STATE OF ILLINOIS

OFFICE OF THE AUDITOR GENERAL

STATE ACTUARY'S REPORT

THE ACTUARIAL ASSUMPTIONS AND VALUATIONS OF THE FIVE STATE-FUNDED RETIREMENT SYSTEMS

DECEMBER 2012

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OFFICE OF THE AUDITOR GENERAL
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To the Speaker and Minority Leader of the House of Representatives, the President and Minority Leader of the Senate, the members of the General Assembly, and the Governor:

This is our 2012 report on the actuarial assumptions and valuations of the five State-funded retirement systems.

This report was conducted pursuant to Public Act 097-0694 which amended the Illinois State Auditing Act by adding a requirement for the Auditor General to annually review assumptions and valuations prepared by the actuaries of the five State-funded retirement systems. The report is based on reports prepared by Cheiron, the State Actuary, on each of the State-funded retirement systems.

The report is transmitted in conformance with Section 5/2-8.1(c) of the Illinois State Auditing Act.

WILLIAM G. HOLLAND
Auditor General

Springfield, Illinois
December 2012

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GLOSSARY OF TERMS

Actuarial Assumptions – Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, interest rate (also called the investment return or discount rate) and inflation. Demographic assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (interest rate and inflation) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Gain (Loss) – The difference between actual experience and actuarial assumed experience during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial funding method.

Actuarial Liability – The Actuarial Liability is the present value of system benefits that have been allocated by an Actuarial Cost Method to past service as of the valuation date. It is also the difference between the Present Value of Future Benefits and the Present Value of Future Normal Costs. It is referred to by some actuaries as the "accrued liability".

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

Actuarial Value of Assets – The Actuarial Value of Assets equals the Market Value of Assets adjusted according to a smoothing method. The smoothing method in Illinois Law is intended to smooth out the short-term volatility of investment returns in order to stabilize contribution rates and the funded status reported under GASB 25 and 27.

Actuarial Cost Method – A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Annual Required Contribution – The sum of the normal cost and amortization of the unfunded actuarial accrued liability over a period not to exceed 30 years. Currently required for accounting principles by the Governmental Accounting Standards Board (GASB).

Asset Smoothing Method – A method of asset valuation where the annual fluctuation in the market value of assets is averaged over a period of years. See Actuarial Value of Assets above.

Entry Age Normal (EAN) – A method under which the Present Value of Future Benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this Present Value of Future Benefits allocated to a valuation year is called the Normal Cost. The portion of this Present Value of Future Benefits not provided for at a valuation date by the Present Value of Future Normal Costs is called the Actuarial Liability.

Funded Status – The Actuarial Value of Assets divided by the Actuarial Liability. The Funded Status represents the percentage of assets in the Plan compared to the Actuarial Liability. The Funded Status can also be calculated using the Market Value of Assets.

Governmental Accounting Standards Board – The Governmental Accounting Standards Board (GASB) defines the accounting and financial reporting requirements for governmental entities. GASB Statement No. 25 defines the plan accounting and financial reporting for governmental pension plans, and GASB Statement No. 27 defines the employer accounting and financial reporting for participating in a governmental pension plan.

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

Net Pension Obligation – The cumulative difference between annual pension cost and the employer's contributions to the plan.

Normal Cost – The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Present Value of Future Benefits – The Actuarial Present Value of all benefits promised in the future to current members of the Plan assuming all Actuarial Assumptions are met.

Present Value of Future Normal Costs – The Actuarial Present Value of retirement system benefits allocated to future years of service.

Projected Unit Credit (PUC) – A method under which the benefits of each individual included in an actuarial valuation are allocated by a consistent formula to the years in which they are earned. The Actuarial Present Value of benefits allocated to a valuation year is called the Normal Cost. The Actuarial Present Value of benefits allocated to all periods prior to a valuation year is called the Actuarial Liability.

Unfunded Actuarial Liability (UAL) – The difference between the actuarial accrued liability and valuation of assets. Sometimes referred to as "unfunded accrued liability."

Chapter One

AUDITOR GENERAL'S SUMMARY

REPORT CONCLUSIONS

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. Cheiron was selected as the State Actuary. The Public Act directed the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;

- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and

- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

Cheiron reviewed the actuarial assumptions used in each of the five systems' actuarial valuations and **concluded that they were reasonable**. Consequently, Cheiron did not recommend any changes to the assumptions. Cheiron did, however, make recommendations for additional disclosures for the 2012 valuations (involving information that Cheiron reviewed but which was not presented in the valuation reports) and also recommended changes for future valuations. Recommendations included the following:

- Cheiron concluded that the interest rate assumptions for each of the five systems were reasonable at this time. However, for three of the systems (TRS, SURS, and SERS), Cheiron recommended that the Boards consider lowering the interest rate assumption in the future. Cheiron also recommended that the Boards annually review the interest rate assumption as opposed to waiting for the completion of a formal experience study.

- Cheiron recommended that the systems' actuaries, in future valuations, consider establishing a corridor that would limit the maximum spread between the actuarial value of assets (smoothed value) and the market value of assets so that the actuarial value of assets, in any year, would be no more than 120 percent of market value or no less than 80 percent of market value. A move to this approach would have no impact on the 2012 actuarial valuation results as the actuarial value of assets for all five systems is currently within the 80 percent to 120 percent corridor.

Cheiron verified the arithmetic behind the calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based. Cheiron did, however, recommend that the systems' actuaries disclose additional information in future valuation reports to enable a more comprehensive analysis of the required State contribution.

The Illinois Pension Code requires that the systems' actuaries base the required contribution using a prescribed funding method that achieves 90 percent funding in the year 2045. In the actuarial valuation reports, the systems' actuaries discuss the issues with this funding method. The actuaries for two of the systems (TRS and SURS) specifically recommend that the funding method should be based on 100 percent funding within 30 years. Similarly, the actuaries for the remaining three systems (SERS, JRS, and GARS) recommend reducing the projection period and increasing the 90 percent target. Cheiron concurred with the systems' actuaries stating that the statutorily mandated funding method does not conform with the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices. Cheiron also suggested that, due to the systematic underfunding of the systems, the Boards use the conservative end of any range of assumptions recommended by the systems' actuaries.

INTRODUCTION AND BACKGROUND

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. The Public Act amended the Illinois State Auditing Act as well as sections of the Illinois Pension Code for each of the five State-funded retirement systems. The five State-funded retirement systems are:

- The Teachers' Retirement System (TRS);
- The State Universities Retirement System (SURS);
- The State Employees' Retirement System (SERS);
- The Judges' Retirement System (JRS); and
- The General Assembly Retirement System (GARS).

Requirements of Public Act 097-0694

Public Act 097-0694 requires the State Actuary to conduct an annual review of the valuations prepared by the actuaries of the State-funded retirement systems. Specifically the Act requires the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;
- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and

- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

On or before November 1 of each year, beginning November 1, 2012, the boards of each of the systems must submit to the State Actuary a proposed certification of the amount of the required State contribution to the system for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based.

On or before January 1, 2013, and each January 1 thereafter, the Auditor General shall submit a written report to the General Assembly and Governor documenting the initial assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems, any changes recommended by the State Actuary in the actuarial assumptions, and the responses of each board to the State Actuary's recommendations.

On or before January 15, 2013, and every January 15 thereafter, each Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

Contracting with the State Actuary

On July 12, 2012, the Office of the Auditor General issued a Request for Proposals for the services of a State Actuary. On August 24, 2012, the contract was awarded to Cheiron. Cheiron is a full-service actuarial and consulting firm with offices in eight locations throughout the United States. Cheiron has experience working with multiple public pension plans around the country.

REVIEW OF THE ACTUARIAL ASSUMPTIONS

Cheiron reviewed the actuarial assumptions used in each of the five systems' actuarial valuations and **concluded that they were reasonable**. Consequently, Cheiron did not recommend any changes to the assumptions this year.

Cheiron did, however, make recommendations for additional disclosures for the 2012 valuations and also recommended changes for future valuations. Exhibit 1-1 summarizes the recommendations made for the various retirement systems. The recommended additional disclosures for the current 2012 valuation involved additional information that was not presented in the systems' actuarial valuation reports. Cheiron requested and subsequently received this information from the retirement systems. However, for the actuarial valuation reports to fully comply with actuarial standards, Cheiron recommended that this information also be disclosed in the 2012 valuation reports.

Exhibit 1-1
RECOMMENDATIONS TO THE RETIREMENT SYSTEMS

Recommendations	TRS	SURS	SERS	JRS	GARS
Recommended Changes to Actuarial Assumptions used in the 2012 Actuarial Valuations:					
Cheiron reviewed the actuarial assumptions and concluded that they were reasonable. Consequently, Cheiron did not have any recommended changes to assumptions this year.					
Recommended Additional Disclosures for the 2012 Actuarial Valuations:					
• Disclose the merit pay increase assumption by age and active employment status	X				
• Disclose how the New Entrant Profile assumption was developed	X	X		X	X
• Include projections of the maximum contribution calculation without Government Obligation Bonds		X			
• Offer an explanation of the loss due to retirees from active status			X		
• Explore the actuarial liability loss item for salary increases of inactive members and add an actuarial assumption if necessary					X
Recommended Changes for Future Actuarial Valuations:					
• Consider lowering the interest rate assumption below its current level and annually review the interest rate assumption	X	X	X		
• Provide better explanation of unexplained annual liability losses	X				
• Consider establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited	X	X	X	X	X
• Include a complete disability incidence table		X			
• Continued examination of the recurring loss for benefit recipients and adjustment to assumptions if the loss persists		X			
• Demonstrate the development of the capped pay calculation		X			
• Consider increasing the 1% of salary load for disability benefits			X		
• Disclose the specific data referred to in the description as to how the New Entrant Profile assumption was developed			X		
• Consider using a fully generational mortality table				X	X
• Consider using actual data available rather than an assumption for determining if a member will choose a benefit option that provides a survivor annuity				X	
• Consider eliminating the disability assumption				X	X
Source: OAG summary of Cheiron's preliminary reports to the five State-funded retirement systems.					

The following sections discuss some of the key assumptions and recommendations. Further details on the assumptions and recommendations, including those not discussed in this summary chapter, are contained in the State Actuary's preliminary reports for each of the five systems, found in chapters 2 – 6 of this report.

Economic Assumptions

Cheiron reviewed the economic assumptions utilized in the actuarial valuations for each of the five State-funded retirement systems. The following sections discuss two of those assumptions – the interest rate assumption and the inflation assumption.

Interest Rate Assumption

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption is used to value liabilities for funding purposes. The retirement systems use varying interest rate assumptions. Exhibit 1-2 shows the interest rate assumptions for each of the five State-funded retirement systems. As can be seen in the exhibit, each of the systems recently lowered its interest rate assumption.

Exhibit 1-2
INTEREST RATE ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS

System	Interest Rate	Notes
Teachers' Retirement System	8.00%	Lowered from 8.50% for the June 30, 2012 actuarial valuation
State Universities Retirement System	7.75%	Lowered from 8.50% for the June 30, 2010 actuarial valuation
State Employees' Retirement System	7.75%	Lowered from 8.50% for the June 30, 2010 actuarial valuation
Judges' Retirement System	7.00%	Lowered from 8.00% for the June 30, 2010 actuarial valuation
General Assembly Retirement System	7.00%	Lowered from 8.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

After reviewing all of the materials made available, Cheiron concluded that the interest rate assumptions for each of the five systems were reasonable at this time. However, for three of the systems (TRS, SURS, and SERS), Cheiron recommended that the Boards consider lowering the interest rate in the future and annually reviewing the interest rate assumption as opposed to waiting for the completion of a formal experience study. As shown in Exhibit 1-2, all three systems have recently lowered their interest rate assumption:

- **TRS** – The TRS actuary, Buck Consultants, issued a five-year experience study in August 2012 where they recommended that the Board change the interest rate assumption to a figure in the range of 7.75 percent to 8.25 percent. The Board adopted a rate of 8.0 percent at its September 21, 2012 Board meeting.

- **SURS –** SURS changed its interest rate assumption to 7.75 percent from 8.5 percent for the June 30, 2010 actuarial valuation.

- **SERS –** SERS changed its interest rate assumption to 7.75 percent from 8.5 percent for the June 30, 2010 actuarial valuation in partial response to a 2010 five-year experience study.

For each of the three systems, Cheiron cited specific rationale for concurring with the system's interest rate assumption. For example, for TRS, Cheiron noted the following:

- The TRS actuary, Buck Consultants, complied with Actuarial Standard of Practice No. 27 in developing the interest rate assumption;

- Buck's expectation for expected future earnings over the next 30 years was 8.42 percent; and

- TRS' long history of actual returns exceeding 8.0 percent.

While concurring with the current interest rate assumptions, Cheiron offered several different rationales for considering lowering the interest rate in future valuations. These included:

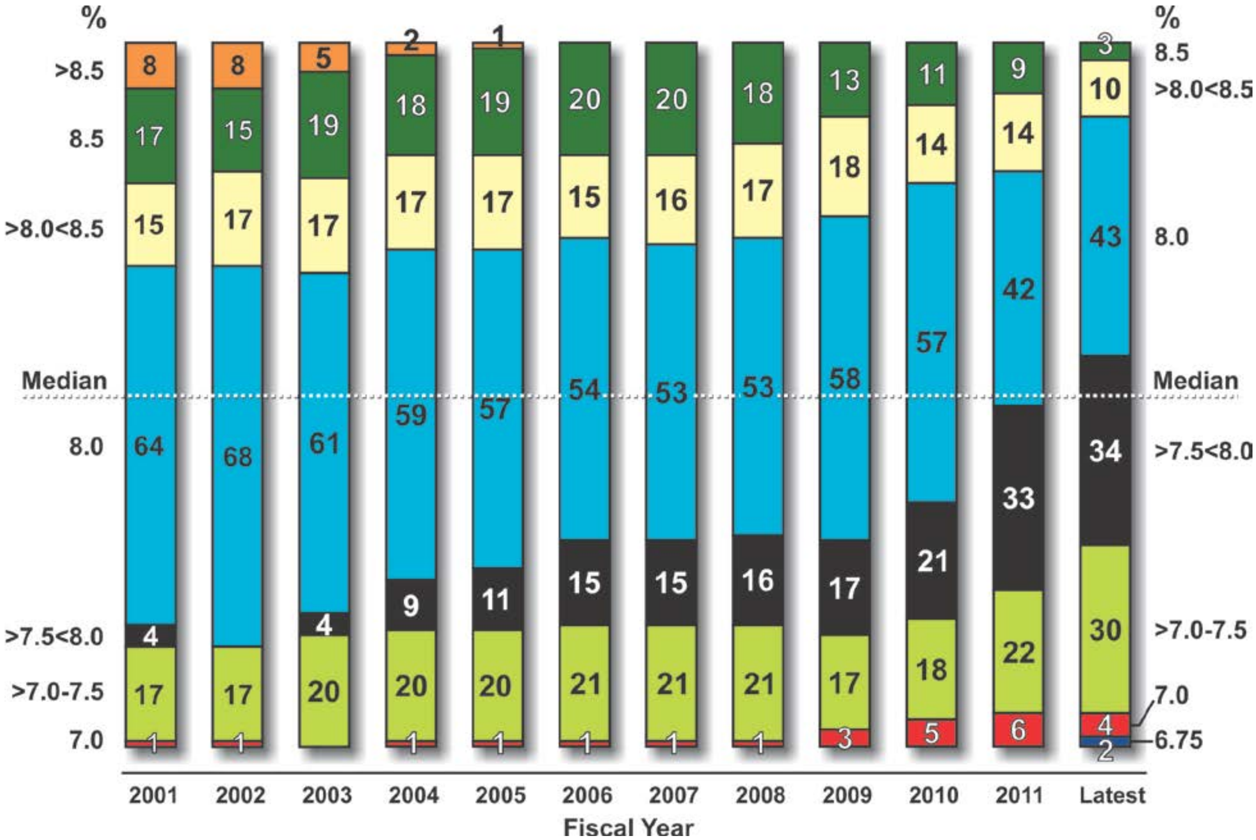
- Under Actuarial Standard of Practice (ASOP) No. 27 *Selection of Economic Assumptions for Measuring Pension Obligations,* Section 3.6.3 Measurement Specific Factors refers to other factors to consider in the selection of the investment assumption. Cheiron believes the statutory funding requirement under the Illinois Pension Code is one such factor to consider in the selection of the investment assumption. Given that the actuarial value of assets are projected to grow at the interest assumption rate, if the market value of assets is less than the actuarial value there is an implied expectation of contribution rate increases. Also if the interest rate assumption is less than the median expected average future return there is also an implied expectation of contribution rate increases. To mitigate these factors a lower long term interest rate assumption should be considered.

- Industry pressure may lead to mandated lower discount rates. In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from its traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

Cheiron also discussed the nationwide movement among pension plans to lower interest rates. The National Association of State Retirement Administrators (NASRA) conducts the Public Fund Survey which is an online compendium of key characteristics of 99 of the nation's largest public retirement systems covering 126 public pension plans. Exhibit 1-3 shows the change in the interest rate assumptions, since the inception of the Public Fund Survey in 2001, for 126 public pension plans.

Exhibit 1-3
CHANGE IN INTEREST RATE ASSUMPTIONS SINCE 2001
126 PENSION PLANS IN THE NATION'S LARGEST PUBLIC RETIREMENT SYSTEMS



Source: NASRA Public Fund Survey.

The exhibit shows the shift to lower interest rate assumptions. In 2001, 104 of the 126 plans (83%) used an interest rate assumption of 8.0 percent or higher. The most recent data shows that this number has dropped to only 56 of 126 plans (44%) that use an interest rate of 8.0 percent or higher. The median assumption has fallen below 8.0 percent for the first time. Also for the first time, two plans have adopted a rate below 7.0 percent.

Inflation Assumption

The inflation assumption primarily impacts the salary increase assumption. The five State-funded retirement systems use inflation assumptions ranging from 2.75 percent to 3.25 percent. Exhibit 1-4 shows the inflation assumptions for each of the five systems.

Exhibit 1-4
**INFLATION ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS**

System	Inflation Rate	Notes
Teachers' Retirement System	3.25%	Lowered from 3.50% for the June 30, 2012 actuarial valuation
State Universities Retirement System	2.75%	Lowered from 3.75% for the June 30, 2011 actuarial valuation
State Employees' Retirement System	3.00%	Lowered from 3.50% for the June 30, 2002 actuarial valuation
Judges' Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation
General Assembly Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

Cheiron concluded that the inflation assumptions used by the five State-funded retirement systems were within a reasonable range. Cheiron's rationale for concurring with the inflation assumptions included:

- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8 percent and 3.8 percent.

- Cheiron's comparison of other public sector retirement systems' inflation assumptions as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75 percent to 3.75 percent.

Demographic Assumptions

The retirement systems utilize a number of demographic assumptions such as mortality rates, disability rates, and termination rates. Cheiron reviewed the demographic assumptions and concluded that they were reasonable. Cheiron did, however, make a number of recommendations for additional disclosures for the 2012 valuations and also recommended changes for future valuations concerning various demographic assumptions. As shown previously, Exhibit 1-1 summarizes the recommendations made for the various retirement systems. Additional details on the demographic assumptions examined can be found in the chapters for each of the five State-funded retirement systems.

PROPOSED CERTIFICATION OF REQUIRED STATE CONTRIBUTION

As required by Public Act 097-0694, each of the five State-funded retirement systems submitted to the State Actuary a proposed certification of the amount of the required State contribution for that system. **Cheiron verified the arithmetic behind the calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based.** Exhibit 1-5 shows the amounts of proposed State contributions submitted by the systems.

Exhibit 1-5
AMOUNTS OF STATUTORILY REQUIRED STATE CONTRIBUTIONS

System	**State Contribution (for Fiscal Year 2014)**
Teachers' Retirement System	$ 3,438,578,000
State Universities Retirement System	1,551,766,000
State Employees' Retirement System	1,743,865,000
Judges' Retirement System	126,808,000
General Assembly Retirement System	13,856,000
Total	**$6,874,873,000**

Source: 2012 retirement system actuarial valuation reports.

Cheiron did, however, recommend that the systems' actuaries disclose additional information in future valuation reports to enable a more comprehensive analysis of the required State contribution. To calculate the required State contribution, the systems' actuaries must make an assumption regarding the new hires that replace existing members over the projection period. This assumption is commonly referred to as the new entrant profile. The new entrant profile is a critical assumption as the required projection of 90 percent funding in 2045 means that the majority of active members at that time will be new hires after the current June 30, 2012 valuation.

Cheiron recommended that the systems' actuaries disclose additional information as to how the new entrant profile was developed and include all relevant information in their valuation reports to better comply with Actuarial Standard of Practice No. 41 *Actuarial Communications*.

ACTUARIAL METHODS

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). The amortization basis is discussed under the State Mandated Funding Method in the next section.

Funding Method

All of the five State-funded retirement systems use the Projected Unit Credit (PUC) cost method to assign costs to years of service. This method is required under the Illinois Pension Code. Cheiron had no objection to using the PUC cost method as it is an acceptable method that is used by other public sector pension funds. However, Cheiron would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Pension Code's requirement for level percent of pay funding.

Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones.

As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the EAN funding method to mitigate this affect. The NASRA Public Fund Survey indicates that only 15 of the 126 public pension plans (12%) use the PUC cost method.

Asset Smoothing Method

The actuarial value of assets for the systems is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. Cheiron concurred with the use of the asset smoothing method noting that smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets (smoothed value) and the market value of assets. Many public sector pension plans limit the actuarial value of assets to, in any year, no more than 120 percent of market value or no less than 80 percent of market value. According to Actuarial Standard of Practice No. 44 *Selection and Use of Asset Valuation Methods for Pension Valuations* 3.3(b)(1) the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." Therefore, Cheiron recommended that the Boards consider moving to this approach in future valuations. Cheiron also noted that a move to this approach would have no impact on the 2012 actuarial valuation results as the actuarial value of assets for all five systems is currently within the 80 percent to 120 percent corridor.

OTHER ISSUES

Cheiron raised two other issues in its reports to the retirement systems. The first issue related to the State mandated funding method and the second issue related to the State mandated projection method.

State Mandated Funding Method

The Illinois Pension Code requires that the systems' actuaries base the required contribution using a prescribed funding method that achieves 90 percent funding in the year 2045. In the actuarial valuation reports, the systems' actuaries discuss the issues with this funding method. The actuaries for two of the systems (TRS and SURS) specifically recommend that the funding method should be based on 100 percent funding within 30 years. Similarly, the actuaries for the remaining three systems (SERS, JRS, and GARS) recommend reducing the projection period and increasing the 90 percent target.

In the TRS June 30, 2012 Actuarial Valuation Report, TRS's actuary, Buck Consultants, notes the following:

- *"Public Act 94-0004 has resulted in contributions to the System much less than those that would be contributed under generally accepted actuarial standards. Under such standards, a funded ratio of 100% would be achieved within 30 years as opposed to the 90% funded ratio achieved by 2045 under Public Act 94-0004."*

- *"The continued use of Public Act 94-0004 in its current form will continue the history of an inadequate funded ratio of less than 100%. In addition, the Net Pension Obligation clearly exhibits the shortfall of the Public Act 94-0004 contributions when compared to the GASB 25/27 ARC* [Annual Required Contribution], *which is generally recognized as a reasonable contribution under generally accepted actuarial standards."*

Similarly, in the SURS June 30, 2012 Actuarial Valuation Report, SURS's actuary, Gabriel Roeder Smith, notes the following:

- *"The calculations in this report were prepared based on the methods required by the Statutory funding policy…In light of the current funded status of this Retirement System, we do not endorse this funding policy because the Statutory funding policy defers funding for these benefits into the future…."*

Cheiron concurred that, under generally accepted actuarial standards, the funding method should be based as a minimum on achieving 100 percent funding within 30 years. Cheiron also suggested that, due to the systematic underfunding of the systems, the Boards use the conservative end of any range of assumptions recommended by the systems' actuaries.

State Mandated Projection Method

Cheiron noted that under the Pension Code, the actuarial methodologies utilized in performing the 2045 projection of the systems' funded status assume that the future earnings rate is applied to the actuarial value of assets (smoothed value) rather than the market value of assets. If the actuarial value of assets (smoothed value) is higher than the market value of assets, as it has been for each of the systems, the assets of the system would have to earn a much higher rate of return than what was projected. Cheiron recommended that consideration be given to requiring that the projected future earnings of the systems be based on the starting market value of assets rather than the smoothed value of assets.

RESPONSES TO THE RECOMMENDATIONS

Each of the five State-funded retirement systems provided responses to Cheiron's recommendations contained in the preliminary reports. The systems generally agreed with Cheiron's recommendations. The complete responses are in Appendix C. Cheiron offered additional comments regarding the response from TRS.

Response from Teachers' Retirement System

In its response to Cheiron's preliminary report, TRS agreed with the majority of recommendations and findings of Cheiron. However, TRS disagreed with Cheiron's recommendation that TRS annually review the interest rate assumption rather than wait for the completion of the next formal experience study. TRS stated in its response that "…one year is not long enough to consider changing such a key assumption, and actually making the change would add more volatility to the state contribution."

Cheiron disagreed with TRS. In asking for TRS to review the assumption annually, Cheiron was not suggesting that the review be based on one year's return, which they agree is too short. Cheiron's recommendation for an annual review was to start with the conclusions arrived in Buck's July 1, 2006- June 30, 2011 Experience Study, and annually consider whether the factors reached in that study have changed materially enough (e.g. new market expectation, major economic movements, etc.) to warrant further change. In Cheiron's opinion, there is no benefit to be gained to wait for a formal study for the interest rate assumption.

Cheiron also recommended additional disclosures, including disclosures on the historical development of TRS assets without the pension obligation bonds. In its response, TRS stated that they will give careful consideration to how they could present such items. However, they noted: "Other recommended schedules may make the report even more informative to an actuary, but we are concerned that they may not add the same value for lay users." Cheiron notes that the recommendation was not just to be more informative but was based on adherence to Actuarial Standard of Practice No. 41 Section 3.2 which states that the actuarial report should present data "…with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuarial report." The value to the lay user is in the knowledge that the inclusion of the additional information makes the report more transparent to the methods used in calculating the State contributions.

Chapter Two

PRELIMINARY REPORT ON THE TEACHERS' RETIREMENT SYSTEM

In accordance with Public Act 097-0694, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the Teachers' Retirement System (TRS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was based on Cheiron's review of actuarial assumptions included in TRS' 2012 Actuarial Valuation.

Following is Cheiron's preliminary report submitted to the Board of Trustees of the Teachers' Retirement System. An initial draft of the preliminary report was submitted to TRS on November 30, 2012. An updated final preliminary report was submitted to TRS on December 10, 2012. TRS' written response, provided on December 14, 2012, can be found in Appendix C.

December 10, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
Teachers' Retirement System
of the State of Illinois
2815 West Washington Street
Springfield, Illinois 62702

Dear Ladies and Gentlemen:

In accordance with Public Act 097-0694 Cheiron is submitting this preliminary report concerning the proposed certification prepared by the Buck Company, of the required State contribution to the Teachers' Retirement System of the State of Illinois (TRS) for Fiscal Year 2014. This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

In summary, our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions were reasonable both individually and in the aggregate.

However, we do have recommended changes for the Board to consider for this 2012 valuation, and other changes for the Board to consider in future valuations. Details on recommendations can be found in the report which follows. Please provide written responses to our recommendations by the close of business on December 14, 2012.

The report which follows describes in Section I the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in Buck's actuarial certification, as well as our assessment of Buck's determination of the Required State Contribution for FY 2014. Finally, in Section III we comment on other issues impacting the funding of the Teachers' Retirement System, including the implications of Article 16 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. The mandated funding method does not conform to the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices.

In preparing this report, we relied on information (some oral and some written) supplied by the Teachers' Retirement System of the State of Illinois (TRS) and Buck. This information

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includes actuarial assumptions and methods adopted by TRS's Board, plan provisions, summarized census data, the 2012 actuarial valuation report, 2011 formal Experience Study, and various studies and memos prepared by the System's advisors and Executive Director. A detailed description of all information provided for this review is contained in the body of our report. We have examined the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the Teachers' Retirement System of the State of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Gene Kalwarski, FSA, FCA, EA, MAAA	Ken Kent, FSA, FCA, EA, MAAA
Principal Consulting Actuary	Principal Consulting Actuary

SECTION I - REPORT SCOPE

Under Illinois Public Act 097-0964 (the Act) Cheiron, the State Actuary, is required to review the actuarial assumptions and valuation of the Teachers' Retirement System of the State of Illinois (TRS) and issue this preliminary report to the TRS Board on the proposed certification prepared by Buck Consultants of the required State contributions for fiscal year 2014. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the TRS Board to consider before Buck, the TRS actuary, finalizes their certification of the required State contributions to the TRS for FY 2014. In accordance with the Act, our review did not include a replication of the actuarial valuation results.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of State contribution being certified. Finally, we have offered our opinion on the implications of Article 16-158 of the Illinois Pension Code, which impacts the contribution amount certified by Buck.

