COMPREHENSIVE ACTUARIAL REVIEW OF THE 2017 ACTUARIAL VALUATION OF THE LOUISIANA STATE POLICE RETIREMENT SYSTEM

ACTUARIAL SERVICES
PRESENTED TO THE PUBLIC RETIREMENT SYSTEMS' ACTUARIAL COMMITTEE
JANUARY 9, 2018

December 15, 2017

Ms. Irwin L. Felps, Jr., Executive Director
Louisiana State Police Retirement System
9224 Jefferson Highway
Baton Rouge, Louisiana 70809

Re: Comprehensive Actuarial Review of the 2017 Actuarial Valuation

Dear Mr. Felps:

To fulfill the requirements of R.S. 11:127(C), the Louisiana Legislative Auditor (LLA) will prepare a Comprehensive Actuarial Review (CAR) every year for each of the State retirement systems.

The remainder of this letter contains the results of our comprehensive review of your June 30, 2017, Actuarial Valuation. More specifically, we have evaluated for reasonableness the actuarial assumptions and methods employed by the System and its actuary. Based on our review, we expect to recommend that the Public Retirement Systems' Actuarial Committee (PRSAC) not accept the LSPRS' funding valuation prepared by G.S. Curran & Company for June 30, 2017, and dated October 6, 2017. Instead, we will recommend that PRSAC request LSPRS to revise its actuarial valuation report (a) to include a recognition of future COLAs with (b) at a significantly lower return assumption.

I would like to thank you and your staff for your cooperation and assistance with this review. Your formal response to this review has been incorporated in Appendix B of this letter.

Sincerely,

Daryl G. Purpera, CPA, CFE
Legislative Auditor

DGP:PTR:ch

cc: G.S. Curran & Company

2017 COMPREHENSIVE ACTUARIAL REVIEW FOR LSPRS

Scope of Review

The 2017 Actuarial Valuation Report for LSPRS for funding purposes (2017 Funding Valuation) was prepared by the actuary for LSPRS' retirement board, G.S. Curran & Company, dated October 6, 2017.

This Comprehensive Actuarial Review of that report was prepared by the Actuary for the Louisiana Legislative Auditor and includes evaluations and recommendations concerning key actuarial assumptions and methods for appropriateness.

This Comprehensive Actuarial Review presents documented evidence for the opinions expressed herein concerning various assumptions and methods employed by the board and its actuary in the 2017 Funding Valuation.

Summary of Findings

A summary of our findings follows. Additional details on these matters are addressed in the remainder of this report.

1. **Cost-of-Living Adjustments (COLAs)**. The cost of future COLAs is currently not included in the 2017 Funding Valuation. We recommend that the board adopt a method to explicitly recognize future COLAs in the actuarial valuation of costs and liabilities.

   Refer to "Section 1: Cost-of-Living Adjustments" of this report for details.

2. **Overly Optimistic Return Assumption**. The net inflation assumption, which is one of the building blocks included within the net investment return assumption, is at the highest end of our range, being higher than all but one source of inflation forecasting. The board's 7.00% net investment return assumption is also outside of the consensus mainstream of professional forecasters. It is, in our opinion, overly optimistic. A more appropriate net return assumption should be 6.00% per year.

   Refer to "Section 2: Overly Optimistic Return Assumption" of this report for details.

3. **Mortality Assumption**. The current mortality assumption is acceptable. However, the process used to determine the mortality assumption is not as current as it could be.

   Refer to "Section 3: Mortality Assumption" of this report for details.

As a result of the findings summarized above, with particular regard for the overly optimistic return assumptions, I cannot endorse the actuarial valuation prepared by LSPRS. I realize that other actuaries may have different opinions on the future than I have. However, I trust you will give consideration to the robust methodology and process by which I arrived at my opinion.

I relied on research provided by Gabriel, Roeder, Smith & Company (GRS); however, I am solely responsible for my opinions. GRS bears no responsibility for the opinions I have expressed in this report. I reviewed their work carefully, as I do for any other external resource, in forming my opinions and in drafting and signing this Comprehensive Actuarial Review. Please refer to my certification at the end of this report.

Section 1: Cost-of-Living Adjustments

Page 44 of the 2017 Funding Valuation states:

> "The present values and accrued liabilities within this report do not include provisions for potential future increases not yet authorized by the Legislature, but do include a recognition of the existing balance in the Experience Account together with the present value of future contributions to the Account up to the maximum permissible value of the Account based upon current account limitations."

Certain Louisiana statues 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 report, we refer to cost of living adjustments and permanent benefit increases as COLAs.

For example, R.S. 11:241-248 provides substantive rules applicable broadly to many of Louisiana's retirement systems, including LSPRS. This statute has been around for a very long time. Certain other Louisiana statutes are applicable to specific retirement systems. For example, R.S. 11:1331.1-R.S. 11:1332 provides substantive COLA rules specifically for LSPRS.

The broadly applicable rules and the specific system rules have changed over time; significant changes were most recently adopted in 2013 and 2014. Nevertheless, COLA statutes applicable to LSPRS have been part of the framework for many years. And this statutory history of providing a mechanism for LSPRS COLAs continues today.

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

When

LSPRS has a complex benefit provision that transfers "excess investment earnings" in certain circumstances to an Experience Account for the subsequent granting of COLAs if approved by various parties and governing bodies. Similar benefit provisions have been in law for many years, with a major amendment to the complexities in 2014 (Act 399).

The statutory mechanism for *when* a COLA may be granted has a two-step process:

a. Transfers into the Experience Account depend on (a) whether there are excess investment earnings, (b) whether the excess investment earnings exceed a given threshold, and (c) the annual cap on the experience account balance.

b. Freedom to recommend and grant a COLA depends on (a) whether there are sufficient reserves in the Experience Account, (b) whether the funded ratio is at or above certain percentage levels, and (c) how long it has been since a COLA had previously been granted. There is an every-other-year provision in the statutory mechanism whenever the funded ratio is at least 55% but less than 85% (at or over 85%, COLAs may be granted every year).

