TRS Board of Trustees Meeting

May 1, 2015
TEACHER RETIREMENT SYSTEM OF TEXAS MEETING
BOARD OF TRUSTEES

AGENDA

May 1, 2015 – 10:00 a.m.

TRS East Building, 5th Floor, Boardroom

NOTE: The Board may take up in any order the items posted on the agenda during its meeting on Friday, May 1, 2015.

The open portions of the May 1, 2015 Board meetings are being broadcast over the Internet. Access to the Internet broadcast of the Board meeting is provided on TRS' website at www.trs.state.tx.us.

1. Call roll of Board members.

2. Consider the following Board administrative matters – David Kelly:
   A. Approval of the March 26-27, 2015 Board meeting minutes.
   B. Setting, rescheduling, or canceling future Board meetings.

3. Provide opportunity for public comments – David Kelly.

4. Receive an overview of and discuss the upcoming Pension Fund Experience Study – Joseph Newton, Gabriel, Roeder, Smith and Co.

5. Review and discuss the Executive Director's report on the following matters – Brian Guthrie:
   A. Legislative Update.
   B. Administrative operational matters, including updates on financial, audit, legal, staff services, board administration activities including nominating election matters, special projects, long-term space planning, and strategic planning.
   C. Board operational matters, including a review of draft agendas for upcoming meetings.
   D. Event notices or reminders; holiday and other schedules of interest; board member, employee or other individual recognitions; and expressions of thanks, congratulations, or condolences.

NOTE: The Board meeting likely will recess after the last item above for a lunch break and resume after lunch to take up the items listed below.
6. Budget and appropriation updates, including the cash report – Don Green.

7. Consider proposed amendments to the following key employee and signature authority resolutions – Don Green:
   A. TRS Key Employee Determinations;
   B. Designation of Persons Authorized To Sign TRS Vouchers; and
   C. General Authority Resolutions.

8. Consider personnel matters, including the appointment, employment, evaluation, compensation, performance, duties, discipline, or dismissal of the Executive Director, Chief Investment Officer, or Chief Audit Executive – David Kelly.

9. Consult with the Board's attorney(s) in Executive Session on any item listed above on this meeting agenda as authorized by Section 551.071 of the Texas Open Meetings Act (Chapter 551 of the Texas Government Code) – David Kelly.
Minutes of the Board of Trustees
March 26, 2015

The Board of Trustees of the Teacher Retirement System of Texas met on March 26, 2015 in the boardroom located on the fifth floor of the TRS East Building offices at 1000 Red River Street, Austin, Texas. The following board members were present:

David Kelly, Chair
Nanette Sissney, Vice-Chair
Todd Barth
Karen Charleston
Joe Colonnetta
David Corpus
Christopher Moss
Anita Palmer
Dolores Ramirez, via telephone conference

Others present:

Brian Guthrie, TRS             Hugh Ohn, TRS
Ken Welch, TRS                Mike Pia, TRS
Carolina de Onis, TRS         Steve Poliner, TRS
Amy Barrett, TRS              Garry Sitz, TRS
Janet Bray, TRS               Rebecca Smith, TRS
Don Green, TRS                Heather Traeger, TRS
Howard Goldman, TRS           Courtney Villalta, TRS
T. Britton Harris IV, TRS     Dr. Keith Brown, Investment Advisor
Barbie Pearson, TRS           Steve Huff, Reinhart Boerner Van Deuren
Jase Auby, TRS                Brady O’Connell, Hewitt Ennis Knupp
Ronnie Bounds, TRS            Michael Johnson, Bridgepoint Consulting
Grant Birdwell, TRS           Jay Masci, Provaliant
David Cook, TRS               Herman Martina
Chris Cutler, TRS             Dwight Harris, Texas American Federation of Teachers
Rob Dunn, TRS                  Bill Barnes, Texas Retired Teachers Association
Edward Esquivel, TRS          Tim Lee, Texas Retired Teachers Association
Adam Fambrough, TRS           Josh Sanderson, Association of Texas Professional Teachers
Tom Guerin, TRS                Joni Lozano, CVS Caremark
Dan Junell, TRS                Victor Ferreira, HP Enterprise Services
Eric Lang, TRS                Steve Tolbut, HP Enterprise Services
Lynn Lau, TRS                  Murail Kyasa, HP Enterprise Services
                                 John Powell, State Street

Mr. Kelly called the meeting to order at 8:12 a.m.

1.     Call roll of Board members.

Ms. Lau called the roll. All trustees were present. Ms. Ramirez attended the meeting via telephone conferencing under section 551.130 of the Government Code.
2. Consider the following Board administrative matters – David Kelly:

   A. Approval of the February 11-13, 2015 meeting minutes.

   The minutes of the February 11-13, 2015 meeting were approved by unanimous consent as presented by staff.

   B. Setting, rescheduling, or canceling future Board meetings.

   The board took up agenda item 2.B. later in the meeting.

3. Provide opportunity for public comments – David Kelly.

   Mr. Kelly called for public comment. No public comment was received.

5. Review and discuss the Executive Director's report on the following matters – Brian Guthrie:

   B. Administrative operational matters, including updates on financial, audit, legal, staff services, board administration activities, special projects, long-term space planning, and strategic planning.

16. Consider personnel matters, including the appointment, employment, evaluation, compensation, performance, duties, discipline, or dismissal of the Executive Director, Chief Investment Officer, or Chief Audit Executive – David Kelly.

   Under items 5.B and 16, Mr. Kelly and Mr. Guthrie recognized Ms. Melinda Nink’s 30 years of service at TRS. Without objection, Mr. Kelly read the proposed resolution attached to these minutes. There was no motion or vote on the proposal.

4. Discuss and consider the following investment matters:

   A. Quarterly Public Strategic Partnership Update – Grant Birdwell.

   Mr. Birdwell provided an update on the Public Markets Strategic Partnership (SPN), including its performance, tactical positioning, benchmark, commitments, and research projects completed. Mr. Kelly requested that, in future updates, staff describe the tactical application of the research projects. Mr. Harris announced that Mr. Mike Pia would be the new Director of SPN effective April 1, 2015.
B. Consider authorizing staff to negotiate and execute agreements concerning the following additional or new commitments relating to the Private Markets Strategic Partnership Network, including conferring with TRS staff, consultants or legal counsel or with a third party about an investment or potential investment in a private investment fund or the purchase, holding, or disposal of restricted securities by TRS or a private investment fund – Britt Harris and Courtney Villalta; Leon Black and James Zelter, Apollo; George Roberts and Scott Nuttall, KKR:

i. Review of current Private Strategic Partnership investments.

ii. Additional commitments to the Private Markets Strategic Partnerships' investments in two existing master limited partnership funds of funds.

iii. New commitments to up to two new master limited partnership funds of funds for investments in potential tactical opportunities to be managed by affiliates of the general partners of the Private Markets Strategic Partnerships.

At 8:25 a.m., Mr. Kelly announced that the board would go into executive session on agenda item 4B under section 825.3011 of the Government Code to confer about confidential investment matters and section 551.071 to seek advice from legal counsel. He asked all members of the public and staff not needed for the executive session to leave the meeting room and take their belongings with them.

After completion of the executive session, Mr. Kelly announced that the open session was reconvened at 10:25 a.m.

Mr. Kelly stated that the board would consider a resolution relating to proposed increases to previous commitments to the two strategic partnerships in the Private Markets SPN network. He said that the board would also consider a resolution relating to a follow-on or additional allocation to each strategic partnership for tactical investment purposes. Ms. de Onís clarified that staff was presenting the board one resolution to consider for the commitment increases and a choice of two resolutions (A and B) for the tactical SPN allocation. She explained that the first proposed version, Resolution A, included a waiver that would exclude certain investments by the strategic partnerships from the calculation of allocation or commitment limits applied to a management organization under Appendix B of TRS' Investment Policy Statement (IPS). She said the second version, Resolution B did not have such an exclusion.

On a motion by Mr. Barth, seconded by Ms. Palmer, the board unanimously adopted the following resolution to authorize commitment increases to the two existing Private Markets Strategic Partnerships:

**Whereas**, Pursuant to that certain Resolution Regarding Private Markets Strategic Partnership attached hereto as Exhibit A (the “Authority Resolution”), the Board resolved on November 4, 2011 to authorize the Chief Investment Officer and an authorized designee to allocate and commit up to
$3 billion each (plus realized profits to be re-invested) (the “Authority Limit”) to up to two master limited partnership funds of funds (totaling up to $6 billion in the aggregate, exclusive of re-invested profits) (the “PM Strategic Partnerships”) managed and operated by not more than two Private Markets strategic partners;

Whereas, Pursuant to and in accordance with such Authority Resolution, the Chief Investment Officer and the authorized designee duly negotiated two such PM Strategic Partnerships, with affiliates of each of KKR & Co., L.P. (“KKR”) and Apollo Global Management, LLC (“Apollo” and, together with KKR, the “PM Strategic Partners”), on substantially the same terms as, or better than, those presented to the Board, which negotiations were deemed by the Chief Investment Officer and the Executive Director, in their discretion, to have been successful;

Whereas, Pursuant to and in accordance with such Board authorization, the Executive Director duly executed definitive documentation establishing the PM Strategic Partnerships with Apollo and KKR on January 31, 2012 and February 1, 2012, respectively;

Whereas, The Investment Division acting through the Internal Investment Committee has recommended that, notwithstanding the provisions of IPS Sections 1.3(c) and Appendix B, the Board authorize the Chief Investment Officer to allocate and commit from time to time up to an additional $1 billion to each PM Strategic Partnership (totaling up to an additional $2 billion in the aggregate, exclusive of re-invested profits, provided that any reinvestment of such amount or profits thereupon shall be at the discretion of the Chief Investment Officer or the designee thereof) (the “Commitment Increases”); now, therefore be it

Resolved, That the Board of Trustees hereby approves and authorizes an increase in the Authority Limit to reflect the Commitment Increases, each in the form of an amendment to the definitive documents governing such PM Strategic Partnerships, and to implement such Commitment Increases the Board further authorizes the Chief Investment Officer to allocate and commit from time to time up to the amount of the Commitment Increases as determined by the Chief Investment Officer, to be invested and managed by the PM Strategic Partners, on the terms and conditions set forth in the definitive documents governing the PM Strategic Partnerships, as amended; and

Resolved, That the authority to negotiate the terms of such Commitment Increase with each PM Strategic Partner shall be as set forth in the Authority Resolution, provided that a Senior Managing Director, Managing Director, Director or Senior Investment Manager designated by the Chief Investment Officer may also be, and hereby is, authorized to negotiate the terms of such Commitment Increases; and

Resolved, That the Board hereby expressly authorizes the additional or follow-on allocations or commitments with respect to the Commitment Increases contemplated hereby, consistent with the requirement of IPS Appendix B that any such allocations or commitments in excess of 1% of the total fund value (including investments occurring in the prior six months) require prior authorization of the Board; and

Resolved, That, except as otherwise expressly modified by this Resolution, the Authority Resolution shall remain in full force and effect, shall apply to the terms of the increase in the Authority Limit approved hereby, and is hereby reaffirmed.