In conducting this review, Cheiron reviewed both the June 30, 2011 and June 30, 2012 actuarial valuations prepared by Buck, as well as Buck's Experience Study which included experience investigation of the demographic and economic experience for the TRS for the period July 1, 2006 through June 30, 2011. We also received and reviewed the membership data which Buck used to prepare its actuarial valuation as well as various presentations, formal studies, and memorandum prepared by Buck, RV. Kuhns (TRS investment consultant), and TRS staff. The materials we reviewed are listed in Appendix B. Supplemental to the materials we reviewed, we also participated in a meeting with TRS staff and Buck on September 24 2012, had requests for additional information from TRS staff and Buck with respect to the New Entrant Profiles, and then a conference call with TRS staff and Buck to discuss the actuarial projections to 2045.

Finally, in addition to reviewing the actuarial certification of the required State Contribution to the TRS, the Act requires the State Actuary to also conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, for this initial report we interpret actuarial practices to mean: (1) does the Board utilize a qualified actuary to prepare the annual actuarial valuation which determines the required State contribution; and (2) does the Board require the actuary to conduct periodic formal experience studies to justify the assumptions used in the actuarial valuation? Future reports may examine additional actuarial practices of the Board.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the June 30, 2012 Actuarial Valuation of the TRS. Detailed analysis and rationale for these recommendations can be found in Section III of this report.

Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation:

Public Act 097-0694 requires the State Actuary to identify recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the Teachers' Retirement Systems 2012 Actuarial Valuation and conclude that they are reasonable. Consequently, we do not have any recommended changes to the assumptions this year.

Recommended Additional Disclosures for the 2012 Valuation:

1) While we support the recommended total salary increase assumption used in this valuation and conclude that the assumption is reasonable, we recommend that Buck explicitly disclose in their report the merit pay increase assumption by age and active employment status.

2) We recommend Buck disclose in their June 30, 2012 report a complete description as to how the New Entrant Profile assumption was developed.

Recommended Changes for Future Valuations:

1) We recommend the Board consider lowering the interest rate assumption below 8% and that the Board annually review the interest rate assumption rather than waiting for the next planned Experience Study.

2) Before completing the June 30, 2013 valuation next year, we recommend Buck better explain the sources for the unexplained annual liability losses which for the past six valuations have totaled $2.8 billion. In each of Buck's past six valuation reports, they have reported a line item liability loss which they have described as "other causes".

3) We recommend Buck consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with the Statute.

Proposed Certification of the Required State Contribution:

Buck has determined that the FY 2014 required State contribution calculated under the current statutory funding plan is $3,438,578,000. We have verified the arithmetic calculations made by Buck to develop this required State contribution and reviewed the assumptions on which it is based. In verifying these calculations, we have accepted Buck's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions. **We recommend that Buck disclose in the June 30, 2012 valuation an explicit development of the required State contribution for FY 2014, showing all sub-components**. **We also recommend that Buck**

disclose in the June 30, 2013 valuation and later valuations the following items in order for us to perform a more comprehensive analysis of the required State contribution in the future:

- Projections by year of future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);

- Projections by year of future Gross TRS normal costs and member contributions in dollar amounts by year; and

- The present value of future benefits as of the valuation date for actives, terminated vested, retirees and beneficiaries, and disabled members.

We recommend Buck include historic details on the projections of the maximum contribution calculation without Government Obligation Bonds (GOB) in order for us to vary the numbers.

We also recommend Buck include the historic development of assets without GOB in future reports.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Economic Assumptions

1. The Interest Rate:

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 8.0% from 8.50% for the plan year ending June 30, 2012. The change was adopted by the Board at the TRS Board meeting on September 21, 2012. The TRS actuary, Buck Consultants, had performed a formal study of all assumptions used in the actuarial valuation, called *Investigation of Demographic and Economic Experience*. The study, which was issued in August of 2012, covered the period July 1, 2006 through June 30, 2011. With respect to the investment assumption, Buck recommended to the Board to change the assumption from 8.5% to some figure in the range of 7.75% to 8.25%.

After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes that while we would prefer that the Board adopts 7.75%, the low end of Buck's recommended range, the use of 8.0% for this valuation is reasonable at this time.

Our rationale for concurring with the current assumption for this valuation is as follows:

- Buck adhered to Actuarial Standards of Practice (ASOP No. 27) in developing the interest rate assumption by selecting a best-estimate range for the assumption, by considering appropriate factors such as expectations for the existing asset allocation.

- TRS' long history of actual returns exceeded 8%. Buck's May 19, 2011 presentation to the TRS Board on the investment return assumption shows on page 14 that the arithmetic rate of return from 1981 through 2010 was 8.72%, and that the geometric return over that same period was 7.96%.

- On page 15 of that same presentation Buck's expectations for expected future earnings over the next thirty years, based on the TRS's specific asset allocation, is 8.42%.

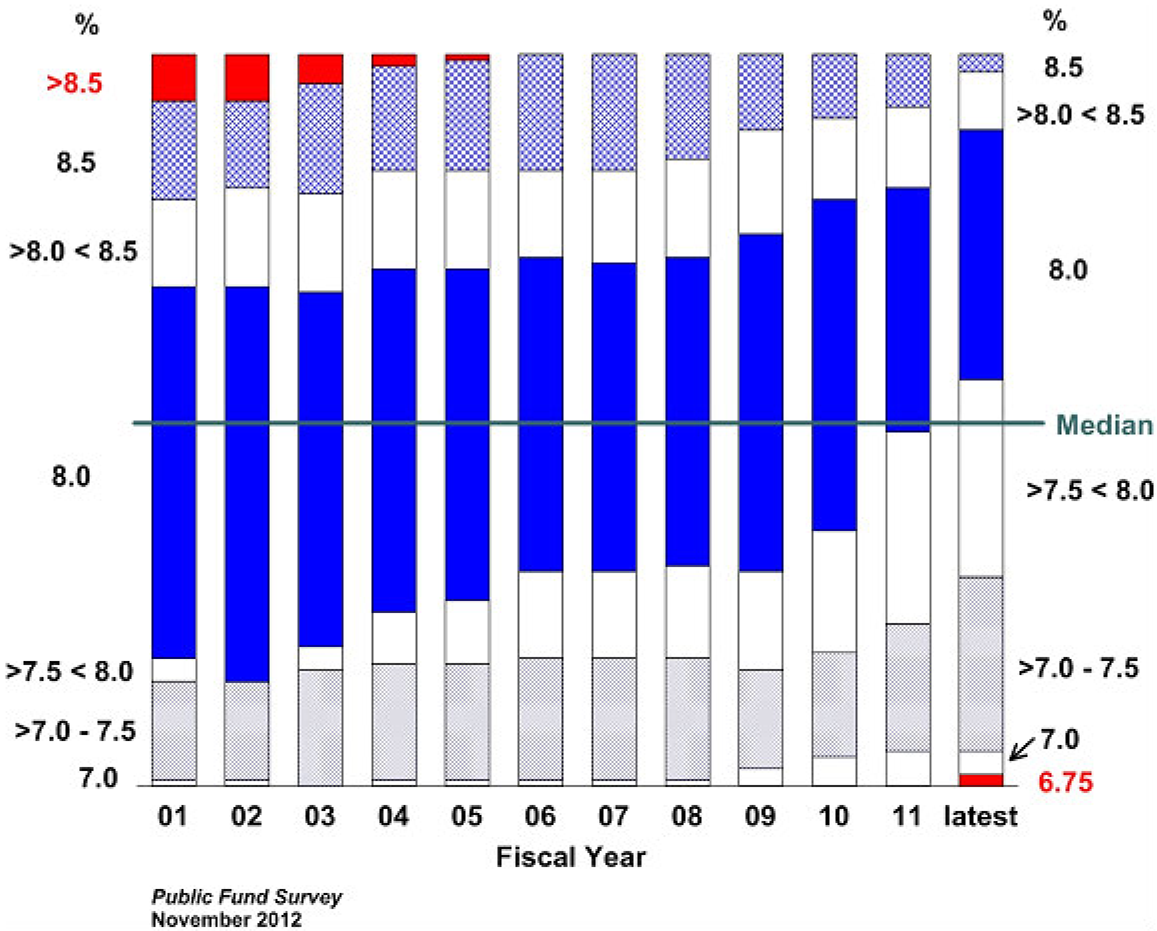
- The April 2011 Report from TRS's investment consultant R.V. Kuhn's shows on page 22 that the expected future earnings for the asset allocation at that time was 8.23% on an arithmetic mean basis, and 7.44% on a geometric basis. This is reasonably close to Buck's recommended range for the discount rate (7.75 to 8.25%) and reasonably close to the 8% assumption selected by the Board.

SECTION III - SUPPORTING ANALYSIS

While we find the 8.0% interest rate assumption a reasonable assumption for 2012, we recommend the Board in future valuations consider lowering the rate below 8.0%, and furthermore to annually review the interest rate assumption as opposed to waiting for the completion of a formal Experience Study.

Our rationale for this recommendation is as follows:

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The Public Fund Survey covers 99 large retirement systems. The following chart shows the distribution of investment return assumptions for the last 12 years of their survey.



Over the period shown in the survey, there has been a pattern of reducing investment return assumptions, first reducing the highest assumptions to below 8.5% and more recently reducing assumptions below 8.0%. This survey is the first in which the median assumption is less than 8.0%, and the first in which a system adopted an assumption less than 7.0%. The survey is consistent with experience on other Cheiron clients that there has been a significant trend to reduce the investment return assumptions in the last three years.

- *Industry pressures may lead to mandated lower discount rates:* In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from this traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return. Near risk free rates of return today would be less than 4% and would enormously increase the liabilities of TRS, and the resulting required State contribution. While this debate continues and has not been resolved, there are external signs that the public sector may ultimately be forced to utilize much lower investment assumptions.

- New GASB 67 and 68 pronouncements will require many public pension plans, such as the TRS, to use a lower discount rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015 respectively. It's important to note however, that the new standards do not define funding requirements for a plan.

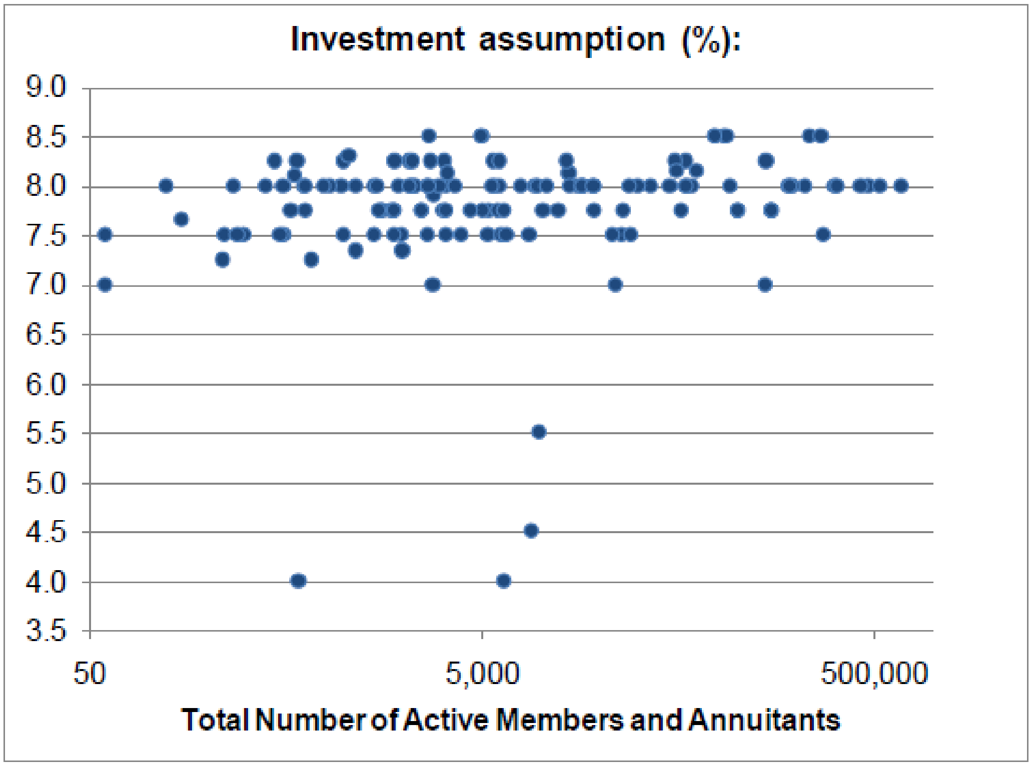
- Moody's, an organization that provides bond rating information for private investors, has recently announced that they propose to compare the financial viability of public sector pension plans by using, among other things, a 5.5% discount rate assumption.

- Under Actuarial Standards of Practice (ASOP) No. 27 *Selection of Economic Assumptions for Measuring Pension Obligations,* Section 3.6.3 Measurement Specific Factors refers to other factors to consider in the selection of the investment assumption. Cheiron believes the statutory funding requirement under Article 16-158 of the Illinois Pension Code is one such factor to consider in the selection of the investment assumption. Given that actuarial value of assets are projected to grow at the interest assumption rate, if the market value of assets is less than the actuarial value there is an implied expectation of contribution rate increases. Also if the interest rate assumption is less than the median expected average future return there is also an implied expectation of contribution rate increases. To mitigate these factors a lower long term interest rate assumption should be considered.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

- The following chart from page 6 of the June *2011 National Conference on Public Employee Retirement Systems (NCPERS) Public Fund Study* shows the rates used nationwide by public sector pension plans.

SECTION III - SUPPORTING ANALYSIS



> As part of the study, NCPERS identified that the average investment assumption for the 215 state and local pension plan respondents was 7.7%, and that it was anticipated that 23% have reduced this assumption in the past two years and 15% of the respondents planned to reduce their rates in the next two years.

So while TRS long history of actual returns and Buck's expectations of 8.42% may justify an 8.0% assumption, there are compelling reasons to consider in the future a lower discount rate assumption.

2. *Inflation Assumption:*

The inflation assumption, which primarily impacts the salary increase assumption used by TRS, was changed to 3.25% from 3.5% for the plan year ending June 30, 2012. The change was adopted by the Board at the TRS Board meeting on September 21, 2012.

We find that Buck's recommended 3.25% inflation assumption used in certifying the required state contribution is reasonable.

SECTION III - SUPPORTING ANALYSIS

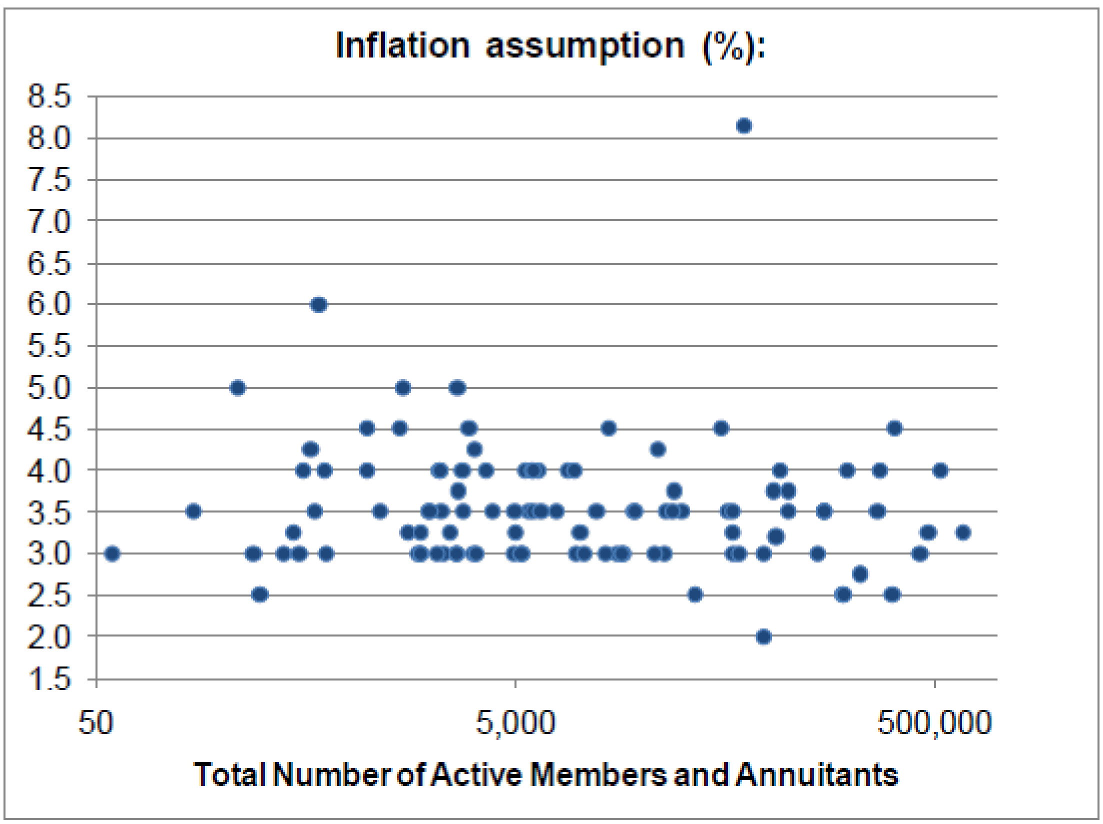
Our rationale for concurring with the 3.25% assumption is as follows:

- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8% and 3.8%.

- As shown on page 9 of Buck's August 23, 2012 presentation to the TRS Board, recent experience (2007 through 2011) has been 2.2%.

- Our comparison of other public sector retirement systems' inflation assumptions as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75% to 3.75%.

- Referencing the NCPERS 2011 study, they provided the following graphic of respondents' inflation assumptions:



This shows that the 3.25% assumption, which the TRS uses, is a prevalent inflation assumption amongst the 215 systems who responded to this study with 3.5% as the average.

SECTION III - SUPPORTING ANALYSIS

3. *Salary Increase Assumption:*

For the June 30, 2012 Actuarial Valuation, the total salary increase assumption has been changed from 7.00% to 6.00%. **We concur with this change**. The components of this change are as follows:

Salary Component	Valuation June 30, 2012	2011
Inflation	3.25%	3.50%
Real Wage Growth	0.75%	1.20%
Career Scale	1.75%*	2.05%
Employment Type and Status Changes	0.25%*	0.25%
Total Salary Increase Assumption	**6.00%**	**7.00%**

*Estimated, not explicitly broken out in the report

Buck includes the following listing of salary increases by age.

Age Male and Female	Salary Increase
20	10.15%
25	9.25%
30	7.45%
40	6.25%
50	5.00%
55	5.00%
60	5.00%
65	5.00%

Our rationale for concurring with Buck's recommended salary increase assumption:

- For reasons just described above, we accept the recommended reduction in the inflation component from 3.50% to 3.25%.

- The graph on page 16 of Buck's August 23, 2012 presentation to the Board, which compares actual salary increases by age to expected, for the period July 1, 2006 through June 30, 2011, indicates that while the past data supports a total salary increase assumption of 6.44% as opposed to 6%, the current outlook and future expectations are lower. We concur, and as a result we agree with the recommended changes to the salary increases above inflation.

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

SECTION III - SUPPORTING ANALYSIS

B. Demographic Assumptions:

For the June 30, 2012 Actuarial Valuation, TRS has adopted the following changes in demographic assumptions:

- An increase in the expected life longevity (mortality assumption) for all members, actives and retired (increases costs);
- A decrease in the overall rates of termination from employment by reasons other than death, disability, or retirement (increases costs);
- A decrease in the rates of disability (increases costs);
- A decrease in the rates of Early Retirement (ERO) and Regular Retirement (decreases costs); and
- An increase in the assumed amount of optional and sick leave credits that a member will have at retirement (increases costs).

For each of the above, as shown on pages 19-31 of Buck's August 23, 2012 presentation to the Board, and pages 46-64 of Buck's formal *Investigation of Demographic and Economic Experience*, **all the implemented changes reflect in our opinion, reasonable and supportable adjustments to the assumptions to bring them more in line with the actual plan experience during the period July 1, 2006 through June 30, 2011. In addition, the changed demographic assumptions meet the standards called for under ASOP No. 35, 3.3.4.** We also fully endorse the use of generational projections of mortality improvements which were not observed in the above mentioned study. Recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption.

Notwithstanding the above, as stated in Section II, before completing the June 30, 2013 valuation next year, we recommend Buck analyze the causes for the unexplained annual liability losses which for the past six valuations have totaled $2.8 billion. In each of Buck's past six valuation reports, (on page 10 in the 2012 report) they have reported a line item liability loss which they have described each year as "other causes". They further state each year that this is a "balancing item needed to complete the reconciliation and is mainly due to the lag in data reporting, higher than expected retirement rates and actual cost of benefits earned during the year higher than expected". We question how "higher than expected retirements" could have been part of the reason, as Buck's Experience Study indicated that there were fewer retirements (ERO and Regular) than expected (see page 1, the cover letter to Buck's August 21st, 2012 Experience Study report). We also believe that an item which over just six years represents nearly 5% of the unfunded liability requires more analysis than its being given.

SECTION III - SUPPORTING ANALYSIS

Below we summarize all the demographic assumptions which we reviewed and we've concluded all are reasonable.

1. Rates of Termination:

	Males		Females	
Age	Non-vested	Vested	Non-vested	Vested
20	12.00%	8.00%	18.00%	10.00%
25	7.00	6.00	7.80	9.00
30	8.60	3.70	10.60	6.00
40	11.10	1.50	10.00	2.20
50	12.00	1.40	10.00	1.40
55	16.00	4.00	15.00	3.10
60	21.00	4.00	14.00	4.00
65	21.00	4.00	40.00	4.00
70	-	-	-	-

2. Rates of Mortality:

a. Death before Retirement at Selected Ages (number of deaths per 100 members)*:

Age	Males	Females
20	0.023	0.011
25	0.029	0.011
30	0.035	0.013
40	0.061	0.031
50	0.122	0.069
55	0.183	0.116
60	0.303	0.219
65	0.531	0.395
70	-	-

* *Beginning July 1, 2012, projected mortality improvements are phased in with the Society of Actuaries Mortality Projection Scale AA. The table above reflects this phase in, and shows representative values as of July 1, 2012.*

b. Death after Retirement: For annuitants, the RP-2000 White Collar Table projected nine years using scale AA, with a two-year age setback from men and no age setback for women. Rates for women are further adjusted for ages 63-77 by 65% and ages 78-87 by 85%.

For beneficiaries, the RP-2000 blended table, projected nine years using scale AA, with a one-year age setback for both men and women.

For the period after disability retirement, the RP-2000 Disabled Table, projected nine years using scale AA, with a one-year age setback for both men and women.

Future generational rates are projected from 2009 based on scale AA.

3. Rates of Disability (per 100 members)*:

Age	Males	Females
20	0.029	0.045
25	0.029	0.045
30	0.026	0.117
40	0.051	0.162
50	0.094	0.172
55	0.111	0.197
60	0.170	0.144
65	0.510	0.287
70	-	-

* *A 2% load was placed on disability benefits to account for Occupational Disability benefits being greater than standard disability.*

4. Rates of Retirement:

a. For Members Hired before January 1, 2011 (per 100 members):

			Service*		
Age**	**5 - 18**	**19 - 30**	**31**	**32-33**	**34+**
54	-	6	12	38	40
55	-	10	20	38	40
56	-	7	16	38	32
57	-	7	16	38	32
58	-	7	13	38	32
59	-	25	34	45	31
60	14	27	45	45	31
61	14	24	30	45	31
62-63	14	26	36	45	31
64	20	33	36	45	31
65-67	23	33	45	45	31
68-69	27	33	45	45	31
70	100	100	100	100	100

* *Active member service rounded to nearest year on June 30 prior to retirement.*
** *Age rounded to nearest year on June 30 prior to retirement.*

b. For Members Hired on or after January 1, 2011 (per 100 members):

			Service*		
Age**	**5 - 18**	**19 - 30**	**31**	**32-33**	**34+**
≤ 61	-	-	-	-	-
62	13	15	20	25	25
63	8	10	15	20	20
64	8	10	15	20	20
65	8	10	15	20	20
66	20	10	15	20	20
67	20	40	70	70	70
68	20	40	40	40	40
69	20	40	40	40	40
70	100	100	100	100	100

* *Active member service rounded to nearest year on June 30 prior to retirement.*
** *Age rounded to nearest year on June 30 prior to retirement.*

c. Utilization of Early Retirement Option (ERO) among All Active Service Retirees* (per 100 members):**

	Service*			
Age**	**19 - 30**	**31**	**32**	**33**
54	68	90	49	22
55	75	79	53	25
56	66	75	45	17
57	63	71	48	15
58	64	69	46	14
59	23	27	28	13

* *Active member service rounded to nearest year on June 30 prior to retirement.*

** *Age rounded to nearest year on June 30 prior to retirement.*

*** *ERO Utilization Rates are applied only to members who have less than 35 years of total service at the assumed retirement date (including assumed sick leave and optional service purchased at retirement). Based on the sick leave and optional service assumptions, the majority of members with 33 years of service at the beginning of the year of retirement will not be assumed to retire on ERO because they will be assumed to have at least 35 years of service at retirement. In addition, ERO Utilization Rates are not applied to members whose pension under the ERO program would be less than their money purchase benefit.*

5. **Marital Data:** It is assumed that 85% of members are married and that the female spouse is three years younger than the male spouse. (Adopted effective June 30, 1993.)

6. **Growth in Active Membership:** For purposes of the projection required by State funding law, it is assumed that the active membership of the System will remain constant in number, with no change in the size of either the full-time/part-time group or the hourly/substitute group. (Adopted effective June 30, 1994.)

7. **Severance Pay:** For members hired before January 1, 2011, the percent of retirees from active service assumed to receive severance payments, and the amount of such severance payments, are assumed to be as follows (before adjustment for Section 16-158(f)):

Percent of Retirees Who Receive Severance Pay	Severance Pay as a Percent of Other Pensionable Earnings in the Last Year of Employment
20%	6%

8. **Optional Service Purchases:** The pension benefit obligation for retirement benefits for active members who have not previously purchased optional service is increased to cover the employer cost of out-of-system service purchased in the last two years prior to retirement.

The amount purchased varies by the amount of regular service at retirement. Representative amounts purchased at retirement, and other assumptions used, are as follows:

Regular Service at Retirement	Maximum Service Purchased
10 years	0.473 years
20 years	0.835 years
25 years	1.360 years
30 years	1.040 years
34 or more	None

a. Actual optional service credit for each current member is provided by TRS;
b. No additional service purchases will be assumed for members who currently have optional service credit;
c. Members will not purchase service if it does not improve their pension benefit; and
d. When optional service is purchased within the last two years prior to retirement, 25% of the cost is covered by member payments and the remaining cost is the responsibility of the employer.

The PBO covered by future member payments is not included in the liability on the valuation date, but is brought into projected liabilities as those payments are brought into the assets.

9. **Unused and Uncompensated Sick Leave Service at Retirement:** Such credit varies by the amount of regular service at retirement. Representative assumed amounts of unused and uncompensated sick leave service are as follows:

Regular Service at Retirement	Maximum Service Purchased
20 years	1.035 years
25 years	1.847 years
30 years	1.454 years
34 years	1.000 years
35 or more	None

10. **Administrative Expenses:** The administrative staff of the System estimates the expected administrative expenses for the fiscal year following the valuation. Total payroll for the same year is projected based on valuation assumptions and the expected administrative expenses are then expressed as a percent of total payroll. Administrative expenses in future years are then assumed to remain constant as a percent of total payroll. (Adopted effective June 30, 1994.)

11. **2.2 Upgrade Assumption:** For those active members who have already made a payment to upgrade past service prior to June 30, 1998 or have enrolled in the Payroll Deduction

Program (PDP), their benefits are based on their upgrading at the valuation date. For all other active members, they are assumed to upgrade at retirement. (Adopted effective June 30, 1999.)

12. **Data Lag Adjustment:** The current actuarial valuation was based on the latest membership data available, which were submitted by the System for (i) active and inactive members as of prior valuation date, and (ii) retirees and beneficiaries in receipt of benefits as of the current valuation date. As part of the valuation procedure, actual salaries and member account balances reported for active and inactive members were increased by 4% to adjust for the one-year lag in the census information. The 4% assumption is intended to reflect the salary increases that have occurred during the lag period for the entire population.