According to page 1 of the 2017 Funding Valuation, the funded ratio of LSPRS was 72.91% as of June 30, 2017. According to the statutes, this allows a COLA to be granted every other year, as long as all other conditions are satisfied.

In our opinion, it is likely that COLAs will be *allowed* for LSPRS every few years. The statutory mechanism for *when* COLAs will be allowed to be recommended and granted is entirely mathematical and can be modelled actuarially. However, although this feature is automatic, the board's actuary is not including any actuarial or other estimate in the 2017 Funding Valuation about *when* future COLAs may be allowed.

How much

The statutory mechanism for *how much* COLA the LSPRS board may recommend (assuming it is allowed to do so based on the conditions above) depends on (a) the funded status of the system; (b) if the actuarial valuation rate earned during the year was above the assumed valuation rate; (c) whether it is a base COLA; (d) whether it is an additional COLA, in which case the additional increase amount is 2% of the eligible member's initial commencement amount; (e) whether the A+B method in R.S. 11:241 is applied; (f) how much the CPI-U increased for the previous year; and (g) benefits in relation to a $60,000 cap (indexed).

The statutory mechanism for *how much* COLA may be recommended and granted is also entirely mathematical and can be modelled actuarially. However, although this feature is automatic, the board's actuary is not including any actuarial or other estimate in the 2017 Funding Valuation about *how much* in future COLAs may be allowed.

Discretion

If the conditions outlined in the second step above satisfied, the System's COLA benefits require the approval of four parties: (a) The LSPRS board recommends an increase to the President of the Senate and the Speaker of the House of Representatives, (b) the Actuary for the Legislative Auditor concurs that the COLA is allowed in the amount proposed, (c) the Legislature approves a bill granting the increase, and (d) the Governor signs the bill.

The LSPRS COLAs are not automatic and are considered ad hoc because of these four points of discretion. *When* and *how much* COLAs are allowed is statutorily automatic, but actually granting COLAs includes this discretionary element.

The board is free to vote for or against a recommendation to grant a COLA when allowed, or not to vote at all. The Legislature and the Governor are free to approve or deny a COLA recommended by the board. 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, which tend to press board members to recommend COLAs when allowed:

    a.   While we have no personal knowledge or experience with the LSPRS board, generally speaking, retirement board members often have a sense of duty to serve the plan members. The LSPRS retirement board of trustees is composed of individuals who have a natural constituency in plan members. There is a natural tendency to recommend COLAs when allowed.

b. Social Security gives a COLA almost every year. In any given future year, if LSPRS 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 recommend a COLA if allowed.

c. Furthermore, if other retirement systems, such as LASERS, TRSL, or other state or statewide systems give COLAs in a given year, LSPRS board members, legislators and the Governor will feel pressure to recommend a COLA if allowed.

d. Finally, if the funded ratio of the System continues to improve as it is expected to do, board members might feel like sharing that success with the plan members by recommending a COLA.

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

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

<table>
<tr><td colspan="6">Exhibit 1
The Automatic Mechanism for Allowing COLAs is Actuarially Measurable
The Pattern of Experience, and Legislative History & Framework Presume COLA Approvals Whenever Allowed</td></tr>
<tr>
<td>Actuarial Valuation Date</td>
<td>Amount Allowed By Statutory Template</td>
<td>Amount Granted by Legislature, Approved by Governor</td>
<td>Legislative Session</td>
<td>Date COLA Increases Start</td>
<td>Comments</td>
</tr>
<tr><td>6/30/16</td><td>None[1]</td><td>None</td><td>2017</td><td>NA</td><td></td></tr>
<tr><td>6/30/15</td><td>0.1%</td><td>2.0%[2]</td><td>2016</td><td>7/1/16</td><td>The 2016 Legislature overrode the statutory template and allowed for a 2% COLA and a 2% Supplement[2]</td></tr>
<tr><td>6/30/14</td><td>None</td><td>None</td><td>2015</td><td>NA</td><td></td></tr>
<tr><td>6/30/13</td><td>1.5%</td><td>1.5%[3]</td><td>2014</td><td>7/1/14</td><td>The 2014 Legislature approved the 1.5% statutory template COLA and a 2% Supplement</td></tr>
<tr><td>6/30/12</td><td>None</td><td>None</td><td>2013</td><td>NA</td><td rowspan="4">Empty experience account due to Great Recession investment losses phased in over time</td></tr>
<tr><td>6/30/11</td><td>None</td><td>None</td><td>2012</td><td>NA</td></tr>
<tr><td>6/30/10</td><td>None</td><td>None</td><td>2011</td><td>NA</td></tr>
<tr><td>6/30/09</td><td>None</td><td>None</td><td>2010</td><td>NA</td></tr>
<tr><td colspan="6">Source: This information has been extracted from Title 11 of Revised Statutes and from information reported in LSPRS' annual actuarial valuation reports.</td></tr>
</table>

Given the recent examples of granting a COLA when allowed, coupled with the analysis above, it is our opinion that there is a high likelihood that all four approval points will opt to grant a COLA whenever allowed. It seems unreasonable to "assume" a 0% chance of granting a COLA in future years when otherwise allowed.

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[1] According to the statutory mechanism, even if there are funds in the Experience Account, the Board of Trusties was not permitted to recommend to the Legislature that a COLA be granted to be effective July 1, 2017 (based on the 2016 Experience Account balance).

[2] The application of the statutory mechanism available to the 2016 Legislature would have allowed only a 0.1% COLA due to the limitation of the Consumer Price Index. However, the 2016 Legislature overrode the template (Act 93) and allowed for a 2% COLA but not to exceed the percentage that could be purchased by the balance in the Experience Account at June 30, 2016. The balance could purchase a full 2.0% increase. Besides the 2.0% COLA for all eligible retirees (including the 0.1% base template COLA), an additional 2.0% COLA (aka Supplemental) was granted and paid to a certain subset of otherwise eligible retirees.