Next, Mr. Kelly called for a motion to approve the tactical follow-on allocations. Mr. Colonnetta made a motion. Ms. Charleston seconded the motion. Ms. de Onís confirmed for Mr. Barth that the resolution offered by Mr. Colonnetta through his motion was Resolution B, which would not exclude investments made with the tactical follow-on allocations from the calculation of the
allocation or commitment limits under the IPS. The board unanimously adopted the following resolution (Resolution B):

**Whereas**, Pursuant to that certain Resolution Regarding Private Markets Strategic Partnership, the Board resolved on November 4, 2011 to authorize the Chief Investment Officer and an authorized designee to allocate and commit up to $3 billion each (plus realized profits to be re-invested) (the “Authority Limit”) to up to two master limited partnership funds of funds (totaling up to $6 billion in the aggregate, exclusive of re-invested profits) (the “PM Strategic Partnerships”) managed and operated by not more than two Private Markets strategic partners;

**Whereas**, Pursuant to and in accordance with such Board authorization, the Chief Investment Officer and the authorized designee duly negotiated two such PM Strategic Partnerships, with affiliates of each of KKR & Co., L.P. (“KKR”) and Apollo Global Management, LLC (“Apollo” and, together with KKR, the “PM Strategic Partners”), on substantially the same terms as, or better than, those presented to the Board, which negotiations were deemed by the Chief Investment Officer and the Executive Director, in their discretion, to have been successful;

**Whereas**, Pursuant to and in accordance with such Board authorization, the Executive Director duly executed definitive documentation establishing the PM Strategic Partnerships with Apollo and KKR on January 31, 2012 and February 1, 2012, respectively;

**Whereas**, Pursuant to a resolution dated as of the date hereof, the Board has approved an increase in the Authority Limit with respect to each of the PM Strategic Partnerships;

**Whereas**, IPS Appendix B limits the amount that may be allocated to a single manager organization, and requires prior Board authorization to exceed that limit;

**Whereas**, The Investment Division acting through the Internal Investment Committee has recommended that, notwithstanding the provisions of IPS Sections 1.3(c) and Appendix B, the Board authorize the Chief Investment Officer to allocate and commit from time to time up to $1 billion to up to two master limited partnership funds of funds (the “Tactical Strategic Partnerships”) (totaling up to $2 billion in the aggregate, exclusive of re-invested capital) to be managed and operated by affiliates of the PM Strategic Partners (the “Tactical Strategic Partners”) to pursue certain credit and debt market and related opportunistic investments (“Credit Investments”), including, but not limited to, investment portfolio funds that are managed by other affiliates of each Tactical Strategic Partner or for the purpose of co-investing therewith;

**Whereas**, The Chief Investment Officer has recommended that the Board authorize the Tactical Strategic Partnerships to pursue tactical investment strategies and opportunities (“Other Tactical Investments”) in addition to Credit Investments, subject to prior Internal Investment Committee approval of the strategy, opportunity or underlying asset class of such Other Tactical Investments, including, but not limited to, investment portfolio funds that are managed by other affiliates of each Tactical Strategic Partner or for the purpose of co-investing therewith (such approved Other Tactical Investments, together with Credit Investments, “Tactical Investments”);

**Whereas**, The general partner of each respective Tactical Strategic Partnership will be the Tactical Strategic Partner or its affiliate, and such general partner will exercise its discretion, subject to the agreed investment guidelines of the Tactical Strategic Partnership, to further allocate and commit such TRS capital to Tactical Investments;
Whereas, Section 825.301(a), Government Code, states that, for purposes of the investment authority of the Board of Trustees under Section 67, Article XVI, Texas Constitution, an interest in a limited partnership is a security without regard to the number of investors or the control, access to information, or rights granted to or retained by the retirement system; now, therefore be it

Resolved, That the Board of Trustees hereby approves and authorizes up to two investments, each in the form of a master limited partnership fund of funds, and to implement such investments the Board further authorizes the Chief Investment Officer to allocate and commit from time to time up to $1 billion to each Tactical Strategic Partnership (totaling up to $2 billion in the aggregate, exclusive of re-invested capital), to be invested and managed by the Tactical Strategic Partners, on the terms and conditions presented to the Board; and

Resolved, That the Chief Investment Officer, or a Senior Managing Director, Managing Director, Director or Senior Investment Manager designated by the Chief Investment Officer, be and hereby is authorized to negotiate a fund of funds master limited partnership agreement with each Tactical Strategic Partner, on substantially the same terms as, or better than, those presented to the Board, and, if negotiations are deemed by the CIO and the Executive Director, in their discretion, to be successful, then the Executive Director is hereby authorized to execute such definitive documents with up to two of the Tactical Strategic Partners on such terms and conditions as the Executive Director may deem, in his discretion, to be in the best interest of TRS, and to execute and deliver all such other documents and agreements that the Executive Director or his designee may deem necessary or appropriate to effect this resolution, as conclusively evidenced by the taking of the action or the execution and delivery of the documents and agreements, and to incur, approve and pay any budgeted expenses or costs associated with such documents and agreements, and deemed in the discretion of the Executive Director and CIO to be reasonably necessary or advisable with respect to such documents and agreements; and

Resolved, That the Board hereby expressly authorizes the additional or follow-on allocations or commitments with respect to the formation of the Tactical Strategic Partnerships contemplated hereby, consistent with the requirement of IPS Appendix B that any such allocations or commitments in excess of 1% of the total fund value (including investments occurring in the prior six months) require prior authorization of the Board; and

Resolved, That the investments approved hereby and the authority granted in these resolutions to implement the approved investments does not supersede, waive, or otherwise affect the investment allocations set forth in the table in IPS Section 1.6. All investments shall be considered for purposes of the 6% Total Manager Organization limit in the IPS Appendix B.


Mr. O’Connell presented the trust fund performance review for the fourth quarter of 2014. In response to a question from Dr. Brown about measuring performance using peer comparison, Mr. O’Connell stated that peer comparison could be used as a secondary benchmark, which could be important in judging the performance of the current asset allocation. Dr. Brown noted the importance of choosing the right group for peer comparison. Mr. Kelly stated that he would like staff to conduct a study of the fund’s overall investment strategies, asset allocation, and philosophy in comparison with its peers.

Mr. Kelly announced that the board would take up agenda 2B per Mr. Guthrie’s request.
2. Consider the following Board administrative matters – David Kelly:

   B. Setting, rescheduling, or canceling future Board meetings.

On a motion by Ms. Sissney, seconded by Mr. Corpus, the board unanimously approved the following resolution to set the date and location for the February 2016 meeting:

**Resolved**, That the Board of Trustees of the Teacher Retirement System of Texas (“board”) sets the following date and location for its February 2016 meeting: February 24 - 26, 2016 at the Region 10 Educational Service Center located at 400 E. Spring Valley Road, Richardson, Texas 75081, at convenient times to be determined by the board chairman and executive director.

5. Review and discuss the Executive Director's report on the following matters – Brian Guthrie:

   A. The most recent actuarial valuation of the TRS Pension Trust Fund.

   B. Administrative operational matters, including updates on financial, audit, legal, staff services, board administration activities, special projects, long-term space planning, and strategic planning.

   C. Board operational matters, including a review of draft agendas for upcoming meetings.

Mr. Guthrie announced that Ms. Barbie Pearson was selected to be the new Chief Benefit Officer (CBO). Ms. Pearson briefly remarked on her new position. Mr. Kelly expressed appreciation to Mr. Tom Guerin for serving as the interim CBO during the transition.

Mr. Guthrie gave a preview of the mid-year actuarial valuation. He stated that assumptions would be re-examined this summer through the experience study. He provided an update on the legislative session. He highlighted the bills concerning pension and health care benefits and related funding issues. He also summarized administrative issues addressed by the Omnibus Bill.

Mr. Guthrie highlighted agenda items planned for the May, June and July meetings.

Mr. Guthrie stated that the board would go into executive session to discuss a sensitive administrative matter.

Whereupon, Mr. Kelly announced that the board would go into executive session on agenda items 5B and 5C under section 551.071 of the Government Code to seek advice from legal counsel about board administrative and operational matters and related legal issues. He asked all members of the public and staff not needed for executive session to leave the meeting room and take their belongings with them.

Whereupon, the open session of the board meeting recessed at 11:17 a.m. to go into executive session.

At 11:50 a.m., Mr. Kelly announced that the board reconvened in open session and would recess to conduct committee meetings.
After a recess, the board meeting reconvened at 4:00 p.m. Mr. Kelly announced that the board would take up agenda item 6.

6. **Review the report of the Investment Management Committee on its March 26, 2015 meeting – Todd Barth.**

Mr. Barth, Committee Chair, provided the Investment Management Committee report, as follows:

The Investment Management Committee met today, March 26, 2015. The first presentation given was a review of the internal public markets, which was presented by Chi Chai, Patrick Cosgrove and KJ Van Ackeren. Following that, there was a review of the trading management group presented by Bernie Bozzelli, Jaime Llano, Steve Peterson and Jared Morris.

7. **Review the report of the Risk Management Committee on its March 26, 2015 meeting – Karen Charleston.**

Ms. Charleston, Committee Chair, provided the Risk Management Committee report, as follows:

The Risk Management Committee met on March 26, 2015. A presentation was given on the review of the investment risk report, which was presented by Jase Auby.

8. **Review the report of the Policy Committee on its March 26, 2015 meeting, including adoption of a TRS Litigation Policy – Joe Colonnetta.**

Mr. Colonnetta, Committee Chair, provided the Policy Committee report, as follows:

The Policy Committee met on March 26, 2015. The committee adopted the minutes of the November 20, 2014 meeting and also recommended the board adoption of the proposed TRS Litigation Policy as presented. The committee discussed the development of the TRS Trustee Procurement Policy. Finally, the committee continued the required review of the TRS Code of Ethics for Contractors.

