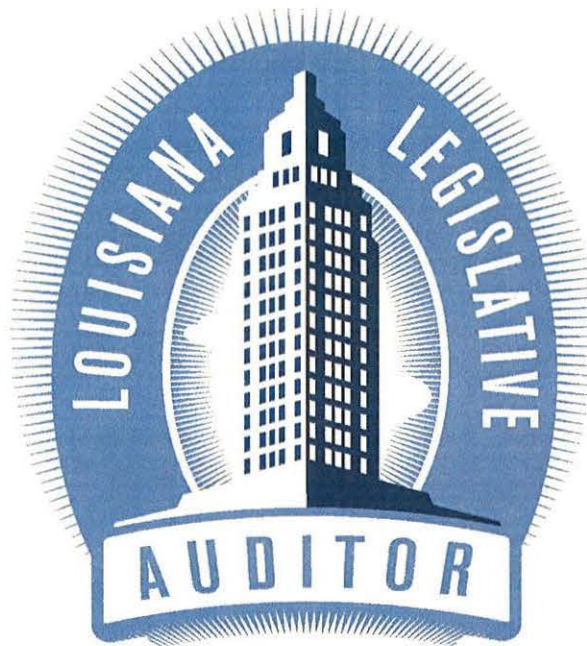


COMPREHENSIVE ACTUARIAL REVIEW OF THE
2016 ACTUARIAL VALUATION OF THE
PAROCHIAL EMPLOYEES' RETIREMENT SYSTEM



ACTUARIAL SERVICES
PRESENTED TO THE PUBLIC RETIREMENT SYSTEMS' ACTUARIAL COMMITTEE
SEPTEMBER 26, 2017



LOUISIANA LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

September 8, 2017

Ms. Dainna S. Tully
Administrative Director
Parochial Employees' Retirement System
Post Office Box 14619
Baton Rouge, Louisiana 70898

Re: Comprehensive Actuarial Review of the 2016 Actuarial Valuation

Dear Ms. Tully:

To fulfill the requirements of R.S. 11:127(C), the Louisiana Legislative Auditor will prepare a comprehensive actuarial review every other year for each of the statewide retirement systems. Your system, the Parochial Employees' Retirement System (System), is scheduled to receive a comprehensive review for funding valuations associated with odd numbered years.

The remainder of this letter contains the results of our comprehensive review of your December 31, 2016, Actuarial Valuation (2016 Actuarial Valuation). More specifically, we have evaluated for reasonableness the actuarial assumptions and methods employed by the System and its actuary. Based on this review, we expect to recommend at the September 26, 2017, meeting of the Public Retirement System's Actuarial Committee that the 2016 Actuarial Valuation prepared by G.S. Curran & Company (GSC) for December 31, 2016, and dated June 20, 2017, be approved.

I would like to thank you and your staff for your cooperation and assistance with this review.

Sincerely,

Daryl G. Purpera, CPA, CFE
Legislative Auditor

DGP:PTR:ch

cc: G.S. Curran & Company

2016 Comprehensive Actuarial Review for PERS

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Net Expected Rate of Return (eROR)

According to the 2016 Actuarial Valuation, the net eROR used in the determination of the discount rate for the System's valuation as of December 31, 2016 was 7.00%. The report does not explicitly state if it is net of investment-related expenses. However, the System's CAFR does indicate that the 7.00% is net of investment expenses.

We would prefer to see a net eROR assumption closer to the 5.63% consensus expectation for the 10-year compound return (see below for more details). We recommend a significantly lower return assumption for funding.

The most significant factors in setting or evaluating an assumed eROR are:

- The horizon over which returns are expected to be satisfied,
- A consensus of professional forecasts of future rates of inflation (forward-looking),
- Current and future asset allocation percentages by asset class, and
- A consensus of professional forecasts of future investment performance (forward-looking) and other capital market assumptions for the different asset classes comprising the asset allocation.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Horizons

Some have argued that pension plans are long-term propositions and the return assumptions should reflect a long-term horizon, for example, 30-years. We believe that a forward-looking mid-term horizon (e.g., 10 years) should influence the final choices of return assumptions. Long-term horizon forecasts (e.g., 20-30 years) are useful for discussion purposes, but not to the exclusion of mid-term horizons. Pension funds are usually long-term arrangements. However, 30 years is too long for the selection of a pension fund's expected rate of return.

