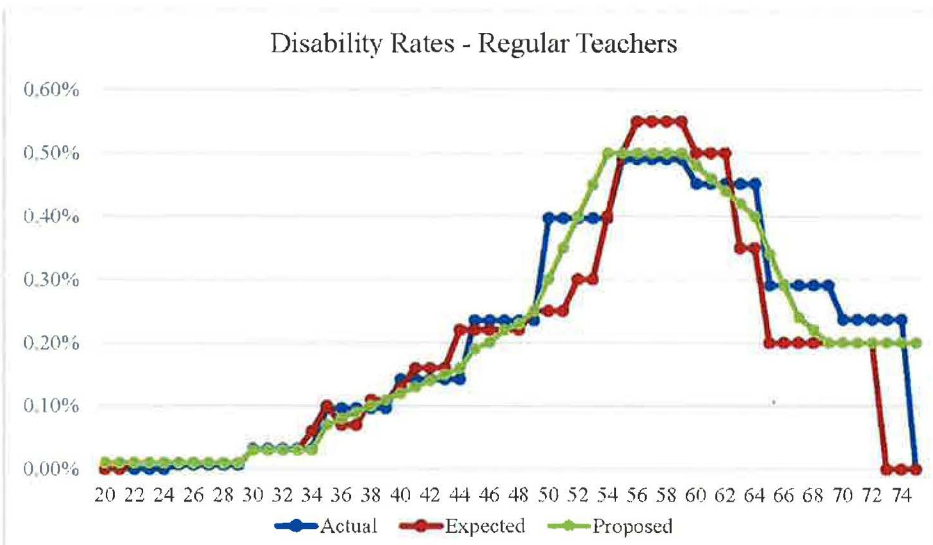
Impact on Valuation Results

The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

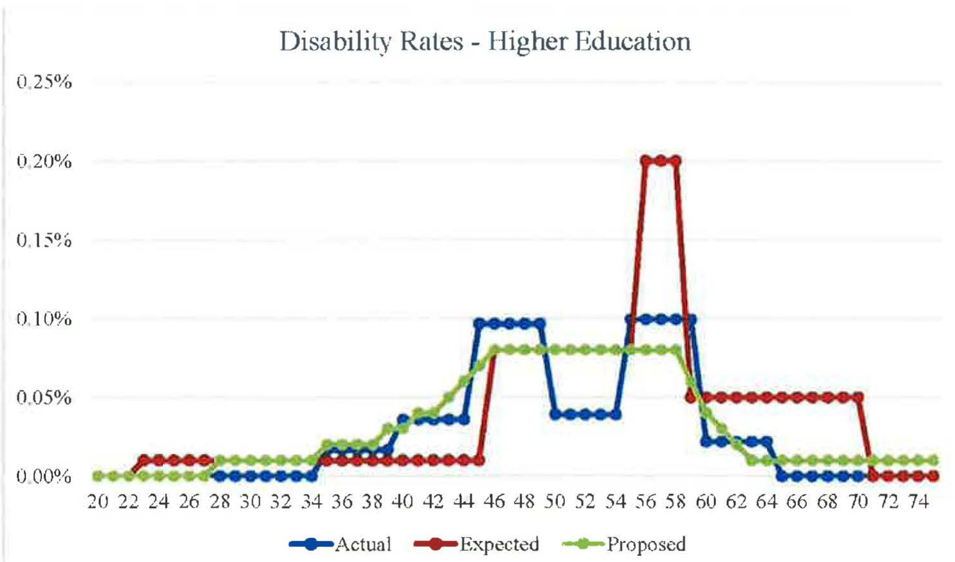
	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	(2,851,311)	49,604
Higher Education	163,075	34,090
Lunch Plans A and B	(10,791)	(27,204)
TOTAL	(2,699,027)	56,490

The actual, expected, and proposed rates of disability are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed disability rates compared to the current assumptions.