On a motion by Mr. Colonnetta, the board unanimously adopted the proposed TRS Litigation Policy as recommended by the Policy Committee.

9. **Review the report of the Audit Committee on its March 26, 2015 meeting – Christopher Moss.**

Mr. Moss, Committee Chair, provided the Audit Committee report, as follows:

The Audit Committee met on Thursday, March 26, 2015, in the fifth floor Board Room. Internal Audit staff presented the results of the payables audit, a status report on the test results of investment controls, the quarterly investment testing, and the status of prior audit consulting recommendations. Internal Audit staff also presented routine administrative reports and the status of any new and outstanding complaints.
10. **Review the Deputy Director’s Report, including matters related to administrative, financial, and staff services operations** – Ken Welch

Mr. Welch highlighted some operational matters. He shared with the board the passing of Carol Kolb of Accounts Payable in February. He expressed his condolences to Ms. Kolb’s family and recognized her 20 years of service at TRS and contribution to the system. Mr. Welch noted matters relating to member services, including hold-time for callers to the Telephone Counseling Center. He also highlighted new developments in the IT area, including switching the agency mobile phones from BlackBerry to iPhone and promoting Kyle Weigum to be the new Director of Network Infrastructure and Support. He provided a brief update on the audit of pension liability required by the new accounting standards issued by the Governmental Accounting Standards Board (GASB). He also reported on the board nominating elections, which were still ongoing.

Per Mr. Welch’s request, the board took up agenda item 12 to provide context for the independent program assessment presentation to be given in item 11.

12. **Receive a quarterly review of the TEAM Program, including a discussion of data management and an update on the Line of Business Project.** – Adam Fambrough; Barbie Pearson; David Cook; and Jay Masci, Provaliant.

Mr. Welch and Mr. Masci provided a general update on the TEAM program. Mr. Welch highlighted the re-baselining process and the need for change requests. Mr. Masci noted that the business rules project would be removed from the schedule and a new project for testing and quality assurance of all TEAM projects would be added.

Mr. Fambrough provided an updated project timeline, which reflected the eight-month delay due to the process improvement phase (PIP). He also contrasted change requests that enhanced functionality with refinements to original commitments by with Hewlett-Packard (HP). Mr. Cook estimated that the change requests would cost about $3.9 million and extend the schedule by about 4½ months. Mr. Fambrough confirmed for Ms. Sisney that the 4½ months had been included in the eight-month delay and represented the total impact to the schedule caused by the 26 change requests.

Mr. Masci provided an update on the milestones. He stated that the board would receive updated schedules for milestone completion and project interdependency at the June board meeting. Responding to a question from Mr. Kelly regarding quality assurance, Mr. Masci stated that both TRS and HP provided regular reports evaluating project performance and improvement through the PIP process.

Mr. Cook provided a budget update. He stated that, although the project cost had increased by approximately $4.7 million because of delay and change requests, it remained within the $7.2 million project-budget contingency.

Ms. Pearson discussed the progress of the data conditioning project. She laid out in detail the process of updating and correcting old data in the legacy system and creating data in the new TRUST system.
Mr. Welch provided an update on the financial system replacement project. He stated that staff was currently evaluating information for the procurement related to the project.

11. **Receive a presentation from the TEAM Program Independent Program Assessment (IPA) Vendor – Michael Johnson, Bridgepoint Consulting.**

Mr. Johnson provided an update on the scorecard and observations for the Independent Program Assessment (IPA). He noted that the process improvement phase and detail level requirements both had significant impacts on the quality of the deliverables. He expressed concern about the extent of delay occurring this early in the project. He recommended tightening the project management controls, making timely decisions and holding vendors responsible for quality deliverables. He stated that the effectiveness of the corrective action would be known in the next six months. Responding to Mr. Johnson’s recommendation, Mr. Cook stated that staff had implemented or developed solutions to improve timely decision-making, quality review and tracking the completion of deliverables. He said the schedules would be updated in accordance with the re-baselined timetable. Mr. Johnson also observed that adequate resources must be properly allocated to the tasks scheduled for the next 12 months so TRS may test the system and prepare it for deployment to the reporting entities. Mr. Cook said that staff agreed with the recommendations and would bring back updated information to the board in June.

13. **Mid-year budget review for FY 2015 – Don Green.**

Mr. Green provided a mid-year report of expenditures. He said that, because of TEAM, TRS had spent about $4 million in administrative expenditures over what it had spent year-to-date by this same time in FY 2014. He explained that the spike in costs for January was due to the payment of $6 million in incentive compensation. He provided details of the FY 2015 budget by fund, division and expense. Mr. Green also described for Mr. Corpus the budgeting process for facility maintenance.

14. **Review the report of the Chief Benefit Officer and consider the following related matters – Tom Guerin:**

A. **Approve members qualified for retirement.**

Mr. Guerin presented the list of members and beneficiaries receiving initial benefit payments during the periods from September 2014 through November 2014 and December 2014 through February 2015.

On a motion by Mr. Moss, seconded by Ms. Sissney, the board unanimously approved the list of members and beneficiaries who qualified for retirement, disability, DROP, PLSO, survivor, or death benefits initiated during the reporting period.

B. **Approve minutes of Medical Board meetings.**

Mr. Guerin presented the minutes of the July 8, 2014, September 9, 2014, November 17, 2014, and January 13, 2015 Medical Board meetings. On a motion by Ms. Palmer, seconded by Ms.
Sissney, the board approved the minutes of the Medical Board meetings as presented, thereby ratifying the actions of the Medical Board reflected in those minutes.

15. **Review the report of the General Counsel on pending and contemplated litigation, including updates on litigation involving benefit-program contributions, retirement benefits, health-benefit programs, and open records** – Carolina de Onís.

Ms. de Onís said she had nothing to add to the written litigation report unless the board had questions. The board members had no questions about the report.

16. **Consider personnel matters, including the appointment, employment, evaluation, compensation, performance, duties, discipline, or dismissal of the Executive Director, Chief Investment Officer, or Chief Audit Executive** – David Kelly.

17. **Consult with the Board's attorney(s) in Executive Session on any item listed above on this meeting agenda as authorized by Section 551.071 of the Texas Open Meetings Act (Chapter 551 of the Texas Government Code)** – David Kelly.

The board took up no further business under agenda items 16 and 17.

The meeting was adjourned at 5:15 p.m.
RESOLUTION

WHEREAS, Melinda Nink joined the Teacher Retirement System of Texas (TRS) in October 1984 as an administrative secretary in the service retirement area; and

WHEREAS, in April 1985 she was transferred to the executive director’s office where she began a career in executive and board trustee support, responsible for coordinating board member travel and board meeting material collection and distribution, and managing the annual convention registration operation for the National Council on Teacher Retirement (NCTR) for many years; and

WHEREAS, in July 1998 she became the assistant to the executive director and served in that capacity for two executive directors — Charles Dunlap and Ronnie Jung — for a total of 16 years, meeting challenging deadlines and successfully dealing with high-pressure and high-profile situations; and

WHEREAS, in September 2011 she became the assistant to the TRS Board of Trustees, acting as liaison between TRS staff and trustees, responsible for all preparations and logistics related to board meetings; and

WHEREAS, during her years with TRS, in addition to her regular duties, Melinda has volunteered for numerous agency committees and project teams, including serving on the Holiday, SECC and Golden Apple Selection committees, and facilitating the SECC drive; and

WHEREAS, TRS recognized Melinda with a TRS Golden Apple Award in 2009 in part for her demonstrated ability to excel in all assignments, remain an invaluable resource to the executive office and the board of trustees, and help TRS capitalize on its positive history; and

WHEREAS, Melinda has developed her institutional knowledge to the point of serving as a one-stop source for information, guidance and action, not only in her areas of responsibility, but also in TRS’ history, staff organization and member services; and

WHEREAS, Melinda has continually been a cheerful and helpful presence at TRS; she is known for her professionalism, dependability, loyalty, compassion, competency, and patience and is deserving of recognition for a job beyond well done; and

WHEREAS, Melinda currently has 37 years of service to the State of Texas, having previously worked for the Texas Department of Health and Texas Department of Public Safety; and

WHEREAS, Melinda has proven to be the glue that holds the TRS Executive Division together and is an invaluable resource to the current executive director, Brian Guthrie, and all other members of the Executive Council; and

NOW, THEREFORE, BE IT RESOLVED, that the Board of Trustees and staff of the Teacher Retirement System of Texas recognize the accomplishments and contributions of Melinda Nink at TRS during her career with the retirement system and express their sincere appreciation on behalf of TRS members both present and future,

AND BE IT FURTHER RESOLVED, that a copy of this resolution be presented to Melinda Nink and entered into the record of the board for March 26, 2015.
Tab 4
TRS of Texas
Summary of the Valuation Process & An Intro to Experience Studies

May 1, 2015
Joseph Newton, FSA, FCA, MAAA, EA
The Valuation Process

- Every year, GRS performs an actuarial valuation and brings to the Board 100 pages of dense reports with industry specific terminology and acronyms.
- With a 30-60 minute presentation, we attempt to provide the Board a high-level summary of the results and what they may mean for decision making purposes and strategies going forward.
- However, there are several concepts often discussed that are complex and may not be quite so intuitive. With a communication focus on strategic initiatives and enhancing the Board’s level of understanding of complex actuarial matters, we find it valuable for Board members (especially new ones) to periodically review these complexities.
INTRODUCTION TO ACTUARIAL MATHEMATICS
Hypothetical Analogy

- John, a recent graduate from college at age 25, just got his first real job making $40,000 per year.
- John wants to be proactive about saving for a secure retirement, so he is taking his parents’ advice and starting early.
- He finds a retirement savings calculator online and begins the process of determining his savings strategy.
- Step 1: Setting his expectations. What assumptions is John required to make?
First Decisions

- John must set his expectations or goals for several parameters:
  - What return can he get on his savings?
    - Before and after retirement
  - What replacement income is he targeting?
  - Does he want his replacement income to have purchasing power protection?
  - How fast will his salary increase over time?
  - When does he want to retire?
  - How long will he live?
  - What pattern of savings does he want?
  - What ability will he have in the future to change his strategy based on changing circumstances?
  - What level of certainty does he want that his actual experience will meet or exceed his expectations?
- What sources can he use to help with these decisions?
**Initial Expectations**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Initial Expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return expectations before retirement</td>
<td>7% per year</td>
</tr>
<tr>
<td>Return expectations after retirement</td>
<td>5% per year</td>
</tr>
<tr>
<td>Target replacement income</td>
<td>75% of final salary</td>
</tr>
<tr>
<td>Purchasing power protection</td>
<td>2% growth per year</td>
</tr>
<tr>
<td>Average future salary increases</td>
<td>3% per year</td>
</tr>
<tr>
<td>Desired retirement age</td>
<td>65</td>
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<tr>
<td>Expected Age of Death</td>
<td>90</td>
</tr>
<tr>
<td>Savings pattern</td>
<td>Level % of Salary</td>
</tr>
<tr>
<td>Ability to adapt later in life</td>
<td>?</td>
</tr>
<tr>
<td>Level of certainty</td>
<td>?</td>
</tr>
</tbody>
</table>

- Based on John’s initial scenario, he must save 14.3% of his salary into his retirement program.
- He then decides he will re-examine his strategy at age 35. What could have changed by age 35?
Hypothetical Analogy (cont.)