13. **Future Payroll Assumption:** Future payroll is projected using the assumed decrements for the members in the system and the new entrant profile as described below:

    a. **Distribution of New Entrants is as follows:**

Age	Full Time/ Part Time			Hourly/ Substitute		
Group	Males	Females	Total	Males	Females	Total
20 – 24	5.4%	26.2%	31.6%	8.8%	16.8%	25.6%
25 – 29	7.7	24.6	32.3	8.4	14.7	23.1
30 – 34	3.6	10.3	13.9	2.9	5.7	8.6
35 – 39	1.8	5.6	7.4	2.7	5.9	8.6
40 – 44	1.4	3.9	5.3	3.7	8.4	12.1
45 – 49	0.8	3.3	4.1	2.6	5.5	8.1
50 – 54	0.6	2.0	2.6	1.8	3.6	5.4
55 – 59	0.6	1.3	1.9	1.6	2.6	4.2
60 – 64	0.3	0.4	0.7	1.3	1.6	2.9
65 – 69	0.1	0.1	0.2	0.5	0.5	1.0
70	0.0	0.0	0.0	0.2	0.2	0.4
Total	22.3%	77.7%	100.0%	34.5%	65.5%	100.0%

b. Service Credit Earned in Each Future Year:

Age	Full Time/ Part Time			Hourly/ Substitute		
Group	Males	Females	Total	Males	Females	Total
20 – 24	0.991	0.987	0.988	0.291	0.331	0.320
25 – 29	0.991	0.990	0.990	0.303	0.277	0.287
30 – 34	0.987	0.987	0.987	0.344	0.288	0.304
35 – 39	0.993	0.978	0.982	0.286	0.308	0.303
40 – 44	0.989	0.979	0.982	0.304	0.314	0.314
45 – 49	0.996	0.978	0.982	0.318	0.348	0.345
50 – 54	0.993	0.978	0.982	0.339	0.355	0.353
55 – 59	0.986	0.967	0.974	0.362	0.358	0.359
60 – 64	0.967	0.961	0.963	0.345	0.347	0.346
65 – 69	-	-	-	0.339	0.325	0.330
70	-	-	-	0.303	0.295	0.297
Average	0.990	0.986	0.987	0.326	0.328	0.329

c. Projected Annual Rate of Pay at 6/30/2011*
(for one year of service credit)

Age	Full Time/ Part Time			Hourly/ Substitute		
Group	Males	Females	Total	Males	Females	Total
20 – 24	$ 46,349	$ 45,029	$ 45,254	$ 17,475	$ 18,053	$ 17,893
25 – 29	47,771	48,290	48,167	17,467	17,374	17,407
30 – 34	55,110	52,482	53,163	17,704	16,908	17,155
35 – 39	57,001	54,980	55,472	16,839	16,595	16,652
40 – 44	64,467	55,424	57,812	16,616	15,919	16,075
45 – 49	68,190	55,885	58,286	16,348	16,192	16,227
50 – 54	74,055	56,203	60,323	16,806	16,281	16,434
55 – 59	68,428	68,443	68,438	16,095	16,233	16,180
60 – 64	77,237	58,749	66,672	15,935	16,183	16,067
65 – 69	-	52,933	26,466	15,841	15,565	15,716
70	-	47,386	-	15,783	14,993	15,520
Total	$ 52,582	$ 49,509	$ 50,195	$ 17,074	$ 16,989	$ 17,014

* *The rate of pay profile will increase 4.00% per annum. 3.25% of the increase is attributable to inflation and 0.75% to real wage growth.*

C. Actuarial Methods

Actuarial methods consist of three components: (1) The funding method, which is the attribution of total costs to past, current, and future years; (2) The method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) The amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Funding Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required to under the Pension Code (40 ILCS 5/16). **We have no objections with respect to using the PUC method, although we, as Buck does, would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Act's requirement for level percent of pay funding.** Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the EAN funding method to mitigate this affect.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.**

   Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans. Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore,**

we recommend that the TRS Board consider moving to this approach in future valuations. It's important to note that currently a move to this corridor approach would have no impact on the 2012 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

D. <u>Determination of the Required State Contribution</u>

As required by Public Act 94-0004, in determining the required State contribution under State law, the actuary must determine what level of future contributions is needed to make a projection of the System's funded status in 2045 be at 90%. To make that determination, the actuary needs to make an assumption regarding the age/sex/salaries of new hires that replace existing members leaving over this period. This assumption is commonly referred to as the "New Entrant Profile". In addition to making that assumption, the actuary needs to apply actuarial methodologies to project the June 30, 2012 valuation into the future.

The "New Entrant Profile" assumption is a critical assumption as the required projection of 90% funding in the year 2045 means that the majority of active members will be new hires after the current June 30, 2012 valuation. Therefore, **we recommend that Buck disclose additional information in their valuation report as to how the new entrant profile, which is shown on pages 43 and 44 of their June 30, 2012 Actuarial Valuation, was developed**. In the Buck experience investigation, that same information is presented on pages 74 and 75, again without any disclosure as to how it was developed. We have since received and reviewed this information from Buck; however, **we recommend that they include all relevant information regarding the New Entrant Profile in the valuation report so as to better comply with ASOP No. 41 dealing with actuarial communications.**

We also recommend that Buck revise in future valuations following this June 30, 2012 valuation items that would allow Cheiron to better verify Buck's determination of the required State contribution. The specific items missing in Buck's report that are needed are projections by year of:

- Future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested).
- Future Gross TRS normal costs and member contributions in dollar amounts by year.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

In addition we recommend Buck provide in future valuation a disclosure of the present value of future benefits for actives, terminated vested, retirees and survivors, and disabled members. We also recommend that GRS include the historic development of assets without GOB.

We believe these would be appropriate disclosures under ASOP No. 41 and that the additional information will allow us to perform a more comprehensive analysis of Buck's determination of the required State contribution.

E. Other Issues

1. State Mandated Funding Method:

In its transmittal letter, Buck clearly states their criticism over the fact that the required State contribution to TRS is limited by Illinois Pension Code (40 ILCS 5/16-158) which in their opinion, results in a deficient contribution from an actuarial point of view. This Law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045. Buck's opinion is that the minimum contribution level should be 100% funding within thirty years in accordance with GASB 25 as well as generally accepted actuarial practices, **We concur with this recommendation, and suggest due to the systematic underfunding of the System, that the TRS Board always use the conservative end of any range of assumptions recommended by Buck.**

2. State Mandated Projection Method:

Under Public Act 96-0043, the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 8%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA).

The following table demonstrates what the market value would have to earn in order for the actuarial value to earn 8.0% based on the ratio of actuarial value to market value. We recommend that consideration be given to require that the projected future earnings of the System be based on starting market values of assets (rather than a smoothed value).

SECTION III - SUPPORTING ANALYSIS

What the market value of assets (MVA) would need to earn in a given year, if the actuarial value of assets (AVA) are assumed to earn 8.00%, at various ratios of

Ratio of AVA to MVA	Required MVA Return
133.00%	87.20%
130.00%	80.00%
125.00%	68.00%
120.00%	56.00%
115.00%	44.00%
110.00%	32.00%
105.00%	20.00%
100.00%	8.00%
95.00%	-4.00%
90.00%	-16.00%
85.00%	-28.00%
80.00%	-40.00%
75.00%	-52.00%
70.00%	-64.00%

Chapter Three

PRELIMINARY REPORT ON THE STATE UNIVERSITIES RETIREMENT SYSTEM

In accordance with Public Act 097-0694, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the State Universities Retirement System concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was based on Cheiron's review of actuarial assumptions included in SURS' 2012 Actuarial Valuation.

Following is Cheiron's preliminary report submitted to the Board of Trustees of the State Universities Retirement System. An initial draft of the preliminary report was submitted to SURS on November 30, 2012. An updated final preliminary report was submitted to SURS on December 10, 2012. SURS' written response, provided on December 18, 2012, can be found in Appendix C.

December 10, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
State Universities Retirement System of Illinois
1901 Fox Drive
P.O. Box 2710
Champaign, Illinois 61825-2710

Dear Ladies and Gentlemen:

In accordance with Public Act 097-0694 Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the State Universities Retirement System of Illinois (SURS) for Fiscal Year 2014. This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

In summary our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions were reasonable both individually and in the aggregate.

However, we have recommended some changes for the Board to consider, some for this 2012 valuation, and others for the Board to consider in future valuations. Details on recommendations can be found in the report which follows. Please provide written responses to our recommendations by close of business on December 14, 2012.

The report which follows, describes in Section I the review process undertaken by Cheiron. Section II summarizes our findings Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of the GRS's determination of the Required State Contribution for FY 2014. Finally, in Section III we comment on other issues impacting the funding of the State Universities Retirement System, including the implications of Article 15 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. The mandated funding method does not conform to the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices.

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In preparing this report, we relied on information (some oral and some written) supplied by the State Universities Retirement System of Illinois (SURS) and GRS. This information includes actuarial assumptions and methods adopted by SURS's Board, plan provisions, summarized census data, the June 30, 2011 and June 30, 2012 actuarial valuation reports, the 2010 formal Experience Study, and various studies and memos prepared by the System's advisors, staff, and Executive Director. A detailed description of all information provided for this review is contained in the body of our report. We have examined the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the State Universities Retirement System of Illinois and the Office of the Auditor General for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Gene Kalwarski, FSA, FCA, EA, MAAA
Principal Consulting Actuary

Michael J. Noble, FSA, FCA, EA, MAAA
Consulting Actuary

SECTION I - REPORT SCOPE

Under Illinois Public Act 097-0964 (the Act) Cheiron, as the State Actuary, is required to review the actuarial assumptions and valuation of the State Universities Retirement System of Illinois (SURS) and issue this preliminary report to the SURS Board, on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contributions for fiscal year 2014. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the SURS Board to consider before GRS, the SURS actuary, finalizes their certification of the required State contributions to the SURS for FY 2014. In accordance with the Act, our review did not include a replication of the actuarial valuation results.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the appropriate choice of assumptions and amount of State contribution being certified. Finally, we have offered our opinion on the implications of Article 15-155 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

In conducting this review, Cheiron reviewed both the June 30, 2011 and June 30, 2012 actuarial valuations prepared by GRS, as well as the GRS's Experience Study which included experience investigation of the demographic and economic experience for the SURS for the period July 1, 2005 through June 30, 2010. In addition, we reviewed various presentations and formal studies prepared by GRS and SURS staff. The materials we reviewed are listed in Appendix B. Supplemental to the materials we reviewed, we also participated in meetings with SURS staff and GRS on September 25, 2012, had a conference call, and requested additional information from SURS staff and GRS with respect to the projections within the report.

Finally, in addition to reviewing the actuarial certification of the required State Contribution to the SURS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, for this initial report we interpret actuarial practices to mean: (1) does the Board utilize a qualified actuary to prepare the annual actuarial valuation for determining the required State contribution; and (2) does the Board require the actuary to conduct periodic formal experience studies to justify the assumptions used in the actuarial valuation? Future reports may examine additional actuarial practices of the Board.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the June 30, 2012 Actuarial Valuation of the SURS. Detailed analysis and rationale for these recommendations can be found in Section III of this report.

Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation:

Public Act 097-0694 requires the State Actuary to identify recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the State Universities' Retirement Systems 2012 Actuarial Valuation and conclude that they are reasonable. Consequently, we do not have any recommended changes to the assumptions this year.

Recommended Additional Disclosures for the 2012 Valuation:

1) We recommend GRS revise its June 30, 2012 valuation to include projections of the maximum contribution calculation without Government Obligation Bonds (GOB).

2) We recommend GRS disclose in their June 30, 2012 report a complete description as to how the New Entrant Profile assumption was developed.

Recommended Changes for Future Valuations:

1) We concur with GRS's recommendation to establish a corridor around the market value of assets beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with the Statute.

2) We recommend GRS include a complete disability incidence table in future reports.

3) We recommend a continued examination of the recurring loss for benefit recipients and adjustment to assumptions if the loss persists.

4) We recommend the Board annually review the interest rate assumption.

5) We recommend that GRS demonstrate the development of the capped pay calculated in the report.

Proposed Certification of the Required State Contribution:

GRS has determined that the FY 2014 required State contribution calculated under the current statutory funding plan is $1,551,766,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and reviewed the assumptions on which it is based. In verifying these calculations, we have accepted GRS' annual projections of future payroll, total normal costs, benefits, expenses, and total contributions. **We recommend that GRS disclose in the June 30, 2013 valuation report and later valuations** the following items in order for us to perform a more comprehensive analysis of the required State contribution in the future:

- Projections by year of future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);

- Projections by year of future SURS normal costs and member contributions; and

- The present value of future benefits for actives, terminated vested, retirees and beneficiaries, and disabled members.

- We also recommend that GRS include the historic development of assets without GOB in future reports

For each of these items the impact of the Self Managed Plan (SMP) needs to be clearly delineated.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Economic Assumptions

1. The Interest Rate:

The interest rate assumption (also called the investment return or discount rate), is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 7.75% from 8.50% for the June 30, 2010 Actuarial Valuation.

After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes the use of 7.75% for this valuation is reasonable.

Our rationale for concurring with the current assumption for this valuation is as follows:

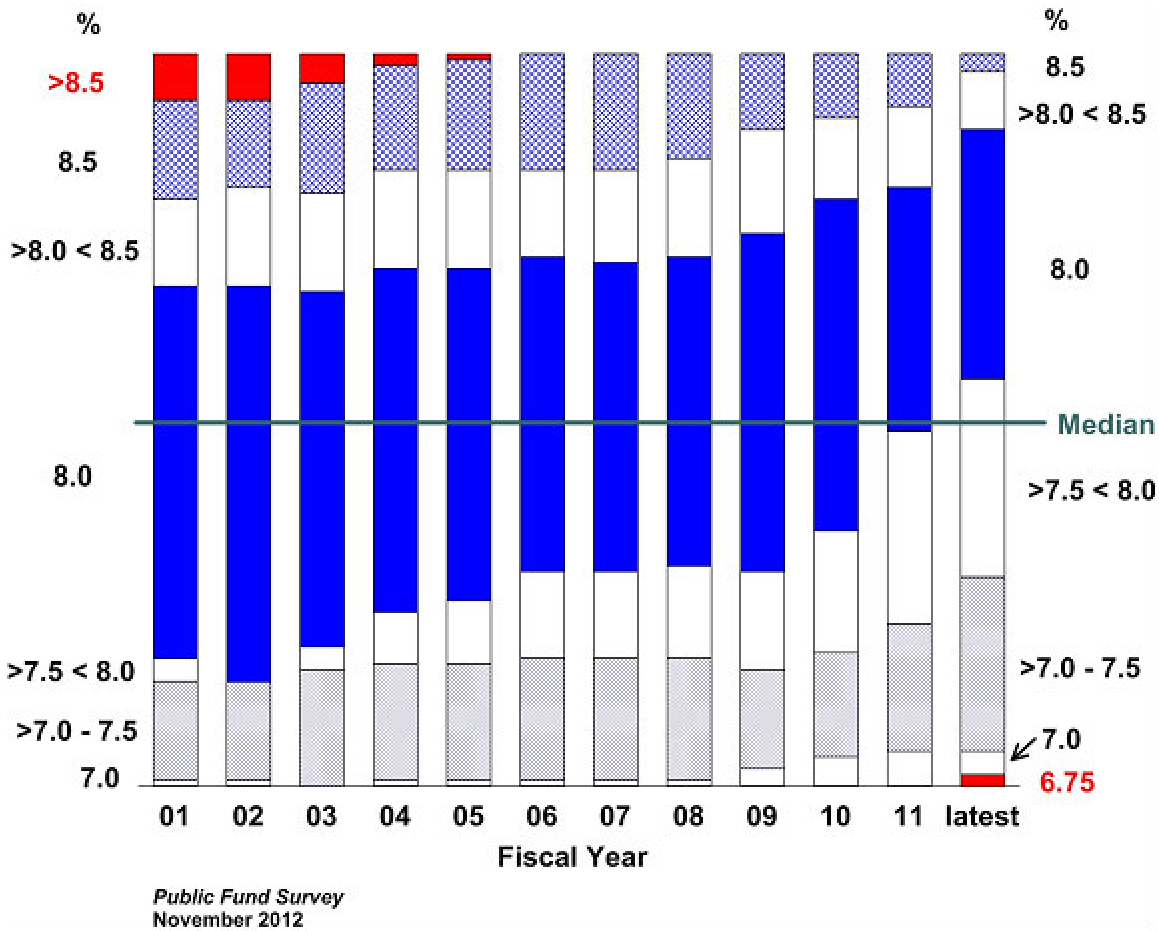
- GRS adhered to Actuarial Standards of Practice (ASOP No. 27) in developing the interest rate assumption by application of the building block approach based on underlying capital market assumptions provided by nine independent investment consultants in the Experience Study (see pages 9 through 11).

While we find the 7.75% interest rate assumption a reasonable assumption for 2012, we recommend the Board in future valuations consider lowering the rate further and annually review the interest rate assumption as opposed to waiting for the completion of a formal Experience Study.

Our rationale for this recommendation is as follows:

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 99 large retirement systems. The following chart shows the distribution of investment return assumptions for the last 12 years of their survey.

SECTION III - SUPPORTING ANALYSIS

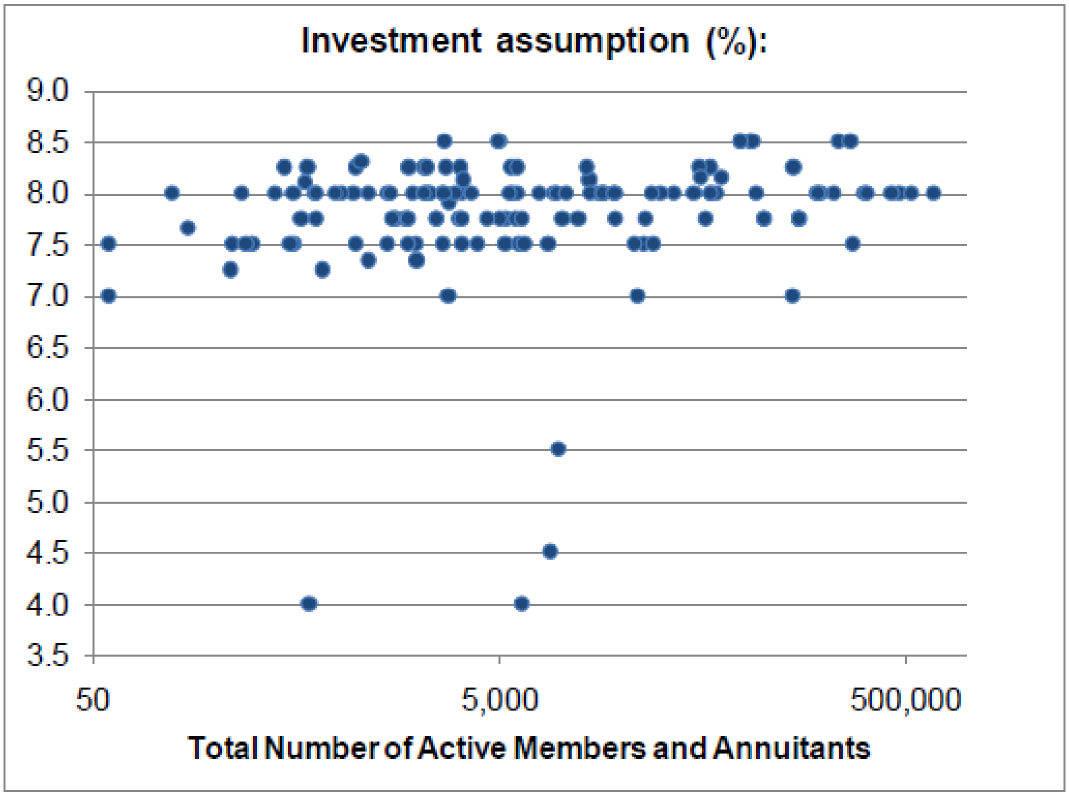


Over the period shown in the survey, there has been a pattern of reducing investment return assumptions, first reducing the highest assumptions to below 8.5% and more recently reducing assumptions below 8.0%. This survey is the first in which the median assumption is less than 8.0%, and the first in which a system adopted an assumption less than 7.0%. The survey is consistent with experience on other Cheiron clients that there has been a significant trend to reduce the investment return assumptions in the last three years.

- In GRS's 2010 Experience Study, they relied on the opinion of nine independent investment consultants who provided that *the probability of exceeding 7.75%* investment return each year is *44.59%* (page 9 of the experience report). Therefore it can be inferred that at this assumption there is a higher likelihood of investment loss than gain and the expected average return rate based on the current asset allocation is lower than 7.75%.

- The Statutory funding requirement can not be ignored in the choice of an appropriate interest assumption. Fundamental to the Statute is the requirement to determine the appropriate portion of unfunded liability to be funded each year that produces a level amortization amount as a percent of future projected payroll. If the interest assumption is expected to result in a higher likelihood of returns below the rate than above, then by definition, this will produce future losses and an increasing amortization amount as a percent of payroll.

- The following chart from page 6 of the June *2011 National Conference on Public Employee Retirement Systems (NCPERS) Public Fund Study* shows the rates used nationwide by public sector pension plans.



As part of the study, NCPERS identified that the average investment assumption for the 215 state and local pension plan respondents was 7.7%, and that it was anticipated that 23% have reduced this assumption in the past two years and 15% of the respondents planned to reduce their rates in the next two years.

- *Industry Pressures may lead to mandated lower discount rates:* In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from this traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of returns, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return. Near risk free rates of returns today would be less than 4% and would enormously increase the liabilities of the SURS, and the resulting required State contribution. While this debate continues and has not been resolved, there are external signs that the public sector may ultimately be forced to utilize much lower investment assumptions.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as the SURS, to effectively use a lower discount rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015 respectively. It's important to note however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, has recently announced that they propose to compare the financial viability of public sector pension plans by using, among other things, a 5.5% discount rate assumption.

- Under Actuarial Standards of Practice (ASOP) No. 27 *Selection of Economic Assumptions for Measuring Pension Obligations,* Section 3.6.3 Measurement Specific Factors refers to other factors to consider in the selection of the investment assumption. Cheiron believes the statutory funding requirement under Article 15-155 of the Illinois Pension Code is one such factor to consider in the selection of the investment assumption. Given that actuarial value of assets are projected to grow at the interest assumption rate, if the market value of assets is less than the actuarial value there is an implied expectation of contribution rate increases. Also if the interest rate assumption is less than the median expected average future return there is also an implied expectation of contribution rate increases. To mitigate these factors a lower long term interest rate assumption should be considered.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

So while the SURS has already taken a large step by reducing the rate from 8.5% to 7.75% in 2010, there are compelling reasons to considering in the future a lower discount rate assumption.

2. *Inflation Assumption:*

The inflation assumption, which primarily impacts the salary increase assumption, used in this 2012 valuation is at 2.75%, which in our opinion is reasonable.

Our rationale for concurring with the 2.75% assumption:

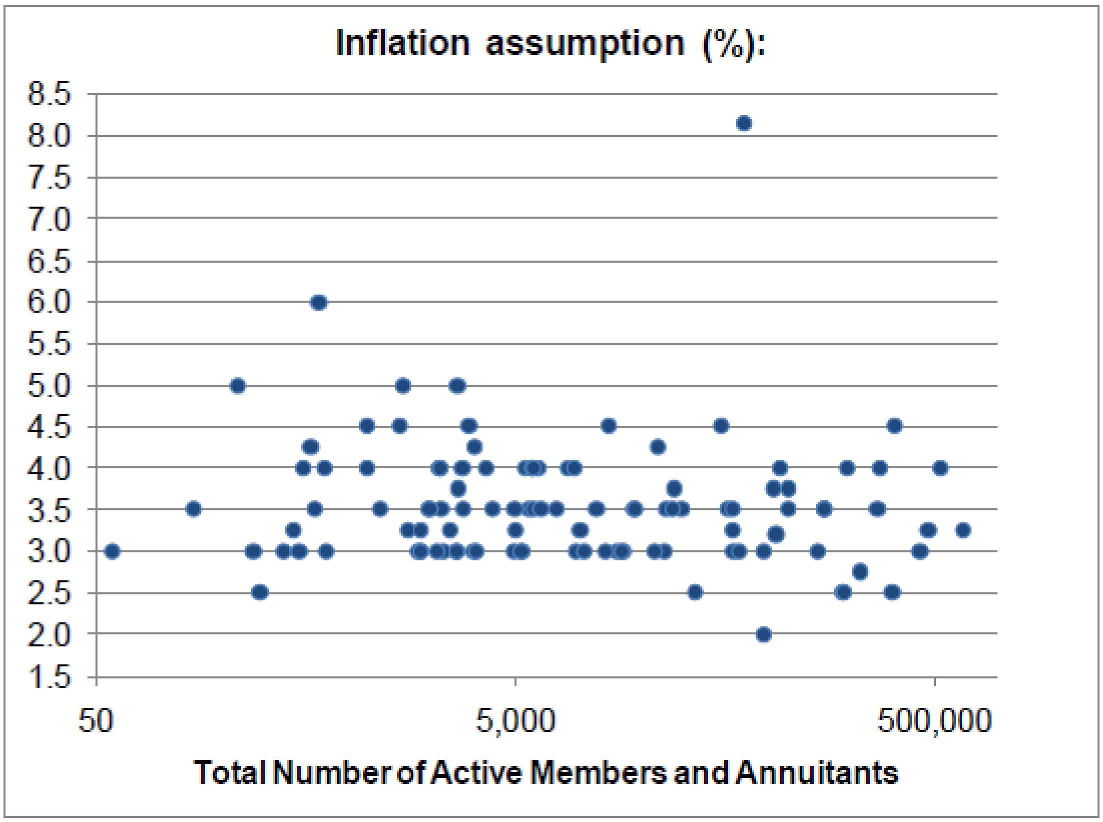
- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8% and 3.8%.

SECTION III - SUPPORTING ANALYSIS

- As shown on pages 6 and 7 of the GRS 2010 Experience Study, there continues to be support for this assumption as a long-term rate even though the historic short-term averages are being lowered by the current historically low rates.

- Our comparison of other public sector retirement systems' inflation assumption as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75% to 3.75%.

- Referencing the NCPERS 2011 study, they provided the following graphic of respondents inflation assumption:



This shows that the 2.75% assumption, which the SURS uses, is on the lower end of the inflation assumptions used amongst the 215 systems who responded to this study with 3.5% as the average.

SECTION III - SUPPORTING ANALYSIS

3. *Salary Increase Assumption:*

For the June 30, 2012 Actuarial Valuation, the salary scale assumption, which remains the same as it was in 2011, is shown in the table below.

Salary Increase

Illustrative rates of increase per individual employee per annum, compounded annually:

Service Year	Annual Increase
0	12.00%
1	10.00%
2	8.50%
3	7.25%
4	6.50%
5	6.25%
6	6.00%
7	5.75%
8	5.50%
9-13	5.00%
14-19	4.75%
19-33	4.25%
34+	3.75%

These increases include a component for inflation of 2.75% per annum and 1.00% standard of living increase.

This assumption was arrived at following the 2010 GRS Experience Study and first implemented in the 2011 valuation. **We find the assumption and the basis for setting it as reasonable.**

Our rationale for concurring with GRS's recommended salary increase assumption:

- This assumption, which is employer specific, is supported by credible data as shown on pages 11-14 of the 2010 Experience Study performed by GRS.

- During the year ending June 30, 2012 there was a small experience gain from this assumption (i.e. salary increases were less than assumed) as shown on page 16 of the June 30, 2012 GRS Actuarial Valuation Report. However, this one year experience should not be a consideration for changing this assumption long term, and is more indicative of the state of the current economy.

SECTION III - SUPPORTING ANALYSIS

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees which was addressed when the assumption was changed effective for the June 30, 2011 valuation.

4. *Cost of Living Adjustment Assumption:*

Benefits are increased annually as described on page 42 of the 2012 valuation. Annual increases are 3% for those hired prior to January 1, 2011 and based upon the Consumer Price Index for those hired on or after January 1, 2011. There is a description on page 21 of the report of the assumption used for COLA.

We recommend the assumption of COLA be described within the assumption section in future reports.

5. *Capped Pay Assumption:*

Benefits for members hired after January 1, 2011 are calculated using pay that is capped under Public Act 96-0889. The pay cap is shown on page 37 of the June 30, 2012 valuation to be $106,800 for 2011 and $108,883 for 2012. However, there is no demonstration of how the 2012 value was calculated or a reference to the source of this value.

We recommend the development of capped pay be demonstrated in future reports.

B. Demographic Assumptions

For the June 30, 2012 Actuarial Valuation, GRS has maintained the assumption changes adopted in the June 30, 2011 Actuarial Valuation which include modifications recommended in the 2010 Experience Study.

Out of the demographic assumptions there are three assumptions that are of interest.

1. *Disability:*

The table of disability incidence only shows sample rates in five year increments from 25 to 70. A full description of the table would be required for another actuary to replicate results which is not done in the 2010 Experience Study or the valuation report. Without a complete description of the table the report does not meet Actuarial Standards of Practice.

We recommend the full table of disability incidence is shown in the report.

Meeting this recommendation will lead to better compliance with ASOP No. 41 dealing with actuarial communications.

SECTION III - SUPPORTING ANALYSIS

2. *Recurring Loss for Benefit Recipients:*

Benefit Recipients have shown consistent losses over the past several years (p 18 of the June 30, 2012 valuation report). One source contributing to this loss described in the valuation is the difference between expected and actual benefits calculated for benefit recipients. For the June 30, 2011 valuation a 10% load was added to the liability of retirees who are receiving benefits based on preliminary estimates. However, for the 2012 valuation there was still a significant loss ($55.5 million) for these participants.

We recommend the source for this continue to be examined each year and if losses persist appropriate changes be made to the assumption.

The other changed demographic assumptions first made in 2011 and continued in 2012 meet the Standards called for under ASOP No. 35, 3.3.4. The one exception, which we fully endorse, is to continue to move out the projection year currently to 2017, for mortality improvements. Recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption. GRS has stated that the most recent Experience Study indicates that the current mortality assumption has an estimated margin of 10% for future mortality improvements.