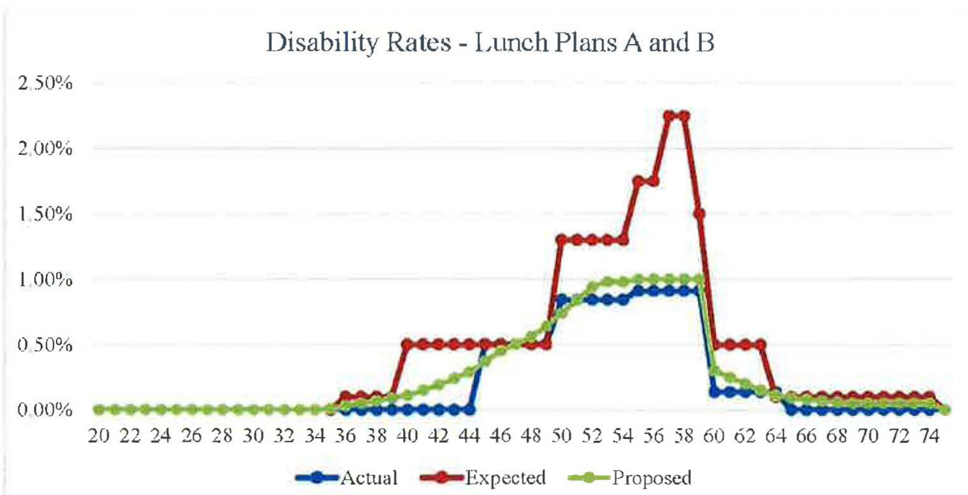
Regular Teachers – Disability Rates						
Age	Eligible Members	Actual Disabilities	Expected Disabilities	Actual Disability Rates	Expected Disability Rates	Proposed Disability Rates
<20	8	0	0	0.00%	0.00%	0.00%
20-24	5,735	0	0.47	0.00%	0.01%	0.01%
25-29	30,308	2	2.85	0.01%	0.01%	0.01%
30-34	43,734	14	11.08	0.03%	0.03%	0.03%
35-39	48,910	47	38.9	0.10%	0.08%	0.09%
40-44	53,535	76	75.37	0.14%	0.14%	0.14%
45-49	53,208	125	114.25	0.23%	0.21%	0.22%
50-54	51,402	204	131.41	0.40%	0.26%	0.40%
55-59	39,958	196	190.42	0.49%	0.48%	0.49%
60-64	26,134	118	115.6	0.45%	0.44%	0.45%
65-69	9,971	29	22.11	0.29%	0.22%	0.25%
70-74	2,956	7	5.2	0.24%	0.18%	0.20%
75+	0	0	0	N/A	N/A	N/A
Total	365,859	818	707.66	0.224%	0.193%	0.219%



Higher Education – Disability Rates						
Age	Eligible Members	Actual Disabilities	Expected Disabilities	Actual Disability Rates	Expected Disability Rates	Proposed Disability Rates
20-24	466	0	0.05	0.00%	0.01%	0.00%
25-29	3,419	0	0.31	0.00%	0.01%	0.00%
30-34	5,826	0	0.52	0.00%	0.01%	0.01%
35-39	6,000	1	0.56	0.02%	0.01%	0.02%
40-44	5,592	2	0.52	0.04%	0.01%	0.04%
45-49	5,183	5	3.18	0.10%	0.06%	0.08%
50-54	5,131	2	3.88	0.04%	0.08%	0.08%
55-59	5,027	5	6.85	0.10%	0.14%	0.08%
60-64	4,562	1	2.15	0.02%	0.05%	0.02%
65-69	2,808	0	1.31	0.00%	0.05%	0.01%
70-74	1,466	0	0.64	0.00%	0.04%	0.01%
75+	0	0	0	N/A	N/A	0.00%
Total	45,480	16	19.94	0.04%	0.04%	0.04%