Some of the reasons to support the use of a mid-term horizon are:

1. *Underperformance in the mid-term is not sustainable.* If the forecasting experts are correct, there may be a decade or two of lower pension plan returns, while waiting for the following decades to bail out pension plans in order to achieve the higher long-term expectation. Aiming and hoping for higher returns in the long-term, while regularly suffering underperformance in the mid-term is not sustainable.
2. *Forecasts for 30-year long-term horizons are the least reliable.* There is much less certainty in long-term forecasts. In the face of uncertainty, investors become more conservative. Thus, decision-makers should consider being more conservative than the longest-term forecasts indicate because the longest-term forecasts are more uncertain. This is a principle in any forecasting profession, whether in finance, elections or phenomena in nature. Long-term forecasts are less reliable than mid-term forecasts.
3. *We are not judged in the long run.* Even though pensions are long-term propositions, we live in a short-term and mid-term world. Decision-makers (PR SAC and board members), actuaries and investment consultants are judged more in the short-term and mid-term. We should not need to wait 30 or more years to be vindicated for an assumption that we have so little confidence in anyway. Many financial economists, many in the press and many academics are calling for much lower investment return assumptions for public pension funding and financial reporting. The optics are not good for continuing to use a long-term 30+ year horizon, when so many mid-term years are underperforming.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Inflation

The 2016 Actuarial Valuation (page 5) states "An inflation rate of 2.50% was implicit in both the assumed rate of return and rate of salary increases". We would prefer to see an inflation assumption closer to the 2.25% suggested by the expected inflation rates in the exhibit below. However, we do not find the use of 2.50% in the 2016 Actuarial Valuation to be unreasonable for the purpose at hand.

Because average historical rates of inflation over various time periods are relatively easy to calculate, and are therefore readily available, it is tempting to rely on historical rates based on the Consumer Price Index.

However, there are many professional sources available to actuaries and investment consultants that forecast inflation on a forward-looking inflation basis. In our opinion, forward-looking forecasts are more appropriate than historical rates. Actuarial Standards of Practice (ASOP) No. 27 Section 3.4 states:

"Relevant Data—To evaluate relevant data, the actuary should review appropriate recent and long-term historical economic data. The actuary should not give undue weight to recent experience. The actuary should consider the possibility that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment."

There are many reasons to rely far more on forward-looking forecasts than historical ones. The past history of inflation rates in the U.S. (whether it is over the past 10, 25, 50 or 100 years) may be interesting and useful in understanding inflation forces, but they should not supplant forward-looking expectations from inflation-forecasting experts, and should not be used to defend or support a current valuation assumption concerning future inflation rates.

Currently, expert professional sources for forward-looking inflation forecasts generally lie between 1.73% and 2.60%. Consider the forward-looking forecasts from expert professionals presented on the following page.

It has become increasingly difficult to defend inflation assumptions greater than 2.50% in the face of so many opinions to the contrary from experts in the field of inflation forecasting. Our preferred inflation assumption would currently be 2.25% because it lies more comfortably within a consensus of the expectations above. A 2.50% inflation expectation lies at the very upper end of the range of professional forecasters presented above.

**Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the
 Parochial Employees' Retirement System**

Forward-looking Annual Inflation Forecasts (From Professional Experts in the Field of Forecasting Inflation)	
Federal Reserve Board's Federal Open Market Committee Current Long-run Price Inflation Objective (Since Jan 2012)	2.00%
Congressional Budget Office: <i>The Budget and Economic Outlook</i> Overall Consumer Price Index (June 2017; Ultimate) Overall Consumer Price Index (June 2017; 11 Years) Personal Consumer Expenditures (June 2017; Ultimate) Personal Consumer Expenditures (June 2017; 11 Years)	2.40% 2.36% 2.00% 1.98%
2017 Social Security Trustees Report CPI-W 15-Year Intermediate Assumption CPI-W 30-Year Intermediate Assumption GDP Deflator 15-Year Intermediate Assumption GDP Deflator 30-Year Intermediate Assumption	2.60% 2.60% 2.20% 2.20%
Quarterly Survey of Professional Forecasters 2Q2017 Federal Reserve Bank of Philadelphia 10-Year Forecast	2.30%
Federal Reserve Bank of Cleveland 30-Year Expectation on June 1, 2017 20-Year Expectation on June 1, 2017 10-Year Expectation on June 1, 2017	2.13% 1.97% 1.73%
Bond Investors (Excess Yield of Non-indexed Treasuries Over Indexed Treasuries) 30-Year Expectation on June 30, 2017 Median 30-year Expectation over 6/30/12 - 6/30/17 20-Year Expectation on June 30, 2017 Median 20-year Expectation over 6/30/12 - 6/30/17 10-Year Expectation on June 30, 2017 Median 10-year Expectation over 6/30/12 - 6/30/17	1.85% 2.09% 1.77% 2.02% 1.73% 1.96%
Investment Consultants and Forecasters 2017 GRS Survey major national investment forecasters and consultants Median expectation among 8 firms (averaging 9.4 years) Median expectation among 4 firms (averaging 26.3 years) 2016 HAS Survey of 12 investment advisors: Median (10 years) 2016 HAS Survey of 12 investment advisors: Median (20 years)	2.25% 2.21% 2.22% 2.31%

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Asset Allocation

It has been generally accepted for many years that a fund's asset allocation is responsible for the vast majority of a fund's investment performance. Therefore, the asset allocation of the System is a core element in setting and evaluating the assumed future eROR.

In our evaluation of the actuary's net eROR assumption, we relied on the 15 target asset allocation percentages set forth in the System's formal Investment Policy Statement last updated in June 2017 (asset allocation was adopted June 2016). These percentages agree with the targets presented in a report ("2016 Capital Market Assumptions") from the System's investment consultant.