- Possible changes to John’s circumstances
  - Actual investment returns outpace or underperform
  - Changes to future return expectations
    - Before and after retirement
  - Changes to replacement needs: health care, children...
  - Changes in future inflation expectations
  - Actual salary increases (faster growth not necessarily a positive)
  - Changes to future salary growth expectations
  - Changes to future retirement age expectation or goal?
  - Was cancer cured? Has life expectancy changed?
  - Is 14.3% of salary still affordable? Have living expenses grown more rapidly or perhaps not as fast? What about timing of expenses (children)
  - What ability will he have in the future to change his strategy based on changing circumstances? Has to be less now, less time.
  - What level of certainty does he want that his actual experience will meet or exceed his expectations? Has to be more now, less time.

- Notice there are still more decisions about the future (unknown) than the past (known)
If all goes as planned, John should have $89,123 in his account on his 35th birthday.

His first measurement will be to compare his actual balance to this target balance.

In a scenario where all goes as planned except his investments returned 5% per year, John would have an actual balance of $81,504.

- He has a shortfall of $7,619.

What are John’s options?
John could:

- Increase his savings
  - By 0.8% to 15.1%
- Attempt to earn more in future earnings
  - Need 7.2% per year
- Delay retirement
  - 1 year to age 66
- Decrease his expected income at retirement
  - 72% replacement income
- Wait and see?
Age 35 Scenario 2

- If all goes as planned, John should have $89,123 in his account on his 35\textsuperscript{th} birthday.
- His first measurement will be to compare his actual balance to this target balance.
- In a scenario where all goes as planned except his salary has grown 4\% per year, John would have an actual balance of $92,837.
  - Is this a surplus?
Because of the higher than expected salary increases, his projected age 65 salary is higher than originally projected.

- Thus his target age 35 account balance is closer to $99,000.
- Has a shortfall of $6,163.
Age 35 Scenario 3

- If all goes as planned, John has $89,123 in his account on his 35th birthday
- However, economists now forecast even lower returns going forward
- John adjusts his future expectations so that future investments earn 6% per year before retirement and 4% per year after retirement
- Based on this scenario, John should have been saving 20% of salary per year and should have a balance of $119,182 by age 35
  - Shortfall of $30,059
- John could:
  - Increase his savings to 23.5%
    - Increase his normal savings up to the 20% for future return expectations
    - And add an additional 3.5% to make up the shortfall
  - Attempt to earn more in future earnings
    - Need more than 7.5% per year pre-retirement
  - Delay retirement
    - 3 years to age 68
  - Decrease his expected income at retirement
    - 59% replacement income
  - Wait and see?
Application of John’s Scenario to the Actuarial Process

- John was basically performing an actuarial valuation on his own personal situation.
- At age 25, he was setting future expectations and his contribution strategy.
- At age 35, he was:
  - comparing the actual experience against his past expectations.
  - reassessing his future expectations.
  - and making changes to future contributions or benefits if necessary.
Application of John’s Scenario to the Actuarial Process

- The annual valuation of TRS is doing this exact exercise for every individual member of the plan.
- However, there is a material difference in that while John was alone, the individuals in TRS are not:
  - There are other members in their own generation
  - There are other generations of members
  - There is a Plan Sponsor
- Using a defined benefit approach, most of the risks borne by John can be shared across the population of members and the plan sponsor, making a more stable and predictable outcome.
Similar to John, the following decisions have to be made:

- What benefit is being targeted?
- What assumptions can be made about future expectations?
- What policy will be utilized to determine contribution amounts?
- How will these policies react to actual experience if it deviates materially from the initial expectations?
Purpose of 2015 Experience Study

- Assumptions are not static; they should occasionally change to reflect
  - New information and changing knowledge
  - Mortality improvement
  - Changing patterns of retirements, terminations, etc.
  - Implementation of improved technology and processes

- The analysis will address these questions for each assumption
  - What was the plan’s actual experience?
  - How does that compare with current assumptions?
  - Is a change warranted?
Procedure of 2015 Experience Study

- Compare economic assumptions to:
  - General US price inflation and wage inflation statistics
  - TRS specific salary increases
  - Expected return using alternative capital market assumption sets
  - Economic assumptions should be consistent

- Analyzed demographic assumptions
  - Retirement, mortality, disability, other terminations
  - Compared to TRS’ actual experience
  - Used Actual-to-Expected (A/E) Ratio as analysis tool
  - Looked at patterns by age and service

- If A/E = 100% at all ages, assumption is “perfect”
  - Although we may want to build in some margin
Experience study conducted for five-year period ending August 31, 2014

Timeline for next assumption review

► Present draft report of experience study results to Board this summer
► The Board adopts, modifies, or rejects proposed assumptions by September
► The Board adopted assumptions are used for performing the August 31, 2015 actuarial valuation
The model built for TRS is based on the following main strategic objectives:

- Maximize dependability of the retirement program
- Create a stable, predictable contribution pattern that remains relatively level as a percentage of overall payroll
- Maximize intergenerational equity
  - With a focus on both cost and risk
- Create a reasonable and defendable representation of the future liabilities (cash outflows) of the System
- Explicitly mimic all material attributes and provisions of the growth in liabilities and assets
- Eliminate all bias
  - Defined as a predictable, chronic gain or loss that is a result of an inappropriate structure or method
  - It may be appropriate to include some margin in the model, to account for asymmetric risk
- Minimize artificial volatility
  - Volatility that can be anticipated in magnitude and/or direction
Assumptions versus Methods

- **Assumption**
  - **Formal Definition**
    - to think that something is true or probably true without knowing that it is true
    - something taken for granted; a supposition
      - “I assume you are going to take out the trash”
  - The assumptions are behaviors, occurrences, or performances expected to occur in the future

- **Method**
  - **Formal Definition**
    - a procedure, technique, or way of doing something, especially in accordance with a definite plan
      - “There are three possible methods to repairing this motor”
  - The methods are how the benefit provisions, assumptions, and specific attributes of the financing arrangement will be modeled
Over time, there are three parts of the actuarial funding equation:

\[ C + I = B \]

Where:
- **C = Contributions**
  - Payroll Growth Rate, Funding Method, Asset Valuation Method
- **I = Investment Earnings**
  - Inflation, Real Rate of Return Assumption
- **B = Benefits**
  - Individual Salary Increases, Termination Patterns, Retirement Patterns, Life Expectancy
Inside the Actuarial Valuation:
Projecting the Liability for each Member

What is the probability the member reaches retirement?

How much will the benefit be?

How long will the benefit be paid?

Hired at age 30

Retire at age 60 with annual benefit

Receive benefit for remaining lifetime

Assumptions must be made to project:

- Future behavior
  - Voluntary or Involuntary
- Life expectancy
- Economic growth
How assumptions factor in...

- Over time, the true cost of benefits will be borne out in actual experience
  - Cost of benefits NOT affected by actuarial assumptions
  - Determined by actual participant behavior (termination, retirement), plan provisions, and actual investment returns
- But if wrong can lead to poor decisions, poor outcomes
  - If objective is to fund levelly over active career, and assumptions suggest cost is 10% per year, but true cost is 14%
  - Losses and unfunded liabilities will develop
  - Can’t outrun or “out-assume” the true cost
  - Important to update regularly and re-chart your course
- Assumptions help us anticipate and manage what each component of the equation will be
  - Assumptions dictate the timing of the contributions
  - Develop expectations for future contributions, investment returns and benefit payments
  - Important for decision making
- Same can be true to the positive side, as overly conservative assumptions would pull resources to the System and away from other alternatives or force unnecessary reductions in benefits
TRS specific attributes that would impact what methods to use

- Fixed employer and member contributions received as a percentage of payroll received monthly throughout each year
- Funding goals mostly centered around calculated funding period
- Very tight turnaround time during legislative session
- Events mostly occurring one time each year
  - Hiring, pay increases occur in August, Terminations and Retirements in Summer
  - Service earned in one year increments (per 1,000 hours)
- Different tiers of benefits based on hire/vesting dates
Actuarial Standards

- Guidelines for the assumption setting process are set by the Actuarial Standards of Practice
  - ASOP #4 Measuring Pension Obligations
  - ASOP #27 Selection of Economic Assumptions
  - ASOP #35 Selection of Demographic and Other Noneconomic Assumptions
  - ASOP #44 Selection and Use of Asset Valuation Methods
Actuarial Standards

- Each Individual Assumption must satisfy the Actuarial Standard
- The Assumption set should be internally consistent
- The Assumption set as a whole must satisfy the Actuarial Standard
The “Perfect” Assumption Set

Level of Conservatism

- Investment Return
- Wage Inflation
- Individual Salary Increases
- Life Expectancy
- Retirement Behavior
- Termination Behavior
- Other Methods
- Total Assumption Set

0% equals fully conservative, 100% equals fully aggressive
50% equals a perfect fit (crystal ball)
Magnitude of Individual Assumptions

Impact on Determination of Funding Period

- Investment Return
- Life Expectancy
- Payroll Growth
- Individual Salary Increases
- Retirement Behavior
- Termination Behavior
- Funding Method
- Incidence of Disability/Active Mortality
- Other
The assumption selected should be reasonable
- Identify a reasonable range of possible assumptions
- Select a best-estimate from within that range
- No single “correct” answer

Assumption is selected using a process that considers:
- Historical investment performance
- Comparison with peers
- TRS target asset allocation
- Economic capital market expectations
  - Utilize a building block approach that reflects expected inflation, real rates of return, and plan related expenses
  - Take into account the volatility of the expected returns produced by the investment portfolio
How does this impact pension funding?