SECTION III - SUPPORTING ANALYSIS

Below we summarize all the demographic assumptions which we reviewed and we have concluded all are reasonable.

1. Mortality

Post-Retirement Mortality

RP2000 Combined Healthy mortality table, sex distinct, with rates projected to 2017 with scale AA, with rates multiplied by 0.80 for males and 0.85 for females. No adjustment is made for post-disabled mortality. The mortality table used is a static table with the provision for future mortality improvement in the projection to 2017.

Pre-Retirement Mortality

Based on a percentage of 85% for males and 60% for females of post-retirement mortality.

Sample Mortality Rates

	Postretirement		Preretirement	
Age	**Males**	**Females**	**Males**	**Females**
35	0.0568%	0.0335%	0.0483%	0.0201%
40	0.0753%	0.0464%	0.0640%	0.0278%
45	0.0966%	0.0726%	0.0821%	0.0436%
50	0.1256%	0.1064%	0.1068%	0.0639%
55	0.2093%	0.2015%	0.1779%	0.1209%
60	0.4103%	0.3946%	0.3488%	0.2367%
65	0.8018%	0.7576%	0.6815%	0.4546%
70	1.3740%	1.3068%	1.1679%	0.7841 %
75	1.3817%	2.0841%	2.0244%	1.2505%

2. Marriage Assumption

Age	Males	Females
20	25%	40%
30	70	75
40	80	80
50	85	80
60	85	70

3. Self Managed Plan Election

15% of total future hires will elect to participate in the Self Managed Plan.

4. Termination

Illustrative rates of withdrawal from the System are as follows:

Years of Service	All Members
0	22.0%
1	22.0
2	16.0
3	14.0
4	12.0
5	10.5
6	9.0
7	7.5
8	6.5
9	6.0
10	5.5
11	4.5
12	4.0
13	3.7
14	3.2
15	3.0
16	2.6
17	2.3
18	2.1
19	2.0
20	1.7
21	1.5
22	1.5
23	1.5
24	1.5
25	1.5
26	1.5
27	1.5
28	1.5
29	1.5

Part time members with less than three years of service (all members classified as part time for valuation purposes) are assumed to terminate at the valuation date.

Members that terminate with at least five years of service are assumed to elect the most valuable option on a present value basis – refund of contributions or a deferred benefit.

5. Retirement

Upon eligibility, active members are assumed to retire as follows:

	Members Hired before January 1, 2011 and Eligible for		Members Hired on or after January 1, 2011 and Eligible for	
Age	**Normal Retirement**	**Early Retirement**	**Normal Retirement**	**Early Retirement**
Under 50	40.0%	-	-	-
50	38.0	-	-	-
51	38.0	-	-	-
52	38.0	-	-	-
53	38.0	-	-	-
54	34.0	-	-	-
55	32.0	7.0%	-	-
56	26.0	5.0	-	-
57	26.0	4.5	-	-
58	26.0	5.5	-	-
59	26.0	6.0	-	-
60	11.0	-	-	-
61	11.0	-	-	-
62	13.0	-	-	35.0%
63	13.0	-	-	15.0
64	13.0	-	-	15.0
65	17.0	-	-	15.0
66	15.0	-	-	15.0
67	15.0	-	50.0%	-
68	15.0	-	35.0	-
69	15.0	-	30.0	-
70-79	30.0	-	30.0	-
80+	100.0	-	100.0	-

Members that retire are assumed to elect the most valuable option on a present value basis – refund of contributions (or portable lump sum retirement, if applicable) or a retirement annuity.

SECTION III - SUPPORTING ANALYSIS

6. Disability

A table of disability incidence with sample rates follows:

Age	Males/ Females
20	0.050%
25	0.063%
30	0.075%
35	0.095%
40	0.145%
45	0.195%
50	0.270%
55	0.345%
60	0.420%
65	0.495%
70	0.570%

7. Operational Expenses

The amount of operational expenses for administration incurred in the latest fiscal year are supplied by SURS staff and incorporated in the Normal Cost.

8. Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

9. Missing Data

Members with an unknown gender are assumed to be female. Active and inactive members with an unknown date of birth are assumed to be 30 years old at the valuation. An assumed spouse date of birth is calculated for current service retirees in the traditional plan for purposes of calculating future survivor benefits. The female spouse is assumed to be three years younger than the male spouse. 70% of current total male retirees and 80% of current total female retirees in the traditional plan that have not elected a survivor refund are assumed to have a spouse at the valuation date.

10. Benefit Commencement Age

Inactive members eligible for a deferred benefit are assumed to commence benefits at their earliest normal retirement age. For Tier 1 members this is age 62 with at least five years of service, age 60 with at least eight years of service, or immediately if at least 30 years of service.

11. Load on Final Average Salary

No load is assumed to account for higher than assumed pay increases in final years of employment before retirement.

12. Load on Liabilities for Service Retirees with Non-finalized Benefits

A load of 10% on liabilities for service retirees whose benefits have not been finalized as of the valuation date is assumed to account for finalized benefits that on average are 10% higher than 100% of the preliminary estimated benefit.

13. Valuation of Inactives

An annuity benefit is estimated based on information provided by staff for inactive members with five or more years of service.

14. Reciprocal Service

Reciprocal service is included for current inactive members for purposes of determining vesting eligibility and eligibility age to commence benefits. The recently updated actuarial assumptions (including retirement and termination rates) were based on SURS service only.

Therefore, reciprocal service was not included for current active members. Reciprocal service will be collected and analyzed in the future and will be considered in the next Experience Study.

15. Other Projection Assumptions

The number of total active members will remain the same as the total number of active members in the current valuation throughout the projection period.

New entrants have an average age of 37.3 and average pay of $34,115 (2012 dollars). These values are based on the average age and average pay of current members with service between one and four years.

C. Actuarial Methods

Actuarial methods consist of three components: (1) The funding method, which is the attribution of total costs to past, current, and future years; (2) The method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) The amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Funding Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required to under Pension Code (40 ILCS 5/15). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Act's requirement for level percent of pay funding.** Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit values increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in actuarial cost, and we concur with its use.**

   Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of asset to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value" **Therefore, we concur with GRS's recommendation that the SURS Board consider moving to this approach in future valuations.** It's important to note that currently a move to this corridor approach would have no impact on the 2012 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

D. Determination of the Required State Contribution

As required by Public Act 94-0004, in determining the required State contribution under state law, the actuary must determine what level of future contributions is needed to make a projection of the Plan's funded status in 2045 to be at 90%. To make that determination, the actuary needs to make an assumption regarding the age/sex/salaries of new hires that replace existing members leaving over this period. This assumption is commonly referred to as the "New Entrant Profile". In addition to making that assumption, the actuary needs to apply actuarial methodologies to project the June 30, 2012 valuation into the future.

The "New Entrant Profile" assumption is a critical assumption as the required projection of 90% funding in the year 2045 means that the majority of active members will be new hires after the current June 30, 2012 valuation. Therefore, **we recommend that GRS disclose additional information in their 2012 valuation report as to how the new entrant profile, which is shown on page 35 of their June 30, 2012 Actuarial Valuation, was developed. Also, we recommend that GRS include all relevant information regarding the New Entrant Profile in the valuation report so as to better comply with ASOP No. 41 dealing with actuarial communications.**

We recommend that GRS revise its June 30, 2012 valuation to include projections of the maximum contribution calculation without Government Obligation Bonds (GOB).

We also recommend that GRS revise future valuations to include items that would allow Cheiron to better verify GRS's determination of the required State contribution. The specific items missing in GRS's report that are needed are projections by year of:

- future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested); and

- future gross SURS normal costs and member contributions in dollar amounts by year.

For each of these items the impact of the Self Managed Plan (SMP) needs to be clearly delineated.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

SECTION III - SUPPORTING ANALYSIS

In addition we recommend GRS provide in future valuation a disclosure of the present value of future benefits for actives, terminated vested, retirees and survivors, and disabled members. We also recommend that GRS include the historic development of assets without GOB.

We believe these would be appropriate disclosures under ASOP No. 41 and that the additional information will allow us to perform a more comprehensive analysis of GRS's determination of the required State contribution.

SECTION III - SUPPORTING ANALYSIS

E. Other Issues

1. *State Mandated Funding Method:*

   In the Summary of the Valuation, GRS clearly states their criticism that the required State contribution to the SURS, defined by Illinois Pension Code (40 ILCS 5/15-155), is currently underfunding the system. This law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045. GRS comments that the current funding policy defers funding which puts the system at risk that benefit obligations will not be met. They recommend a funding policy based on 100% funding within thirty years in accordance with GASB 25 as well as generally accepted actuarial practices. **We concur with GRS's comments on the implication on the System of the State Mandated Funding method, and suggest due to the systematic underfunding of the System, that the SURS Board always use the conservative end of any range of assumptions recommended by GRS.**

2. *State Mandated Projection Method*:

   Under Public Act 96-0043, the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 7.75%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA).

   The table below demonstrates what the market value would have to earn for the actuarial value to earn 7.75% based on the ratio of actuarial value to market value. We recommend that consideration be given to require that the projected future earnings of the System be based on starting market values of assets (rather than a smoothed value).

SECTION III - SUPPORTING ANALYSIS

What the market value of assets (MVA) would need to earn in a given year, if the actuarial value of assets (AVA) are assumed to earn 7.75%, at various ratios of

Ratio of AVA to MVA	Required MVA Return
130.00%	79.37%
125.00%	67.44%
120.00%	55.50%
115.00%	43.56%
110.00%	31.63%
105.00%	19.69%
100.00%	7.75%
95.00%	-4.19%
90.00%	-16.13%
85.00%	-28.06%
80.00%	-40.00%
75.00%	-51.94%
70.00%	-63.88%

Chapter Four

PRELIMINARY REPORT ON THE STATE EMPLOYEES' RETIREMENT SYSTEM

In accordance with Public Act 097-0694, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the State Employees' Retirement System concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was based on Cheiron's review of actuarial assumptions included in SERS' 2012 Actuarial Valuation.

Following is Cheiron's preliminary report submitted to the Board of Trustees of the State Employees' Retirement System. An initial draft of the preliminary report was submitted to SERS on November 30, 2012. An updated final preliminary report was submitted to SERS on December 10, 2012. SERS' written response, provided on December 17, 2012, can be found in Appendix C.

December 10, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
State Employees' Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with Public Act 097-0694 Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the State Employees' Retirement System of Illinois (SERS) for Fiscal Year 2014. This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

In summary, our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions were reasonable both individually and in the aggregate.

However, we do have some recommended changes for the Board to consider, some for this 2012 valuation, and others for the Board to consider in future valuations. Details on recommendations can be found in the report which follows. Please provide written responses to our recommendations by close of business on December 14, 2012.

The report which follows describes in Section I the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of GRS's determination of the Required State Contribution for FY 2014. Finally, in Section III we comment on other issues impacting the funding of the State Employees' Retirement System, including the implications of Article 14 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. The mandated funding method does not conform to the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices.

In preparing this report, we relied on information (some oral and some written) supplied by the State Employees Retirement System of Illinois (SERS) and GRS. This information includes actuarial assumptions and methods adopted by SERS's Board, plan provisions, summarized census data, the 2012 Actuarial Valuation Report, 2010 Experience Study, and various studies and memos prepared by the System's advisors and Executive Director. A detailed description of all information provided for this review is contained in the body of our report. We have examined the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the State Employees' Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Gene Kalwarski, FSA, FCA, EA, MAAA
Principal Consulting Actuary

Kenneth A. Kent, FSA, FCA, EA, MAAA
Principal Consulting Actuary

SECTION I - REPORT SCOPE

Under Illinois Public Act 097-0964 (the Act) Cheiron, the State Actuary, is required to review the actuarial assumptions and valuation of the State Employees Retirement System of Illinois (SERS) and issue this preliminary report to the SERS Board on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contributions for fiscal year 2014. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the SERS Board to consider before GRS, the SERS actuary, finalizes their certification of the required State contributions to the SERS for FY 2014. In accordance with the Act, our review did not include a replication of the actuarial valuation results.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of State contribution being certified. Finally, we have offered our opinion on the implications of Article 14-131 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

In conducting this review, Cheiron reviewed both the June 30, 2011 and June 30, 2012 actuarial valuations prepared by GRS, as well as GRS's 2010 Experience Study which included experience investigation of the demographic and economic experience for the SERS for the period July 1, 2005 through June 30, 2010. We also received and reviewed the membership data which GRS used to prepare its actuarial valuation as well as various presentations and formal studies prepared by GRS, the Illinois State Board of Investments (ISBI), and SERS staff. The materials we reviewed are listed in Appendix B. Supplemental to the materials we reviewed, we also participated in a meeting with SERS staff on September 24, 2012, and requested additional information from SERS staff and GRS.

Finally, in addition to reviewing the actuarial certification of the required State Contribution to the SERS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, for this initial report we interpret actuarial practices to mean: (1) does the Board utilize a qualified actuary to prepare the annual actuarial valuation which determines the required State contribution; and (2) does the Board require the actuary to conduct periodic formal experience studies to justify the assumptions used in the actuarial valuation? Future reports may examine additional actuarial practices of the Board.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the June 30, 2012 Actuarial Valuation of SERS. Detailed analysis and rationale for these recommendations can be found in Section III of this report.

Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation:

Public Act 097-0694 requires the State Actuary to identify recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the State Employees' Retirement System 2012 Actuarial Valuation and conclude that they are reasonable. Consequently, we do not have any recommended changes to the assumptions this year.

Recommended Additional Disclosures for the 2012 Valuation:

1) We recommend GRS offer an explanation of the $395 million loss due to retirees from active status as this item has created a source for recurring loss. Additional disclosure will help determine if there is an emerging trend not adequately captured by the assumptions.

Recommended Changes for Future Valuations:

1) To ensure expected future costs can be determined as a level percent of payroll as called for by the Illinois Pension Code (40 ILCS 5/14-131), we recommend the Board consider reducing the interest rate to the level recommended in the Experience Review study to the level expected to result in returns equally above or below the assumptions.

2) We recommend GRS consider, in future valuations, increasing the 1% of salary load for disability benefits to tie into the trend demonstrated in the 2010 Experience Review study and better cover the cash outflows for disability benefit payments.

3) We recommend GRS consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with the Statute.

4) We recommend that GRS disclose, in future valuations, the specific data referred to in the description as to how the New Entrant Profile assumption was developed.

Proposed Certification of the Required State Contribution

GRS has determined that the FY 2014 required State contribution calculated under the current statutory funding plan is $1,743,865,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and reviewed the assumptions on which it is based. In verifying these calculations, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions. We recommend that GRS **continue to disclose** in the June 30, 2013 and

SECTION II - SUMMARY OF RECOMMENDATIONS

later valuations the above items in order for us to continue to perform an analysis of the required State contribution in the future.

In addition, we would also request that GRS include the following items in future reports, in order for us to perform a more comprehensive analysis of the required State contribution in the future:

- Projections by year of future benefit payouts split by actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);

- The present value of future benefits by year for actives, terminated vested, retirees and beneficiaries, and disabled members; and

- A historic development of assets without GOB.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Economic Assumptions

1. *The Interest Rate:*

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was last changed in the June 30, 2010 Actuarial Valuation to 7.75% from 8.50%. This was a partial response to the findings presented in the 2010 Experience Review study performed by GRS.

After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes that the use of 7.75% for this valuation is reasonable.

Our rationale for concurring with the current assumption for this valuation is as follows:

- GRS adhered to Actuarial Standards of Practice (ASOP No. 27) in developing the interest rate assumption by application of the building block approach based on underlying capital market assumptions provided by seven independent investment consultants in the Experience Review study (see pages 9 through 11).

- SERS's long history of actual returns exceeded 7.75% on average.

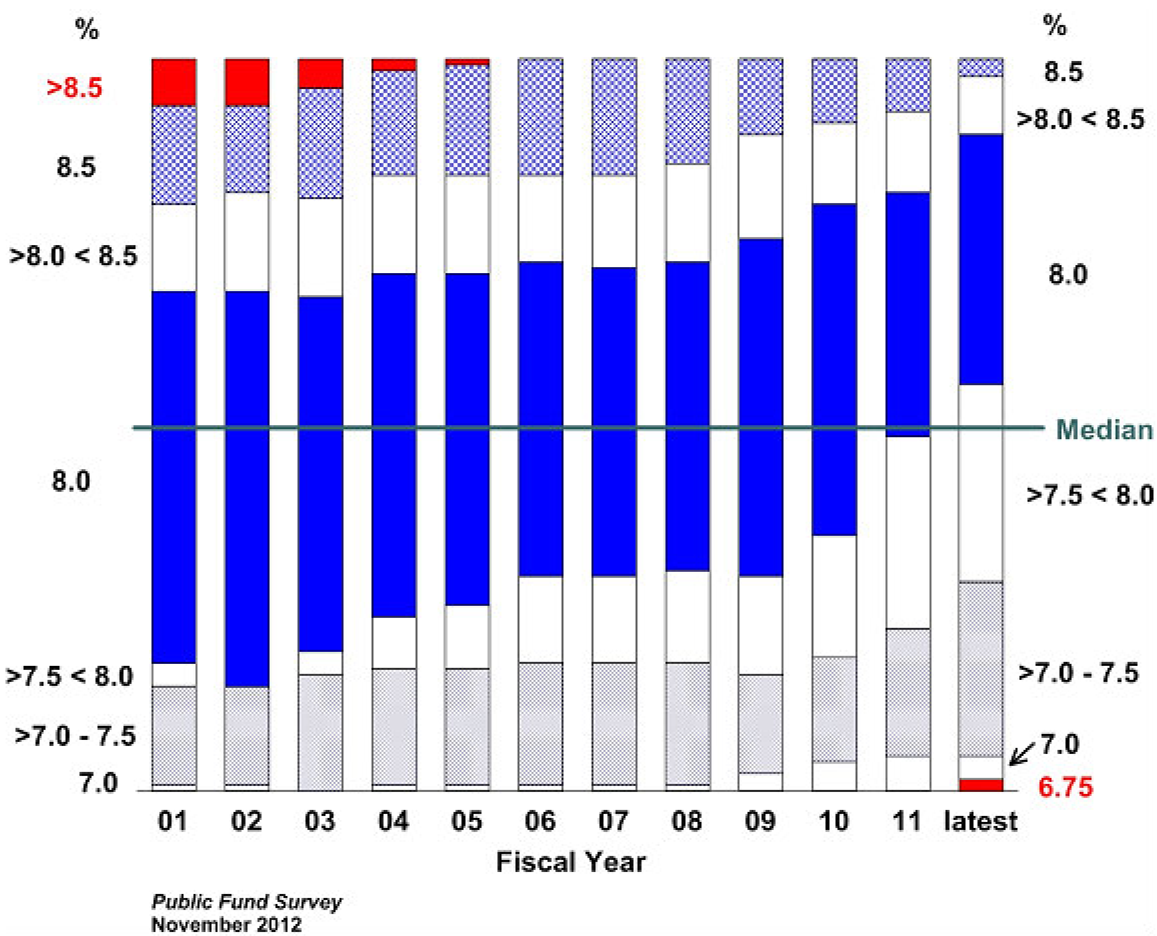
While we find the 7.75% interest rate assumption a reasonable assumption for 2012, we recommend the Board in future valuations consider lowering the rate further in support of the direction recommended in the 2010 Experience Review study and furthermore to annually review the interest rate assumption as opposed to waiting for the completion of a formal Experience Review study.

Our rationale for this recommendation is as follows:

- In GRS's 2010 Experience Review study, they relied on the opinion of seven independent investment consultants who provided that *the probability of exceeding 7.75%* investment return each year is *38.97%* (page 10 of the 2010 Experience Review study). Therefore it can be inferred that at this assumption there is a higher likelihood of investment loss than gain and the expected average return rate based on the current asset allocation is lower than 7.75%.

- The Statutory funding requirement can not be ignored in the choice of an appropriate interest assumption. Fundamental to the Statute is the requirement to determine the appropriate portion of unfunded liability to be funded each year that produces a level amortization amount as a percent of future projected payroll. If the interest assumption is expected to result in a higher likelihood of returns below the rate than above, as presented in discussion in the 2010 Experience Review study by GRS, then by definition, this will produce future losses and an increasing amortization amount as a percent of payroll.

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 99 large retirement systems. The following chart shows the distribution of investment return assumptions for the last 12 years of their survey.



Over the period shown in the survey, there has been a pattern of reducing investment return assumptions, first reducing the highest assumptions to below 8.5% and more recently reducing assumptions below 8.0%. This survey is the first in which the median assumption is less than 8.0%, and the first in which a system adopted an assumption less than 7.0%. The survey is consistent with experience on other Cheiron clients that there has been a significant trend to reduce the investment return assumptions in the last three years.

SECTION III - SUPPORTING ANALYSIS

- *Industry pressures may lead to mandated lower discount rates:* In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from this traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return. Near risk free rates of return today would be less than 4% and would enormously increase the liabilities of SERS, and the resulting required State contribution. While this debate continues and has not been resolved, there are external signs that the public sector may ultimately be forced to utilize much lower investment assumptions.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as SERS, to effectively use a lower discount rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015 respectively. It's important to note however, that the new standards do not define funding requirements for a plan.

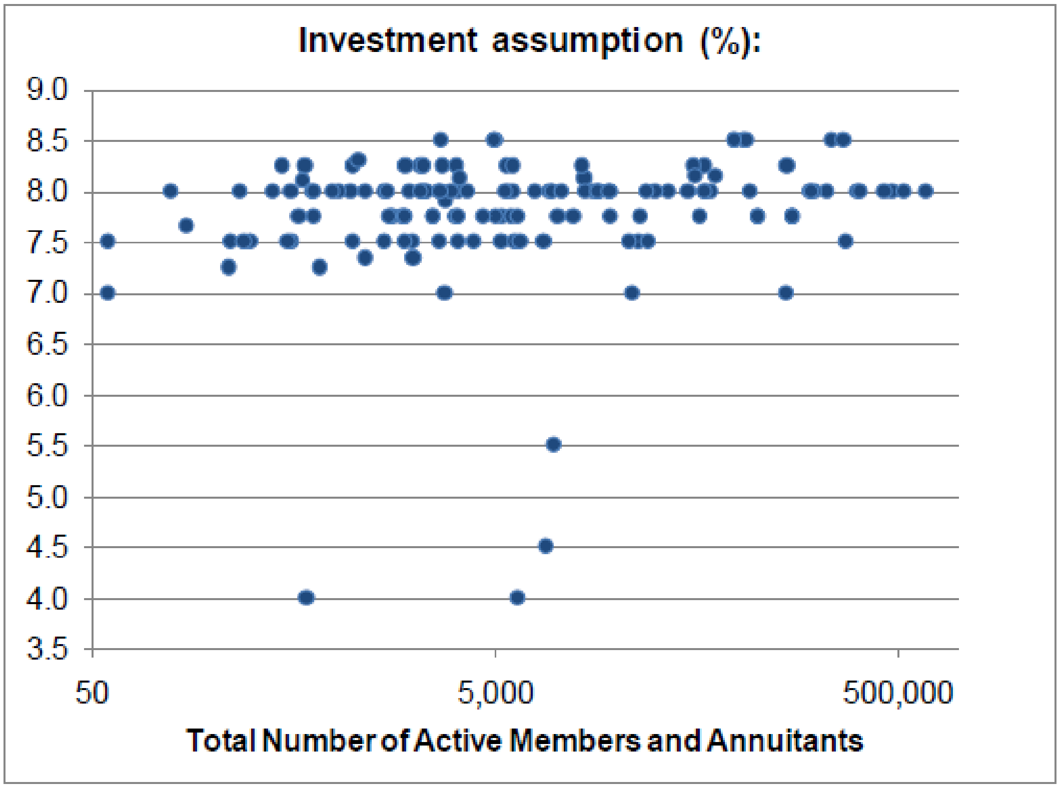
- Moody's, an organization that provides bond rating information for private investors, has recently announced that they propose to compare the financial viability of public sector pension plans by using, among other things, a 5.5% discount rate assumption.

- Under Actuarial Standards of Practice (ASOP) 27 *Selection of Economic Assumptions for Measuring Pension Obligations,* Section 3.6.3 Measurement Specific Factors refers to other factors to consider in the selection of the investment assumption. Cheiron believes the statutory funding requirement under Article 14-131 of the Illinois Pension Code is one such factor to consider in the selection of the investment assumption. Given that actuarial value of assets are projected to grow at the interest assumption rate, if the market value of assets is less than the actuarial value there is an implied expectation of contribution rate increases. Also if the interest rate assumption is less than the median expected average future return there is also an implied expectation of contribution rate increases. To mitigate these factors a lower long term interest rate assumption should be considered.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

- The following chart from page 6 of the June *2011 National Conference on Public Employee Retirement Systems (NCPERS) Public Fund Study* shows the rates used nationwide by public sector pension plans.

SECTION III - SUPPORTING ANALYSIS



As part of the study, NCPERS identified that the average investment assumption for the 215 state and local pension plan respondents was 7.7%, and that it was anticipated that 23% have reduced this assumption in the past two years, and 15% of the respondents planned to reduce their rates in the next two years.

So while SERS has already taken a large step by reducing the rate from 8.5% to 7.75% in 2011, there are compelling reasons to consider in the future a lower discount rate assumption.

2. *Inflation Assumption:*

We find the inflation assumption, which primarily impacts the salary increase assumption, used in this 2012 valuation by GRS of 3.00%, in certifying the required state contribution is reasonable.

Our rationale for concurring with the 3.00% assumption:

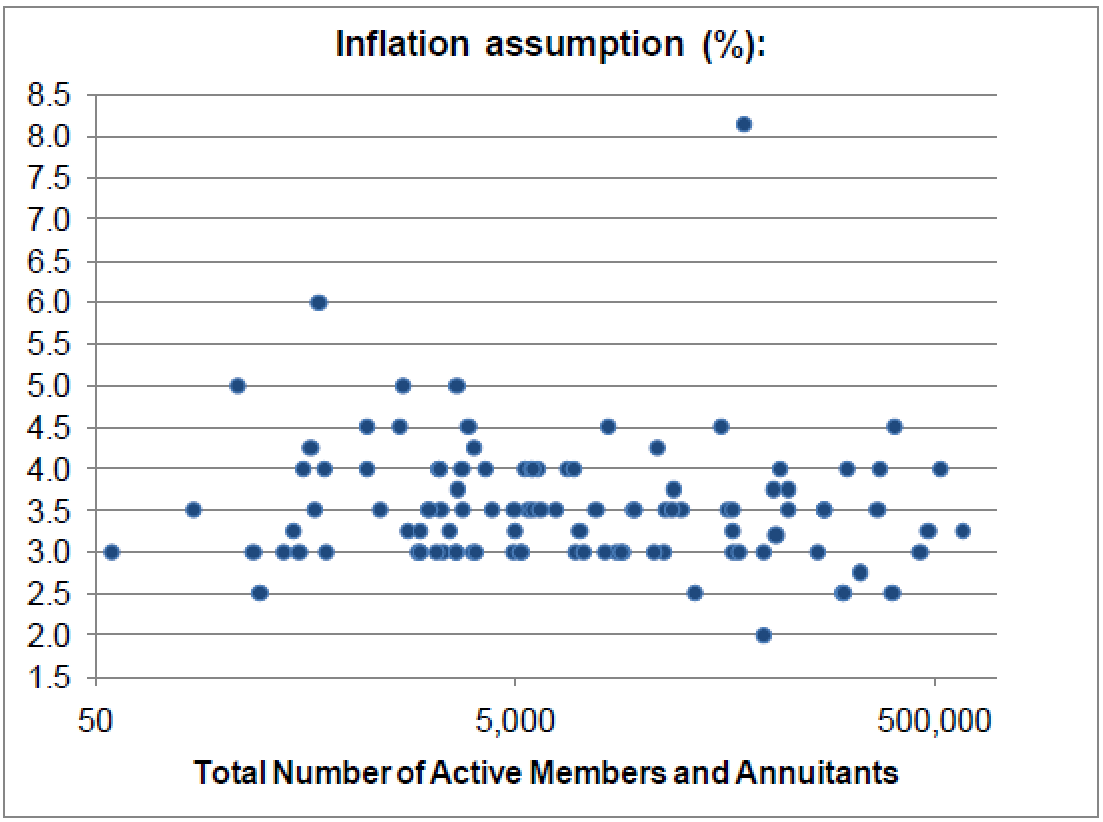
- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8% and 3.8%.

SECTION III - SUPPORTING ANALYSIS

- As shown on pages 7 and 8 of the GRS 2010 Experience Review study, there continues to be support for this assumption as a long-term rate even though the historic short-term averages are being lowered by the current historically low rates.

- Our comparison of other public sector retirement systems' inflation assumptions as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75% to 3.75%.

- Referencing the NCPERS 2011 study, they provided the following graphic of respondents' inflation assumptions:



This shows that the 3.0% assumption, which the SERS uses, is a prevalent inflation assumption among the 215 systems who responded to this study with 3.5% as the average.