2017 PERS Target Asset Allocation			
Risk Assets		Fixed Income Assets	
Large Cap Domestic Equity	21.0%	Core Fixed Income	13.0%
Mid Cap Domestic Equity	4.0%	High Yield	5.0%
Small Cap Domestic Equity	5.0%	Global Fixed Income	9.0%
Large Cap Non-US Equity	10.0%	Emerging Markets Debt	7.0%
Small/Mid Cap Non-US Equity	4.0%	Cash Equivalents	1.0%
Emerging Market Equity	8.0%		
Private Equity	3.0%	<i>Total Fixed Income Assets</i>	<i>35.0%</i>
Real Estate	5.0%		
Hedge Funds	3.0%		
Timber	2.0%		
<i>Total Risk Assets</i>	<i>65.0%</i>	<i>Total Asset Allocation</i>	<i>100.0%</i>

Source: Current PERS Investment Policy Statement (dated June 2017)

Notice this asset allocation is conservative compared to many retirement systems, with 35% of assets targeted for fixed income instruments. Even though the fixed income sector includes asset classes that are on the riskier end of the fixed income spectrum, the overall risk/fixed asset allocation is more conservative than many other retirement systems.

As a result, PERS' expected rate of return should be lower than many other retirement systems.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Consensus of Professional Investment Forecasts

We applied the target asset allocations to the expectations in the GRS Survey of 10 major national investment consultants and forecasters. Eight of these 10 investment consultants/forecasters provided GRS with their mid-term (10 years) horizon forecasts and four of them provided GRS with their longer-term (20 to 30 years) horizon forecasts. Given the brevity of the descriptions of the asset classes identified, our mapping of these 15 asset classes to the investment consultant's asset classes may not be exact.

Listed below are the national firms in our 2017 GRS Survey. These are very large and reputable investment consultants and forecasters.

10 Major National Investment Consultants and Forecasters in the GRS Survey			
Aon Hewitt	BNY/Mellon*	J. P. Morgan*	Marquette Associates
Mercer*	NEPC *	Pension Consulting Alliance*	Principal
R.V. Kuhns	Voya		

**Each firm has between \$1 trillion and \$10 trillion in worldwide assets under management or advisement; the others are large managers and advisors below \$1 trillion.*

We applied the investment forecasters' expected returns to PERS' asset allocation. We replaced the investment forecasters' respective inflation assumptions with 2.25%, our preferred assumption based on the inflation forecasters' expectations presented above in order to normalize for a consistent inflation assumption across all forecasters.

We reduced the respective forecasts for PERS by the expected investment-related expenses and added alpha for active management (above expected passive management expenses) back in as permitted and limited by ASOP No. 27.

This process results in normalized expected returns for any one given year in the forecast horizon (called the expected arithmetic return). Finally, we reduced the resultant one-year arithmetic returns for volatility drag in the compound return expected over time because pensions are all about compounding in a volatile environment over the horizon.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Below are the results of this process for the mid-term horizon.

Investment Consultant 10 Year Horizon	Distribution of 10-Year Average Geometric-Compound Net Nominal Return (Percentiles)			Probability of exceeding 7.0%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	3.79%	4.72%	5.65%	26.83%
2	4.41%	5.38%	6.36%	33.83%
3	4.67%	5.54%	6.42%	33.73%
4	4.56%	5.53%	6.51%	35.29%
5	5.04%	5.89%	6.76%	37.29%
6	4.93%	5.90%	6.87%	38.74%
7	4.90%	5.89%	6.90%	39.00%
8	5.29%	6.18%	7.08%	40.88%
Average	4.70%	5.63%	6.57%	35.70%

There are three important takeaways from this table:

- Over the mid-term horizon the range of expectations of the 50th percentile of compound average return runs from 4.72% to 6.18%.
- The 50th percentile expectation of the consensus average for the mid-term horizon is 5.63%, or rounded to 5.75%.
- The consensus is that there is only a 35.70% chance of achieving at least the current 7.00% over the mid-term horizon. This does not mean a 35.70% chance of achieving the 7.00% assumption in any year during the horizon; it means that the compound return over the next 10 years has a 35.70% of achieving at least the 7.00% assumption.

This is why, actuarially speaking, the 5.63% rate of return is the preferred assumption for funding because it is the 50th percentile expectation of compound returns over a mid-term horizon. It has a 50-50 chance of returning at least the assumption when compounded over the next 10 years.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Below are the results of this process for the long-term horizon.

Investment Consultant 20-30 Year Horizon	Distribution of 25-Year Average Geometric-Compound Net Nominal Return (Percentiles)			Probability of exceeding 7.0%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	5.73%	6.27%	6.82%	36.75%
2	5.54%	6.15%	6.76%	36.18%
3	5.73%	6.34%	6.96%	39.31%
4	5.93%	6.55%	7.16%	42.60%
Average	5.73%	6.33%	6.92%	38.71%

There are three important takeaways from this table:

- Over the long-term horizon the range of expectations of the 50th percentile of compound average return runs from 6.27% to 6.55%.
- The 50th percentile expectation of the consensus average for the long-term horizon is 6.33%
- The consensus is that there is only a 38.71% chance of achieving the current 7.00% over the long-term horizon. This does not mean a 38.71% chance of achieving the 7.00% assumption in any year during the horizon; it means that the compound return over the next 25 years has a 38.71% of achieving at least the 7.00% assumption.