![Chart showing percentage of benefits vs earnings and contributions for different return rates (6%, 7%, 8%).]
Inflation is the first building block for other economic assumptions.

Current Assumption Set for TRS
Inflation

- The assumed inflation rate (currently 3.00% per year) is not used directly in the actuarial valuation, but it impacts the development of:
  - Investment return assumption
  - Salary increase assumptions
  - Payroll growth rate

- We look at several indicators
  - Investment firms: 2.20% - 3.00%, 2.48% average
    - HEK currently assumes 2.10%
  - Social Security Trustee’s Report: 2.80% (intermediate)
  - TIPs vs. Nominal US Treasuries: 2.26%
  - Professional forecasters: 2.30%
  - Public Funds Survey: 3.25% (37 at 3.00%, 31 at 3.5% out of 126)
Estimated Yields Based on Market Value of Assets

8.20% average compound return (on market value) since 1994.
Historical Interest Rates

Nominal and Real 10-year Treasury Yields

Average (1958 – 2015 YTD) 3/31/15
Nominal Yields 6.24% 1.94%
Real Yields 2.48% 0.25%
Inflation 3.79% 1.69%

Real 10-year Treasury yields are calculated as the daily Treasury yield less year-over-year core CPI inflation for that month except for March 2015, where real yields are calculated by subtracting our February 2015 year-over-year core inflation. All returns above reflect annualized total returns, which include reinvestment of dividends. Corporate bond returns are based on a composite index of investment grade bond performance. Data are as of March 31, 2015.
Comparison to Other Systems

Investment Return Assumptions of Other Large Pension Systems (Nominal Returns)

Source: Public Funds Survey Summary of Findings (available data as of March 2014)
2014: Mean: 7.75%, Median: 7.90%, Mode: 8.00%
2011: Mean: 7.94%, Median: 8.00%, Mode: 8.00%
TRS Current Assumption: 8.00%
Investment Return Assumption

Historical Change in the Investment Return Assumption Used by Large Public Retirement Systems

Comparison to Other Systems

Investment Return Assumptions of Other Large Pension Systems (Real Rate of Return)

Source: Public Funds Survey Summary of Findings (FY 2014)
Average: 4.56%
TRS Current Assumption: 5.00%
Projected real returns were developed using TRS target investment allocation and 2010 capital market return assumptions developed by the following investment consultants:

- Ennis Knupp
- Callan
- JPM
- NEPC
- PCA
- PCA
- SIS
- Towers Watson
From 2010 Experience Study: Real Return Expectations

- Average annual expected return for the assumptions from the seven consulting firms is about 8.28%
  - The current assumption is exceeded by five of the seven sets of assumptions

<table>
<thead>
<tr>
<th>Investment Consultant</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Return</td>
<td>5.03%</td>
<td>5.16%</td>
<td>5.35%</td>
<td>5.40%</td>
<td>5.76%</td>
<td>5.80%</td>
<td>6.23%</td>
<td>5.53%</td>
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<tr>
<td>Expected Plan Expenses</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
<td>(0.25%)</td>
</tr>
<tr>
<td>Net Real Return</td>
<td>4.78%</td>
<td>4.91%</td>
<td>5.10%</td>
<td>5.15%</td>
<td>5.51%</td>
<td>5.55%</td>
<td>5.98%</td>
<td>5.28%</td>
</tr>
<tr>
<td>Anticipated Inflation</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
</tr>
<tr>
<td>Net Investment Return</td>
<td>7.78%</td>
<td>7.91%</td>
<td>8.10%</td>
<td>8.15%</td>
<td>8.51%</td>
<td>8.55%</td>
<td>8.98%</td>
<td>8.28%</td>
</tr>
</tbody>
</table>
From 2010 Experience Study: Expected Return Volatility

- Investment returns are also uncertain and can have volatility, especially in the short term. Therefore, it is also appropriate to examine the assumption from the perspective of what is the range of return that can be expected based on current capital market assumptions.

<table>
<thead>
<tr>
<th>Investment Consultant</th>
<th>Distribution of 20-Year Average Geometric Net Nominal Return</th>
<th>Probability of exceeding 8.00%</th>
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</thead>
<tbody>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
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<tr>
<td>1</td>
<td>5.32%</td>
<td>7.10%</td>
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<tr>
<td>2</td>
<td>5.54%</td>
<td>7.27%</td>
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<tr>
<td>3</td>
<td>5.86%</td>
<td>7.52%</td>
</tr>
<tr>
<td>4</td>
<td>5.90%</td>
<td>7.56%</td>
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<tr>
<td>5</td>
<td>5.75%</td>
<td>7.70%</td>
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<tr>
<td>6</td>
<td>5.71%</td>
<td>7.53%</td>
</tr>
<tr>
<td>7</td>
<td>5.91%</td>
<td>8.03%</td>
</tr>
<tr>
<td>Average</td>
<td>5.71%</td>
<td>7.53%</td>
</tr>
</tbody>
</table>
Arithmetic vs Geometric Means

Growth of $100,000 over a 20 year period
21 simulated return patterns

Median: $407,910
11th out of 21 results
Average Annual Return of 7.28%

Mean: $453,866
Straight average of dollar values
Average Annual Return of 7.86%

Mean: $453,866
Straight average of dollar values
Average Annual Return of 7.86%

Median: $407,910
11th out of 21 results
Average Annual Return of 7.28%
### Forward Looking Expectations

#### Aon Hewitt Long-Term Capital Market Assumptions (30 Years) – 2015 Q1

<table>
<thead>
<tr>
<th></th>
<th>30-yr</th>
<th>30-yr</th>
<th>30-yr</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Cap U.S. Equity</td>
<td>4.3%</td>
<td>6.5%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Small Cap U.S. Equity</td>
<td>4.8%</td>
<td>7.6%</td>
<td>22.5%</td>
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<tr>
<td>Global Equity</td>
<td>4.6%</td>
<td>7.0%</td>
<td>16.5%</td>
</tr>
<tr>
<td>International Developed Equity</td>
<td>4.8%</td>
<td>7.0%</td>
<td>26.0%</td>
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<tr>
<td>Emerging Markets Equity</td>
<td>6.0%</td>
<td>8.2%</td>
<td>36.0%</td>
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<tr>
<td><strong>Fixed Income</strong></td>
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<td></td>
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<tr>
<td>Cash (Govt)</td>
<td>0.3%</td>
<td>2.4%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Cash (LIBOR)</td>
<td>0.6%</td>
<td>2.7%</td>
<td>1.5%</td>
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<tr>
<td>TIPS</td>
<td>1.1%</td>
<td>3.2%</td>
<td>4.5%</td>
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<tr>
<td>Core Fixed Income (Market Duration)</td>
<td>1.2%</td>
<td>3.3%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Long Duration Bonds – Gov’t/Credit</td>
<td>1.6%</td>
<td>3.7%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Long Duration Bonds – Credit</td>
<td>2.1%</td>
<td>4.2%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Long Duration Bonds – Gov’t</td>
<td>1.1%</td>
<td>3.2%</td>
<td>12.5%</td>
</tr>
<tr>
<td>High Yield Bonds</td>
<td>2.5%</td>
<td>4.7%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Bank Loans</td>
<td>1.5%</td>
<td>3.7%</td>
<td>7.5%</td>
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<tr>
<td>Non-US Developed Bonds (0% Hedged)</td>
<td>0.7%</td>
<td>2.6%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Non-US Developed Bonds (50% Hedged)</td>
<td>0.8%</td>
<td>2.9%</td>
<td>8.5%</td>
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<tr>
<td>Non-US Developed Bonds (100% Hedged)</td>
<td>0.8%</td>
<td>2.9%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Emerging Market Bonds (Sovereign USD)</td>
<td>3.2%</td>
<td>5.4%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Emerging Market Bonds (Corporate USD)</td>
<td>3.0%</td>
<td>5.2%</td>
<td>11.5%</td>
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<tr>
<td>Emerging Market Bonds (Sovereign Local)</td>
<td>4.1%</td>
<td>6.3%</td>
<td>14.5%</td>
</tr>
<tr>
<td><strong>Alternative Investments</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hedge Fund-of-Funds</td>
<td>3.0%</td>
<td>5.2%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Broad Hedge Funds</td>
<td>4.6%</td>
<td>6.8%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Real Estate (Broad Market)</td>
<td>4.6%</td>
<td>6.8%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Real Estate (Core)</td>
<td>3.7%</td>
<td>5.9%</td>
<td>11.5%</td>
</tr>
<tr>
<td>U.S. REITs</td>
<td>4.0%</td>
<td>6.2%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Commodities</td>
<td>2.6%</td>
<td>4.8%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>2.6%</td>
<td>8.6%</td>
<td>24.5%</td>
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<tr>
<td>Infrastructure</td>
<td>5.2%</td>
<td>7.4%</td>
<td>14.5%</td>
</tr>
<tr>
<td>U.S. Inflation</td>
<td>0.0%</td>
<td>2.1%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

---

1. All expected returns are geometric (long-term compounded; rounded to the nearest decimal) and net of investment fees.
2. Represents diversified portfolio of Fund of funds investments (includes additional layer of fees at the FoF level).
3. Represents diversified portfolio of Direct hedge fund investments.
Wage Assumptions

Building block approach to assumptions for projecting wages

- They should be consistent and tied to inflation
- Wage Inflation: General Inflation plus General Productivity
  - 3.00% + 0.50% = 3.50% Wage Inflation
- Salary Scale: Wage Inflation plus Individual Merit and Promotion
  - 3.50% + 0.75% = 4.25% Ultimate Salary Increase Assumption
- Overall Payroll Growth: Wage Inflation, adjusted for demographics and amortization period
  - 3.50% +/- based on projected actual payroll growth, which can be impacted by the projected change in the population, age of population, salary schedules, rates of termination and retirement, retirement eligibilities, and applicable time period
National Statistics

National Change in Wages versus Inflation

- Last 10 Years: 0.45% above inflation
- Last 20 Years: 0.45% above inflation
- Last 30 Years: 0.99% above inflation
- Since 1951: 0.99% above inflation

Change in NAW  
Change in CPI
Mortality Assumption

- Consistent with trends across the country, the life expectancy for the beneficiaries of TRS have continued to improve
- Also consistent with national trends, the rate of improvement has accelerated over the recent past
Since 2010, life expectancies continue to increase. The latest published rates (2012) are 20.5 years for females and 17.9 years for males, both from age 65.
By Classification

Life Expectancy by Current Age (Males)

Source: Current GRS Study of a very large municipal employer
As mortality rates have continued to decline over time, concern has increased about the impact of potential future mortality improvements on the magnitude of pension commitments.