[3] In Act 399 the 2014 Legislature adopted a template limiting the frequency and level of COLAs to be recommended while the Plan is less than 80% funded or when the actual actuarial rate of return is below 7.00%. Act 101 of 2014 granted a 1.5% COLA in accordance with that newly adopted template.

Legislative Framework Presumes COLAs

The COLA provisions are in the Louisiana statutes for a reason: To pay COLAs – sometimes. The sponsors and other legislators fully presume COLAs to be granted periodically, even if only every few 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 few years. That is why we believe the statutory provision is there. Failure to recognize (even if making only a rough estimate) the cost and liability of the statutes' COLA provisions is to deny the purpose of the statutes.

Something is Better Than Nothing

In prior years, the board's current actuary has posited that one cannot know with any certainty when COLAs will be granted. This has been put forth as support for not recognizing future COLAs in advance (the "No Recognition" approach).

Traditional actuarial methods model the payment of various plan benefits over time, none of which are known with 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 using accepted actuarial techniques to measure future costs and liabilities associated with any given plan benefit provision. 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 using accepted actuarial techniques, and (c) other aspects of their eligibility/approval may be discretionary but 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 on a scientific basis other plan benefit provisions (recognizing a degree of likelihood and timing).

Refer to the Appendix at the end of this letter for several citations from the Actuarial Standards of Practice (ASOPs) pertaining to the valuation of COLAs.

Given the size of LSPRS' accrued liabilities and asset portfolio, reasonable scientific actuarial modelling methods are available to the board and its actuary. The modelling methods are affordable and cost effective; producing information that better identifies the true cost of the LSPRS benefit program.

Although scientific measurements are superior and preferred, even a rough non-scientific estimate is better than the "No Recognition" approach currently used by LSPRS. Following the reasoning set forth in the pages above, it is reasonable to expect COLAs to be allowed every few years, in the amount of 1.5% to 5.0% for some or all eligible members each time granted.

Other Ad Hoc COLAs

LSPRS is different from other systems that have no statutory COLA framework, but simply grant COLAs on a truly ad hoc basis.

There is a long and specific statutory history in Louisiana with detailed conditions for granting COLAs, fully contemplating that COLAs would be granted. In the past eight years, every time the board and Legislature were allowed to grant a COLA, they did. That pattern, together with other facts presented above, is a strong indicator that a COLA will be granted whenever mathematically allowed. Future COLAs are actuarially measureable and, thus, should be fully included in the actuary's measurement of costs and liabilities for funding purposes.

Reasonable Actuarial Estimates

There are at least two preferred approaches to actuarially measuring the cost and liabilities of LSPRS' COLA provisions. Both preferred approaches use explicit, scientific actuarial methods. In contrast, LSPRS' current "No Recognition" method is based on an implicit approach which is subjective and not transparent. Both scientific actuarial methods involve running actuarial simulations of the future.

1. *Single equivalent annual COLA assumption.* The simulation spins off information about the frequency and magnitude of each year's potential transfer to the Experience Account. The mean (average) transfer amount can be considered a benefit stream. Solving for X, it determines what would be the single annual equivalent COLA, e.g., 0.40%, 0.50% or some other such estimated equivalent annual COLA. Solve for the X% that has the same actuarial present value over the next 30 years as the average simulated transfer amount.

2. *Single equivalent benefit load assumption.* Dividing that same mean (average) transfer stream for each year by its regular benefits projected to be payable for that year, as spun off from the open group forecast valuation, provides an estimate of the load on benefits that approximates the average transfer amount, e.g., 4%, 6% or some other such percent load.

Either of these two alternative *actuarial methods* is acceptable and preferable, in our opinion. Both of these methods are transparent and explicit *actuarial methods* for recognizing the actuarially measureable likelihood of future gain sharing COLAs for funding purposes.

The first method presented above (single equivalent annual COLA assumption) provides a reasonable proxy for what would likely actually happen in the years to come. The value of X% annual COLA serves as the single equivalent COLA, and is treated in the valuation "as if" it is a regular annual COLA increase. The only challenge is to make a reasonable estimate of X% which scientific methods enable us to do.

Section 2: Overly Optimistic Return Assumption

In our opinion, the assumed rate of return used by LSPRS and its actuary (7.00% as of June 30, 2017) is overly optimistic relative to a consensus of independent expert investment consultants and forecasters. Our rationale for this conclusion follows.

This section sets forth (a) our evaluation of LSPRS' defense of 7.00% as a return assumption and (b) a disciplined process for setting a return assumption that ensures it is mainstream and defensible and provides the details for how we arrived at 6.00% as the most appropriate return assumption.

The cost of being wrong is substantial, especially if it is over a 10-year or 30-year period, and could be detrimental to both plan members and taxpayers. To take this evaluation of LSPRS' net return assumption a step further, consider the subsection below which describes a *process* for setting or evaluating a net return assumption that:

a. Is unbiased, objective, and free of agency risk;
b. Is disciplined and robust;
c. Is defensible; and
d. Improves intergenerational equity, contribution stability, and benefit security of plan members.

A Disciplined Process

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

a. The horizon over which returns are expected to be satisfied;

b. Future rates of inflation (forward-looking), as expected by a *consensus of experts* in the field of inflation forecasting who are both independent and nationally recognized;

c. Current and future asset allocation percentages by asset class; and

d. Future investment performance (forward-looking) and other capital market assumptions for various asset classes, as expected by a consensus of experts in the field of investment forecasting who are both independent and nationally recognized.

Horizons

There is an ongoing debate over the time horizon that should be used to set the rate of return assumption. Some have posited that pension plans are long-term propositions and their return assumptions should reflect a long-term horizon, for example, 30 years. Others believe that a shorter time horizon should be used. It is our opinion that a forward-looking <u>mid-term horizon</u> (e.g., 10 years) should influence the final choices of return assumptions. Long-term horizon forecasts (e.g., 20 to 30 years) are useful for discussion purposes, but not to the exclusion of mid-term horizons. Pension funds are, indeed, usually long-term arrangements. However, in our opinion (for the reasons cited below), 30 years is too long for the selection of a pension fund's expected rate of return.