For use in an actuarial valuation for pensions, where the entire measurement and funding model is built on compounding (present values and future values), the 50th percentile compound or geometric expectation over a mid-term horizon is the most appropriate choice of a net eROR assumption.

None of the 10 major national investment consultants expects the 50th percentile of the compound return over time to be at or above the current 7.00% assumption over the next 10 years. None of the four consultants with longer term forecasts expects a 50-50 chance of achieving the 7.00% return over 25 years.

This makes the current 7.00% assumption seem like an outlier among the mainstream investment forecasters. According to the capital market assumptions of these investment forecasters, there is only a 35.50% chance of achieving at least the 7.00% compound annual return over the next 10 years and a 38.71% chance of achieving at least the 7.00% compound annual return over the next 25 years.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

PERS' Investment Consultants' Forecast

We were provided with the 10-year and 20-year capital markets assumptions from PERS' investment consultant, to which we applied PERS asset allocation like we did for the other major national forecasters in the process described on the previous pages. PERS' investment consultant is a reasonably large and reputable firm.

However, their expected real rates of return are much higher than any of the 10 in our Survey. Normalizing for a consistent inflation assumption (of 2.25%) across all forecasters and reducing slightly for passive investment expenses yields the following conclusions:

- Their 50th percentile compound expectation is 6.32% over a mid-term horizon. This is beyond the range of the eight other forecasters which range from 4.72% to 6.18%, averaging 5.63%.
- Rather than disregard PERS' investment consultant's 6.32% as an outlier, if it were averaged in as a ninth forecaster, it would raise the mid-term horizon consensus average from 5.63% to 5.71%.
- Their 50th percentile compound expectation is 7.11% over a long-term horizon. This is well beyond the range of the four other forecasters which range from 6.15% to 6.55%, averaging 6.33%.
- Rather than disregard PERS' investment consultant's 7.11% as an outlier, if it were averaged in as a fifth forecaster, it would raise the long-term horizon consensus average from 6.33% to 6.48%.

Net Return Assumption

Assuming PERS' current investment policy remains in place:

- Our independent assessment of a range of reasonableness is from 5.75% to 6.50%, with a preference of 5.63%, rounded to 5.75%, for the reasons stated above.
- Our independent assessment is that the retirement board should consider a net return assumption used in the December 31, 2017 actuarial funding valuation to be no more than 6.50% with a formal commitment and adoption of a plan to lower it again the following year(s) to reach the updated mid-term consensus of 50th percentile compound expectation within two or three years at most.

We recognize there is a difference between the minimum actuarially required contribution and an actuarial contribution rate adopted by the board. These assessments and preferences apply to the minimum actuarially required contribution.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Mortality

The 2016 Actuarial Valuation (page 65) states that mortality assumption for annuitant and beneficiary mortality is the "RP 2000 Healthy Adjustment Table set forward 2 years and projected to 2031 using scale AA for males and RP 2000 Healthy Adjustment Table set forward 1 year and projected to 2031 using scale AA for females."

Base Table

To evaluate the reasonableness of the mortality assumption, we reviewed the base mortality (RP2000) separately from the projection scale for mortality improvements.

We believe the use of the RP2000 as the base mortality table to be reasonable. The process we used to determine the reasonableness of the base mortality table is as follows:

1. Experience Study: An experience study (dated June 13, 2016) was prepared covering the period from January 1, 2010 through December 31, 2014. We reviewed the experience study report and found the section on mortality to be described with reasonable detail and careful recognition of relevant mortality experience. The report describes reasonable applications of actuarial credibility principles.
2. Size of the Plan: Due to the small size of the experience group and low number of total deaths likely during the study period, the results of the experience study are not fully credible. Only partial credibility can therefore be given to the results of the experience study. Therefore, the use of a standard reference table is needed to obtain a final mortality assumption for valuation purposes.
3. Standard Mortality Table: Since the experience study is not fully credible, it is necessary to select a standard mortality table as a reference table to be used in the determination of the mortality assumption. Possible candidates for a standard reference table include:
 - a. The mortality tables developed for LASERS or TRSL. However, an actuarial assessment would need to be made of the appropriateness of the actuarial methodology and the comparability of the groups covered before considering them for use as the standard reference table for this purpose.
 - b. The RP2000 mortality table was published in or around the year 2000. It was developed by the Society of Actuaries based on national private sector pension data.
 - c. The RP2014 mortality table was published in October 2014. As for RP2000, this table was also developed by the Society of Actuaries based on national private sector pension data. It is the most recent reliable base mortality table available, for purposes of national estimates of mortality for pension plans.
4. Louisiana Mortality Rates: The Centers for Disease Control and Prevention (CDC) has published data¹ demonstrating that mortality rates in Louisiana are generally higher than national averages.