In the view of many actuaries, the guidance regarding mortality assumptions should more explicitly recognize estimated future mortality improvement as a fundamental and necessary assumption, and the actuary’s provision for such improvement should be disclosed explicitly and transparently.

From Section 3.5.3: Mortality and Mortality Improvement Assumptions

The actuary should consider the effect of mortality improvement both prior to and subsequent to the measurement date.

With regard to mortality improvement, the actuary should do the following:

i. adjust mortality rates to reflect mortality improvement prior to the measurement date.
ii. include an assumption as to expected mortality improvement after the measurement date.

From Section 3.9: Reviewing Assumptions

At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable. The actuary is not required to do a complete assumption study at each measurement date. However, if the actuary determines one or more of the previously selected assumptions are no longer reasonable, the actuary should follow the general process described in section 3.3 and select reasonable new assumptions as appropriate.
Recent and Commissions and Publications

- Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published in September of 2012
  - “In light of the nearly continuous pattern of increasing longevity in the United States over the past century, the Committee recommends that actuaries incorporate adequate provisions for future mortality improvement into their calculations.”

- In February 2014, the SOA issued an exposure draft (now finalized) with a new mortality table RP-2014 along with updated projection scales MP-2014
  - Substantially increased life expectancy compared to previous tables and substantially increased the expected rate of increase in the future
TRS History and Experience

- In the last experience study (2010), new life expectancy tables were adopted which provided margin for future improvement in mortality consistent with historical trends at the time and published actuarial tables at the time
  - A/E of 110% for males and 111% for females
  - Equivalent of adding an entire year of life expectancy for a 65 year old retiree (21.2 actual versus 22.2 expected for females)
- However, in four years, all of the margin had been overtaken
  - 99% A/E for females and 95% A/E for males in FY2014
- This combined with a strong annual trends and confirmation by other national statistics and peer Systems suggests the previous mortality assumption had no margin for future improvement - and thus was no longer reasonable
Not all data points prior to 2003 were available and were estimated based on linear growth between known points.
Recommended Changes to Current Assumptions

- From November Valuation Presentation:
- With the experience study scheduled to be completed prior to the next valuation, we recommend a temporary assumption that meets the definition of reasonable
  - The final RP-2014 tables and MP-2014 projection scales are scheduled to be finalized this fall
  - We have added in 0.7 years in life expectancy, or 7% margin, to create a reasonable assumption for future improvement
  - This added approximately $2 billion to the UAAL
  - The long term assumption will be examined in the experience study next summer, and it is likely further strengthening will be needed
Generational Mortality Methodology

- An Actual to Expected ratio (A/E) is used to measure the Actual experience to the assumption, or what was Expected
  - For example, if the actuary expects 100 deaths and 80 deaths actually occur during the observation period, A/E ratio would be 80 / 100 which = 80%. An A/E of 100% would be a “perfect match”

- Traditionally for this assumption, setting a static assumption with 10% to 20% margin was preferred to allow for future increases in life expectancy

- An example from the 2010 TRS Experience Study:
  - A/E of 110% for males and 111% for females

- Historically (pre 2000), this would have been similar to adding in one (1) decade of mortality improvement

- However, this has led to upward drift in contribution rates as the assumption is slightly modified every 4-5 years. Over time, this adds up
  - An additional UAAL was created every time the assumption was updated

- This was a customary practice for two main reasons:
  - (1) a general belief that there was a limit on the ultimate longevity, and
  - (2) the added complexity of implementing a generational mortality type model and limitations in computational power
New Assumption: Static Projection

If we added in more margin using historical methods

Add an additional year of improvement

Estimated 0.09 growth per year 1995-2013

If historical methodologies are used, there will likely be other adjustments to the assumption in future years
Future Recommendation to Valuation Mortality Assumption

- GRS’ recommendation will be to move to full generational mortality
  - Instead of a static assumption with margin, the goal would be to find a good fit for today’s experience and then project the rates using standard tables
- With this fully generational projection approach, a gradual and consistent improvement over time would be in the valuation process
  - Future rates would not have to be reset every 4-5 years
- Produces a larger change to current liabilities and costs, but has the expectation of not systematically creating future UAAL’s
A new projection Scale BB has recently been published, based on very recent data and trends. The following are excerpts from the Report which introduced Scale BB.

“As part of its periodic review of retirement plan mortality experience, RPEC initiated a Pension Mortality Study in 2010. This study, which is still in progress, includes a comprehensive review of recent mortality experience of uninsured retirement plans in the United States. The SOA anticipates publishing a new set of retirement plan mortality tables and mortality improvement rates in late 2013, or early 2014, that would be the successors to the RP-2000 tables and Scale AA.”

“RPEC recognizes that there is a wide range of opinion with respect to future levels of mortality in the United States and that the assumptions underlying any set of mortality improvement rates must necessarily reflect some degree of subjectivity. RPEC characterizes the assumptions that underpin Scale BB (including a 1.0% long-term rate of mortality improvement and limited cohort effects) as middle-of-the road, being neither overly optimistic nor too pessimistic with respect to future longevity improvements in the United States.”

“In light of the nearly continuous pattern of increasing longevity in the United States over the past century, the Committee recommends that actuaries incorporate adequate provisions for future mortality improvement into their calculations. Taking into consideration the methodology used to develop Scale BB (Section 5.3) and RPEC’s preference for generational projection of mortality over static approximations (Section 7.1), the committee encourages users of Scale BB to do so on a fully generational basis.”
New Assumption: Static Projection

If we added in more margin using historical methods

- Project approximately 0.09 growth per year going forward
- Growth already recognized in valuation
- Today’s 65 year old will have a different life expectancy than a 65 year old in 2025

Estimated 0.09 growth per year 1995-2013

If historical methodologies are used, there will likely be other adjustments to the assumption in future years
From other Client: Post Retirement Mortality

Average Life Expectancy in Years from Current Age 65

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-2011</td>
<td>22.0</td>
<td>24.5</td>
</tr>
<tr>
<td>2010</td>
<td>21.3</td>
<td>24.6</td>
</tr>
<tr>
<td>2010</td>
<td>21.3</td>
<td>24.6</td>
</tr>
<tr>
<td>2020</td>
<td>23.1</td>
<td>26.4</td>
</tr>
<tr>
<td>2030</td>
<td>25.5</td>
<td>27.4</td>
</tr>
</tbody>
</table>


RP-2000 with blue collar adjustment projected to 2010 by Scale BB, with 109% load for males and 103% load for females. Full projection after 2010 by Scale BB.
Timeline

- Today will kick off the process
- Will meet with Staff and IMD over next couple of months with initial findings
- Draft report to Staff in June
- Present initial results to Board in July
- Present final report to Board in September for approval
- Assumptions are adopted (as proposed or as modified by direction of Board) for use in actuarial valuations as of August 31, 2015
Questions?
Tab 5
Executive Director’s Report

Brian Guthrie
May 1, 2015
Presentation Objectives

- Legislative update.
- Discuss June and July Board meeting agendas.
Legislative Update
Upcoming Agendas
Upcoming Agendas

June 11-12, 2015 Major items include (Quarterly Meeting):

Board
- Report on Q1 earnings.
- TRS-Care and TRS-ActiveCare Rates and Plan Design Adoption.
- Legislative update.
- Quarterly SPN Update.
- Update on Trustee elections.
- TEAM.

Committees

- **Audit Committee Meeting**
  - SAO Performance Incentive Pay Plan Audit and various ISD Audits.

- **Benefits Committee Meeting**
  - Recommend adoption of TRS-Care and TRS-ActiveCare Rates and Plan Design.

- **Budget Committee Meeting**
  - FY 2016 Operating Budget (Discuss only – adopt in July).

- **Investment Management Committee Meeting**
  - Private Equity Review.
  - Real Assets Review.
  - Energy and Natural Resources Portfolio.

- **Policy Committee Meeting**
  - Trustee Procurement Policy (Discussion and possible recommended Board adoption).

- **Risk Management Committee Meeting**
  - Enterprise Risk Management Update.
July 24, 2015 Major items include (1 Day Off-Quarter Meeting):

Board
- Adopt TRS FY 2016 Operating Budget.
- Consider selection of fiduciary counsel.
- Pension Fund Experience Study.
- Executive Evaluations.
- Recognize outgoing Trustees.
- Legislative implementation.