Some of the reasons supporting the use of a <u>mid-term horizon</u> are:

a. *Underperformance in the mid-term may not be sustainable.* If the forecasting experts are correct, there will be lower compounded returns over the next decade or two while waiting for the

following decades to bail out pension plans in order to achieve the higher long-term expectation. Undoubtedly, there will be better-than-assumed years on occasion. But a consensus of independent experts says (in the support outlined below, in various investment periodicals and in retirement conferences across the country) the next decade is expected to see compound returns well below LSPRS' current 7.00% assumed rate.

Anticipating higher returns in the long-term, while regularly suffering underperformance in the mid-term, is not sustainable. It causes repeated contribution rate increases and a lack of progress in paying down the unfunded actuarial accrued liability. It will test the patience and tolerance of taxpayers, elected representatives, and budget directors and may push them into serious consideration of proposed retirement plan designs that transfer all or some of the investment risk onto plan members.

b. *Forecasts for 30-year long-term horizons are the least reliable.* There is much less certainty in long-term forecasts than mid-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 truism, whether in financial forecasting, election forecasting, or hurricane forecasting. Long-term forecasts are less reliable than mid-term forecasts.

No one knows the future for certain. When in doubt, err on the side of conservatism (lower return assumptions).

Perspectives

There are two types of perspectives to consider when defending or determining assumptions for a future net rate of return of a pension fund and a future rate of inflation. One is temporal – Do we look more to historical rates to inform decision-makers; or more to forward-looking forecasts of the future? The other is social – Do we look more to what other retirement systems are doing; or look more to what expert forecasters would expect for LSPRS' own portfolio in the future?

Temporal. According to current and retrospective actuarial literature, looking backwards at historical rates of return and inflation is not considered to be reliable supporting documentation for current pension actuarial assumptions of future net returns and inflation. Historical rates of return and inflation are viewed more as mere information than used to defend or determine a current net return or inflation assumption. The past is indeed useful for understanding historical relationships among various economic forces and various statistical metrics such as standard deviations, correlation coefficients, and P/E ratios; but even those have been known to change over time and may be different from their historical averages.

However, the current domestic and global environment is not like the past 10, 30, or 50 years; and the future domestic and global environment is certain to be different from the past. A forward-looking perspective should drive the defense or determination of a net return assumption for pension actuarial valuations. Strategically selecting historical returns (an X-year period ending on Y-date) to justify a net return assumption being applied to the next 10, 20, or 30 year period is not valid.

Social. Looking to what other peer retirement systems are doing is generally not a well-placed focus. Other retirement systems have their own asset allocation and expense structure and their own set of politics, protectionism, budget issues, and agency risk. They are not the best source to turn for validation of another system's net return assumption.

Independent, unbiased, expert sources of inflation and investment return forecasts are the best places to look for input when setting a net return assumption for pension valuations. These are much more objective and unfiltered sources, directly from the experts themselves, to guide decision-makers.

Adopting a *process* that looks to a consensus of external subject matter experts' forward-looking forecasts is the best way to avoid the political and budget pressures that sometimes distract or influence assumption-setters away from their primary duty to set return assumptions as their unbiased best estimate of future.

Inflation

An assumed rate of future inflation is a component of the assumed return assumption and the salary increase assumptions. When inflation rates are lowered, the return and salary increases should be lowered (unless there is a coincidental change in real returns or real salary increases that offset it). Conversely, when inflation rates are increased, the return and salary increases should be increased. Expected future inflation is a critical component of the other assumptions. Therefore, much care and attention should be given to the expected future rates of inflation.

The LSPRS 2017 Funding Valuation (page 4) states: "The 7% nominal return rate was developed based on the above inputs and the system's current asset allocation model together with an inflation assumption of 2.50%."

The LLA requested the LSPRS Executive Director (in correspondence dated November 3, 2017) to provide certain backup information concerning inflation and other assumptions. The board actuary's response included the following commentary concerning the System's inflation assumption:

> "In order to set the inflation assumption, we reviewed a number of sources including the system consultant's forecasts, forecasts of inflation provided by consultants for other plans, federal reserve forecast estimates, and historical inflation results over a number of periods as well as assumptions used by other plans and other published reports. We have also considered the reliability of forecasts of future inflation rates.

> "In addition, we have reviewed the inflation assumption used for the LSPRS' valuation in conjunction with other economic assumptions such as the investment return assumption and the annual salary increase rate assumption to be sure that each of these assumptions is consistent with the others. Based on all of these factors we find that an inflation assumption of 2.50% is more consistent with the valuation rate of 7.0% and other economic assumptions."

The first three sources the board's actuary mentions above (the System consultant's forecasts, forecasts of inflation provided by consultants for other plans, and Federal Reserve forecast estimates) all support a lower forecast of future inflation than 2.50%.

a. The Executive Director's response to the LLA's request (dated November 8, 2017) included a document from UBS ("Intellectual Capital Blog," dated February 28, 2017) which states: "Now if we assume that the Fed will on average achieve its 2% inflation target for PCEPI, by implication CPI inflation will average around 2.4%, and this is the inflation number that we incorporate into our CMA."

b. At the bottom of Exhibit 4, we present averages from two surveys of other investment consultants. Depending on the grouping, their average ranges from 2.21% to 2.44%. The participating investment consultants and forecasters in the GRS Survey are listed in the

subsection below. The participating investment consultants and forecasters in the Horizon Actuarial Services (HAS) Survey are identified in their published paper found on their website.

c. The Federal Reserve forecasts are also listed in Exhibit 4. They range from 1.73% to 2.13%.

These three sources are weak in their support of 2.50%.