¹ Refer to Table 3 in the *National Vital Statistics Reports* (Volume 60, Number 4) dated January 22, 2012 published by the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Therefore, it would be more prudent not to use a current national mortality table (such as RP2014) as the standard reference table in the weighted average calculations described above without adjustment.

5. **RP2000 as the Standard Mortality Table:** The experience study states that RP2000 mortality table was selected as the standard base mortality table. At the time of the Experience Study, the RP2014 mortality table (the newest table currently available) was published and available. The experience study does not mention if that table was considered by the system's actuary. However, the RP2000 mortality table was ultimately selected and we believe it is reasonable since it accounts for the higher mortality rates in Louisiana (as compared to RP2014). We analyzed data from the CDC¹ and found that mortality rates in Louisiana are approximately 20% higher than national mortality rates. We found the mortality rates in RP2000 to be approximately 26% higher than those of RP2014 (representative of national rates). In our opinion, this is close enough for RP2000 to qualify as a reasonable standard reference table for reflecting general Louisiana mortality.
6. **Credibility Weights:** Credibility weights were calculated separately by GSC for males and females based on the number of deaths observed in the experience study. The weighting factors calculated by GSC used standard actuarial treatment required for developing weighted average mortality that recognizes the credibility level of data in an experience study with insufficient data of its own. However, we were unable to analyze the credibility weights calculated by GSC since we did not obtain sufficient data to prepare that analysis.
7. **Credibility Weighted Mortality:** The credibility weights were applied to (a) the experience study mortality rates and (b) the standard reference table's mortality rate (RP2000 as projected to 2012) to obtain the weighted mortality rates. However, we were unable to analyze the weighted mortality rates calculated by GSC since we did not obtain sufficient data to prepare that analysis.
8. **Set-forwards and Set-backs:** The credibility weighted mortality rates were compared to the standard reference table to set the appropriate set-forwards and set-backs to determine the best fitting table to use for the final mortality assumption. A set-forward of one year (in the RP2000 table projected by Scale AA to 2012) was determined by GSC to be the best fit for males and a set-forward two years (in the RP2000 table projected by Scale AA to 2012) was determined to be the best fit for females.

Therefore, we find the base table (before projection for future mortality) to be reasonable for the 2016 Actuarial Valuation.

Projection Scales

Once the base table was found to be reasonable, we then reviewed the projection scale used in the mortality assumption (projection Scale AA). We believe the actuary's use of Scale AA projected to 2031 is not unreasonable.

However, there is an intermediate projection scale, Scale BB, which was developed to be used in connection with RP2000, pending creation and release of RP2014 and MP2014. Scale BB was released in September 2012 and available at the time of the experience study. Scale BB was developed after the results of the Society of Actuaries' analyses showed that the rates of mortality improvement in the U.S. over the then-

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

recent past had differed significantly from those predicted by Scale AA. Scale BB would have been a better choice for the projection of mortality improvements when coupled with RP2000.

Furthermore, there are two ways to reflect mortality improvement: (a) Project the improvements to a target year in the future or (b) Apply the improvement scale generationally. The first way applies the mortality rate for a 65-year old (for example) regardless of whether the member turns 65 in 2020 or 2040. This overstates the rates prior to the projection date and understates them thereafter. The generational projection applies the improvements for the four years between 2016 and 2020 for a member turning 65 in 2020, but applies the improvements for the 24 years between 2016 and 2040 for a member turning 65 in 2040. While the actuarial literature permits the use of a static projection to a given future year, the actuarial profession is endorsing the generational approach as being preferable.

A more current approach to estimating mortality rates for valuation purposes would be to use either: (a) RP2000 projected generationally by Scale BB or (b) RP2014 loaded with 120% (for general Louisiana experience) and projecting generationally using MP2016. While either of these two approaches would be more current and preferable methodologies, we do not find the mortality tables used in the 2016 Actuarial Valuation to be unreasonable.

Cost of Living Adjustments

Pages 5-6 of the 2016 Actuarial Valuation, states:

“Although the board of trustees has authority to grant ad hoc Cost of Living Adjustments (COLAs) under limited circumstances, these COLAs have not been shown to have a historical pattern, the amounts of the COLAs have not been relative to a defined cost-of-living or inflation index, and there is no evidence to conclude that COLAs will be granted on a predictable basis in the future. Therefore, for purposes of determining the present value of benefits, these COLAs were deemed not to be substantively automatic and the present value of benefits excludes COLAs not previously granted by the board of trustees.”

Certain Louisiana statutes are applicable to all state and statewide retirement systems and provide numerous rules, conditions, thresholds and benefit levels governing the (a) eligibility for and (b) the granting and paying of cost-of-living adjustments or permanent benefit increases. For the purpose of this letter report, we refer to cost-of-living adjustments and permanent benefit increases as COLAs.