SECTION III - SUPPORTING ANALYSIS

3. *Salary Increase Assumption:*

For the June 30, 2012 Actuarial Valuation, the salary scale assumption, which remains the same as it was in 2011, is shown in the table below.

Illustrative rates of increase per individual employee per annum, compounded annually:

Age	Annual Increase
25	8.87%
30	7.25%
35	6.47%
40	5.87%
45	5.41%
50	5.02%
55	4.72%
60	4.44%
65	4.23%
70	4.00%

These increases include a component for inflation of 3.0% per annum.

This assumption was arrived at following the 2010 GRS Experience Review study and first implemented in the 2011 valuation.

We find the assumption and the basis for setting it as reasonable.

Our rationale for concurring with GRS's recommended salary increase assumption:

- This assumption, which is employer specific, is supported by credible data as shown on pages 12-15 of the 2010 Experience Review study performed by GRS.

- During the year ending June 30, 2012 there was a small experience gain from this assumption (i.e., salary increases were less than assumed) as shown on page 16 of the June 30, 2012 GRS Actuarial Valuation Report. However, this one year experience should not be a consideration for changing this assumption long term, and is more indicative of the state of the current economy.

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees which was addressed when the assumption was changed effective for the June 30, 2011 valuation.

B. Demographic Assumptions

For the June 30, 2012 Actuarial Valuation, GRS has maintained the assumption changes adopted in the June 30, 2011 Actuarial Valuation which include modifications recommended in the 2010 Experience Review study.

Out of the demographic assumptions, there are two assumptions that are of interest.

1. *Disability:*

The only assumption related to the incidents of disability is among active employees. *Because members who receive disability benefits typically spend less than one year on disability, they are considered active members. Therefore, a load of 1.00% of pay on the normal cost is applied to reflect the near-term cash flow.* The expected benefit payments appear to be funded through a term cost according to this assumption. While this is a minor component of the total cost if the expectation is for actual normal cost to cover current benefit payouts with no reserving for this liability, the payouts are running 15 - 25% of the expected normal cost.

While the assumption is a load on covered payroll, based on payments as a percent, the trend shown on page 40 of the 2010 Experience Study, the payments are an increasing percent. The following table summarized the normal cost compared to the payments made in the plan year. On this basis the assumption is trending on average closer to 1.2% of payroll. An alternative assumption could be 110% of prior year payments.

Plan Year Ended June 30,	Normal Cost	Annual Benefit Payments	Actuarial Liability	Ratio of Payments to Normal Cost
2012	$43,290,838	$47,394,506	$282,966,926	-
2011	$37,900,676	$44,856,266	$285,643,801	125%
2010	$37,074,248	$43,341,995	$280,162,795	121%
2009	$36,245,367	$40,951,016	$234,199,764	120%
2008	$35,709,336	$36,274,664	$222,527,173	115%

We recommend that GRS in future valuations consider increasing the 1% of salary load for disability benefits to tie into the trend demonstrated in the 2010 Experience Review study and to better cover the cash outflows for disability benefit payments.

2. *Recurring Loss:*

   The only other issue the valuation results raised as a concern which should be reviewed and commented on in the valuation report is the experience loss attributable to retirements from active status of $395 million (page 16 of the 2012 Valuation Report). This is a material and recurring source for loss to the System (in 2011 the loss was $264 million, in 2010 the loss was $203 million, in 2009 the loss was $201 million, and in 2008 it came to $224 million). This is neither discussed as a source nor reflected as an issue in the recent 2010 Experience Review study.

We recommend the source for this loss be explained and, if possible, prefunded through an appropriate assumption.

The other changed demographic assumptions first made in 2011 and continued in 2012 meet the Standards called for under ASOP No. 35, 3.3.4. The one exception, which we fully endorse, is to continue to move out the projection year to 2015 for mortality improvements. Recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption.

SECTION III - SUPPORTING ANALYSIS

Below we summarize all the demographic assumptions which we reviewed and have concluded are reasonable.

1. Mortality

Post-Retirement Mortality

RP2000 Combined Healthy mortality table, sex distinct, with rates projected to 2015 with scale AA. No adjustment is made for post-disabled mortality. The mortality table used is a static table with the provision for future mortality improvement in the projection to 2015 which is in sync with the next scheduled experience study.

Pre-Retirement Mortality

Based on a percentage of 85% for males and 70% for females of post-retirement mortality. Five percent of deaths among active employees are assumed to be in the performance of their duty.

2. Marriage Assumption

85.0% of active male participants and 65.0% of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

3. Social Security Offset for Survivor Benefits

No offset assumption for male surviving spouses because it is assumed their own primary insurance amount (PIA) of benefits provided under Social Security is as great as their spouses' PIA. Sixty percent of married male members are assumed to have a dual income household. For the dual income household, it is assumed the offset at age 60 is 45.0% of the original survivor benefit. It is assumed the offset at age 62 is 10.0% of the original survivor benefit. Furthermore, it is assumed that 50% of retirees on or after July 1, 2009, will elect to remove the offset provision. In exchange for the removal, the member's retirement annuity is reduced by 3.825% monthly as mandated by law (40 ILCS 5/14-119).

SECTION III - SUPPORTING ANALYSIS

4. Termination

Illustrative rates of withdrawal from the System are as follows:

	Service Based Withdrawal			
	General Formula Employees		Alternate Formula Employees	
Service (Beginning of Year)	**Males**	**Females**	**Males**	**Females**
0	0.1800	0.1700	0.0400	0.0775
1	0.1200	0.1100	0.0250	0.0475
2	0.0600	0.0850	0.0250	0.0450
3	0.0550	0.0700	0.0250	0.0300
4	0.0500	0.0550	0.0250	0.0300
5	0.0450	0.0500	0.0250	0.0300
6	0.0350	0.0400	0.0150	0.0300
7	0.0300	0.0350	0.0150	0.0300
8	0.0300	0.0250	0.0150	0.0300
9	0.0250	0.0250	0.0150	0.0200
10	0.0200	0.0250	0.0150	0.0200
11	0.0200	0.0200	0.0100	0.0175
12	0.0200	0.0200	0.0100	0.0175
13	0.0200	0.0200	0.0100	0.0175
14	0.0150	0.0150	0.0100	0.0175
15	0.0150	0.0150	0.0100	0.0100
16	0.0150	0.0150	0.0075	0.0100
17	0.0125	0.0150	0.0075	0.0100
18	0.0125	0.0150	0.0075	0.0100
19	0.0125	0.0100	0.0075	0.0100
20	0.0100	0.0100	0.0075	0.0100
21	0.0100	0.0075	0.0050	0.0100
22	0.0100	0.0075	0.0050	0.0100
23	0.0100	0.0075	0.0050	0.0100
24	0.0100	0.0075	0.0050	0.0100
25	0.0100	0.0075	0.0050	0.0100
26	0.0100	0.0075	0.0050	0.0100
27	0.0100	0.0075	0.0050	0.0100
28	0.0100	0.0075	0.0050	0.0100
29	0.0100	0.0075	0.0050	0.0100
30+	0.0100	0.0075	0.0050	0.0100

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

5. Retirement

Retirement Rates for General Formula Employees		
	Males	**Females**
50	5.00%	5.00%
51	5.00%	5.00%
52	15.00%	15.00%
53	12.00%	15.00%
54	15.00%	15.00%
55	12.00%	13.00%
56	10.00%	13.00%
57	10.00%	13.00%
58	10.00%	13.00%
59	10.00%	13.00%
60	10.00%	13.00%
61	10.00%	10.00%
62	15.00%	17.50%
63	12.50%	15.00%
64	12.50%	15.00%
65	20.00%	25.00%
66	20.00%	20.00%
67	12.50%	20.00%
68	12.50%	15.00%
69	12.50%	15.00%
70	100.00%	100.00%

Early Retirement Rates for General Formula Employees		
	Males	**Females**
55	5.50%	6.00%
56	6.00%	6.00%
57	7.50%	8.00%
58	9.00%	8.00%
59	12.00%	18.00%

SECTION III - SUPPORTING ANALYSIS

Retirement Rates for Alternate Formula Employees

	Males	**Females**
50	50.00%	50.00%
51	35.00%	25.00%
52	35.00%	40.00%
53	35.00%	40.00%
54	35.00%	30.00%
55	35.00%	30.00%
56	20.00%	25.00%
57	20.00%	25.00%
58	20.00%	25.00%
59	20.00%	20.00%
60	30.00%	20.00%
61	30.00%	30.00%
62	45.00%	40.00%
63	30.00%	25.00%
64	30.00%	25.00%
65	50.00%	40.00%
66	20.00%	40.00%
67	30.00%	40.00%
68	50.00%	40.00%
69	50.00%	40.00%
70	100.00%	100.00%

6. Assets

Assets available for benefits are used as described on page 44 of the most recent valuation report.

7. Expenses

As estimated and advised by SERS staff, based on current expenses and are expected to increase in relation to the projected capped payroll.

8. Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

9. Children

It is assumed that married members have 2.2 children, one year apart in age.

The age of the youngest child of a deceased employee at his or her date of death is assumed to be as follows:

Age of Death of Employee	Age of Youngest Child	Age at Death of Employee	Age of Youngest Child
20	2	40	6
25	3	45	8
30	4	50	10
35	5	55	12
		60	14

10. Overtime and Shift Differentials

Reported earnings include base pay alone. It is assumed that overtime and shift differentials will increase total payroll by 3.5% over reported earnings.

11. Missing Data

If earnings were not available, the annual rate of pay is assumed to be the rate of pay for the population as a whole on the valuation date. If a birth date was not available, the member was assumed to be age 35.

12. Decrement Timing

Decrements are assumed to occur mid-year.

13. Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

14. Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

15. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

16. Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have the same demographic profile as new entrants in the 15 years prior to the valuation date. The average increase in payroll for the projection period is 4.0% per annum.

New Entrant Benefit Group	Average Age	Average Pay (2012 Dollars)
New entrants eligible for Regular Formula Benefits that are covered by Social Security.	37.45	$46,628
New entrants eligible for Regular Formula Benefits that are not covered by Social Security.	30.85	$42,510
New entrants in positions formerly eligible for Alternate Formula Benefits that are covered by Social Security that are now eligible for Regular Formula Benefits.	39.26	$53,584
New entrants eligible for Alternate Formula Benefits that are covered by Social Security.	31.98	$48,282
New entrants in positions formerly eligible for Alternate Formula Benefits that are not covered by Social Security that are now eligible for Regular Formula Benefits.	28.91	$61,680
New entrants eligible for Alternate Formula Benefits that are not covered by Social Security.	27.64	$58,844

ASSUMPTIONS AS A RESULT OF PUBLIC ACT 96-0889 (ADOPTED BY THE BOARD ON JULY 12, 2010)

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Retirement rates for tier two members eligible for regular formula benefits account for the change in retirement age, as follows:

Age	Members Eligible for Normal Retirement	Age	Members Eligible for Early Retirement
67	50.0%	62	30.0%
68	75.0	63	34.0
69	90.0	64	38.0
70	100.0	65	42.0
		66	46.0

Members hired after December 31, 2010, eligible for the alternate formula benefits will retire according to the age-based retirement rates used in the most recent valuation as follows:

Age	Male Members Eligible for Normal Retirement	Female Members Eligible for Normal Retirement
60	35.0%	20.0%
61	37.0	15.0
62	38.0	25.0
63	40.0	40.0
64	41.0	40.0
65	80.0	55.0
66	40.0	55.0
67	55.0	45.0
68	55.0	45.0
69	40.0	45.0
70	100.0	100.0

C. Actuarial Methods

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e., asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Funding Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required under the Pension Code (40 ILCS 5/14). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Act's requirement for level percent of pay funding.** Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in actuarial cost, and we concur with its use.**

   Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the SERS Board consider moving to this approach in future valuations.** It's important to note that currently a move to this corridor approach would have no impact on the 2012 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

D. Determination of the Required State Contribution

As required by Public Act 94-0004, in determining the required State contribution under State law, the actuary must determine what level of future contributions is needed to make a projection of the System's funded status in 2045 be at 90%. To make that determination, the actuary needs to make an assumption regarding the age/sex/salaries of new hires that replace existing members leaving over this period. This assumption is commonly referred to as the "New Entrant Profile." In addition to making that assumption, the actuary needs to apply actuarial methodologies to project the June 30, 2012 valuation into the future.

The "New Entrant Profile" assumption is a critical assumption as the required projection of 90% funding in the year 2045 means that the majority of active members will be new hires after the current June 30, 2012 valuation. **Therefore, we recommend that GRS continue to provide specific information in their valuation report showing what new entrant profile used and as shown on page 38 of their June 30, 2012 Actuarial Valuation. We also recommend including sampling information on the historic information referenced in the profile development so as to better comply with ASOP No. 41 dealing with actuarial communications.**

We also recommend that GRS disclose in future valuations items needed to perform a more comprehensive analysis of GRS's determination of the System's funded status in 2045. The specific items are outlined on page 3 in Section II: Proposed Certification of the Required State Contribution. We believe these would be appropriate disclosures under ASOP No. 41 and that the additional information will allow us to perform a more comprehensive analysis of GRS's determination of the required State contribution.

E. Other Issues

1. *State Mandated Funding Method:*

   In its valuation, GRS does not offer any commentary or opinion on whether or not the required State contribution to SERS defined by the Illinois Pension Code (40 ILCS 5/14-131) is limited in meeting the risks of the System. This Law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045. **We suggest due to the systematic underfunding of the System that the SERS Board always use the conservative end of any range of assumptions recommended by GRS.**

SECTION III - SUPPORTING ANALYSIS

2. *State Mandated Projection Method*:

Under Public Act 96-0043, the actuarial methodologies utilized in performing the 2045 projection of the System's funded status, assume the future earnings rate (currently at 7.75%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level. We have similar concerns over the implications of the law under the Act.

The table below demonstrates what the market value would have to earn for the actuarial value to earn 7.75% based on the ratio of actuarial value to market value. We recommend that consideration be given to require that the projected future earnings of the System be based on starting market values of assets (rather than a smoothed value).

What the market value of assets (MVA) would need to earn in a given year, if the actuarial value of assets (AVA) are assumed to earn 7.75%, at various ratios of

Ratio of AVA to MVA	Required MVA Return
130.00%	79.37%
125.00%	67.44%
120.00%	55.50%
115.00%	43.56%
110.00%	31.63%
105.00%	19.69%
100.00%	7.75%
95.00%	-4.19%
90.00%	-16.13%
85.00%	-28.06%
80.00%	-40.00%
75.00%	-51.94%
70.00%	-63.88%

Chapter Five

PRELIMINARY REPORT ON THE JUDGES' RETIREMENT SYSTEM

In accordance with Public Act 097-0694, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the Judges' Retirement System concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was based on Cheiron's review of actuarial assumptions included in JRS' 2012 Actuarial Valuation.

Following is Cheiron's preliminary report submitted to the Board of Trustees of the Judges' Retirement System. An initial draft of the preliminary report was submitted to JRS on November 30, 2012. An updated final preliminary report was submitted to JRS on December 10, 2012. JRS' written response, provided on December 17, 2012, can be found in Appendix C.

December 10, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
Judges' Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with Public Act 097-0694 Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the Judges' Retirement System of Illinois (JRS) for Fiscal Year 2014. This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

In summary our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions were reasonable both individually and in the aggregate.

However, we do have some recommended changes for the Board to consider, some for this 2012 valuation, and others for the Board to consider in future valuations. Details on recommendations can be found in the report which follows. Please provide written responses to our recommendations by the close of business on December 14, 2012.

The report which follows, describes in Section I the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of GRS's determination of the Required State Contribution for FY 2014. Finally, in Section III we comment on other issues impacting the funding of the Judges' Retirement System, including the implications of Article 18 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. The mandated funding method does not conform to the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices.

In preparing this report, we relied on information (some oral and some written) supplied by the Judges Retirement System of Illinois (JRS), GRS, and Goldstein & Associates. This information includes actuarial assumptions and methods adopted by JRS's Board, plan provisions, summarized census data, the 2012 Actuarial Valuation Report, formal Experience Study, and investment return assumption study. A detailed description of all information provided for this review is provided in the body of our report. We have examined the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the Judges' Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Anne Harper, ASA, EA, MAAA	Kenneth A. Kent, FSA, FCA, EA, MAAA
Associate Actuary	Principal Cponsulting Actuary

SECTION I - REPORT SCOPE

Under Illinois Public Act 097-0964 (the Act) Cheiron, as the State Actuary, is required to review the actuarial assumptions and valuation of the Judges Retirement System of Illinois (JRS) and issue this preliminary report to the JRS Board, on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contributions for fiscal year 2014. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the JRS Board to consider before GRS, the JRS actuary, finalizes their certification of the required State contributions to the JRS for FY 2014. In accordance with the Act, our review did not include a replication of the actuarial valuation results.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the appropriate choice of assumptions and amount of State contribution being certified. Finally, we have offered our opinion on the implications of Article 18-131 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

In conducting this review, Cheiron reviewed both the June 30, 2011 and June 30, 2012 actuarial valuations prepared by Goldstein & Associates and GRS, respectively, as well as Goldstein & Associates' Experience Study which included experience investigation of the demographic and economic experience for the JRS for the period July 1, 2005 through June 30, 2010. In addition, we reviewed the investment return assumption study performed by Goldstein & Associates as of October 6, 2010. We also received and reviewed the membership data which GRS used to prepare its actuarial valuation. The materials we reviewed are listed in Appendix B. Supplemental to the materials we reviewed; we also participated in a meeting with JRS staff on September 24, 2012, and requested additional information from JRS staff and GRS.

Finally, in addition to reviewing the actuarial certification of the required State Contribution to the JRS, the Act requires the State Actuary to also conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, for this initial report we interpret actuarial practices to mean: (1) does the Board utilize a qualified actuary to prepare the annual actuarial valuation which determines the required State contribution; and (2) does the Board require the actuary to conduct periodic formal experience studies to justify the assumptions used in the actuarial valuation? Future reports may examine additional actuarial practices of the Board.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the June 30, 2012 Actuarial Valuation of the JRS. Detailed analysis and rationale for these recommendations can be found in Section III of this report.

Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation:

Public Act 097-0694 requires the State Actuary to identify recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the Judges' Retirement Systems 2012 Actuarial Valuation and conclude that they are reasonable. Consequently, we do not have any recommended changes to the assumptions this year.

Recommended Additional Disclosures for the 2012 Valuation:

1. We recommend GRS disclose in their June 30, 2012 report a complete description as to how the New Entrant Profile assumption was developed.

Recommended Changes for Future Valuations:

1. We recommend GRS consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with the Statute.

2. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.

3. We recommend that GRS consider using the actual data available rather than an assumption for determining if a member will choose a benefit option that provides a survivor annuity.

4. We recommend that GRS consider eliminating the disability assumption since there is very little incidence of disability, there is no distinct disabled mortality table being used, and there is no distinction in the retiree data between healthy and disabled annuitants.

Proposed Certification of the Required State Contribution

GRS has determined that the FY 2014 required State contribution calculated under the current statutory funding plan is $126,808,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and reviewed the assumptions on which it is based. In verifying these calculations, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, benefit payments plus expenses, and total contributions. We recommend that GRS **continue to disclose** in the June 30, 2013 and later valuations the above items in order for us to continue to perform an analysis of the required State contribution in the future.

SECTION II - SUMMARY OF RECOMMENDATIONS

In addition, we would also request that GRS include the following items in future reports, in order for us to perform a more comprehensive analysis of the required State contribution in the future:

- Projections by year of future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);

- The present value of future benefits by year for actives, terminated vested, retirees and beneficiaries, and disabled members; and

- A historic development of assets without GOB.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Economic Assumptions

1. The Interest Rate:

The interest rate assumption (also called the investment return or discount rate), is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 7.00% from 8.00% for the June 30, 2010 Actuarial Valuation in response to the Investment Return Assumption study letter dated October 6, 2010 prepared by Goldstein and Associates.

After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes that the use of 7.00% for this valuation is reasonable.

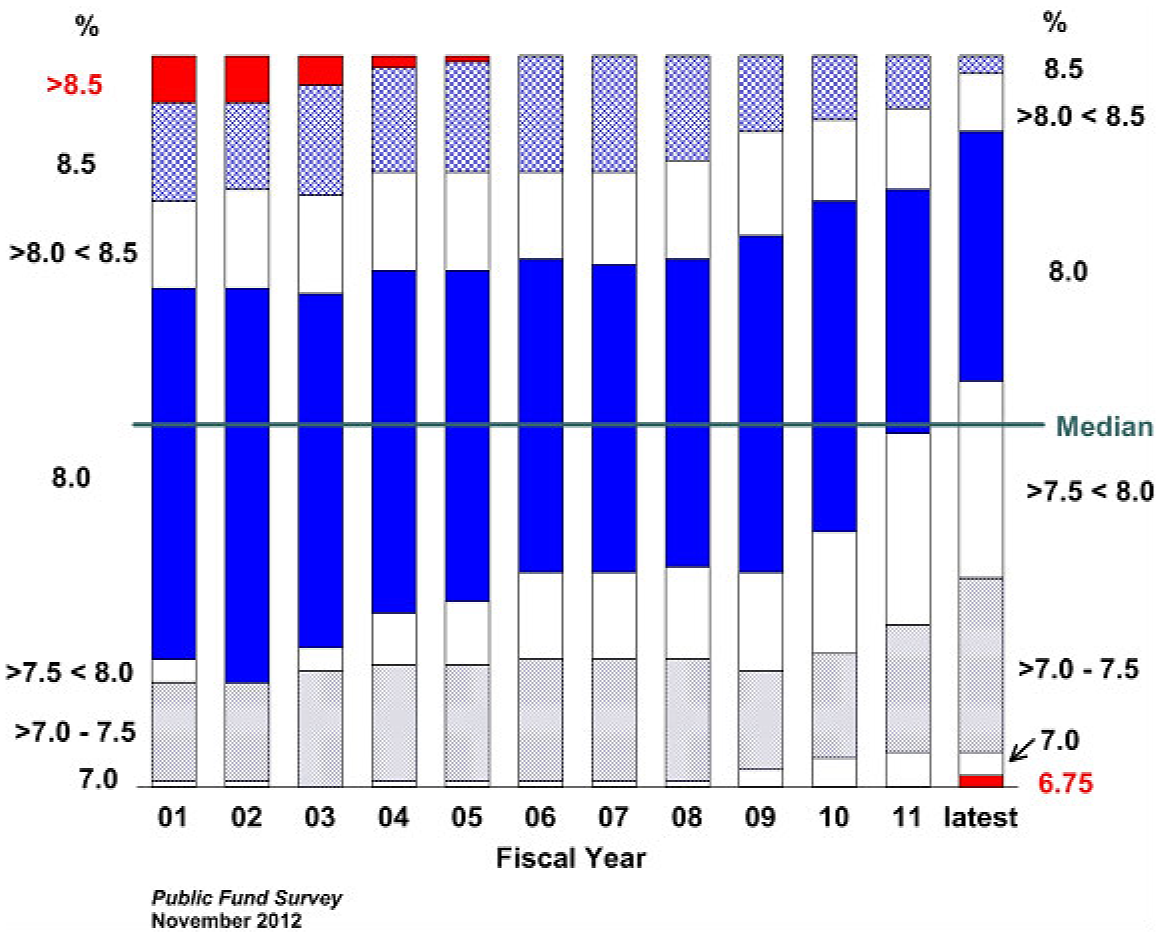
Our rationale for concurring with this assumption is as follows:

- Goldstein and Associates adhered to Actuarial Standards of Practice (ASOP No. 27) in developing the interest rate assumption by application of the building block approach based on underlying capital market assumptions provided by independent investment consultants in the Investment Return Assumption study letter.

- From the above mentioned study, the long-term expected rate of return based on the fund's target asset allocation policy and expected returns by asset class is 7.38%.

SECTION III - SUPPORTING ANALYSIS

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The Public Fund Survey covers 99 large retirement systems. The following chart shows the distribution of investment return assumptions for the last 12 years of their survey.



Over the period shown in the survey, there has been a pattern of reducing investment return assumptions, first reducing the highest assumptions to below 8.5% and more recently reducing assumptions below 8.0%. This survey is the first in which the median assumption is less than 8.0%, and the first in which a system adopted an assumption less than 7.0%. The survey is consistent with our experience that there has been a significant trend to reduce the investment return assumptions in the last three years.

- *Industry Pressures may lead to mandated lower discount rates:* In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from this traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return. Near risk free rates of return today would be less than 4% and would enormously increase the liabilities of JRS, and the resulting required State contribution. While this debate continues and has not been resolved, there are external signs that the public sector may ultimately be forced to utilize much lower investment assumptions.

- New GASB 67 and 68 pronouncements will require many public pension plans, such as JRS, to effectively use a lower discount rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015 respectively. It's important to note however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, has recently announced that they propose to compare the financial viability of public sector pension plans by using, among other things, a 5.5% discount rate assumption.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

The inflation assumption, which primarily impacts the salary increase assumption, used by JRS in the 2011 and 2012 valuations is 3.0%**.** The inflation assumption was decreased from 4.0% from the 2010 valuation. However, there was no explicit analysis of inflation in the Five-Year Experience Study Analysis or the Investment Return Assumption study performed by Goldstein and Associates.

We find that the 3.00% inflation assumption, used in certifying the required state contribution, is reasonable.

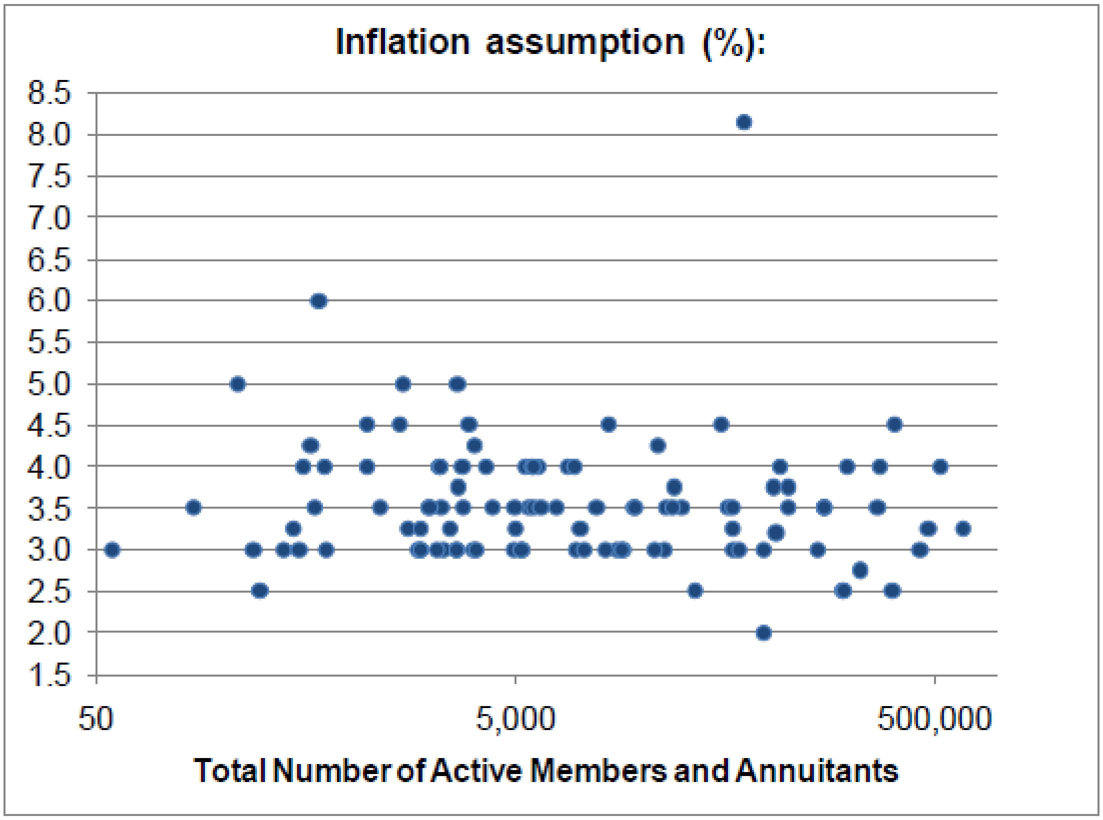
Our rationale for concurring with the 3.00% assumption:

- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8% and 3.8%.

- Our comparison of other public sector retirement systems' inflation assumption as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75% to 3.75%.

- Referencing the National Conference on Public Employee Retirement Systems (NCPERS) 2011 study, they provided the following graphic of respondents' inflation assumptions:

SECTION III - SUPPORTING ANALYSIS



This shows that the 3.0% assumption, which the JRS uses, is a prevalent inflation assumption amongst the 215 systems who responded to this study with 3.5% as the average.

SECTION III - SUPPORTING ANALYSIS

3. *Salary Increase Assumption:*

   For the June 30, 2012 Actuarial Valuation, the salary scale assumption is 4.0% per year, compounded annually for all active members regardless of age or service. It includes a component for inflation of 3.0% per annum.

   This assumption was first implemented in the 2011 valuation based on the 2010 Experience Study. Prior to the 2011 valuation the assumption was 5.0% per year. **We find the assumption and the basis for setting it as reasonable.**

   Our rationale for concurring with Goldstein & Associates recommended salary increase assumption:

   - The table on page 9 of Goldstein & Associates' July 18, 2011 report, which shows average salary increases for each fiscal year from 2006 to 2010, indicates that the data clearly supports the recommended changes.