Lunch Plans A and B – Disability Rates						
Age	Eligible Members	Actual Disabilities	Expected Disabilities	Actual Disability Rates	Expected Disability Rates	Proposed Disability Rates
20-24	26	0	0	0.00%	0.00%	0.00%
25-29	81	0	0	0.00%	0.00%	0.00%
30-34	214	0	0	0.00%	0.00%	0.00%
35-39	368	0	0.29	0.00%	0.08%	0.05%
40-44	477	0	2.3	0.00%	0.48%	0.20%
45-49	992	5	4.82	0.50%	0.49%	0.50%
50-54	1,541	13	19.47	0.84%	1.26%	0.90%
55-59	1,537	14	27.32	0.91%	1.78%	1.00%
60-64	730	1	2.37	0.14%	0.32%	0.20%
65-69	339	0	0.23	0.00%	0.07%	0.07%
70-74	142	0	0.07	0.00%	0.05%	0.05%
75+	0	0	0	N/A	N/A	N/A
Total	6,447	33	56.95	0.51%	0.88%	0.58%



OTHER ASSUMPTIONS

Deferred vested: Currently, the valuation assumes 80% of participants that leave the system as vested members will receive a deferred benefit upon attaining the retirement eligibility requirements. We have reviewed this assumption and believe it is reasonable. We recommend no changes to this assumption.

Marital status: Current dependent/minor children statistics are based on population reports published by the United States Census Bureau. We have reviewed these assumptions and believe they are generally realistic. We recommend no changes to these assumptions.

Spouse's age: Male spouses are assumed to be 3 years older. Correspondingly, female spouses are assumed to be three years younger. We recommend no changes to this assumption.

Dependent/minor children: The current valuation assumes that 75% of active members are married. This statistic is used to determine the probability that spousal benefits will be payable in the event of an active member's death. We are not provided the marital status on the census data, but we believe this assumption continues to be reasonable. We recommend no changes to this assumption.

Option factors: The current option factors are based on the mortality table and the 7.50% discount rate to which the Board is incrementally moving. We recommend revising the factors to be based on the proposed base mortality tables for retirees and we recommend retaining the 7.50% discount rate. We recommend using a static projection of mortality improvement to the middle of the next five-year experience study period (i.e., 2019) rather than using a fully generational projection (which could produce different rates each year).

Unisex rates: For valuation purposes, we use sex distinct mortality rates. However, for option factors, and service purchases, it is appropriate to use unisex rates. We currently assume that the membership is 80% female and 20% male to determine unisex rates. Although we are seeing a gradual increase to a higher percentage of females, the current total membership remains approximately 80% females and 20% males. Therefore, we recommend retaining the current assumption.

Unused annual leave service credit adjustments: In the prior study leave credit for Regular Teachers and Higher Education was determined in aggregate. For this study, we obtained Plan specific data which showed Higher Education members convert more leave to service credit than previously assumed. The amount of leave credit converted to service credit during the study period decreased for all Plans relative to the prior study period when considered separately by Plan. This is due to limits placed on the amount of leave that can be converted to service credit.

Since leave credit is accrued throughout the duration of the member's career, we recognize the anticipated average service credit to be converted as a percentage increase of the accrued benefit. We recommend revising this assumption as follows.

	Prior Rates	Proposed Rates
Regular Teachers	1.5%	0.9%
Higher Education	1.5%	3.0%
Lunch Plan A and B	1.0%	0.9%

Impact on Valuation Results

The table below shows the impact of the proposed changes to the accrued liability and normal cost by Plan. Note the change in accrued liability and normal cost are determined based on the recent June 30, 2017 actuarial valuation updated to reflect a 7.70% interest rate, retaining prior decrements for all other assumptions. The impact to the Lunch Plans will be combined with Regular Teachers to determine the impact on funding requirements.

	Change in Accrued Liability	Change in Normal Cost
Regular Teachers	(43,727,049)	(1,901,479)
Higher Education	12,821,308	625,320
Lunch Plan A and B	(34,866)	(2,250)
TOTAL	(30,940,607)	(1,278,409)

APPENDIX C: RESUMES OF KEY STAFF

JASON L. FRANKEN, FSA, EA, MAAA

Foster & Foster, Inc.
184 Shuman Boulevard, Suite 305
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POSITIONS

Partner **May, 2008 – Present**
Foster & Foster, Inc.
Naperville, IL

- Consults pension boards on all aspects of retirement benefits.
- A frequent speaker at Illinois Public Pension Fund Association (IPPFA), Illinois Public Pension Advisory Committee (IPPAC) and Associated Firefighters of Illinois (AFFI) conferences discussing all aspects of Illinois Public Pension Plans.
- Focus on business development and the day-to-day operations of the firm.