For example, R.S. 11:241-248 provides substantive rules broadly applicable to many of Louisiana's retirement systems, including PERS. These statutes have been in place for a very long time. Certain other Louisiana statutes are applicable to specific retirement systems. For example, R.S. 11:1937 provides substantive COLA rules specifically for PERS.

The broadly applicable rules and the specific system rules have changed over time; most recently, in 2013 significant changes were adopted. Nevertheless, COLA statutes applicable to PERS have been part of the framework for many years. And this statutory history of providing a mechanism for PERS COLAs continues today.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Currently, the COLA statutes applicable to PERS provide for (a) mathematical and logical rules for *when* the PERS board is allowed to grant a COLA and (b) mathematical and logical rules for *how much* COLA the PERS board is allowed to grant. There is not much if any discretion in the application of these rules.

When

The statutory mechanism for *when* the PERS board is allowed to grant base COLAs and additional COLAs depends on the magnitude of a given year's investment earnings, on whether the funded ratio is at or above certain percentage levels, and on how long it has been since a COLA had previously been granted.

According to pages 1 and 2 of the 2016 Actuarial Valuation, the funded ratios of PERS were 99.20% for Plan A and 100.38% for Plan B as of December 31, 2016. According to the statutes, during the time while PERS's funded ratio is at least 90% a COLA is allowed every other year, subject to the excess earnings rule determining the amount, as described below. However, there may not be complete clarity on exactly how to apply the every-other-year rule.

Discretion

If these conditions are satisfied and the PERS board is allowed to grant a base COLA and possibly an additional COLA, the board must vote to actually grant the COLA. The board is able to vote for or against a COLA when allowed, or not to vote at all. This is the discretionary aspect of the COLA-granting process. This discretionary step is what prevents the COLA from being considered "automatic". But consider the following internal and external forces at play that tend to press board members to grant COLAs when allowed:

- While we have no personal knowledge or experience with the PERS board, generally speaking, retirement board members often have a sense of duty to serve the plan members. The PERS retirement board of trustees is composed of individuals who have a natural constituency in plan members. There is likely a natural inclination to grant benefits when allowed.
- The board members may be inclined to approve COLAs whenever allowed since they are told there are sufficient "excess" interest earnings to fund the increases.
- Social Security gives a COLA almost every year. In any given future year, if PERS retirees have not had a COLA in a couple years and since they are not generally covered by Social Security, there is a natural tendency to want to grant a COLA if allowed.
- Furthermore, if other retirement systems, such as LASERS, TRSL or other state or statewide systems give COLAs in a given year, PERS board members will feel some pressure to grant a COLA if allowed.

These are strong forces that are likely to press board members to grant COLAs whenever allowed.

On the other hand, the direction of the employer contribution rate (going upward or downward) also influences the willingness to grant a COLA. Indeed, there are fiscal pressures that move board members at times to refrain from granting benefits when allowed if the employer contribution rate goes up by sufficient margins or if the funded ratio falls.

**Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the
 Parochial Employees' Retirement System**

We are not addressing any proclivity to grant COLAs from the Funding Deposit Account. That topic introduces a whole discussion itself and is outside our focus here on COLAs that are likely to be granted from excess earnings.

The following table illustrates recent history of when PERS excess earnings COLAs were allowed to be granted and how much.

PERS COLAs Granted			
Evaluated December 31	Effective January 1	Allowed to Grant COLA?	% COLA Granted
2016	2018	No*	0.00%
2015	2017	No*	0.00%
2014	2016	No	0.00%
2013	2015	Yes	2.50%
2012	2014	No	0.00%
2011	2013	No	0.00%

** A full and detailed interpretive decision tree is needed to evaluate the actuary's conclusion that a COLA was not allowed.*

Given the recent example of granting a COLA when allowed (measured at the fiscal year ending December 31, 2013), coupled with the analysis above, in our opinion there is a reasonable probability that the board will grant a COLA whenever allowed; maybe not every time, but at least half the time or more would be a reasonable estimate. It seems inappropriate to "assume" a 0% chance of granting excess earnings COLAs in future years when otherwise allowed. The board members themselves may dispute that assumption about their future behavior toward plan members' benefits.

Important and material plan provisions like these COLA provisions require objective analysis, careful attention and reasonable actuarial judgement of the future to appropriately measure the cost and liability of a retirement plan.

How Much

The statutory mechanism for *how much* of a COLA the PERS board may recommend (assuming it is allowed to do so based on the conditions above) depends on (a) how far above the threshold the funded ratio is, (b) how far above the assumed valuation rate the actuarial valuation rate actually was during the year, (c) how much the present value of benefits for eligible members is measured to be: (d) whether it is a base COLA, in which case the increase amount for each eligible member is not to exceed 2.5% of the eligible member's initial commencement amount, (e) whether it is an additional COLA, in which case the additional increase amount is 2% of the eligible member's initial commencement amount and (f) whether the A+B method in R.S. 11:241 is applied.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Legislative Framework Expects COLAs

The COLA provisions are in the Louisiana statutes for a reason: to pay COLAs -- sometimes. Plan sponsors and other legislators fully expect COLAs to be granted periodically, even if only every two or three years. If not, these statutory provisions probably would not have been codified.