   - Every year from 2006 to 2010, the valuation reports show actuarial gains, totaling $52.4 million, due to salary increases being lower than expected.

   - In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

B. Demographic Assumptions:

For the June 30, 2012 Actuarial Valuation, GRS has maintained the assumption changes adopted in the June 30, 2011 Actuarial Valuation which include modifications recommended in the Experience Study for the Period 2006 – 2010 by Goldstein & Associates. However, GRS has recommended that GRS review the assumptions prior to the June 30, 2013 valuation.

Out of the demographic assumptions there are three assumptions that are of interest.

1. *Mortality:*

   Prior to the Goldstein and Associates' most recent Experience Study, the mortality table used for active and retired members was the UP-1994 Mortality Table for Males, set back two years and for spouses, the UP-1994 Mortality Table for Females, set back one year. The Experience Study showed that actual plan experience was in line with the assumptions.

   However, recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption.

SECTION III - SUPPORTING ANALYSIS

Goldstein and Associates recommended additional one year set backs to both the male and female version of the UP-1994 Mortality Table which builds in more than a 10% margin in the assumption in order to allow for future improvements in mortality. Thus, we believe that the mortality tables recommended and used in the 2011 and 2012 valuation satisfy the requirements of ASOP No. 35. **However, we recommend using a fully generational mortality table. A fully generational mortality table has mortality improvements automatically built-in for new members entering the plan, which is important given that contribution rates are based on open group projections through 2045.**

GRS has specifically highlighted the need to address the mortality assumption before the June 30, 2013 valuation.

2. *Marriage Assumption:*

75% of active members are assumed to be married at the time of retirement. This assumption is used to determine the form of benefit elected by members at retirement; however, it was not analyzed or mentioned in the most recent experience study. **We recommend that GRS use actual data that is available rather than an assumption to determine the form of benefit payable at retirement.** Active members contribute an additional 2.5% of pay if they want to provide a benefit for their survivor upon death. They can elect not to pay the 2.5% and there is no continuance benefit.

3. *Disability Incidence:*

The following table illustrates the current disability rates:

Age Based Disability Rate	
Age	**Males**
30	0.00057
35	0.00064
40	0.00083
45	0.00115
50	0.00170
55	0.00000

There has only been one member in the last nine years who became disabled as an active employee. The GRS report and data do not distinguish between healthy and disabled annuitants, and there is no separate mortality table for disabled members. **We recommend that GRS consider eliminating the disability rates.** The impact of this change would not have a material effect on the liabilities or contributions of the plan since the Actuarial Liability for active members who become disabled is very small ($1 million) compared to $2,022 million for the total plan.

SECTION III - SUPPORTING ANALYSIS

Below we summarize all the demographic assumptions which we reviewed and we have concluded all are reasonable.

1. Termination

Illustrative rates of withdrawal from the System are as follows:

Age Based Termination Rates	
Age	**Males**
30	0.0128
35	0.0110
40	0.0094
45	0.0076
50	0.0058
55	0.0042
60	0.0024
65	0.0007

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Note: Termination rates were reduced 20% for each age based on the Five-Year Experience Study for the Period 2006-2010 when actual terminations were only 10% less than the expected. Setting termination rates lower than actual plan experience is a more conservative approach and is reasonable.

2. Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates	
Age	**Males**
60	22.0%
61-70	11.0%
71	12.0%
72	14.0%
73	16.0%
74	18.0%
75-79	20.0%
80	100.0%

SECTION III - SUPPORTING ANALYSIS

Early Retirement Rates	
Age	**Males**
55	8.0%
56	8.0%
57	8.0%
58	8.0%
59	8.0%

3. Assets

Assets available for benefits are used as described on page 41 of the most recent valuation report.

4. Expenses

Assumed expenses are estimated and advised by JRS staff. They are based on current expenses and are expected to increase in relation to the projected capped payroll.

5. Spouse's Age

The spouse is assumed to be four years younger than employee/retiree.

6. Decrement Timing

All decrements are assumed to occur beginning of year.

7. Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

8. Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

9. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

SECTION III - SUPPORTING ANALYSIS

10. Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age of 46.36 and average uncapped pay of $178,143 (2012 dollars). The average increase in uncapped payroll for the projection period is 4.0% per annum.

SECTION III - SUPPORTING ANALYSIS

ASSUMPTIONS AS A RESULT OF PUBLIC ACT 96-0889

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Retirement rates for these active members, to account for the change in retirement age, are as follows:

Retirement Rates	
Age	**Males**
62	30.0%
63	10.0%
64	13.0%
65	16.0%
66	20.0%
67	30.0%
68	11.0%
69-71	12.0%
72	14.0%
73	16.0%
74	18.0%
75-79	20.0%
80	100.0%

SECTION III - SUPPORTING ANALYSIS

C. Actuarial Methods:

Actuarial methods consist of three components: (1) The funding method, which is the attribution of total costs to past, current, and future years; (2) The method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) The amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Funding Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, and is required to under the Pension Code (40 ILCS 5/18). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Act's requirement for level percent of pay funding.** Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.**

   Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of asset to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans. Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore,**

we recommend that the JRS Board consider moving to this approach in future valuations. It's important to note that currently a move to this corridor approach would have no impact on the 2012 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

D. Determination of the Required State Contribution:

As required by Public Act 94-0004, in determining the required State contribution under State law, the actuary must determine what level of future contributions is needed to make a projection of the Plan's funded status in 2045 be at 90%. To make that determination, the actuary needs to make an assumption regarding the age/sex/salaries of new hires that replace existing members leaving over this period. This assumption is commonly referred to as the "New Entrant Profile". In addition to making that assumption, the actuary needs to apply actuarial methodologies to project the June 30, 2012 valuation into the future.

The "New Entrant Profile" assumption is a critical assumption as the required projection of 90% funding in the year 2045 means that the majority of active members will be new hires after the current June 30, 2012 valuation. **Therefore, we recommend that GRS disclose additional information in their 2012 valuation report as to how the new entrant profile, which is shown on page 35 of their June 30, 2012 Actuarial Valuation, was developed. Also, we recommend GRS include all relevant information regarding the New Entrant Profile in the valuation report so as to better comply with ASOP No. 41 dealing with actuarial communications.**

We also recommend that GRS disclose in future valuations items needed to perform a more comprehensive analysis of GRS's determination of the System's funded status in 2045. The specific items needed are outlined of page 3 in Section II: Proposed Certification of the Required State Contribution. We believe these would be appropriate disclosures under ASOP No. 41 and that the additional information will allow us to perform a more comprehensive analysis of GRS's determination of the required State contribution. We finally recommend that GRS include the historic development of assets without GOB.

E. Other Issues

1. State Mandated Funding Method:

In its valuation report on pages 10-12, GRS offers commentary on the Statutory funding method from an actuarial point of view. They describe the Annual Required Contribution (ARC) under GASB 25 and 27 as a method designed to finance benefits for current participants to a 100% funding target over a projected period not to exceed 30 years, and which is often used as a de facto funding method. They contrast the ARC funding method with the current Statutory method and note that the Statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future. They also provide a chart that "illustrates how significantly the current funding policy defers

SECTION III - SUPPORTING ANALYSIS

contributions into the future". This chart shows the funded ratio at 30% in 2012, a projected funded ratio under 50% until 2035, and a steep increase in the funded ratio from 2035 to 2045.

They advise "strengthening the current statutory funding policy", and provide the following examples:

a. Reducing the projection period needed to reach 90 percent funding;
b. Increasing the 90 percent funding target;
c. Separating the financing of benefits for members hired before and after December 31, 2010;
d. Reverting back to the market value of assets when developing contribution rates; and
e. Changing to an ARC based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

We concur with the GRS recommendations to increase the 90% funding target and to reduce the projection period, in accordance with GASB 25 as well as generally accepted actuarial practices. It may be illustrative to include a comparison of the projected contributions and funded ratios under some combination of the items above as well.

2. *State Mandated Projection Method*:

Under Public Act 96-0043, the actuarial methodologies utilized in performing the 2045 projection of the System's funded status, assume the future earnings rate (currently at 7.00%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level. We have similar concerns over the implications of the law under the Act.

The table on the following page demonstrates what the market value would have to earn in order for the actuarial value to earn 7.00% based on the ratio of actuarial value to market value. We recommend that consideration be given to require that the projected future earnings of the System be based on starting market values of assets (rather than a smoothed value).

SECTION III - SUPPORTING ANALYSIS

What the market value of assets (MVA) would need to earn in a given year, if the actuarial value of assets (AVA) are assumed to earn 7.00%, at various ratios of

Ratio of AVA to MVA	Required MVA Return
130.00%	77.50%
125.00%	65.75%
120.00%	54.00%
115.00%	42.25%
110.00%	30.50%
105.00%	18.75%
100.00%	7.00%
95.00%	-4.75%
90.00%	-16.50%
85.00%	-28.25%
80.00%	-40.00%
75.00%	-51.75%
70.00%	-63.50%

Chapter Six

PRELIMINARY REPORT ON THE GENERAL ASSEMBLY RETIREMENT SYSTEM

In accordance with Public Act 097-0694, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the General Assembly Retirement System concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was based on Cheiron's review of actuarial assumptions included in GARS' 2012 Actuarial Valuation.

Following is Cheiron's preliminary report submitted to the Board of Trustees of the General Assembly Retirement System. An initial draft of the preliminary report was submitted to GARS on November 30, 2012. An updated final preliminary report was submitted to GARS on December 10, 2012. GARS' written response, provided on December 17, 2012, can be found in Appendix C.

December 10, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
General Assembly Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with Public Act 097-0694 Cheiron is submitting this preliminary report concerning the proposed certification prepared by your actuary, Gabriel Roeder Smith & Company (GRS), of the required State contribution to the General Assembly Retirement System of Illinois (GARS) for Fiscal Year 2014. This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

In summary, our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions were reasonable both individually and in the aggregate.

However, we do have some recommended changes for the Board to consider for this 2012 valuation, and other changes for the Board to consider in future valuations. Details on recommendations can be found in the report which follows. Please provide written responses to our recommendations by the close of business on December 14, 2012.

The report which follows, describes in Section I the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings and presents more details on our assessment of the actuarial assumptions and methods employed in GRS' actuarial certification, as well as our assessment of the GRS determination of the Required State Contribution for FY 2014. Finally, in Section III we comment on other issues impacting the funding of the General Assembly Retirement System, including the implications of Article 2 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. The mandated funding method does not conform to the accounting parameters set forth by Governmental Accounting Standards Board Statement No. 25 or generally accepted actuarial practices.

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In preparing this report, we relied on information (some oral and some written) supplied by the General Assembly Retirement System of Illinois (GARS), GRS and Goldstein & Associates. This information includes actuarial assumptions and methods adopted by GARS's Board, plan provisions, summarized census data, the 2012 actuarial valuation report, formal Experience Study, and investment return assumption study. A detailed description of all information provided for this review is contained in the body of our report. We have examined the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the General Assembly Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Scott R. Greeno, ASA, EA, MAAA	Kenneth A. Kent, FSA, FCA, EA, MAAA
Consulting Actuary	Principal Consulting Actuary

SECTION I - REPORT SCOPE

Under Illinois Public Act 097-0964 (the Act) Cheiron, as the State Actuary, is required to review the actuarial assumptions and valuation of the General Assembly Retirement System of Illinois (GARS) and issue this preliminary report to the GARS Board, on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contributions for fiscal year 2014. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the GARS Board to consider before GRS, the GARS actuary, finalizes their certification of the required State contributions to the GARS for FY 2014. In accordance with the Act, our review did not include a replication of the actuarial valuation results.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the appropriate choice of assumptions and amount of State contribution being certified. Finally, we have offered our opinion on the implications of Article 2 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

In conducting this review, Cheiron reviewed both the June 30, 2011 and June 30, 2012 actuarial valuations prepared by Goldstein & Associates and GRS, respectively, as well as Goldstein & Associates' Study which included experience investigation of the demographic and economic experience for the GARS for the period July 1, 2005 through June 30, 2010. In addition, we reviewed the investment return assumption study performed by Goldstein & Associates as of October 6, 2010. We also received and reviewed the membership data which GRS used to prepare its actuarial valuation. The materials we reviewed are listed in Appendix B. Supplemental to the materials we reviewed we also participated in a meeting with GARS staff on September 24, 2012, and had requested for additional information from GARS staff and GRS.

Finally, in addition to reviewing the actuarial certification of the required State Contribution to the GARS, the Act requires the State Actuary to also conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, for this initial report we interpret actuarial practices to mean: (1) does the Board utilize a qualified actuary to prepare the annual actuarial valuation which determines the required State contribution; and (2) does the Board require the actuary to conduct periodic formal experience studies to justify the assumptions used in the actuarial valuation? Future reports may examine additional actuarial practices of the Board.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the June 30, 2012 Actuarial Valuation of the GARS. Detailed analysis and rationale for these recommendations can be found in Section III of this report.

Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation:

Public Act 097-0694 requires the State Actuary to identify recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the General Assembly Retirement Systems' 2012 Actuarial Valuation and conclude that they are reasonable. Consequently, we do not have any recommended changes to the assumptions this year.

Recommended Additional Disclosures for the 2012 Valuation:

1) In the actuarial reports for years 2006 through 2011 (Sandor Goldstein) that we reviewed, there is a consistent Actuarial Liability loss item every year for "salary increases of inactive members who are participants in other Illinois public retirement systems". These liability losses totaled $14.2 million over this six year period. However, we do not see any mention of this feature in the Plan Provisions section(s) and we do not see any explicit actuarial assumption for this item. There was no analysis of this specific item in the 2006-2010 Experience Study as well.

   We recommend GRS document the following in the June 30, 2012 valuation:

   - If this provision continues to exist under Illinois statutes, confirm that this plan provision was valued and include documentation of this in the plan provisions and actuarial assumptions sections.

   - If this provision continues to exist but has not been valued in the System's Actuarial Liability, we recommend adding an actuarial assumption that will capture the expected Actuarial Liability.

2) We recommend that GRS disclose, in their June 30, 2012 report, a complete description as to how the New Entrant Profile assumption was developed.

Recommended Changes for Future Valuations:

1) We recommend GRS to consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with Public Act 94-0004.

SECTION II - SUMMARY OF RECOMMENDATIONS

2) We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.

3) We recommend that GRS consider eliminating the disability assumption since there is very little or no actual incidence of disability, there is no distinct disabled mortality table being used, and there is no distinction in the retiree data shown in the report between current healthy and disabled annuitants.

Proposed Certification of the Required State Contribution:

GRS has determined that the FY 2014 required State contribution calculated under the current statutory funding plan is $13,856,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and reviewed the assumptions on which it is based. In verifying these calculations, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions. We recommend that GRS **continue to disclose** in the June 30, 2013 and later valuations the above items in order for us to continue to perform an analysis of the required State contribution in the future.

In addition, we would also request that GRS include the following items in future reports, in order for us to perform a more comprehensive analysis of the required State contribution in the future:

- Projections by year of future benefit payouts split by actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);

- The present value of future benefits by year for actives, terminated vested, retirees and beneficiaries, and disabled members; and

- A historic development of assets without GOB.

All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Economic Assumptions

1. *The Interest Rate:*

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 7.00% from 8.00% for the June 30, 2011 Actuarial Valuation in response to the Investment Return Assumption study letter dated October 6, 2010 prepared by Goldstein and Associates.

After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes that the use of 7.00% for this valuation is reasonable.

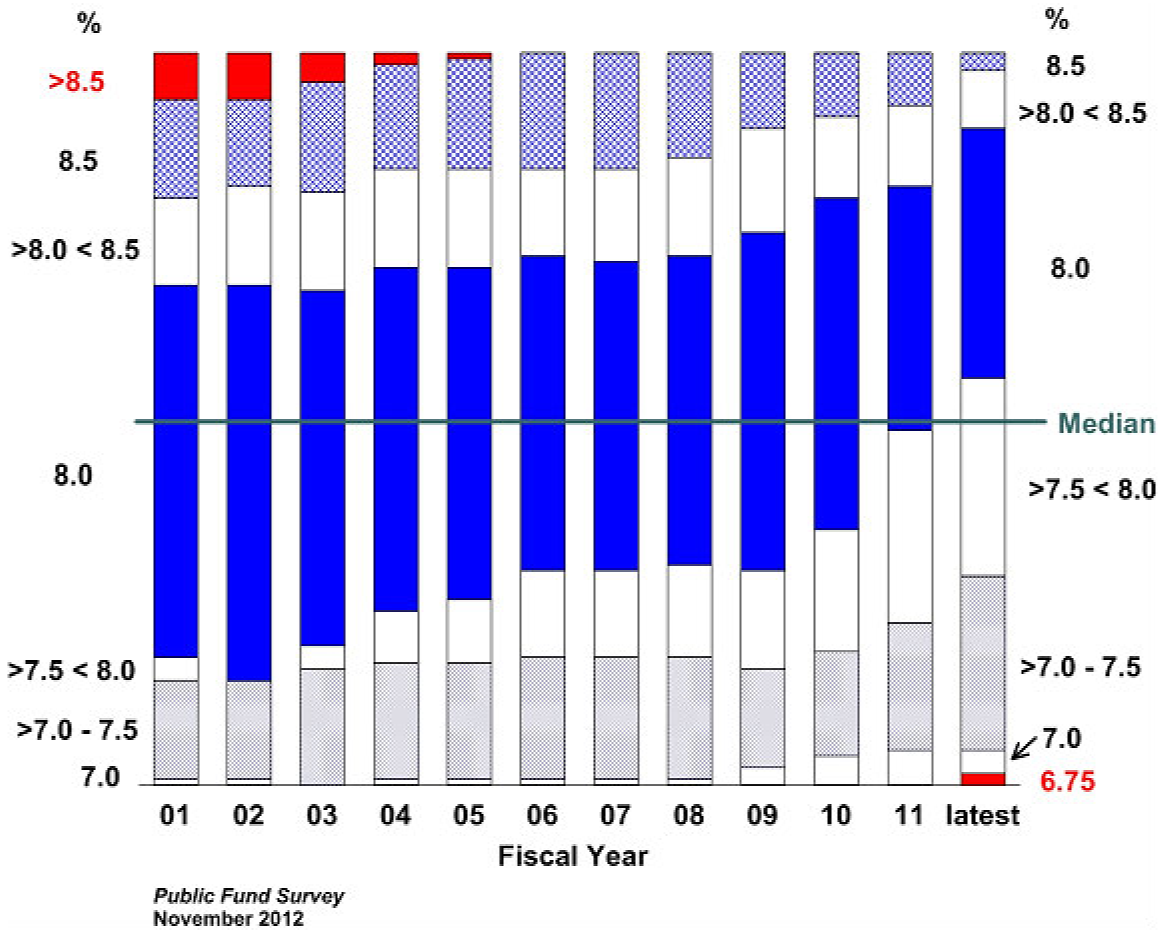
Our rationale for concurring with this assumption is as follows:

- Goldstein and Associates adhered to Actuarial Standards of Practice (ASOP No. 27) in developing the interest rate assumption by application of the building block approach based on underlying capital market assumptions provided by independent investment consultants in the Investment Return Assumption study letter.

- From the above mentioned study, the long-term expected rate of return based on the fund's target asset allocation policy and expected returns by asset class is 7.38%.

SECTION III - SUPPORTING ANALYSIS

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The Public Fund Survey covers 99 large retirement systems. The following chart shows the distribution of investment return assumptions for the last 12 years of their survey.



Over the period shown in the survey, there has been a pattern of reducing investment return assumptions, first reducing the highest assumptions to below 8.5% and more recently reducing assumptions below 8.0%. This survey is the first in which the median assumption is less than 8.0%, and the first in which a system adopted an assumption less than 7.0%. The survey is consistent with our experience that there has been a significant trend to reduce the investment return assumptions in the last three years.

- *Industry pressures may lead to mandated lower discount rates:* In recent years, there has been increased and controversial movement in the actuarial community that actuaries must move away from this traditional theory, and instead employ theories espoused by financial economists. Under this theory, the discount rate used to value pension plan liabilities should be based on near risk free rates of return, because pension liabilities (or benefit payments) are considered more akin to bonds, and that using the higher expected earnings rates hides the risks of achieving that return. Near risk free rates of return today would be less than 4% and would enormously increase the liabilities of GARS, and the resulting required State contribution. While this debate continues and has not been resolved, there are external signs that the public sector may ultimately be forced to utilize much lower investment assumptions.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as GARS, to effectively use a lower discount rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015 respectively. It's important to note however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, has recently announced that they propose to compare the financial viability of public sector pension plans by using, among other things, a 5.5% discount rate assumption.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize discount assumptions that are based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

The inflation assumption, which primarily impacts the salary increase assumption, used by GARS in the 2011 and 2012 valuations is 3.0%**.** The inflation assumption was decreased from 4.0% from the 2010 valuation. However, there was no explicit analysis of inflation in the Five-Year Experience Study Analysis or the Investment Return Assumption study performed by Goldstein and Associates.

We find that the 3.00% inflation assumption used in certifying the required state contribution is reasonable.

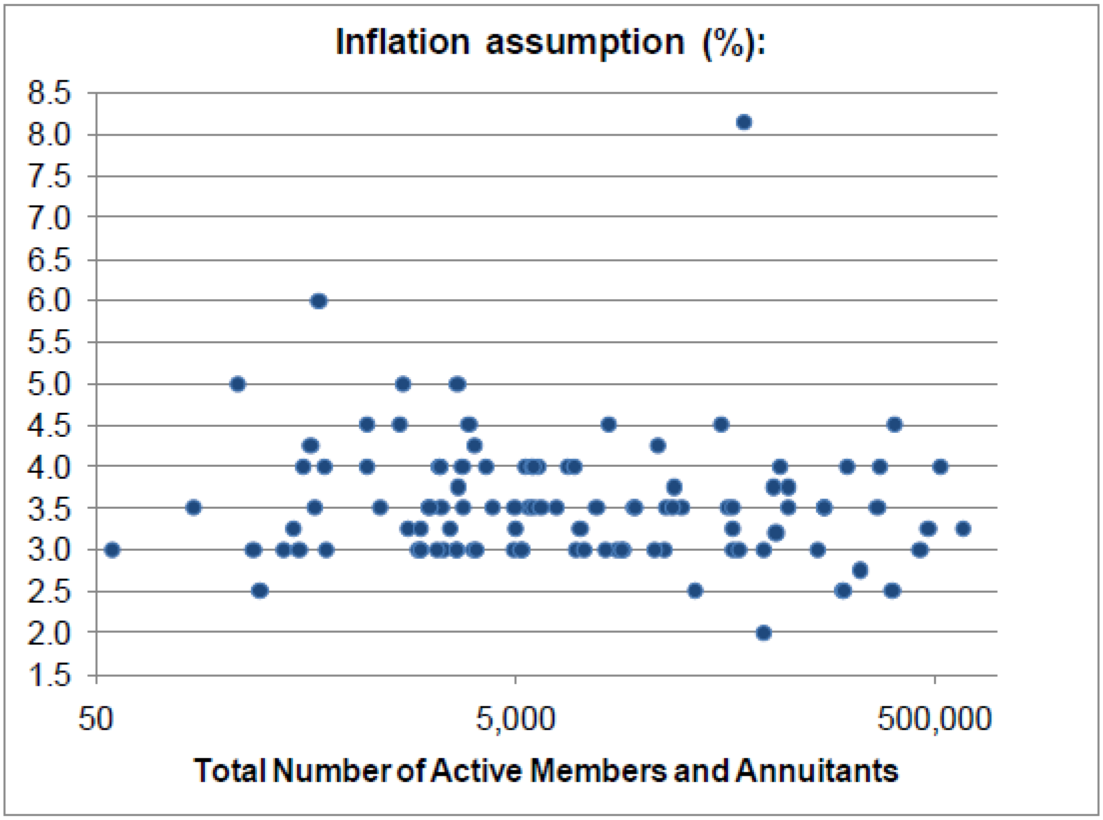
Our rationale for concurring with the 3.00% assumption:

- The 2012 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 1.8% and 3.8%.

- Our comparison of other public sector retirement systems' inflation assumption as shown by surveys published by the National Association of State Retirement Administrators (NASRA) and Boston College's Center of Public Research (CPR) show that most public sector pension plans utilize an inflation assumption in the range of 2.75% to 3.75%.

SECTION III - SUPPORTING ANALYSIS

- Referencing the National Conference on Public Employee Retirement Systems (NCPERS) 2011 study, they provided the following graphic of respondents' inflation assumption:



This shows that the 3.0% assumption, which the GARS uses, is a prevalent inflation assumption amongst the 215 systems who responded to this study, with 3.5% as the average.

3. *Salary Increase Assumption:*

For the June 30, 2012 Actuarial Valuation, the salary scale assumption is 4.0% per year, compounded annually for all active members regardless of age or service. It includes a component for inflation of 3.0% per annum.

This assumption was first implemented in the 2011 valuation based on the 2010 Goldstein & Associates Experience Study. Prior to the 2011 valuation the assumption was 5.0% per year. **We find the assumption and the basis for setting it as reasonable.**

Our rationale for concurring with Goldstein & Associates recommended salary increase assumption:

- The table on page 9 of Goldstein & Associates' August 11, 2011 Experience Study, which shows average salary increases for each fiscal year from 2006 to 2010, indicates that the data clearly supports the recommended changes.
- For four (4) out of six years from 2006 to 2011, the valuation reports showed actuarial gains for salary increases lower than assumed.
- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

B. Demographic Assumptions

For the June 30, 2012 Actuarial Valuation, GRS has maintained the assumption changes adopted in the June 30, 2011 Actuarial Valuation which include modifications recommended in the Experience Study for the Period 2006 – 2010 by Goldstein & Associates. However, GRS has recommended that GRS review the assumptions prior to the June 30, 2013 valuation.

Out of the demographic assumptions there are three assumptions that are of specific interest.

1. *Mortality:*

Prior to the Goldstein and Associates' most recent Experience Study, the mortality table used for active and retired members was the UP-1994 Mortality Table for Males, set back two years and for spouses, the UP-1994 Mortality Table for Females, set back one year. The Experience Study showed that actual plan experience was in line with the assumptions.

However, recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption.

SECTION III - SUPPORTING ANALYSIS

Goldstein and Associates recommended an additional two year set back to the male version of the UP-1994 Mortality Table for pensioners, which builds in a margin in the assumption in order to allow for future improvements in mortality. As such, for the 2011 valuation, the mortality table used for active and retired members was the UP-1994 Mortality Table for Males, set back four years and for spouses, the UP-1994 Mortality Table for Females, set back one year. Thus, we believe that the mortality tables recommended and used in the 2011 and 2012 valuation satisfy the requirements of ASOP No. 35. **However, we recommend using a fully generational mortality table for future valuations. A fully generational mortality table has mortality improvements automatically built-in for new members entering the plan, which is important given that contribution rates are based on open group projections through 2045.**

GRS has specifically highlighted the need to address the mortality assumption before the June 30, 2013 valuation.

2. *Disability Incidence:*

The following table illustrates the current disability rates:

Age Based Disability Rate	
Age	**Males**
25	0.0006
30	0.0006
35	0.0006
40	0.0008
45	0.0012
50	0.0017
55	0.0000

Per the 2006-2010 Experience Study, there were no members during the five-year period who became disabled as an active employee. The GRS report and data do not distinguish between healthy and disabled annuitants, and there is no separate mortality table for disabled members. **We recommend that GRS consider eliminating the disability rates.** The impact of this change would not have a material effect on the liabilities or contributions of the plan since the Actuarial Liability for active members who are assumed to become disabled is $0.2 million compared to $52.4 million for the entire active member Actuarial Liability and $303.5 million for the total plan.

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3. *Salary Increases for Inactive Participants:*

In the actuarial reports for years 2006 through 2011 (Sandor Goldstein) that we reviewed, there is a consistent actuarial liability loss item every year for "salary increases of inactive members who are participants in other Illinois public retirement systems". These liability losses totaled $14.2 million over this six year period. Given that the System's total actuarial liability as of June 30, 2012 is reported as $303,469,263, these losses are material. The table below summarizes these reported annual losses by year:

Actuarial Liability Losses Due to Salary Increases for Inactive Members

Year	Loss
2006	$ 2,008,594
2007	1,567,266
2008	1,025,565
2009	977,739
2010	2,139,529
2011	6,514,624
Total	$ 14,233,317

There is no mention of this feature in the Plan Provisions section of the 2012 actuarial report and we do not see any explicit actuarial assumption for this item. Note that there was no analysis of this specific item in the 2006-2010 Experience Study as well. In Section II (page 2) we asked for confirmation if this provision continues to exist under Illinois statute, and if so, that an appropriate actuarial assumption should be added to the valuation in order to capture this potential liability. We also recommend that details regarding this item be disclosed more fully in the actuarial report.

SECTION III - SUPPORTING ANALYSIS

Below we summarize all of the demographic assumptions which we reviewed and we have concluded all are reasonable.