Consultant/People Leader **June, 1997 – May, 2008**
Hewitt Associates
Lincolnshire, IL

- Provided consulting to employers on a wide range of pension and postretirement welfare plan issues.
- Directly responsible for guiding and managing the careers of junior consultants.

EDUCATION

University of Iowa **August, 1993 – May, 1997**
Iowa City, IA
Bachelor of Science Degree
Major: Actuarial Science

PROFESSIONAL CREDENTIALS

Fellow, Society of Actuaries, 2006
Member, American Academy of Actuaries, 2007
Enrolled Actuary, Joint Board for the Enrollment of Actuaries, 2005

PROFESSIONAL PRESENTATIONS

"Health Benefit Issues Part 2: GASB 43/45", Society of Actuaries' Employee Benefits Meeting, Tampa, FL, June 2008.
"Public Pension Underfunding", Chicago Actuarial Association, Chicago, IL, March 2012.
"Introduction to the Illinois Public Pension System", Chicago Actuarial Association, Chicago, IL, March 2013.
"Introduction to the Illinois Public Pension System - Illinois Municipal Retirement Fund: The Continuing Challenge to Address the Needs of Diverse Stakeholders and to Explain and Rollout GASB 68", Chicago Actuarial Association, Chicago, IL, March 2014.

HEIDI E. ANDORFER, FSA, EA, MAAA

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Positions

July, 2014 – Present

Consultant
Foster & Foster, Inc.
Naperville, IL

- Perform annual actuarial valuations to determine minimum funding requirements and prepare Governmental Accounting Standards Board exhibits.
- Lead and assist in special actuarial projects including cost projections, union negotiations and experience studies.
- Calculate changes in benefits and costs resulting from new legislation or changes adopted by the Board.
- Review pension benefit calculations, including service purchase and buyback calculations, cost of living adjustments, and DROP schedules.

July, 1996 – June, 2014

Consultant
Aon Hewitt
Lincolnshire, IL

- Established efficient valuation processes and quality control procedures for large Aon Hewitt client.
- Project managed annual recurring actuarial work for large Aon Hewitt client.
- Performed plan design analysis and presented alternatives to executive decision makers.
- Consulted with employers on a wide range of employee benefits and compensation topics, primarily focusing on pension and postretirement welfare plan issues.
- Managed projects, assigned workflow and reviewed work product for junior analysts.

Education

August, 1992 – May, 1996

University of Illinois
Urbana-Champaign, IL
Bachelor of Science
Major: Actuarial Science

Professional Credentials

Fellow of the Society of Actuaries, 2008
Enrolled Actuary, Joint Board for the Enrollment of Actuaries, 2003
Member, American Academy of Actuaries, 2016

Statement of Experience Heidi is a consulting actuary with Foster & Foster in Oakbrook Terrace, IL. She has over 18 years of experience working on a wide range of pension and postretirement welfare plan issues, including statutory funding requirements, Financial Accounting Standards Board (FASB) accounting for pension and postretirement medical plans, plan administration, experience studies and plan design.

PAUL M. BAUGHER, FSA, EA, MAAA

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Positions

October 2017 – Present

Senior Pension Consultant
Foster & Foster, Inc.

- Consults pension boards on all aspects of retirement benefits.
- A frequent speaker at Illinois Public Pension Fund Association (IPPFA), Illinois Public Pension Advisory Committee (IPPAC) and Associated Firefighters of Illinois (AFFI) conferences discussing all aspects of Illinois Public Pension Plans.
- Focus on business development and the day-to-day operations of the firm.