The fourth and fifth sources mentioned by the board's actuary above are: "historical inflation results over a number of periods as well as assumptions used by other plans." The subsection above on *Perspectives* (temporal and social) explains how these two are poor sources for informing a board or actuary when setting assumed rates of inflation and net investment return. The sixth source mentioned above is unnamed "other published reports."

We would prefer to see an inflation assumption closer to the 2.25% as suggested by the expected inflation rates in Exhibit 4. However, we do not find the used of 2.50% in the 2017 Funding Valuation to be unreasonable for the purpose at hand.

Currently, expert professional sources for forward-looking inflation forecasts generally lie between 1.73% and 2.60%. Consider the forward-looking forecasts from the following subject matter experts.

Exhibit 2

Eight Major National Sources of Inflation Forecasts	
Bond Investors	Congressional Budget Office
Federal Reserve Bank of Philadelphia	Federal Reserve Bank of Cleveland
Federal Reserve Board	GRS Survey
HAS Survey	Social Security Trustees Report

Some of them provide multiple measures of inflation for different time horizons, making a total of 19 forecasts from eight reputable sources.

Exhibit 3

2017 Measures of Inflation		
Horizon	Average	Number of Sources
26.3 - 30 yrs	2.20%	7
20 yrs	2.06%	3
9.40 -15 yrs	2.16%	9

It has become increasingly difficult to support 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 suggested inflation assumption of 2.25% lies more comfortably near a consensus of the expectations in the summary table above and the detailed table below. In our opinion, outliers are not safe assumptions.

Consider Exhibit 4, which shows inflation forecasts of these eight large reputable experts in the field of inflation forecasting.

Exhibit 4

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; Personal Consumer Expenditures)	2.00%
Congressional Budget Office: *The Budget and Economic Outlook*	
Overall Consumer Price Index (June 2017; Ultimate)	2.40%
Overall Consumer Price Index (June 2017; 11 Years)	2.36%
Personal Consumer Expenditures (June 2017; Ultimate)	2.00%
Personal Consumer Expenditures (June 2017; 11 Years)	1.98%
2017 Social Security Trustees Report	
CPI-W 15-Year Intermediate Assumption	2.60%
CPI-W 30-Year Intermediate Assumption	2.60%
GDP Deflator 15-Year Intermediate Assumption	2.20%
GDP Deflator 30-Year Intermediate Assumption	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	2.13%
20-Year Expectation on June 1, 2017	1.97%
10-Year Expectation on June 1, 2017	1.73%
Bond Investors **(Excess Yield of Non-indexed Treasuries Over Indexed Treasuries)**	
30-Year Expectation on June 30, 2017	1.85%
Median 30-year Expectation over 6/30/12 - 6/30/17	2.09%
20-Year Expectation on June 30, 2017	1.77%
Median 20-year Expectation over 6/30/12 - 6/30/17	2.02%
10-Year Expectation on June 30, 2017	1.73%
Median 10-year Expectation over 6/30/12 - 6/30/17	1.96%
Investment Consultants and Forecasters	
2017 GRS Survey major national investment forecasters and consultants Median expectation among 8 firms (averaging 9.4 years)	2.25%
Median expectation among 4 firms (averaging 26.3 years)	2.21%
2017 HAS Survey of 12 investment advisors: Median (10 years)	2.32%
2017 HAS Survey of 12 investment advisors: Median (20 years)	2.44%

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 assumed future returns.

In our evaluation of the actuary's net return assumption, we relied on the 12 target asset allocation percentages set forth in the System's formal Investment Policy Statement last updated in June 2017.

Exhibit 5

2017 LSPRS Target Asset Allocation			
Risk Assets		**Fixed Income Assets**	
Domestic Large Cap	25.0%	Core Fixed Income	10.0%
Domestic Small Cap	10.0%	Full Discretion (Domestic/Foreign)	10.0%
Domestic Mid Cap	5.0%	Cash	2.0%
Foreign Equities - Developed	15.0%		
Foreign Equities - Emerging	7.5%		
Real Estate	7.5%		
Hedge Funds	2.0%	*Total Fixed Income Assets*	*22.0%*
Private Equity	5.0%		
Timber	1.0%		
Total Risk Assets	*78.0%*	*Total Asset Allocation*	*100.0%*

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

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-year) horizon forecasts, and four of them provided GRS with their longer-term (20- to 30-year) horizon forecasts. Given the brevity of the descriptions of the asset classes identified, our mapping of these 12 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.

Exhibit 6

10 Major National Investment Consultants and Forecasters in the GRS Survey			
Aon Hewitt	BNY/Mellon*	J. P. Morgan*	Marquette Asscoiates
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 LSPRS' asset allocation. We replaced the investment forecasters' respective inflation assumptions with 2.25%, our preferred assumption based on the consensus of expert inflation forecasters' expectations presented above in order to normalize for a consistent inflation assumption across all forecasters.

We reduced the respective forecasts for LSPRS by the expected investment-related expenses and added alpha back in to replace active management expenses above expected passive management expenses, as permitted and limited by ASOP No. 27. This leaves a net reduction estimated to be for passive investments.

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.

It matters not whether the field of forecasting is for hurricanes, earthquakes, elections, or inflation and investment returns, a *consensus average* of many reputable experts is proven to be more accurate than any one of those experts.

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

Exhibit 7
Expected Likelihood of Achieving Forecast Results
Based on a 10-year Time Horizon

Investment Consultant 10 Year Horizon	Distribution of 10-Year Average Geometric-Compound Net Nominal Return (Percentiles)			Probability of exceeding 7.00%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	4.29%	5.32%	6.37%	34.23%
2	4.18%	5.27%	6.38%	34.69%
3	5.05%	6.04%	7.04%	40.35%
4	4.80%	5.90%	7.02%	40.16%
5	5.37%	6.32%	7.28%	42.91%
6	5.09%	6.23%	7.37%	43.20%
7	5.16%	6.29%	7.42%	43.65%
8	6.09%	7.10%	8.11%	50.98%
Average	5.00%	6.06%	7.12%	41.27%

Source: Developed by LLA actuarial staff.