1. Mortality

For active and retired members: the UP-1994 Mortality Table for Males, rated down four years. For spouses: the UP-1994 Mortality Table for Females, rated down one year. No adjustment is made for post-disabled mortality. The mortality table used is a static table with no provision for future mortality improvement.

2. Marriage Assumption

75.0% of active participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

3. Termination

Rates of withdrawal are assumed to be equal to 4.0% for all ages 20 through 65.

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

4. Disability

Illustrative rates of disability are as follows:

Age Based Disability Rate	
Age	**Males**
25	0.0006
30	0.0006
35	0.0006
40	0.0008
45	0.0012
50	0.0017
55	0.0000

5. Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age of 43.58 and average pay of $79,705 (2012 dollars). The average increase in uncapped payroll for the projection period is 4.0 percent per annum.

SECTION III - SUPPORTING ANALYSIS

6. Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates	
Age	**Males**
55	10.00%
56-79	8.50%
80	100.00%

7. Assets

Assets available for benefits are used as described on page 42 of the most recent valuation report.

8. Expenses

As estimated and advised by GARS staff, based on current expenses. Future expenses are expected to increase in relation to the projected capped payroll.

9. Spouse's Age

The spouse is assumed to be four years younger than employee/retiree.

10. Decrement Timing

All decrements are assumed to occur at the beginning of the year.

11. Decrement Relativity

Decrement rates are used directly from the Experience Study, without adjustment for multiple decrement table effects.

12. Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

13. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

SECTION III - SUPPORTING ANALYSIS

ASSUMPTIONS AS A RESULT OF PUBLIC ACT 96-0889

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Retirement rates for tier two members to account for the change in retirement age, as follows:

Retirement Rates	
Age	**Males**
62	40.00%
63	15.00%
64	20.00%
65	25.00%
66	30.00%
67	40.00%
68-79	5.00%
80	100.00%

C. Actuarial Methods

Actuarial methods consist of three components: (1) The funding method, which is the attribution of total costs to past, current, and future years; (2) The method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) The amortization basis of the Unfunded Actuarial Liability. Since the amortization basis is governed by State law, we do not comment on it here.

1. *Funding Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, and is required to under the Pension Code (40 ILCS 5/2). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Act's requirement for level percent of pay funding** Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.**

   Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of asset to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates such a "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the GARS Board**

consider moving to this approach in future valuations. It's important to note that currently a move to this corridor approach would have no impact on the 2012 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

D. Determination of the Required State Contribution

As required by Public Act 94-0004, in determining the required State contribution under State law, the actuary must determine what level of future contributions are needed to make a projection of the System's funded status in 2045 be at 90%. To make that determination, the actuary needs to make an assumption regarding the age/sex/salaries of new hires that replace existing members leaving over this period. This assumption is commonly referred to as the "New Entrant Profile". In addition to making that assumption, the actuary needs to apply actuarial methodologies to project the June 30, 2012 valuation into the future.

The "New Entrant Profile" assumption is a critical assumption as the required projection of 90% funding in the year 2045 means that the majority of active members will be new hires after the current June 30, 2012 valuation. Therefore, **we recommend that GRS disclose additional information in their 2012 valuation report as to how the new entrant profile, which is shown on page 35 of their June 30, 2012 Actuarial Valuation, was developed. Also, we recommend GRS include all relevant information regarding the New Entrant Profile in the valuation report so as to better comply with ASOP No. 41 dealing with actuarial communications.**

We also recommend that GRS disclose in future valuations items needed to perform a more comprehensive analysis of GRS's determination of the System's funded status in 2045. The specific items are outlined on page 3 in Section II: Proposed Certification of the Required State Contribution. We believe these would be appropriate disclosures under ASOP No. 41 and that the additional information will allow us to perform a more comprehensive analysis of GRS's determination of the required State contribution.

E. Other Issues

1. *State Mandated Funding Method:*

   In its valuation report on pages 10-12, GRS offers commentary on the Statutory funding method from an actuarial point of view. They describe the Annual Required Contribution (ARC) under GASB 25 and 27 as a method designed to finance benefits for current participants to a 100% funding target over a projected period not to exceed 30 years, and which is often used as a de facto funding method. They contrast the ARC funding method with the current Statutory method and note that the Statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future. They also provide a chart that "illustrates how significantly the current funding policy defers contributions into the future". This chart shows the projected funded ratio declining from 18% in 2012 to below 10% until 2033.

They advise "strengthening the current statutory funding policy", and provide the following examples:

a. Reducing the projection period needed to reach 90 percent funding;
b. Increasing the 90 percent funding target;
c. Separating the financing of benefits for members hired before and after December 31, 2010;
d. Reverting back to the market value of assets when developing contribution rates; and
e. Changing to an ARC based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

We concur with the GRS recommendations to increase the 90% funding target and to reduce the projection period, in accordance with GASB 25 as well as generally accepted actuarial practices. It may be illustrative to include a comparison of the projected contributions and funded ratios under some combination of the items above as well.

2. *State Mandated Projection Method*:

Under Public Act 96-0043, the actuarial methodologies utilized in performing the 2045 projection of the System's funded status, assume the future earnings rate (currently at 7.00%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level. We have similar concerns over the implications of the law under the Act. We have similar concerns over the implications of this method.

The table on the following page demonstrates what the market value would have to earn in order for the actuarial value to earn 7.00% based on the ratio of actuarial value to market value. We recommend that consideration be given to require that the projected future earnings of the System be based on starting market values of assets (rather than a smoothed value).

SECTION III - SUPPORTING ANALYSIS

What the market value of assets (MVA) would need to earn in a given year, if the actuarial value of assets (AVA) are assumed to earn 7.00%, at various ratios of

Ratio of AVA to MVA	Required MVA Return
130.00%	77.50%
125.00%	65.75%
120.00%	54.00%
115.00%	42.25%
110.00%	30.50%
105.00%	18.75%
100.00%	7.00%
95.00%	-4.75%
90.00%	-16.50%
85.00%	-28.25%
80.00%	-40.00%
75.00%	-51.75%
70.00%	-63.50%

APPENDICES

APPENDIX A

Public Act 097-0694

AN ACT concerning government.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 5. The Illinois State Auditing Act is amended by adding Section 2-8.1 as follows:

(30 ILCS 5/2-8.1 new)

Sec. 2-8.1. Actuarial Responsibilities.

(a) The Auditor General shall contract with or hire an actuary to serve as the State Actuary. The State Actuary shall be retained by, serve at the pleasure of, and be under the supervision of the Auditor General and shall be paid from appropriations to the office of the Auditor General. The State Actuary may be selected by the Auditor General without engaging in a competitive procurement process.

(b) The State Actuary shall:

(1) review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;

(2) issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards;

(3) cooperate with the boards of trustees of the State-funded retirement systems to identify recommended changes in actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions;

(4) conduct reviews of the actuarial practices of the boards of trustees of the State-funded retirement systems;

(5) make additional reports as directed by joint resolution of the General Assembly; and

(6) perform any other duties assigned by the Auditor General, including, but not limited to, reviews of the actuarial practices of other entities.

(c) On or before January 1, 2013 and each January 1 thereafter, the Auditor General shall submit a written report to the General Assembly and Governor documenting the initial assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems, any changes recommended by the State Actuary in the actuarial assumptions, and the responses of each board to the State Actuary's recommendations.

(d) For the purposes of this Section, "State-funded retirement system" means a retirement system established pursuant to Article 2, 14, 15, 16, or 18 of the Illinois Pension Code.

Section 10. The Illinois Pension Code is amended by changing Sections 2-134, 14-135.08, 15-165, 16-158, and 18-140 as follows:

(40 ILCS 5/2-134) (from Ch. 108 1/2, par. 2-134)

Sec. 2-134. To certify required State contributions and submit vouchers.

(a) The Board shall certify to the Governor on or before December 15 of each year until December 15, 2011 the amount of the required State contribution to the System for the next fiscal year and shall specifically identify the System's projected State normal cost for that fiscal year. The certification shall include a copy of the actuarial recommendations upon which it is based and shall specifically identify the System's projected State normal cost for that fiscal year.

On or before November 1 of each year, beginning November 1, 2012, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the System for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based. On or before January 1 of each year beginning January 1, 2013, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions. On or before January 15, 2013 and every January 15 thereafter, the Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

On or before May 1, 2004, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2005, taking into account the amounts appropriated to and received by the System under subsection (d) of Section 7.2 of the General Obligation Bond Act.

On or before July 1, 2005, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2006, taking into account the changes in required State contributions made by this amendatory Act of the 94th General Assembly.

On or before April 1, 2011, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2011, applying the changes made by Public Act 96-889 to the System's assets and liabilities as of June 30, 2009 as though Public Act 96-889 was approved on that date.

(b) Beginning in State fiscal year 1996, on or as soon as possible after the 15th day of each month the Board shall submit vouchers for payment of State contributions to the System, in a total monthly amount of one-twelfth of the required annual State contribution certified under subsection (a). From the effective date of this amendatory Act of the 93rd General Assembly through June 30, 2004, the Board shall not submit vouchers for the remainder of fiscal year 2004 in excess of the fiscal year 2004 certified contribution amount determined under this Section after taking into consideration the transfer to the System under subsection (d) of Section 6z-61 of the State Finance Act. These vouchers shall be paid by the State Comptroller and Treasurer by warrants drawn on the funds appropriated to the System for that fiscal year. If in any month the amount remaining unexpended from all other appropriations to the System for the applicable fiscal year (including the appropriations to the System under Section 8.12 of the State Finance Act and Section 1 of the State Pension Funds Continuing Appropriation Act) is less than the amount lawfully vouchered under this Section, the difference shall be paid from the General Revenue Fund under the continuing appropriation authority provided in Section 1.1 of the State Pension Funds Continuing Appropriation Act.

(c) The full amount of any annual appropriation for the System for State fiscal year 1995 shall be transferred and made available to the System at the beginning of that fiscal year at the request of the Board. Any excess funds remaining at the end of any fiscal year from appropriations shall be retained by the System as a general reserve to meet the System's accrued liabilities.

(Source: P.A. 95-331, eff. 8-21-07; 96-1497, eff. 1-14-11; 96-1511, eff. 1-27-11.)

(40 ILCS 5/14-135.08) (from Ch. 108 1/2, par. 14-135.08)

Sec. 14-135.08. To certify required State contributions.

(a) To certify to the Governor and to each department, on or before November 15 of each year until November 15, 2011, the required rate for State contributions to the System for the next State fiscal year, as determined under subsection (b) of Section 14-131. The certification to the Governor under this subsection (a) shall include a copy of the actuarial recommendations upon which the rate is based and shall specifically identify the System's projected State normal cost for that fiscal year.

(a-5) On or before November 1 of each year, beginning November 1, 2012, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the System for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based. On or before January 1 of each year beginning January 1, 2013, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions. On or before January 15, 2013 and each January 15 thereafter, the Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

(b) The certifications under subsections (a) and (a-5) ~~certification~~ shall include an additional amount necessary to pay all principal of and interest on those general obligation bonds due the next fiscal year authorized by Section 7.2(a) of the General Obligation Bond Act and issued to provide the proceeds deposited by the State with the System in July 2003, representing deposits other than amounts reserved under Section 7.2(c) of the General Obligation Bond Act. For State fiscal year 2005, the Board shall make a supplemental certification of the additional amount necessary to pay all principal of and interest on those general obligation bonds due in State fiscal years 2004 and 2005 authorized by Section 7.2(a) of the General Obligation Bond Act and issued to provide the proceeds deposited by the State with the System in July 2003, representing deposits other than amounts reserved under Section 7.2(c) of the General Obligation Bond Act, as soon as practical after the effective date of this amendatory Act of the 93rd General Assembly.

On or before May 1, 2004, the Board shall recalculate and recertify to the Governor and to each department the amount of the required State contribution to the System and the required rates for State contributions to the System for State fiscal year 2005, taking into account the amounts appropriated to and received by the System under subsection (d) of Section 7.2 of the General Obligation Bond Act.

On or before July 1, 2005, the Board shall recalculate and recertify to the Governor and to each department the amount of the required State contribution to the System and the required rates for State contributions to the System for State fiscal year 2006, taking into account the changes in required State contributions made by this amendatory Act of the 94th General Assembly.

On or before April 1, 2011, the Board shall recalculate and recertify to the Governor and to each department the amount of the required State contribution to the System for State fiscal year 2011, applying the changes made by Public Act 96-889 to the

System's assets and liabilities as of June 30, 2009 as though Public Act 96-889 was approved on that date.

(Source: P.A. 96-1497, eff. 1-14-11; 96-1511, eff. 1-27-11.)

(40 ILCS 5/15-165) (from Ch. 108 1/2, par. 15-165)

Sec. 15-165. To certify amounts and submit vouchers.

(a) The Board shall certify to the Governor on or before November 15 of each year until November 15, 2011 the appropriation required from State funds for the purposes of this System for the following fiscal year. The certification under this subsection (a) shall include a copy of the actuarial recommendations upon which it is based and shall specifically identify the System's projected State normal cost for that fiscal year and the projected State cost for the self-managed plan for that fiscal year.

On or before May 1, 2004, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2005, taking into account the amounts appropriated to and received by the System under subsection (d) of Section 7.2 of the General Obligation Bond Act.

On or before July 1, 2005, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2006, taking into account the changes in required State contributions made by this amendatory Act of the 94th General Assembly.

On or before April 1, 2011, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2011, applying the changes made by Public Act 96-889 to the System's assets and liabilities as of June 30, 2009 as though Public Act 96-889 was approved on that date.

(a-5) On or before November 1 of each year, beginning November 1, 2012, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the System for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based. On or before January 1 of each year, beginning January 1, 2013, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions. On or before January 15, 2013 and each January 15 thereafter, the Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note, in a written response to the State Actuary, any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

(b) The Board shall certify to the State Comptroller or employer, as the case may be, from time to time, by its president and secretary, with its seal attached, the amounts payable to the System from the various funds.

(c) Beginning in State fiscal year 1996, on or as soon as possible after the 15th day of each month the Board shall submit vouchers for payment of State contributions to the System, in a total monthly amount of one-twelfth of the required annual State contribution certified under subsection (a). From the effective date of this amendatory Act of the 93rd General Assembly through June 30, 2004, the Board shall not submit vouchers for the remainder of fiscal year 2004 in excess of the fiscal year 2004 certified contribution amount determined under this Section after taking into consideration the transfer to the System under subsection (b) of Section 6z-61 of the State Finance Act. These vouchers shall be paid by the State Comptroller and Treasurer by warrants drawn on the funds appropriated to the System for that fiscal year.

If in any month the amount remaining unexpended from all other appropriations to the System for the applicable fiscal year (including the appropriations to the System under Section 8.12 of the State Finance Act and Section 1 of the State Pension Funds Continuing Appropriation Act) is less than the amount lawfully vouchered under this Section, the difference shall be paid from the General Revenue Fund under the continuing appropriation authority provided in Section 1.1 of the State Pension Funds Continuing Appropriation Act.

(d) So long as the payments received are the full amount lawfully vouchered under this Section, payments received by the System under this Section shall be applied first toward the employer contribution to the self-managed plan established under Section 15-158.2. Payments shall be applied second toward the employer's portion of the normal costs of the System, as defined in subsection (f) of Section 15-155. The balance shall be applied toward the unfunded actuarial liabilities of the System.

(e) In the event that the System does not receive, as a result of legislative enactment or otherwise, payments sufficient to fully fund the employer contribution to the self-managed plan established under Section 15-158.2 and to fully fund that portion of the employer's portion of the normal costs of the System, as calculated in accordance with Section 15-155(a-1), then any payments received shall be applied proportionately to the optional retirement program established under Section 15-158.2 and to the employer's portion of the normal costs of the System, as calculated in accordance with Section 15-155(a-1).

(Source: P.A. 96-1497, eff. 1-14-11; 96-1511, eff. 1-27-11.)

(40 ILCS 5/16-158) (from Ch. 108 1/2, par. 16-158)

Sec. 16-158. Contributions by State and other employing units.

(a) The State shall make contributions to the System by means of appropriations from the Common School Fund and other State funds of amounts which, together with other employer contributions, employee contributions, investment income, and other income, will be sufficient to meet the cost of maintaining and administering the System on a 90% funded basis in accordance with actuarial recommendations.

The Board shall determine the amount of State contributions required for each fiscal year on the basis of the actuarial tables and other assumptions adopted by the Board and the recommendations of the actuary, using the formula in subsection (b-3).

(a-1) Annually, on or before November 15 until November 15, 2011, the Board shall certify to the Governor the amount of the required State contribution for the coming fiscal year. The certification under this subsection (a-1) shall include a copy of the actuarial recommendations upon which it is based and shall specifically identify the System's projected State normal cost for that fiscal year.

On or before May 1, 2004, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2005, taking into account the amounts appropriated to and received by the System under subsection (d) of Section 7.2 of the General Obligation Bond Act.

On or before July 1, 2005 ~~April 1, 2011~~, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2006, taking into account the changes in required State contributions made by this amendatory Act of the 94th General Assembly.

On or before April 1, 2011 ~~June 15, 2010~~, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2011, applying the changes made by Public Act 96-889 to the System's assets and liabilities as of June 30, 2009 as though Public Act 96-889 was approved on that date.

(a-5) On or before November 1 of each year, beginning November 1, 2012, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the System for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based. On or before January 1 of each year, beginning January 1, 2013, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions. On or before January 15, 2013 and each January 15 thereafter, the Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

(b) Through State fiscal year 1995, the State contributions shall be paid to the System in accordance with Section 18-7 of the School Code.

(b-1) Beginning in State fiscal year 1996, on the 15th day of each month, or as soon thereafter as may be practicable, the Board shall submit vouchers for payment of State contributions to the System, in a total monthly amount of one-twelfth of the required annual State contribution certified under subsection (a-1). From the effective date of this amendatory Act of the 93rd General Assembly through June 30, 2004, the Board shall not submit vouchers for the remainder of fiscal year 2004 in excess of the fiscal year 2004 certified contribution amount determined under this Section after taking into consideration the transfer to the System under subsection (a) of Section 6z-61 of the State Finance Act. These vouchers shall be paid by the State Comptroller and Treasurer by warrants drawn on the funds appropriated to the System for that fiscal year.

If in any month the amount remaining unexpended from all other appropriations to the System for the applicable fiscal year (including the appropriations to the System under Section 8.12 of the State Finance Act and Section 1 of the State Pension Funds Continuing Appropriation Act) is less than the amount lawfully vouchered under this subsection, the difference shall be paid from the Common School Fund under the continuing appropriation authority provided in Section 1.1 of the State Pension Funds Continuing Appropriation Act.

(b-2) Allocations from the Common School Fund apportioned to school districts not coming under this System shall not be diminished or affected by the provisions of this Article.

(b-3) For State fiscal years 2012 through 2045, the minimum contribution to the System to be made by the State for each fiscal year shall be an amount determined by the System to be sufficient to bring the total assets of the System up to 90% of the total actuarial liabilities of the System by the end of State fiscal year 2045. In making these determinations, the required State contribution shall be calculated each year as a level percentage of payroll over the years remaining to and including fiscal year 2045 and shall be determined under the projected unit credit actuarial cost method.

For State fiscal years 1996 through 2005, the State contribution to the System, as a percentage of the applicable employee payroll, shall be increased in equal annual increments so that by State fiscal year 2011, the State is contributing at the rate required under this Section; except that in the following specified State fiscal years, the State contribution to the System shall not be less than the following indicated percentages of the applicable employee payroll, even if the indicated percentage will produce a State contribution in excess of the amount otherwise required under this subsection and subsection (a), and notwithstanding any contrary certification made under subsection (a-1) before the effective date of this amendatory Act of 1998: 10.02% in FY 1999; 10.77% in FY 2000; 11.47% in FY 2001; 12.16% in FY 2002; 12.86% in FY 2003; and 13.56% in FY 2004.

Notwithstanding any other provision of this Article, the total required State contribution for State fiscal year 2006 is $534,627,700.

Notwithstanding any other provision of this Article, the total required State contribution for State fiscal year 2007 is $738,014,500.

For each of State fiscal years 2008 through 2009, the State contribution to the System, as a percentage of the applicable employee payroll, shall be increased in equal annual increments from the required State contribution for State fiscal year 2007, so that by State fiscal year 2011, the State is contributing at the rate otherwise required under this Section.

Notwithstanding any other provision of this Article, the total required State contribution for State fiscal year 2010 is $2,089,268,000 and shall be made from the proceeds of bonds sold in fiscal year 2010 pursuant to Section 7.2 of the General Obligation Bond Act, less (i) the pro rata share of bond sale expenses determined by the System's share of total bond proceeds, (ii) any amounts received from the Common School Fund in fiscal year 2010, and (iii) any reduction in bond proceeds due to the issuance of discounted bonds, if applicable.

Notwithstanding any other provision of this Article, the total required State contribution for State fiscal year 2011 is the amount recertified by the System on or before April 1, 2011 pursuant to subsection (a-1) of this Section and shall be made from the proceeds of bonds sold in fiscal year 2011 pursuant to Section 7.2 of the General Obligation Bond Act, less (i) the pro rata share of bond sale expenses determined by the System's share of total bond proceeds, (ii) any amounts received from the Common School Fund in fiscal year 2011, and (iii) any reduction in bond proceeds due to the issuance of discounted bonds, if applicable. This amount shall include, in addition to the amount certified by the System, an amount necessary to meet employer contributions required by the State as an employer under paragraph (e) of this Section, which may also be used by the System for contributions required by paragraph (a) of Section 16-127.

Beginning in State fiscal year 2046, the minimum State contribution for each fiscal year shall be the amount needed to maintain the total assets of the System at 90% of the total actuarial liabilities of the System.

Amounts received by the System pursuant to Section 25 of the Budget Stabilization Act or Section 8.12 of the State Finance Act in any fiscal year do not reduce and do not constitute payment of any portion of the minimum State contribution required under this Article in that fiscal year. Such amounts shall not reduce, and shall not be included in the calculation of, the required State contributions under this Article in any future year until the System has reached a funding ratio of at least 90%. A reference in this Article to the "required State contribution" or any substantially similar term does not include or apply to any amounts payable to the System under Section 25 of the Budget Stabilization Act.

Notwithstanding any other provision of this Section, the required State contribution for State fiscal year 2005 and for fiscal year 2008 and each fiscal year thereafter, as calculated under this Section and certified under subsection (a-1), shall not exceed an amount equal to (i) the amount of the required State contribution that would have been calculated under this Section for that fiscal year if the System had not received any payments under subsection (d) of Section 7.2 of the General Obligation Bond Act, minus (ii) the portion of the State's total debt service payments for that fiscal year on the bonds issued in fiscal year 2003 for the purposes of that Section 7.2, as determined and certified by the Comptroller, that is the same as the System's portion of the total moneys distributed under subsection (d) of Section 7.2 of the General Obligation Bond Act. In determining this maximum for State fiscal years 2008 through 2010, however, the amount referred to in item (i) shall be increased, as a percentage of the applicable employee payroll, in equal increments calculated from the sum of the required State contribution for State fiscal year 2007 plus the applicable portion of the State's total debt service payments for fiscal year 2007 on the bonds issued in fiscal year 2003 for the purposes of Section 7.2 of the General Obligation Bond Act, so that, by State fiscal year 2011, the State is contributing at the rate otherwise required under this Section.

(c) Payment of the required State contributions and of all pensions, retirement annuities, death benefits, refunds, and other benefits granted under or assumed by this System, and all expenses in connection with the administration and operation thereof, are obligations of the State.

If members are paid from special trust or federal funds which are administered by the employing unit, whether school district or other unit, the employing unit shall pay to the System from such funds the full accruing retirement costs based upon that service, as determined by the System. Employer contributions, based on salary paid to members from federal funds, may be forwarded by the distributing agency of the State of Illinois to the System prior to allocation, in an amount determined in accordance with guidelines established by such agency and the System.

(d) Effective July 1, 1986, any employer of a teacher as defined in paragraph (8) of Section 16-106 shall pay the employer's normal cost of benefits based upon the teacher's service, in addition to employee contributions, as determined by the System. Such employer contributions shall be forwarded monthly in accordance with guidelines established by the System.

However, with respect to benefits granted under Section 16-133.4 or 16-133.5 to a teacher as defined in paragraph (8) of Section 16-106, the employer's contribution shall be 12% (rather than 20%) of the member's highest annual salary rate for each year of creditable service granted, and the employer shall also pay the required employee contribution on behalf of the teacher. For the purposes of Sections 16-133.4 and 16-133.5, a teacher as defined in paragraph (8) of Section 16-106 who is serving in that capacity while on leave of absence from another employer under this Article shall not be considered an employee of the employer from which the teacher is on leave.

(e) Beginning July 1, 1998, every employer of a teacher shall pay to the System an employer contribution computed as follows:

(1) Beginning July 1, 1998 through June 30, 1999, the employer contribution shall be equal to 0.3% of each teacher's salary.

(2) Beginning July 1, 1999 and thereafter, the employer contribution shall be equal to 0.58% of each teacher's salary.

The school district or other employing unit may pay these employer contributions out of any source of funding available for that purpose and shall forward the contributions to the System on the schedule established for the payment of member contributions.

These employer contributions are intended to offset a portion of the cost to the System of the increases in retirement benefits resulting from this amendatory Act of 1998.

Each employer of teachers is entitled to a credit against the contributions required under this subsection (e) with respect to salaries paid to teachers for the period January 1, 2002 through June 30, 2003, equal to the amount paid by that employer under subsection (a-5) of Section 6.6 of the State Employees Group Insurance Act of 1971 with respect to salaries paid to teachers for that period.

The additional 1% employee contribution required under Section 16-152 by this amendatory Act of 1998 is the responsibility of the teacher and not the teacher's employer, unless the employer agrees, through collective bargaining or otherwise, to make the contribution on behalf of the teacher.

If an employer is required by a contract in effect on May 1, 1998 between the employer and an employee organization to pay, on behalf of all its full-time employees covered by this Article, all mandatory employee contributions required under this Article, then the employer shall be excused from paying the employer contribution required under this subsection (e) for the balance of the term of that contract. The employer and the employee organization shall jointly certify to the System the existence of the contractual requirement, in such form as the System may prescribe. This exclusion shall cease upon the termination, extension, or renewal of the contract at any time after May 1, 1998.

(f) If the amount of a teacher's salary for any school year used to determine final average salary exceeds the member's annual full-time salary rate with the same employer for the previous school year by more than 6%, the teacher's employer shall pay to the System, in addition to all other payments required under this Section and in accordance with guidelines established by the System, the present value of the increase in benefits resulting from the portion of the increase in salary that is in excess of 6%. This present value shall be computed by the System on the basis of the actuarial assumptions and tables used in the most recent actuarial valuation of the System that is available at the time of the computation. If a teacher's salary for the 2005-2006 school year is used to determine final average salary under this subsection (f), then the changes made to this subsection (f) by Public Act 94-1057 shall apply in calculating whether the increase in his or her salary is in excess of 6%. For the purposes of this Section, change in employment under Section 10-21.12 of the School Code on or after June 1, 2005 shall constitute a change in employer. The System may require the employer to provide any pertinent information or documentation. The changes made to this subsection (f) by this amendatory Act of the 94th General Assembly apply without regard to whether the teacher was in service on or after its effective date.

Whenever it determines that a payment is or may be required under this subsection, the System shall calculate the amount of the payment and bill the employer for that amount. The bill shall specify the calculations used to determine the amount due. If the employer disputes the amount of the bill, it may, within 30 days after receipt of the bill, apply to the System in writing for a recalculation. The application must specify in detail the grounds of the dispute and, if the employer asserts that the calculation is subject to subsection (g) or (h) of this Section, must include an affidavit setting forth and attesting to all facts within the employer's knowledge that are pertinent to the applicability of that subsection. Upon receiving a timely application for recalculation, the System shall review the application and, if appropriate, recalculate the amount due.

The employer contributions required under this subsection (f) may be paid in the form of a lump sum within 90 days after receipt of the bill. If the employer contributions are not paid within 90 days after receipt of the bill, then interest will be charged at a rate equal to the System's annual actuarially assumed rate of return on investment compounded annually from the 91st day after receipt of the bill. Payments must be concluded within 3 years after the employer's receipt of the bill.

(g) This subsection (g) applies only to payments made or salary increases given on or after June 1, 2005 but before July 1, 2011. The changes made by Public Act 94-1057 shall not require the System to refund any payments received before July 31, 2006 (the effective date of Public Act 94-1057).

When assessing payment for any amount due under subsection (f), the System shall exclude salary increases paid to teachers under contracts or collective bargaining agreements entered into, amended, or renewed before June 1, 2005.

When assessing payment for any amount due under subsection (f), the System shall exclude salary increases paid to a teacher at a time when the teacher is 10 or more years from retirement eligibility under Section 16-132 or 16-133.2.

When assessing payment for any amount due under subsection (f), the System shall exclude salary increases resulting from overload work, including summer school, when the school district has certified to the System, and the System has approved the certification, that (i) the overload work is for the sole purpose of classroom instruction in excess of the standard number of classes for a full-time teacher in a school district during a school year and (ii) the salary increases are equal to or less than the rate of pay for classroom instruction computed on the teacher's current salary and work schedule.