Committees
- **Audit Committee Meeting**
  - Evaluate the Chief Audit Executive.
- **Budget Committee Meeting**
  - Recommend adoption of FY 2016 Operating Budget.
Tab 6
Budget and Appropriation Updates

Don Green, Chief Financial Officer

Board of Trustees Meeting
May 1, 2015
## Pension Trust Fund
### Cash Disbursements

<table>
<thead>
<tr>
<th>Month</th>
<th>FY 2014 *</th>
<th>FY 2015</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>$6,970,179</td>
<td>$8,329,726</td>
<td>$1,359,547</td>
</tr>
<tr>
<td>October</td>
<td>6,917,337</td>
<td>8,291,727</td>
<td>1,374,390</td>
</tr>
<tr>
<td>November</td>
<td>6,708,686</td>
<td>5,966,718</td>
<td>($741,968)</td>
</tr>
<tr>
<td>December</td>
<td>6,566,553</td>
<td>9,042,869</td>
<td>$2,476,316</td>
</tr>
<tr>
<td>January</td>
<td>15,411,211</td>
<td>13,819,515</td>
<td>($1,591,696)</td>
</tr>
<tr>
<td>February</td>
<td>6,792,019</td>
<td>8,004,871</td>
<td>$1,212,852</td>
</tr>
<tr>
<td>March</td>
<td>9,006,093</td>
<td>7,004,924</td>
<td>($2,001,169)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$58,372,078</strong></td>
<td><strong>$60,460,349</strong></td>
<td><strong>$2,088,271</strong></td>
</tr>
</tbody>
</table>

* Cash disbursements totaled $95,107,668 as of August 31, 2014.
## Comparison of Appropriations

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Requested FY 16-17</th>
<th>House and Senate</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Education Retirement</td>
<td>$3,092,586,742</td>
<td>$3,133,557,074</td>
<td>$40,970,332</td>
</tr>
<tr>
<td>Higher Education Retirement</td>
<td>491,440,155</td>
<td>454,678,679</td>
<td>(36,761,476)</td>
</tr>
<tr>
<td>Administrative Operations</td>
<td>196,350,987</td>
<td>196,350,987</td>
<td>0</td>
</tr>
<tr>
<td>TRS Care State Matching</td>
<td>557,360,132</td>
<td>562,175,749</td>
<td>4,815,617</td>
</tr>
<tr>
<td>TRS Care Supplemental</td>
<td>874,761,667</td>
<td>768,100,754</td>
<td>(106,660,913)</td>
</tr>
<tr>
<td>Total</td>
<td>$5,212,499,683</td>
<td>$5,114,863,243</td>
<td>$(97,636,440)</td>
</tr>
<tr>
<td>FTEs</td>
<td>503.3</td>
<td>503.3</td>
<td></td>
</tr>
</tbody>
</table>
Public Education State Matching

<table>
<thead>
<tr>
<th>Biennium</th>
<th>Amount Appropriated</th>
<th>Match %</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2012/13</td>
<td>$2.73 billion</td>
<td>6.0% / 6.4%</td>
</tr>
<tr>
<td>FY 2014/15</td>
<td>$2.73 billion</td>
<td>6.4% / 6.8%</td>
</tr>
<tr>
<td>FY 2016/17</td>
<td>$3.13 billion</td>
<td>6.8% / 6.8%</td>
</tr>
</tbody>
</table>

- Driven by covered payroll which is a function of staffing levels which are correlated to student enrollment.
- 4.3% year over year growth in FY2014. Trending at 4.9% for FY2015.
- Expected 2.0% per year growth in covered payroll through FY2017 based on historical averages.
- The State of Texas settles up the amount owed with TRS annually.
### Higher Education State Matching

<table>
<thead>
<tr>
<th>Biennium</th>
<th>Amount Appropriated</th>
<th>Match %</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2012/13</td>
<td>$510.6 million</td>
<td>6.0% / 6.4%</td>
</tr>
<tr>
<td>FY 2014/15</td>
<td>$511.1 million</td>
<td>6.4% / 6.8%</td>
</tr>
<tr>
<td>FY 2016/17</td>
<td>$454.7 million</td>
<td>6.8% / 6.8%</td>
</tr>
</tbody>
</table>

- 5.4% year over year growth in FY2014. Trending at 6.4% for FY2015.
- Expected 4.0% per year growth in covered payroll through FY2017 based on historical averages.
- Non appropriated funding is not included above. The reliance on non appropriated funding to pay benefits is growing over time.
- The State of Texas settles up the amount owed with TRS annually.
Major Cost Drivers for Administrative Operations
Membership Growth, 10 Yr Trend

- Active members – 21% growth
- Retired members – 46% growth
Phone Calls Answered, FY2009-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Phone Calls Answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>429,171</td>
</tr>
<tr>
<td>2010</td>
<td>457,364</td>
</tr>
<tr>
<td>2011</td>
<td>496,210</td>
</tr>
<tr>
<td>2012</td>
<td>494,281</td>
</tr>
<tr>
<td>2013</td>
<td>504,998</td>
</tr>
<tr>
<td>2014</td>
<td>500,668</td>
</tr>
</tbody>
</table>
Office Visits, FY2009-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>9,489</td>
</tr>
<tr>
<td>2010</td>
<td>9,865</td>
</tr>
<tr>
<td>2011</td>
<td>10,088</td>
</tr>
<tr>
<td>2012</td>
<td>10,149</td>
</tr>
<tr>
<td>2013</td>
<td>10,020</td>
</tr>
<tr>
<td>2014</td>
<td>9,100</td>
</tr>
</tbody>
</table>
Benefit Processing, FY2009-14

Overall 19% growth
- Refunds – 9%
- Retirements – 42%
- Beneficiary Claims – 28%
CEM Peer cost in FY2013 was $84.97.

FY 2011 included one time cost of expensed technology project.
Investment Expense per Basis Points of Net Assets

FY 2011 included one time cost of expensed technology project.
Full-Time Equivalent (FTE) Employees

Excludes TEAM FTEs per Rider 16.
## Total Cost for Pension FTEs

<table>
<thead>
<tr>
<th>Category</th>
<th>FY14 Spend</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages</td>
<td>$ 38,929,333</td>
<td>Excludes incentive comp.</td>
</tr>
<tr>
<td>Retirement</td>
<td>2,627,229</td>
<td>6.8% of salary; employer contribution</td>
</tr>
<tr>
<td>Social Security</td>
<td>2,873,178</td>
<td>6.2% for social security and 1.45% for Medicare</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>5,200,472</td>
<td>Employer contribution only</td>
</tr>
<tr>
<td>Other Benefits</td>
<td>1,232,664</td>
<td>Longevity, BRP, etc.</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$ 50,862,876</strong></td>
<td>Pension fund only, excluding TEAM</td>
</tr>
</tbody>
</table>
Pension Trust Fund Balance

From 2006 – 2014 in Billions $, As of August 31

2006: $100.2
2007: $112.1
2008: $104.9
2009: $88.7
2010: $95.7
2011: $107.4
2012: $111.4
2013: $117.4
2014: $132.8
Pension Trust Fund, FY2014

Additions
- Member: 79%
- Employer & State Match: 11%
- Investment: 10%

$24.5 billion

Deductions
- Benefits: 95%
- Refunds: 5%
- Admin: 0.5%

$9.1 billion

$15.4 billion addition to net assets
The total operating budget is $160,816,484 across all funds.

- Pension, $119.6M, 74%
- Soft Dollars, $33.1M, 21%
- Healthcare, $8.1M, 5%
Recap of FY2015 Budget by Division

- **Agency Support**, $17.0, 11%
- **Info Tech**, $17.2, 11%
- **TEAM**, $23.2, 14%
- **Healthcare**, $8.1, 5%
- **Finance**, $14.7, 9%
- **Benefits**, $10.6, 7%
- **IMD**, $70.0, 43%

The Agency Support Division includes executive, human resources, communications, internal audit, strategic initiatives, risk management and legal. Label amounts in millions.
FY 2016-2017 appropriations for Administrative Operations (excluding TEAM) is $156 million in pension funds; no General Revenue.

Administrative Operations appropriations are greater than the previous biennium primarily as a result of:

- Additional funding for enterprise-wide equity adjustments for targeted positions, as authorized by the Board in July 2014.
- Increased funding for operating costs related to rent, utilities, insurance, software licenses, postage and contractual costs.
- Increased funding for capital budget projects to maintain TRS owned facilities, which is consistent with overall legislative intent to address deferred maintenance needs state-wide. Maintenance costs are borne by the pension fund. Needed projects include a sump pump replacement ($1.2 million), garage fire suppression system upgrade ($1.5 million) and an additional backup generator ($600 thousand).
Both House and Senate recommendations for TEAM are funded at requested levels and include:

- $40.3 million to sustain program funding in this third of four total biennial requests with an estimated program cost of $100+ million.
• Recommendations for FY 16-17 include 11 additional FTEs to provide necessary resources to effectively accomplish TEAM program objectives.

• 11 FTEs include 5 systems analysts, a helpdesk support technician, a technical writer and 4 employer outreach specialists.
Riders

- Both House and Senate recommendations include new rider for Appropriation transfer authority for TRS-Care

- House recommendations include new contingency rider for GASB implementation
## Capital Budgets
### Repair or Rehabilitation of Buildings and Facilities

<table>
<thead>
<tr>
<th>Project</th>
<th>FY 12-13</th>
<th>FY 14-15</th>
<th>FY 16-17</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Renovations</td>
<td>$300,000</td>
<td>$350,000</td>
<td>$1,000,000</td>
<td>provides contingency funds for renovations to the facilities, including reallocation of current space used by employees for any unforeseen circumstances</td>
</tr>
<tr>
<td>Air Handler Replacement</td>
<td>0</td>
<td>3,597,990</td>
<td>0</td>
<td>replace components of the heating, ventilating, and air conditioning (HVAC) system that have exceeded expected useful life with new components that are more efficient</td>
</tr>
<tr>
<td>Pressurization of Stairwells</td>
<td>0</td>
<td>360,000</td>
<td>0</td>
<td>install pressurization fans and controls for west building stairwell</td>
</tr>
<tr>
<td>Sump Pump System Upgrade</td>
<td>0</td>
<td>0</td>
<td>1,200,000</td>
<td>replace components of the sump pump system that have exceeded expected useful life with new components that are more efficient</td>
</tr>
<tr>
<td>Garage Fire Suppression Upgrade</td>
<td>0</td>
<td>0</td>
<td>1,500,000</td>
<td>replace unprotected steel piping with corrosion resistant fire suppression system piping</td>
</tr>
<tr>
<td>Data Center Generator</td>
<td>0</td>
<td>0</td>
<td>600,000</td>
<td>upgrade the back-up generator system that provides power to the data center during emergencies and power outages</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$300,000</td>
<td>$4,307,990</td>
<td>$4,300,000</td>
<td></td>
</tr>
</tbody>
</table>
## Capital Budgets
### Acquisition of Information Resource Technologies