There are three important takeaways from Exhibit 6:

a. Over the <u>mid-term horizon</u> the range of expectations of the 50th percentile of compound average return runs from 5.27% to 7.10%.

b. The 50th percentile consensus expert <u>mid-term</u> forecast is 6.06%, or rounded to 6.00%.

c. The consensus of these experts is that there is only a 41.27% chance of achieving at least the current 7.00% over the mid-term horizon. This does not mean a 41.27% 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 41.27% of achieving at least the 7.00% assumption.

This is why, actuarially speaking, the 6.06% rate of return is the preferred assumption for funding, because it is the 50th percentile expectation of compound returns over a mid-term horizon. The consensus is that there is a 50-50 chance of returning at least 6.06% when compounded over the next 10 years.

Only one of the eight major national investment consultants with <u>mid-term horizon</u> forecasts expect the 50th percentile of the compound return to be at or above the current 7.00% assumption over the next 10 years. Again, there is safety in consensus, rather than rushing to an outlier. There are good reasons for these professionals' bleak mid-term forecasts, the details of which are beyond the scope of this report.

If the independent experts are correct, the next 10-year period will experience a substantial shortfall, while the board hopes to be bailed out in years 11 through 30.

Below are the results of this process for the <u>long-term horizon.</u>

Exhibit 8
Expected Likelihood of Achieving Forecast Results
Based on a 25-year Time Horizon

Investment Consultant 20-30 Year Horizon	Distribution of 25-Year Average Geometric-Compound Net Nominal Return (Percentiles)			Probability of exceeding 7.00%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	5.93%	6.54%	7.15%	42.41%
2	5.80%	6.50%	7.20%	42.84%
3	5.92%	6.62%	7.33%	44.64%
4	6.22%	6.93%	7.65%	49.00%
Average	**5.97%**	**6.65%**	**7.33%**	**44.72%**

Source: Developed by LLA actuarial staff.

There are three important takeaways from Exhibit 8:

a. Over the <u>long-term horizon</u> the range of expectations of the 50th percentile of compound average return runs from 6.50% to 6.93%.

b. The 50th percentile expectation of the consensus average for the <u>long-term horizon</u> is 6.65%, or rounded to 6.75%.

c. The consensus of these experts is that there is only a 44.72% chance of achieving at least the current 7.00% over the long-term horizon. This does not mean a 44.72% 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 44.72% of achieving at least the 7.00% assumption.

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 an outlier among the mainstream investment forecasters. According to the capital market assumptions of these investment forecasters, there is only a 41.27% chance of achieving at least the 7.00% compound annual return over the next 10-year period and only a 44.72% chance over the next 25-year period.

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 <u>mid-term horizon</u> are the most appropriate choices of a net return assumption.

Again, no one knows the future for certain. When in doubt, in our opinion it is best to err of the side of conservatism (lower return assumptions).

Section 3: Mortality Assumption

The 2017 Funding Valuation (page 44) states that the mortality assumption, preretirement and postretirement, is the "RP-2000 Sex Distinct Mortality Table with mortality improvements projected to 2025."

This is an incomplete description of the mortality table. However, we compared the table of probabilities found on page 47 of the 2017 Funding Valuation and found them to be derived from the RP2000 Combined Healthy table (not the tables split by Employee and Healthy Annuitants, and not the tables with adjustments for collar or amount).

Base Table

To evaluate the reasonableness of the mortality assumption, we reviewed the base mortality (RP2000) separately from the any 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:

a. Experience Study: An experience study (dated April 25, 2013) was prepared covering the period from July 1, 2007, through June 30, 2012. Page 7 of the 2016 Funding Valuation report (prepared by LSPRS' previous actuary, Hall Actuarial Associates) states that "There have been no changes to the actuarial assumptions or methods since the preceding measurement date which did incorporate my recommended changes contained in the five-year Experience Study. . ." The experience study report disclosed that there were only seven (7) male deaths and 76 female deaths during the five-year period. This is too few to draw any conclusions or comparisons with confidence.

b. 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 (unlike the other three state systems, which are large enough for their mortality data to be fully credible). Only partial credibility can therefore be given to the results of LSPRS experience study. Therefore, the use of a standard reference table is needed to obtain a final mortality assumption for valuation purposes.

   LSPRS' mortality experience could be combined with that of the Firefighters' Retirement System (FRS), the Municipal Police Employees' Retirement System (MPERS), and the Sheriffs' Pension and Relief Fund (SPRF) to obtain a larger data base which may increase credibility and thereby be applicable to all four Louisiana retirement systems.

c. 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:

   1. The mortality tables developed for Louisiana FRS, MPERS, and/or SPRF. 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. Police officers and firefighters are often combined or otherwise considered as having the same mortality rates.

2. 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.

3. RP2014 mortality table was published in October 2014. As with 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.

d. Louisiana Mortality Rates: The Centers for Disease Control and Prevention (CDC) has published data[4] demonstrating that mortality rates in Louisiana are generally higher than national averages. Therefore, it would be more prudent not to use a current national mortality table (such as RP2014) without adjustment as the standard reference table in the weighted average calculations described above.

e. 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 not published. But at the time of the 2017 Funding Valuation report, the RP2014 mortality table was published and available (the report 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. We analyzed data from the CDC 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.

f. Credibility Weighting: Standard actuarial techniques give partial credibility to a small-to-medium size plan's experience data. Typically, the approach is to develop weighting factors to apply to the group's experience and to the standard reference tables (separately to males and females). Although, if the group or subgroup is too small, the benefit gained from the exercise is not worth the trouble. If the standard actuarial techniques were applied in this case, they would not move the needle very far from the standard reference table because the credibility factors for the group's own experience by itself would be so low.