When assessing payment for any amount due under subsection (f), the System shall exclude a salary increase resulting from a promotion (i) for which the employee is required to hold a certificate or supervisory endorsement issued by the State Teacher Certification Board that is a different certification or supervisory endorsement than is required for the teacher's previous position and (ii) to a position that has existed and been filled by a member for no less than one complete academic year and the salary increase from the promotion is an increase that results in an amount no greater than the lesser of the average salary paid for other similar positions in the district requiring the same certification or the amount stipulated in the collective bargaining agreement for a similar position requiring the same certification.

When assessing payment for any amount due under subsection (f), the System shall exclude any payment to the teacher from the State of Illinois or the State Board of Education over which the employer does not have discretion, notwithstanding that the payment is included in the computation of final average salary.

(h) When assessing payment for any amount due under subsection (f), the System shall exclude any salary increase described in subsection (g) of this Section given on or after July 1, 2011 but before July 1, 2014 under a contract or collective bargaining agreement entered into, amended, or renewed on or after June 1, 2005 but before July 1, 2011. Notwithstanding any other provision of this Section, any payments made or salary increases given after June 30, 2014 shall be used in assessing payment for any amount due under subsection (f) of this Section.

(i) The System shall prepare a report and file copies of the report with the Governor and the General Assembly by January 1, 2007 that contains all of the following information:

(1) The number of recalculations required by the changes made to this Section by Public Act 94-1057 for each employer.

(2) The dollar amount by which each employer's contribution to the System was changed due to recalculations required by Public Act 94-1057.

(3) The total amount the System received from each employer as a result of the changes made to this Section by Public Act 94-4.

(4) The increase in the required State contribution resulting from the changes made to this Section by Public Act 94-1057.

(j) For purposes of determining the required State contribution to the System, the value of the System's assets shall be equal to the actuarial value of the System's assets, which shall be calculated as follows:

As of June 30, 2008, the actuarial value of the System's assets shall be equal to the market value of the assets as of that date. In determining the actuarial value of the System's assets for fiscal years after June 30, 2008, any actuarial gains or losses from investment return incurred in a fiscal year shall be recognized in equal annual amounts over the 5-year period following that fiscal year.

(k) For purposes of determining the required State contribution to the system for a particular year, the actuarial value of assets shall be assumed to earn a rate of return equal to the system's actuarially assumed rate of return.

(Source: P.A. 95-331, eff. 8-21-07; 95-950, eff. 8-29-08; 96-43, eff. 7-15-09; 96-1497, eff. 1-14-11; 96-1511, eff. 1-27-11; 96-1554, eff. 3-18-11; revised 4-6-11.)

(40 ILCS 5/18-140) (from Ch. 108 1/2, par. 18-140)

Sec. 18-140. To certify required State contributions and submit vouchers.

(a) The Board shall certify to the Governor, on or before November 15 of each year until November 15, 2011, the amount of the required State contribution to the System for the following fiscal year and shall specifically identify the System's projected State normal cost for that fiscal year. The certification shall include a copy of the actuarial recommendations upon which it is based and shall specifically identify the System's projected State normal cost for that fiscal year.

On or before November 1 of each year, beginning November 1, 2012, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the System for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based. On or before January 1 of each year beginning January 1, 2013, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions. On or before January 15, 2013 and every January 15 thereafter, the Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

On or before May 1, 2004, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2005, taking into account the amounts appropriated to and received by the System under subsection (d) of Section 7.2 of the General Obligation Bond Act.

On or before July 1, 2005, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2006, taking into account the changes in required State contributions made by this amendatory Act of the 94th General Assembly.

On or before April 1, 2011, the Board shall recalculate and recertify to the Governor the amount of the required State contribution to the System for State fiscal year 2011, applying the changes made by Public Act 96-889 to the System's assets and liabilities as of June 30, 2009 as though Public Act 96-889 was approved on that date.

(b) Beginning in State fiscal year 1996, on or as soon as possible after the 15th day of each month the Board shall submit vouchers for payment of State contributions to the System, in a total monthly amount of one-twelfth of the required annual State contribution certified under subsection (a). From the effective date of this amendatory Act of the 93rd General Assembly through June 30, 2004, the Board shall not submit vouchers for the remainder of fiscal year 2004 in excess of the fiscal year 2004 certified contribution amount determined under this Section after taking into consideration the transfer to the System under subsection (c) of Section 6z-61 of the State Finance Act. These vouchers shall be paid by the State Comptroller and Treasurer by warrants drawn on the funds appropriated to the System for that fiscal year.

If in any month the amount remaining unexpended from all other appropriations to the System for the applicable fiscal year (including the appropriations to the System under Section 8.12 of the State Finance Act and Section 1 of the State Pension Funds Continuing Appropriation Act) is less than the amount lawfully vouchered under this Section, the difference shall be paid from the General Revenue Fund under the continuing appropriation authority provided in Section 1.1 of the State Pension Funds Continuing Appropriation Act.

(Source: P.A. 96-1497, eff. 1-14-11; 96-1511, eff. 1-27-11.)

Section 99. Effective date. This Act takes effect upon becoming law.

APPENDIX B

Materials Reviewed by Cheiron

Appendix B

MATERIALS REVIEWED BY CHEIRON

Following is a listing of information reviewed by Cheiron for each of the five State funded retirement systems. This is the information Cheiron relied upon in preparing the preliminary reports of the retirement systems.

Teachers' Retirement System:

- Illinois Law:
    - Illinois Pension Code (40 ILCS 5/) Article 16: Teachers' Retirement System of the State of Illinois
    - Public Act 088-0593
    - Public Act 093-0002
    - Public Act 093-0839
    - Public Act 094-0004
    - Public Act 096-0043
    - Public Act 096-0889
    - Public Act 097-0694

- Files received from the Teachers' Retirement System:
    - 09.21.12 Rate of Return Decision Memo
    - AA Presentation RVK Apr 2011 Board FINAL
    - Buck - IL TRS Exp Analysis Report 2007-revised
    - Buck August 2012 Board Meeting Presentation Experience Analysis
    - Buck IL TRS 2007 Valuation Report
    - Buck IL TRS 2008 Valuation Report
    - Buck IL TRS 2009 Valuation Report
    - Buck IL TRS 2010 Valuation Report IL TRS
    - Buck IL TRS 2011 Valuation Report
    - Buck IL TRS Exp Analysis Report 2012 FINAL
    - Buck May 2011 Board Meeting Investment Return Assumption
    - Buck October 2011 Board Meeting Presentation Valuation Results
    - Illinois TRS Investment Assumption History 1939-2012
    - Segal IL TRS Actuarial Audit Report-FINAL
    - TRS total fund net returns FY 1983-2011
    - Buck IL TRS 2012 Certification of FY 2014 Required State Contribution

- Buck IL TRS 2012 Data

- Files received from the Illinois Office of the Auditor General:
  - VERISIGHT Memo dated 12/9/2011 from Karl K. Oman

- Other:
  - June *2011 National Conference on Public Employee Retirement Systems* (NCPERS) Public Fund Study
  - Surveys published by the National Association of State Retirement Administrators (NASRA)
  - Surveys published by the Boston College's Center of Public Research (CPR)

<u>State Universities Retirement System</u>

- Illinois Law:
  - Illinois Pension Code (40 ILCS 5/) Article 15 : State Universities Retirement System of Illinois
  - Public Act 088-0593
  - Public Act 093-0002
  - Public Act 093-0839
  - Public Act 094-0004
  - Public Act 096-0043
  - Public Act 096-0889
  - Public Act 097-0694

- Files received from the State Universities Retirement System:
  - SURS 2010 Experience Study
  - SURS June 2012 Investment Update
  - SURS June 2011Asset Allocation and Liability Study
  - SURS May 2011 Status Update of the Asset/ Liability Study
  - GRS IL SURS 2008 Valuation Report
  - GRS IL SURS 2009 Valuation Report
  - GRS IL SURS 2010 Valuation Report
  - GRS IL SURS 2011 Valuation Report
  - GRS IL SURS 2012 DRAFT Valuation Report
  - GRS IL SURS 2012 Certification of FY 2014 Required State Contribution
  - GRS IL SURS 2012 Data
  - GRS spreadsheet with additional details on Tables 13 and 14

    - IL Department of Insurance Bulletin - Annual Salary Maximum for Pension and Annuity Purposes, and Annual Cost of Living Allowance (COLA) for New Hires on or after January 1, 2011

- Other:
    - June *2011 National Conference on Public Employee Retirement Systems* (NCPERS) Public Fund Study
    - Surveys published by the National Association of State Retirement Administrators (NASRA)
    - Surveys published by the Boston College's Center of Public Research (CPR)

<u>State Employees' Retirement System</u>

- Illinois Law:
    - Illinois Pension Code (40 ILCS 5/) Article 14: State Employees' Retirement System of Illinois
    - Public Act 088-0593
    - Public Act 093-0002
    - Public Act 093-0839
    - Public Act 094-0004
    - Public Act 096-0043
    - Public Act 096-0889
    - Public Act 097-0694

- Files received from the State Employees' Retirement System:
    - SERS Five-Year Experience Analysis for the Period 2006-2010 (GRS – 7/12/2011)
    - SERS Funding Policy Review from GRS on 10/19/2010
    - SERS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
    - GRS IL SERS 2007 Valuation Report
    - GRS IL SERS 2008 Valuation Report
    - GRS IL SERS 2009 Valuation Report
    - GRS IL SERS 2010 Valuation Report
    - GRS IL SERS 2011 Valuation Report
    - GRS IL SERS 2012 DRAFT Valuation Report
    - GRS IL SERS 2012 Certification of FY 2014 Required State Contribution
    - GRS IL SERS 2012 Data

- Other:

    - June *2011 National Conference on Public Employee Retirement Systems* (NCPERS) Public Fund Study
    - Surveys published by the National Association of State Retirement Administrators (NASRA)
    - Surveys published by the Boston College's Center of Public Research (CPR)

<u>Judges' Retirement System</u>

- Illinois Law:
    - Illinois Pension Code (40 ILCS 5/) Article 18: Judges' Retirement System of Illinois
    - Public Act 088-0593
    - Public Act 093-0002
    - Public Act 093-0839
    - Public Act 094-0004
    - Public Act 096-0043
    - Public Act 096-0889
    - Public Act 097-0694

- Files received from the Judges' Retirement System:
    - JRS Experience Study: Five-Year Experience Analysis for the Period 2006-2010 (Goldstein & Associates – 7/18/2011)
    - JRS Investment Return Assumption letter (Goldstein & Associates – 10/6/2010)
    - JRS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
    - Goldstein & Associates JRS 2006 Valuation Report
    - Goldstein & Associates JRS 2007 Valuation Report
    - Goldstein & Associates JRS 2008 Valuation Report
    - Goldstein & Associates JRS 2009 Valuation Report
    - Goldstein & Associates JRS 2010 Valuation Report
    - Goldstein & Associates JRS 2011 Valuation Report
    - GRS IL JRS 2012 DRAFT Valuation Report
    - GRS IL JRS 2012 Certification of FY 2014 Required State Contribution
    - GRS IL JRS 2012 Data

- Other:
    - June *2011 National Conference on Public Employee Retirement Systems* (NCPERS) Public Fund Study
    - Surveys published by the National Association of State Retirement Administrators (NASRA)
    - Surveys published by the Boston College's Center of Public Research (CPR)

General Assembly Retirement System

- Illinois Law:
  - Illinois Pension Code (40 ILCS 5/) Article 2: General Assembly Retirement System of Illinois
  - Public Act 088-0593
  - Public Act 093-0002
  - Public Act 093-0839
  - Public Act 094-0004
  - Public Act 096-0043
  - Public Act 096-0889
  - Public Act 097-0694

- Files received from the General Assembly Retirement System:
  - GARS Experience Study: Five-Year Experience Analysis for the Period 2006-2010 (Goldstein & Associates – 8/11/2011)
  - GARS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
  - Goldstein & Associates GARS 2006 Valuation Report
  - Goldstein & Associates GARS 2007 Valuation Report
  - Goldstein & Associates GARS 2008 Valuation Report
  - Goldstein & Associates GARS 2009 Valuation Report
  - Goldstein & Associates GARS 2010 Valuation Report
  - Goldstein & Associates GARS 2011 Valuation Report
  - GRS IL GARS 2012 DRAFT Valuation Report
  - GRS IL GARS 2012 Certification of FY 2014 Required State Contribution
  - GRS IL GARS 2012 Data

- Other:
  - June *2011 National Conference on Public Employee Retirement Systems* (NCPERS) Public Fund Study
  - Surveys published by the National Association of State Retirement Administrators (NASRA)
  - Surveys published by the Boston College's Center of Public Research (CPR)

APPENDIX C

Responses from the Retirement Systems

Teachers' Retirement System of the State of Illinois

2815 West Washington Street | P.O. Box 19253 | Springfield, Illinois 62794-9253

Richard W. Ingram, Executive Director

members@trs.illinois.gov | http://trs.illinois.gov

(800) 877-7896 | for the hearing impaired: (866) 326-0087

December 14, 2012

VIA ELECTRONIC MAIL (oag23@mail.state.il.us)
Joe Butcher
Office of the Auditor General
740 East Ash Street, First Floor
Springfield, IL 62703

Re: State Actuary's Preliminary Report under Public Act 097-0694, December 2012

Dear Mr. Butcher:

We are pleased that Cheiron, the state actuary, found the actuarial assumptions used in our 2012 valuation report to be reasonable and did not recommend any changes in assumptions this year. They were also able to replicate the fiscal year 2014 state contribution calculated by our actuarial firm, Buck Consultants. We appreciate Cheiron's thorough review and we thank you for overseeing this process.

Cheiron recommended additional disclosure for the 2012 valuation that we will provide in an addendum to the original report. The TRS Board of Trustees finalized its certification of the fiscal year 2014 state contribution at its meeting this week. Both the addendum and the final certification will be submitted by the January 15, 2013 deadline.

For the 2012 valuation, Buck will prepare an addendum that is responsive to Cheiron's two recommendations:

1) Explicitly disclose the merit component of the salary increase assumption by age and employment status. Currently, the total salary increase by age is disclosed by age with the components noted below.
2) Provide a complete description of how New Hire assumptions were developed.

For future valuations, Cheiron had other recommendations:

1) Consider lowering the investment return assumption below 8.0% and review it annually rather than waiting for the next experience review. At its October 2012 meeting, the TRS Board decided to conduct the next experience analysis in three years rather than five due to increased uncertainty in financial markets and the economy in general. Any changes would be adopted in time for the June 15, 2015 actuarial valuation report. In the 2013 and 2014 reports, however, the actuaries are very likely to indicate how well the current 8.0% assumption fits with the Board's goal of having at least a 50% chance of achieving the actuarially assumed rate of return. Our view is that one year is not long enough to consider changing such a key assumption, and actually making the change would add more volatility to the state contribution.

2) Add more explanation of "other" in the reconciliation of the unfunded liability. We agree. Part of the reason this balancing item is so large is the data lag, meaning that the active/inactive data file is one year older than the annuitant file. Buck has offered suggestions on how to reduce the value of "other" in future years.

3) Consider adding a 80%/120% corridor. We will study this recommendation. It is not clear whether a statutory change would be required. Also, we are not sure it is necessary. The current five year period seems short enough to mitigate differences between smoothed and market value assets, but we understand that a corridor could add additional safeguards. We asked The Segal Company to comment on the corridor as part of its audit of Buck in 2010, and they did not support such a change.

Cheiron provided additional recommendations to help them verify the proposed state contribution requirement. We agree with some of the recommendations and will study the rest as future valuations are prepared:

- Showing some of the basic information like the projected total normal cost and benefit and expense projections by type would make the report more complete.
- Other recommended schedules may make the report even more informative to an actuary, but we are concerned that they may not add the same value for lay users. We will give careful consideration to how we could present items such as the historic development of assets without the pension obligation bonds and other details involved in the calculation of the state contribution.

Cheiron also advised that the Board adopt the conservative end of any proposed range in actuarial assumptions. We recognize that under this rationale, state contribution requirements would increase and help improve the System's funded status. We have argued strenuously for state law to require that we follow generally accepted actuarial principles and to repeal existing state funding law. This would do more to strengthen the system over the long haul than adopting more conservative assumptions. We urge that both the Auditor General and the State Actuary champion such a statutory change as vigorously as possible.

I would be happy to discuss any of these points with you in greater detail. Thank you again for Cheiron's thoughtful and professional review of Buck's work.

Very truly yours,

Richard Ingram
Executive Director

cc: Gene Kalwarski, Cheiron
Larry Langer, Buck Consultants

Comments from Cheiron regarding TRS' written response

In their response to Cheiron's Preliminary Report under Public Act 097-0694, the Teachers' Retirement System (TRS) agreed with the majority of recommendations and findings of Cheiron, with two exceptions:

1. Cheiron recommended that the TRS annually review the interest rate assumption rather than wait for the completion of the next formal experience study. TRS disagreed with this recommendation on the basis that "one year is not long enough to consider changing such a key assumption, and actually making the change would add more volatility to the state contribution."

2. Cheiron recommended additional disclosures on the historical development of TRS assets without the pension obligation bonds. TRS responded by saying such added disclosures, while being more informative to an actuary, may not add the same value to the lay users. As a result, they will give "careful consideration" to how they could present such information.

We disagree with TRS with point number one above. In asking for the TRS to review the assumption annually, we are not suggesting that the review be based on one year's return, which we would agree is too short. Our recommendation for an annual review is to start with the conclusions arrived in Buck's July 1, 2006- June 30, 2011 Experience Study, and annually consider whether the factors reached in that study have changed materially enough (e.g. new market expectation, major economic movements, etc.) to warrant further change. In our opinion there is no benefit to be gained to wait for a formal study for the interest rate assumption. Also we believe that reviewing this assumption annually will enhance the TRS's understanding of the factors to consider in changing the assumption.

With respect to the second point, our recommendation was based on adherence to the ASOP's, in particular ASOP 41 §3.2 and not just to "be more informative". The value to the lay user is in the knowledge that the inclusion of the additional information makes the report more transparent to the methods used in calculating the State contributions.

State Universities Retirement System of Illinois
Serving Illinois Community Colleges and Universities
1901 Fox Drive • Champaign, IL 61820-7333
(217) 378-8800 • (217) 378-9802 (FAX)

December 18, 2012

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, IL 62703

Dear Mr. Holland:

In accordance with Public Act 097-0694, below is the official response from the State Universities Retirement System (SURS) in regard to the actuarial review of the SURS actuarial assumptions, the 2012 valuation and the proposed certification of the required State contributions for fiscal year 2014 performed by Cheiron, as the State Actuary. We have provided a summary response below and have also included a detailed response for each of the recommendations from our actuary, Gabriel Roeder Smith & Company (GRS).

Recommendations

A. Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation

SURS is pleased there were no recommended changes to the assumptions.

B. Recommended Additional Disclosures for the 2012 Valuation

1. Include projected maximum contribution calculation without Government Obligation Bonds.

   SURS and GRS concur with this recommendation. The recommended disclosure is included in the Addendum to Actuarial Valuation Report for 2012 and will also be included in future valuations.

2. Report as to how the New Entrant Profile assumption was developed.

SURS and GRS concur with this recommendation. The recommended disclosure is included in the Addendum to Actuarial Valuation Report for 2012 and will also be included in future valuations.

C. Recommended Changes for Future Valuations

SURS and GRS concur with these recommendations and will monitor these areas in future years. Detailed responses from GRS are included in the attached Response to State Actuary Report of 2012 letter.

D. Proposed Certification of the Required State Contributions

SURS and GRS concur with these recommendations. GRS provided the projections by year of future benefit payouts for actives and current inactives and projections by year of future SURS normal costs and member contributions to the 2012 valuation addendum. The other recommendations will be disclosed or monitored for the 2013 valuation process. Detailed responses from GRS are included in the attached Response to State Actuary Report of 2012 letter.

Please call if you have any questions concerning these responses. We appreciate the opportunity to work with the Cheiron staff during this review.

Sincerely yours,

William E. Mabe
Executive Director

cc: Gene Kalwarski, Cheiron
Michael J. Noble, Cheiron
Joseph Butcher, Office of the Auditor General
Thomas L. Kizziah, Office of the Auditor General
Joseph J. Evans, McGladrey LLP

20 North Clark Street
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Chicago, IL 60602-5111

312.456.9800 phone
312.456.9801 fax
www.gabrielroeder.com

December 11, 2012

Board of Trustees
State Universities Retirement System of Illinois
1901 Fox Drive
Champaign, Illinois 61820

Re: Response to State Actuary Report of 2012

Dear Members of the Board:

At your request we have reviewed the report issued by Cheiron - The State Actuary's Preliminary Report on the State Universities Retirement System of Illinois ("SURS") Under Public Act 097-0694.

The requests made by the State Actuary are generally requests for additional disclosure. We have itemized each request and provided a response below.

We are pleased to have received a favorable review. This report issued by the State Actuary, Cheiron, indicates that "**In summary our review of the assumptions and methods used in the June 30, 2012 Actuarial Valuation, which were used to determine the required State contribution, found that the assumptions used were reasonable both individually and in the aggregate.**"

A. Recommended Changes to Actuarial Assumptions Used in the 2012 Valuation

No recommended changes.

B. Recommended Additional Disclosures for the 2012 Valuation

1. *We recommend that GRS revise its June 30, 2012 valuation to include projections of the maximum contribution calculation without Government Obligation Bonds (GOB).*

   GRS response: We have added this disclosure to the addendum for the 2012 valuation and it will be incorporated into future valuations.

2. *We recommend GRS disclose in their June 30, 2012 report a complete description as to how the New Entrant Profile assumption was developed.*

   GRS response: We have added this disclosure to the addendum for the 2012 valuation and it will be incorporated into future valuations.

C. Recommended Changes for Future Valuations:

1. *We concur with GRS's recommendation to establish a corridor around the market value of assets beyond which the actuarial value is limited given the use of the actuarial asset value in the projections methodology in accordance with the Statute.*

   GRS response: GRS notes the concurrence.

2. *We recommend that GRS include a complete disability incidence table be included in future reports.*

   GRS response: We will add this disclosure to the 2013 valuation report.

3. *We recommend a continued examination of the recurring loss for benefit recipients and adjustment to assumptions if the loss persists.*

   GRS response: We will continue to monitor this source of loss and report annually to the Board during the presentation of the valuation.

4. *We recommend the Board annually review the interest rate assumption.*

   GRS response: We will continue to monitor this assumption and report annually to the Board during the presentation of the valuation.

5. *We recommend that GRS demonstrate the development of the capped pay calculated in the report.*

   GRS response: The development of the capped pay is calculated by the Illinois Department of Insurance. We will clarify that the capped pay amount is provided by the Department of Insurance in the 2013 valuation report.

D. Proposed Certification of the Required State Contribution

1. *Projections by year of future benefit payouts for actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested).*

   GRS response: We have added this disclosure to the addendum for the 2012 valuation and it will be incorporated into future valuations to also include the active member information split into three distinct groups.

2. *Projections by year of future SURS normal costs and member contributions.*

   GRS response: We have added this disclosure to the addendum for the 2012 valuation and it will be incorporated into future valuations to also include the active member information split into three distinct groups.

3. *The present value of future benefits for actives, terminated vested, retirees and beneficiaries, and disabled members.*

   GRS response: We will add this disclosure to the 2013 valuation report

4. *We also recommend that GRS include the historic development of assets without GOB in future reports.*

   GRS response: We have added this disclosure to the addendum for the 2012 valuation and it will be incorporated into future valuations. We have provided a one year historical development, and will continue this same disclosure for each future valuation.

5. *For each item (1) – (3) indicate the impact of the Self-Managed Plan (SMP).*

   GRS response: The contribution for SMP is shown in Table 15 on page 27 of the 2012 valuation report. The projections on Table 13 indicate that the contributions exclude SMP. Because SMP is a defined contribution plan, it does not impact the projections related to the SURS defined benefit plan.

6. *For each item (1) – (3) show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.*

   GRS response: We will add this disclosure to the 2013 valuation report

We would be happy to discuss any of these points further and answer any questions.

Sincerely,

Leslie Thompson

Leslie Thompson, FSA, EA, MAAA
Senior Consultant

Amy Williams

Amy Williams, ASA, MAAA
Consultant

AW:kb
cc: David Kausch, Gabriel, Roeder, Smith & Company
Lance Weiss, Gabriel, Roeder, Smith & Company
Kristen Brundirks, Gabriel, Roeder, Smith & Company

GRS

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December 14, 2012

Mr. Timothy Blair
Executive Secretary
State Retirement Systems
2101 S. Veterans Parkway
P.O. Box 19255
Springfield, IL 62794-9255

Re: State Employees' Retirement System – State Actuary Review

Dear Tim:

We have reviewed the state actuary's preliminary reports for State Employees' Retirement System of Illinois (SERS). In general, we agree with the recommendations made by the state actuary. We believe the recommendations will improve the measurement of the system's liabilities and contribution requirements. Following is our response to the recommendations included on pages two and three of Cheiron's report dated December 10, 2012:

(1) GRS will include more commentary on recent retirement losses in the report. "The retirement loss for plan year end June 30, 2012, is a one-time extraordinary event which would be difficult to predict in the future. We will continue to monitor retirement experience and make recommended changes if needed."
(2) We understand SERS will consider lowering the investment return assumption, and SERS will discuss the investment return assumption at a future Board meeting.
(3) Changing the interest rate assumption will produce a more stable level percent of pay contribution.
(4) GRS will review the assumption relating to disability load and recommend adjustments for the June 30, 2013, valuation.
(5) GRS will include more details on the new entrant profile assumption starting with the June 30, 2013, valuation.
(6) GRS will consider an asset corridor in the next experience study.
(7) GRS will provide an appendix in the June 30, 2013, valuation report with the additional projection data requested on page three of Cheiron's report.

Please let us know if you have any questions or comments.

Sincerely,

Alex Rivera

Alex Rivera, F.S.A.
Senior Consultant

cc: Mr. David Kausch, Gabriel, Roeder, Smith & Company
Mr. Paul Wood, Gabriel, Roeder, Smith & Company

GRS

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December 14, 2012

Mr. Timothy Blair
Executive Secretary
State Retirement Systems
2101 S. Veterans Parkway
P.O. Box 19255
Springfield, IL 62794-9255

Re: Judges' Retirement System – State Actuary Review

Dear Tim:

We have reviewed the state actuary's preliminary reports for the Judges' Retirement System of Illinois (JRS). In general, we agree with the recommendations made by the state actuary. We believe the recommendations will improve the measurement of the system's liabilities and contribution requirements. Following is our response to the recommendations included on pages two and three of Cheiron's report dated December 10, 2012:

1) GRS will provide more detail on the new entrant profile assumption in the June 30, 2012, valuation report.
2) GRS recommends that a full experience study be performed with proposed assumption updates for the June 30, 2013, valuation.
3) GRS will update the mortality table as part of the experience study.
4) GRS will update the disability assumption as part of the experience study.
5) GRS will request more data for the valuation of survivor annuities starting with the June 30, 2013, valuation.
6) GRS will consider an asset corridor as part of the next experience study.
7) GRS will provide an appendix in the June 30, 2013, valuation report with the additional projection data requested on page three of Cheiron's report.

Please let us know if you have any questions or comments.

Sincerely,

Alex Rivera

Alex Rivera, F.S.A.
Senior Consultant

cc: Mr. David Kausch, Gabriel, Roeder, Smith & Company
Mr. Paul Wood, Gabriel, Roeder, Smith & Company

GRS

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December 14, 2012

Mr. Timothy Blair
Executive Secretary
State Retirement Systems
2101 S. Veterans Parkway
P.O. Box 19255
Springfield, IL 62794-9255

Re: General Assembly Retirement System – State Actuary Review

Dear Tim:

We have reviewed the state actuary's preliminary reports for the General Assembly Retirement System of Illinois (GARS). In general, we agree with the recommendations made by the state actuary. We believe the recommendations will improve the measurement of the system's liabilities and contribution requirements. Following is our response to the recommendations included on pages two and three of Cheiron's report dated December 10, 2012:

1) GRS will provide more detail on the new entrant profile assumption in the June 30, 2012, valuation report.
2) GRS will perform an experience study on emerging experience losses due to salary increases from reciprocal systems, applicable to inactive members, and will include an assumption in the June 30, 2013, valuation. GRS will include commentary in the June 30, 2012, valuation report stating that this assumption will be included in the next valuation.
3) GRS recommends that a full experience study be performed with proposed assumption updates for the June 30, 2013, valuation.
4) GRS will update the mortality table as part of the experience study.
5) GRS will update the disability assumption as part of the experience study.
6) GRS will consider an asset corridor as part of the next experience study.
7) GRS will provide an appendix in the June 30, 2013, valuation report with the additional projection data requested on page three of Cheiron's report

Please let us know if you have any questions or comments.

Sincerely,

Alex Rivera

Alex Rivera, F.S.A.
Senior Consultant

cc: Mr. David Kausch, Gabriel, Roeder, Smith & Company
Mr. Paul Wood, Gabriel, Roeder, Smith & Company