It is incumbent upon the actuary to recognize the possibility and likelihood that COLA benefits will be paid with some regularity, even if only every two or three years. Failure to recognize the cost and liability of the statutes' COLA provisions (even if making only a rough estimate) is to deny that purpose.

Something is Better Than Nothing

Traditional actuarial methods model the payment of various plan benefits over time, none of which are known with any certainty. For example: the times when members will terminate, become disabled, die or retire are not known with certainty; how much employees' pensionable compensation will increase over time is not known with certainty; nor do we know with certainty what the future investment returns or future inflation will be. Nevertheless, these uncertainties do not stop us from making reasonable projections in reasonable calculations of the future costs and liabilities associated with any given plan benefit provisions. Decrement events and benefits do not need to be fully predictable before an actuary recognizes their likelihood within an actuarial valuation.

While COLA benefits are different from other benefit provisions in the events and conditions in which the actual benefits arise, they are the same as any other benefit provision in the sense that (a) they are a well-defined benefit payable to plan members, (b) certain aspects of their eligibility and calculations can be programmed and calculated, and (c) other aspects of their eligibility/approval may be discretionary but they do have a reasonably likely chance of being approved whenever allowed. Actuarially measuring the future costs and liabilities of COLA benefits (recognizing a degree of likelihood and timing) is consistent with our traditional practice of actuarially measuring other legal plan benefit provisions (recognizing a degree of likelihood and timing).

Other Truly Ad Hoc COLAs

Other plans around the country have no special provisions for COLAs, no well-defined criteria or hurdle to satisfy for granting COLAs, and no history (or no discernible pattern) of granting ad hoc COLAs. In those cases, there is no good reason to expect COLAs to be paid in the future, until or unless some pattern of truly ad hoc COLAs emerges. But PERS is different, as are other Louisiana retirement systems.

There is a long and specific statutory history with detailed conditions for granting COLAs, fully contemplating that future COLAs would be granted. In the past five years, the only time when a COLA was allowed to be granted for satisfying the statutory conditions, the board did approve the specified COLA. That, together with other facts presented above, is a strong indicator that there is some likelihood that excess earnings COLAs will be granted sometimes.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Reasonable Actuarial Estimates

There are at least two approaches to actuarially measuring the cost and liabilities of PERS's COLA provision: stochastic modelling and rough estimating. Both methods result in assuming that an annual or biennial COLA increase of X% serves as a reasonable proxy for what would likely actually happen in the years to come. The value of X% serves as the single equivalent COLA, and is treated in the valuation "as if" it is a regular COLA increase. The only challenge is to make a reasonable estimate of X%.

1. An open group forecast valuation of the system forms the basis for a stochastic estimation of the current present values of future COLA benefits. There are other serendipitous benefits to an open group forecast that prove useful to both actuary and board members as they manage the funding of the System. Once the process solves for X%, the usual closed group valuation is then performed using the X% as a regular COLA.

An Excel spreadsheet can be developed with the necessary liability projections, projected fund values based on an investment return for each future year, and annual valuation calculations built into the spreadsheet. With the same expected return every year, the spreadsheet produces deterministic forecast valuations. But if Excel's random number generator selects return assumptions in a macro from its internal lognormal distribution function, the Fund's return varies from year to year, producing a stochastic forecast of future valuations.

Running that forecast valuation with and without COLAs, the single equivalent X% can be solved so as to approximate the present value of simulated COLAs. An alternative approach to a single equivalent COLA is to estimate a load on top of the open group benefit stream representing the stochastically triggered COLAs, resulting on a factor of $1+Y\%$ to multiply by the present value of future benefits before applying the actuarial cost method.

This is being done more and more in many firms across the country. Furthermore, the cost should not be considered too much for a plan the size of PERS (over \$3 billion in assets) for the worthy benefit of obtaining a decent actuarial measure of the cost and liability for providing these COLA benefits. Furthermore, once it is built, it can be adjusted for use on behalf of other retirement systems, thereby spreading the costs.

2. However, even a rough estimate would be better than nothing. Just following the reasoning set forth in the pages above, it is reasonable to expect COLAs to be allowed every other year, in the amount of 2.50% to 4.50% for some members each time granted. With an assumption of granting every time allowed, that might work out to a single equivalent annual COLA of approximately 0.50% to 1.25% over the next 30 years.

Actuarially-determined contributions are required. Recognizing non-zero COLA benefits in advance using reasonable assumptions will effectively require funding the expected benefit in advance. Failing to reflect any COLA until it is granted means that funding always occurs in arrears. Recognizing estimated COLAs in advance is good governance and is more consistent with the State Constitution's requirement to "attain and maintain actuarial soundness."

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Much of the description of the COLA conditions and benefits above are merely a summary and much involves interpretation of statutes. This letter report should not be considered a legal opinion. The statutes should be consulted for more detailed descriptions.