No conclusions at all should be drawn from comparing the group's experience to expected rates from the RP2000 table – No conclusions comparing actual to expected, and no conclusions about margins for improvement. That plan simply does not have enough data for any conclusions.

Without any credible data or even partially credible data available relating to this group's experience, therefore, we find the base table selected (before projection for future mortality) to be acceptable for the 2017 Funding Valuation.

Projection Scales

Once the base table was found to be reasonable, we then turned our attention to the projection scale used in the mortality assumption to reflect expected mortality improvements over time. The

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[4] 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.

experience study report and the 2017 Funding Valuation stated that the RP2000 table was projected for mortality improvements to 2025. However, neither report indicated what projection scale was applied. We compared the table of probabilities found on page 47 of the 2017 Funding Valuation and found they correspond to the RP2000 Combined Healthy table projected by Scale AA.

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-recent past had differed significantly from those predicted by Scale AA. Scale BB would have been (and still is) better choice than Scale AA 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 (static), 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 turns 65 in 2040. This overstates the rates prior the projection date and understates them thereafter. The generational projection applies the improvements for the three years between 2017 and 2020 for a member turning 65 in 2020, but applies the improvements for the 23 years between 2017 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 then projecting generationally using MP2017. While either of these two approaches would be more current and preferable methodologies, we do not find the mortality tables used in the LSPRS 2017 actuarial funding valuation report to be unreasonable.

While there are more current and appropriate means for projecting future mortality improvements, we believe the actuary's use of Scale AA projected to 2025 is not unreasonable.

Actuarial Certification

This report is considered to be a Statement of Actuarial Opinion. Therefore, I make the following certification:

I, Paul Richmond, am the Manager of Actuarial Services for the Louisiana Legislative Auditor. I am a member of the American Academy of Actuaries, an Associate in the Society of Actuaries, an Enrolled Actuary, and I meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein.

_____

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

_12/15/17_____

Date

Actuarial Standards of Practice

Cost-of-Living Actuarial Modelling

APPENDIX A

Actuarial Standards of Practice

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

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.

Cost-of-Living Actuarial Modelling

Following is a simplified step-by-step explanation of the actuarial simulation process.

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 unforeseen 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 open group liability projections, projected fund values based on an investment return for each future year, and annual valuation calculations (annual gain/loss calculation, amortization bases and payments, administrative expense load, experience account balance maintenance, etc.) 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.

This is not too complicated for an actuary to design, program, and run. It 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 LSPRS (approximately $783 million 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.

The Actuary for the Legislative Auditor has prepared this type of stochastic analysis for LASERS and TRSL, which have similar COLA mechanisms. The result was to assume equivalent annual COLAs of 0.40% and 0.50%, respectively. These proxy produce a reasonable approximation to the actual COLA cost expected.

However, even a rough estimate not based on scientific or actuarial processes would be better than the "No Recognition" approach used by LSPRS. Just following the reasoning set forth in the pages above, it is reasonable to expect COLAs to be allowed every few years, in the amount of 1.5% to 5.0% for some members each time granted.

Much of the description of the COLA conditions and benefits above are merely a summary, and much involves interpretation of statutes. This Comprehensive Actuarial Review should not be considered a legal opinion. The statutes should be consulted for more detailed descriptions, and we defer to legal counsel and other authoritative sources for legal interpretations.

APPENDIX B

Management's Response

G. S. CURRAN & COMPANY, LTD.

Actuarial Services

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Gary S. Curran, FCA, MAAA, ASA, EA
Consulting Actuary

Gregory M. Curran, FCA, MAAA, ASA, EA
Consulting Actuary

December 13, 2017

Mr. Paul Richmond, ASA, MAAA, EA, FCA
Manager of Actuarial Services for the
Louisiana Legislative Auditor
1600 North Third Street
Baton Rouge, Louisiana 70804

Re: Comprehensive Actuarial Review of the 2017 LSPRS Actuarial Valuation

Dear Mr. Richmond:

Please accept this written response to the Comprehensive Actuarial Review of the 2017 LSPRS Actuarial Valuation on behalf of the Louisiana State Police Retirement System.

The first topic highlighted in the above referenced report relates to the handling of Cost-of-living adjustments within the funding valuation report. On page 3 of the LLA response, it lists four parties that must act to provide a COLA to retirees – The LSPRS Board, the Actuary for the Legislative Auditor, the Legislature, and the Governor. The report further states, "The LSPRS COLAs are not automatic and are considered ad hoc because of these four points of discretion. *When and how much* COLAs are allowed is statutorily automatic, but actually granting COLAs includes this discretionary element."

Although we recognize that a formula exists in the statutes related to when the Board may ask the Legislature to grant a COLA and how much will be paid, the right to ask the Legislature to grant a COLA exists without regard to these statutes. In addition, the right of the Legislature to grant a COLA exists without regard to these statutes. The only automatic feature related to COLAs in the statutes is the formula for filling the Experience Account. It is for this reason that we opted to increase the measurement of plan liabilities to recognize not only the existing balance in the Experience Account but also to account for the present value of future contributions to the Account up to the maximum permissible value of the Account based upon current account limitations.

Accounting for potential future legislative actions by funding them in advance of their approval in effect usurps the legislative prerogative to decline those future benefits. The act of changing the funding policy of the system to automatically presume consistent future COLAs could in fact make it more difficult for the legislature to choose to limit plan costs by reducing the frequency of future COLAs as constituents argue that employers are already paying for such COLAs. Even if one assumes that the Board of Trustees will always ask to spend the funds accumulated in the Experience Account to pay a COLA, legislation passed in recent years has reduced the funds that can be accumulated in the Experience Account and has required that some of the money credited to the Experience Account be used to pay down the system's UAL instead. These actions have significantly

reduced the amount of potential future funding "ear marked" for COLAs and show that the Legislature's willingness to provide COLAs is not without limit.