August 2007 – June 2017

Principal / Midwest Operations Leader
Buck Consultants

- Provided consulting to employers on a wide range of pension and postretirement welfare plan issues.
- Directly responsible for guiding and managing the careers of junior consultants.

January 1997 – July 2007

Senior Associate / Project Manager
Towers Perrin

- Provided consulting to employers on a wide range of pension and postretirement welfare plan issues.
- Directly responsible for guiding and managing the careers of junior consultants.

Education

August 1993 – December 1996

University of Missouri - Columbia
Columbia, MO
Bachelor of Science Degree – Mathematics and Bachelor of Arts Degree - Psychology

Professional Credentials

Fellow, Society of Actuaries, 2003
Member, American Academy of Actuaries, 2003
Enrolled Actuary, Joint Board for the Enrollment of Actuaries, 2003

DREW D. BALLARD, EA, MAAA
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PROFESSIONAL EXPERIENCE

Foster & Foster, Inc. Fort Myers, FL
Junior Actuarial Consultant, June 2009 – Present

- Actuarial Consultant for 90+ Police, Fire, and General Employees' pension plans
- Preparation and review of annual actuarial valuation reports
- Preparation and review of various actuarial analyses including actuarial impact statements, experience studies, plan design changes and funding cost projections under alternative scenarios
- Experienced in programming ProVal, a robust and state of the art actuarial valuation software
- Preparation and review of interactive benefits modelers utilized by plan membership
- Mentoring role and reviewer of various deliverables for student actuarial analysts
- Created comparative analysis database comparing valuation statistics for Foster & Foster clients

EDUCATION

University of Nebraska - Lincoln, Lincoln, NE
Degree in Actuarial Science, 2009

- James Canfield Scholarship Recipient
- Dean's List member for multiple semesters
- Math Tutor for Student Support Services

EXAMS AND LICENSES

- Enrolled Actuary, 2014
- Member of the American Academy of Actuaries
- Credit for all SOA Preliminary Exams
- Pursuing Associate Designation from SOA

TYLER KOFTAN

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ACTUARIAL EXAMS

Passed Exams P/1, FM/2, MLC/3L, MFE/3F, and C/4
Completed VEE Requirements Applied Statistical Methods, Economics, Corporate Finance

EDUCATION

The University of Iowa, Iowa City, IA
Bachelor of Science in Actuarial Science, May 2011

Courses: Life Contingencies | Loss Models | Actuarial Reserves, Regression, Time Series, and Forecasting | Corp. Finance

EXPERIENCE

Jan 2013 – Present

Foster & Foster, Inc.
Actuarial Analyst

- Perform over 500 benefit calculations per year
- Created several programs to aid in efficiency and accuracy of benefit calculations
- Perform service purchase and buyback calculations
- Assist credentialed actuaries with various projects

COMPUTER SKILLS

Microsoft Excel, Access, Visual Basic, and C

Statement of Experience Tyler is a 2011 graduate of the University of Iowa with a B.S. in actuarial science. Tyler recently joined the Foster & Foster team as an actuarial student, and plans to achieve ASA credentials by the end of the year. Tyler's entire focus will be to guarantee the timeliness and precision of all benefit calculations and statements.

PETER B. McCLOUD, FSA, EA

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Positions

July, 2018 – Present	**Quality Control Actuary** Foster & Foster, Inc. Fort Myers, FL • Provide quality control review of pension and retiree welfare plan valuations
June, 1995- June, 2018	**Actuarial Consultant** Aon/Aon Hewitt/Hewitt Associates Minneapolis, MN; Dallas, TX; and Lincolnshire, IL • Primary contact and consultant for several large companies • Managed teams of actuaries, including managing Dallas retirement practice 2007-2008 • Provided consulting services on a wide range of pension and postretirement welfare plan issues including plan design, non-discrimination testing and merger/acquisition/spin-off-related issues • Responsible for quality and timeliness of work products for wide range of clients

Education

August, 1991 – May, 1995	**University of Iowa** Iowa City, IA Bachelor of Science degree Major: Actuarial Science Minor: Business Administration