Rates of Withdrawal

The 2016 Actuarial Valuation (page 5) states that "the current year actuarial assumptions utilized for this report are based on the results of an actuarial experience study for the period January 1, 2010-December 30, 2014, unless otherwise specified in this report."

We reviewed the experience study report cited above (prepared by GSC, dated June 13, 2016). We also compared the results of the experience study report to the assumptions used in the 2016 GSC actuarial report for funding. We note the rates of withdrawal are slightly different for Plan B. The experience study suggests a withdrawal rate of 19% after one year of completed service and 6% after eight year of completed service while the valuation report shows a withdrawal rate of 18% after one year of completed service and 5% after eight year of completed service.

Materiality

We do not believe the discrepancy in the withdrawal rates between the experience study report and the 2016 Actuarial Valuation is a material issue and we have not attempted to determine the impact it would have on the actuarial accrued liability.

Rates of DROP Entry

The 2016 Actuarial Valuation (page 5) states that "the current year actuarial assumptions utilized for this report are based on the results of an actuarial experience study for the period January 1, 2010-December 30, 2014, unless otherwise specified in this report."

We reviewed the experience study report cited above (prepared by GSC, dated June 13, 2016). We also compared the results of the experience study report to the assumptions used in the 2016 Actuarial Valuation. We note the rates of DROP Entry are slightly different for Plan A. The experience study suggests DROP Entry rates of 15% at age 46 down to 14% for ages above 64 (same rates as the retirement rates) while the valuation report shows DROP Entry rates of 50% at age 46 down to 8% for ages above 70.

Materiality

We do not believe the discrepancy in the DROP Entry rates between the experience study report and the 2016 Actuarial Valuation is a material issue and we have not attempted to determine the impact it would have on the actuarial accrued liability.

Comprehensive Actuarial Review of the 2016 Actuarial Valuation of the Parochial Employees' Retirement System

Calculations and Exhibits

We did not perform an actuarial audit and replication of the results. However, we reviewed the calculations presented in the 2016 Actuarial Valuation to ensure there were no mathematical errors. Based on our review, we believe all the calculations in the report were done correctly and without any mathematical errors.

This communication should not be construed to provide tax advice, legal advice or investment advice.

Actuarial Certification

Although assisted by other actuaries, the actuarial opinions expressed in this report are the opinions of Paul T. Richmond, Manager of Actuarial Services for the LLA. This report was prepared under Mr. Richmond's supervision. He received support from actuaries employed by Gabriel, Roeder, Smith & Company. Mr. Richmond is a member of the American Academy of Actuaries and meets the qualification standards of the Academy necessary to render the professional actuarial opinions contained herein. His supporting actuaries are also members of the Academy and meet the qualification standards that allow Mr. Richmond to rely on their advice and work products.



Paul T. Richmond, ASA, MAAA, EA, FCA

September 6, 2017
Date

APPENDIX

ACTUARIAL STANDARDS OF PRACTICE (ASOPs)

ASOP No. 4 Section 3.5

3.5 Plan Provisions - When measuring pension obligations and determining **periodic costs** or **actuarially determined contributions**, the actuary should reflect all significant **plan provisions** known to the actuary as appropriate for the purpose of the measurement. However, if in the actuary's professional judgment, omitting a significant **plan provision** is appropriate for the purpose of the measurement, the actuary should disclose the omission in accordance with section 4.1(d).

ASOP No. 4 Section 3.5.3

3.5.3 Plan Provisions that are Difficult to Measure - Some **plan provisions** may create pension obligations that are difficult to appropriately measure using traditional valuation procedures. Examples of such **plan provisions** include the following:

- a. Gain sharing provisions that trigger benefit increases when investment returns are favorable but do not trigger benefit decreases when investment returns are unfavorable;
- b. Floor-offset provisions that provide a minimum defined benefit in the event a **participant's** account balance in a separate plan falls below some threshold;
- c. Benefit provisions that are tied to an external index, but subject to a floor or ceiling, such as certain cost of living adjustment provisions and cash balance crediting provisions; and
- d. Benefit provisions that may be triggered by an event such as a plant shutdown or a change in control of the plan sponsor.

For such **plan provisions**, the actuary should consider using alternative valuation procedures, such as stochastic modeling, option-pricing techniques, or deterministic procedures in conjunction with assumptions that are adjusted to reflect the impact of variations in experience from year to year. When selecting alternative valuation procedures for such **plan provisions**, the actuary should use professional judgment based on the purpose of the measurement and other relevant factors.

The actuary should disclose the approach taken with any **plan provisions** of the type described in this section, in accordance with section 4.1(i).

ASOP No. 27 Section 3.11.2

3.11.2 Cost-of-Living Adjustments—Plan benefits or limits affecting plan benefits (including the Internal Revenue Code (IRC) section 401(a)(17) compensation limit and section 415(b) maximum annuity) may be automatically adjusted for **inflation** or assumed to be adjusted for **inflation** in some manner (for example, through regular plan amendments). However, for some purposes (such as qualified pension plan funding valuations), the actuary may be precluded by applicable laws or regulations from anticipating future plan amendments or future cost-of-living adjustments in certain IRC limits.