Although we do intend to discuss the pros and cons of including a provision for future cost of living increases with the Board of Trustees as a part of our ongoing advice with respect to the proper funding of plan liabilities, we do not believe that such an inclusion is required. It is our belief that the funding valuation prepared by G. S. Curran & Company for LSPRS is in compliance with actuarial standards of practice and the provisions set forth in the Governmental Accounting Standards Board Statement 67.

On page 5 of the report it states, "It seems unreasonable to 'assume' a 0% chance of granting a COLA in future years when otherwise allowed." We would like to state clearly that we do not accept this characterization of our actuarial valuation. We have not simply chosen to ignore future COLAs. We have simply chosen to account for the funding of each COLA as the money will be added to the Experience Account. We have found that predicting the frequency and amount of future COLAs is difficult and the chart detailing COLAs granted from 2009 through 2016 provided within the report shows this. Additionally, the statutes governing the Experience Account have changed drastically during this period. The report states, "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 few years. Failure to recognize (even if making only a rough estimate) the cost and liability of the statutes' COLA provisions is to deny the purpose of the statutes." We completely disagree. The Legislature created mechanisms for payment of COLAs and statutes regarding the determination of the actuarially required contributions for the system. Had the legislature intended that the system make recognition of future COLAs a part of the actuarial funding valuation it simply would have added it to the list of items to be included in the determination of the employer contribution rate.

We agree that this topic is appropriate for the Legislature to consider and should be discussed with the legislative committees on retirement along with the Board of Trustees, but to imply that not including it within our actuarial valuation denies the purpose of the statutes is simply incorrect. In short, the legislature should determine whether or not future COLAs are automatic and whether or not the prefunding of COLAs is their goal. Should the system's Board of Trustees or the Legislature wish to prefund COLAs, we could suggest legislative changes that would better accomplish this goal than to simply change the funding policy while maintaining the current legislative construct.

The next major topic within the report was the assumed rate of return, which is titled, "Overly Optimistic Return Assumption". The report states in part that it seeks to set forth "a disciplined process for setting a return assumption that ensures it is mainstream and defensible…" We believe that our process of reviewing the system's assumed rate of return based on the system's particular target asset allocation and a collection of data from many investment consulting firms with regard to long-term expected rates of return, standard deviations of return, and correlations for each asset class is more than defensible. With regard to our assumption being within the "mainstream", a simple look at the NASRA (National Association of State Retirement Administrators) Return Assumption Survey for 2016 shows that LSPRS' investment return assumption is more conservative than the

"mainstream". With the average return assumption among the 152 public employee retirement systems represented in the survey at 7.55%, the median at 7.50%, and only 6% of funds using a return assumption less than the 7.00%, we see no way to say that the LSPRS assumption is too high to be "mainstream". Further, our review of the return assumption, finds the 7.00% to be a reasonable long-term rate of return assumption for a system with LSPRS' asset allocation. This is not to say that we will not continue to review the assumption and to discuss the potential role of conservatism in the long-term rate of return assumption to mediate risk within the plan.

The report states, "It is our opinion that a forward-looking mid-term horizon (e.g., 10 years) should influence the final choices of return assumptions." The report further makes the point that using a 30 year time horizon is too long. In our opinion, the use of mid-term assumptions will lead to frequent changes in assumptions as markets go up and down and assumptions are adjusted for expected near and mid-term performance. We believe that assumptions based on 10 year time horizons will be more volatile and will tend to build in recent experience so that recent out-performance will tend to result in lower 10 year forecasts. In addition, long-term forecasts are not necessarily less reliable than mid-term assumptions. Although determining a reliable long-term point estimate of future returns is difficult, forecasting over longer periods has the advantage of the averaging process to reduce the volatility of outlier returns.

Similarly, we believe that it is incorrect to say that long-term forecasts of 30-year time horizons are the least reliable. Most investment professionals believe that they can more easily predict the longer term average of future returns than the return that will be earned in the coming years. In the end, when investment professionals could not predict the consistent high returns of the 1990s and did not predict the multiple significant corrections of the 2000s, why would it be more reasonable to set a long-term assumed rate of return based on the prevailing view of the next ten years? In the late 1990's a similar view led many systems to increase their assumed rates of return to levels well in excess of the long-term averages, with some investment professionals arguing for valuation interest rates in excess of 9%.

In addition, should the U.S. economy undergo large changes to its monetary and tax policy as is currently being considered, economic forecasts of the next ten years could change significantly. Instead, we believe that longer term estimations provide a less volatile input to a proper funding policy. It is also easy to mistake cyclical trends for secular trends. For this reason, we believe in moving long-term assumptions very slowly. We seem to be in a time of reduced inflation and return expectations, but it is unknown if such circumstances will continue indefinitely.

With regard to the assumed rate of inflation, we believe that current low inflation estimates are often based on static analysis. Items such as higher economic growth and lower tax rates will tend to add to future inflationary pressures. Because of these concerns and other factors, we believe that it is prudent to reduce inflation expectations in a measured way since the ultimate outcome is unknown.
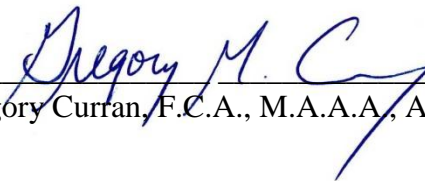
We are scheduled to perform our first experience study for LSPRS over the coming months and based on the results of our study, will be advising the Board with regard to the appropriate assumptions to use in the upcoming valuation. The Board's review of the experience study will provide an appropriate platform for a robust discussion related to each of the plan's assumptions, including those highlighted in the report.

Sincerely,

G. S. CURRAN & COMPANY, LTD.

By: _____
Gary Curran, F.C.A., M.A.A.A., A.S.A.

_____
Gregory Curran, F.C.A., M.A.A.A., A.S.A.

cc: Board of Trustees
        Louisiana State Police Retirement System

cc: Daryl G. Purpera, CPA, CFE
        Louisiana Legislative Auditor