<table>
<thead>
<tr>
<th>Project</th>
<th>FY 12-13</th>
<th>FY 14-15</th>
<th>FY 16-17</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eForms &amp; Self Service Applications</td>
<td>$500,000</td>
<td>$0</td>
<td>$0</td>
<td>expands the use of electronic forms and self-service applications to better serve TRS membership and staff</td>
</tr>
<tr>
<td>Imaging System Upgrade</td>
<td>360,000</td>
<td>0</td>
<td>0</td>
<td>upgrade the existing Filenet Panagon Document Imaging System to the IBM Filenet P8 Document Imaging</td>
</tr>
<tr>
<td>Mainframe &amp; Peripheral Upgrades</td>
<td>0</td>
<td>420,000</td>
<td>840,000</td>
<td>supports upgrading and expanding the TRS enterprise server peripherals to reduce capacity constraints and issues with compatibility and obsolescence</td>
</tr>
<tr>
<td>Telecom Upgrade</td>
<td>0</td>
<td>790,000</td>
<td>900,000</td>
<td>supports the upgrade, development, and maintenance of the telecommunications infrastructure</td>
</tr>
<tr>
<td>Investment Systems Upgrade</td>
<td>0</td>
<td>370,000</td>
<td>370,000</td>
<td>define, develop and implement a Business Intelligence strategy and program, and to migrate existing investment accounting data</td>
</tr>
<tr>
<td>Pension Legislation</td>
<td>0</td>
<td>200,000</td>
<td>200,000</td>
<td>anticipates legislative changes and supports the agency's mission and strategic plans</td>
</tr>
<tr>
<td>PC Workstation Refresh</td>
<td>0</td>
<td>700,000</td>
<td>740,000</td>
<td>project focused on upgrading outdated hardware technology</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$860,000</strong></td>
<td><strong>$2,480,000</strong></td>
<td><strong>$3,050,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
### TRS Care Funding

<table>
<thead>
<tr>
<th>Biennium</th>
<th>Amount Appropriated</th>
<th>Match %</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2012/13</td>
<td>$401.0 million</td>
<td>1.0% / 0.5%</td>
</tr>
<tr>
<td>FY 2014/15</td>
<td>$495.1 million</td>
<td>1.0% / 1.0%</td>
</tr>
<tr>
<td>FY 2016/17</td>
<td>$562.2 million</td>
<td>1.0% / 1.0%</td>
</tr>
</tbody>
</table>

- Funding is based on active employees and driven by covered payroll which is a function of staffing levels which are correlated to student enrollment.
- 4.5% year over year growth in FY2014. Trending at 4.9% for FY2015.
- Expected 2.0% per year growth in covered payroll through FY2017 based on historical averages.
- The State of Texas settles up the amount owed with TRS annually.
TRS-Care Funding Sources

*The funding is based on active member payroll and not actual health care costs.

State Contributions:
1.0% of active member payroll by law.

Active Employees:
Contribute 0.65% of payroll.

District Contributions:
Contribute 0.55% of active member payroll.

Retiree Contributions:
Retirees pay premiums for any plan option other than TRS Care-1.

Other Contributions:
Includes Medicare Part D subsidy and investment income.
## TRS-Care Funding

### Financial History & Projection Through FY 2019 with Data Through December 2014

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Contributions</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Medical Incurred</td>
</tr>
<tr>
<td></td>
<td>State Contributions</td>
<td></td>
</tr>
<tr>
<td>FY 2016</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>FY 2017</td>
<td>$12,979,600</td>
<td>$25,931,680</td>
</tr>
<tr>
<td>FY 2018</td>
<td>$13,426,460</td>
<td>$31,357,632</td>
</tr>
<tr>
<td>FY 2019</td>
<td>$16,289,108</td>
<td>$37,420,711</td>
</tr>
<tr>
<td>FY 2020</td>
<td>$17,956,951</td>
<td>$44,369,915</td>
</tr>
<tr>
<td>FY 2021</td>
<td>$22,827,877</td>
<td>$57,683,877</td>
</tr>
<tr>
<td>FY 2022</td>
<td>$25,316,924</td>
<td>$63,259,924</td>
</tr>
<tr>
<td>FY 2023</td>
<td>$45,265,855</td>
<td>$101,026,855</td>
</tr>
<tr>
<td>FY 2024</td>
<td>$80,123,944</td>
<td>$156,391,944</td>
</tr>
<tr>
<td>FY 2026</td>
<td>$127,474,107</td>
<td>$376,484,107</td>
</tr>
<tr>
<td>FY 2027</td>
<td>$174,707,748</td>
<td>$594,707,748</td>
</tr>
<tr>
<td>FY 2028</td>
<td>$218,345,030</td>
<td>$824,345,030</td>
</tr>
<tr>
<td>FY 2029</td>
<td>$251,362,047</td>
<td>$974,362,047</td>
</tr>
<tr>
<td>FY 2030</td>
<td>$287,726,018</td>
<td>$1,124,726,018</td>
</tr>
<tr>
<td>FY 2031</td>
<td>$323,357,915</td>
<td>$1,274,357,915</td>
</tr>
<tr>
<td>FY 2032</td>
<td>$360,194,047</td>
<td>$1,424,194,047</td>
</tr>
<tr>
<td>FY 2033</td>
<td>$424,345,047</td>
<td>$1,584,345,047</td>
</tr>
<tr>
<td>FY 2034</td>
<td>$501,929,047</td>
<td>$1,781,929,047</td>
</tr>
<tr>
<td>FY 2035</td>
<td>$589,813,944</td>
<td>$1,978,813,944</td>
</tr>
<tr>
<td>FY 2036</td>
<td>$694,513,944</td>
<td>$2,174,513,944</td>
</tr>
<tr>
<td>FY 2037</td>
<td>$817,929,944</td>
<td>$2,371,929,944</td>
</tr>
<tr>
<td>FY 2038</td>
<td>$961,345,944</td>
<td>$2,576,345,944</td>
</tr>
<tr>
<td>FY 2039</td>
<td>$1,124,345,944</td>
<td>$2,781,345,944</td>
</tr>
<tr>
<td>FY 2040</td>
<td>$1,304,345,944</td>
<td>$2,986,345,944</td>
</tr>
</tbody>
</table>

NOTES:
- Incurred costs through December 31, 2014
- 78% participation in Medicare Advantage and 83% participation in Part D plan, which was effective 1/1/2013; CY2013 CMS Subsidy values assumed for Part D Revenue.
- Contribution rate of 3%: District contribution rate of 0.8% and Active contribution rate of 0.8%.
- Enrollment assumptions based on GASP headcounts.
- 4% increase in payroll growth for FY2014; 4% increase in payroll growth thereafter.
- Medical trends: 1% for Care 1; 1% for Care 2; 1% for Care 3.
- Pharmacy trends: 3% for Care 2; 3% for Care 3; 5% for EGWP plans.
- Interest rate = 0.4%
Both House and Senate Supplemental Appropriations Bills include funding for the $768.1M projected shortfall.
<table>
<thead>
<tr>
<th>Date Range</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>March – April</td>
<td>Managers submit department budget priorities</td>
</tr>
<tr>
<td>June board meeting</td>
<td>Review budget history and proposed general provisions, FY 2015 budget update, final appropriations bill</td>
</tr>
<tr>
<td>July board meeting</td>
<td>Approve FY 2016 Operating Budget</td>
</tr>
</tbody>
</table>
Tab 7
Memorandum

DATE: April 23, 2015

TO: TRS Board of Trustees

FROM: Don Green, Chief Financial Officer

COPY: Brian Guthrie, Executive Director; Ken Welch, Deputy Director; Carolina de Onís, General Counsel

RE: Proposed Updates to Key Employee and Signature Authority Resolutions

BOARD ACTION REQUESTED

The board is asked to adopt changes to the following key employee and signature authority resolutions to update certain position titles mentioned in them:

- **TRS Key Employee Determinations (Key Employee)**

  A “Key Employee” is an employee who has been determined by the board as one who exercises significant decision-making or fiduciary authority by virtue of the position he or she holds with TRS. A Key Employee is subject to special requirements under the Employee Ethics Policy and TRS Trading Policy for Employees and Certain Contractors.

- **Designation of Persons Authorized To Sign TRS Vouchers (Voucher Authority)**

  The Voucher Authority resolution is filed with State Comptroller of Public Accounts and designates TRS employees authorized to sign vouchers for payment from TRS accounts. The resolution also evidences the Comptroller's authority to issue warrants for payment from TRS funds.

- **General Authority Resolutions (General Authority)**

  The General Authority Resolutions are contained in a single document that evidences the board’s delegation of approval authority to certain TRS employees with respect to investment and related matters. The General Authority document is also the framework
from which TRS builds a detailed series of transaction approvals, workflows and controls
to conduct investment purchases and sales as well as other investment related matters such
as contracts. Finally, external parties such as custody banks, counterparties, external
managers and brokers use the General Authority document to authenticate the validity of
transactions they conduct on behalf of TRS.

Having correct position titles in the resolutions is needed to properly show the authority
granted to certain TRS employees. Redlined versions of the three resolutions showing
staff’s recommended changes are attached to this memorandum.

**BACKGROUND**

The resolutions need to be amended because of changes to certain titles of positions in the
Financial and Healthcare Policy and Administration Divisions, as shown below:

<table>
<thead>
<tr>
<th>New Title*</th>
<th>Old Title(s)*</th>
<th>Resolution(s) Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chief Healthcare Officer</strong></td>
<td>Director of Health Care Policy and Administration</td>
<td>Key Employee</td>
</tr>
</tbody>
</table>
| **Director of General Accounting & Budget** | Manager of General Accounting
  
  Director of General Accounting & Budgeting | Key Employee
  
  Voucher Authority,
  General Authority |
| **Assistant Director of General Accounting & Budget** | Assistant Director of General Accounting & Budgeting | Voucher Authority,
  General Authority |
| **Director of Investment Accounting** | Manager of Investment Accounting
  
  Director of Investment & Benefit Accounting | Key Employee
  
  Voucher Authority,
  General Authority |
| **Manager of Financial Reporting** | Financial Reporting Manager | Voucher Authority |
| **Manager of Employee Payroll & Benefits** | Employee Payroll & Benefits Manager | Voucher Authority |

* Changes are italicized.
SUGGESTED MOTION LANGUAGE

"I move that the board adopt the proposed changes updating certain employee position titles in the Key Employee, Voucher Authority, and General Authority resolutions, as presented by staff."
Teacher Retirement System of Texas

Board of Trustees

Resolution Adopting Revised TRS Key Employee Determinations

Whereas, In accordance with Government Code Section 825.212 and the Employee Ethics Policy, as revised from time to time, the Board of Trustees of the Teacher Retirement System of Texas (the “Board”) has authority to determine employees who exercise significant fiduciary authority (“key employees”); and

Whereas, The Board desires to adopt the following determinations of key employees; now, therefore be it

Resolved, That the following positions are determined to be key employees and their current and future incumbents subject to all applicable requirements for key employees:

<table>
<thead>
<tr>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Director</td>
</tr>
<tr>
<td>Deputy Director</td>
</tr>
<tr>
<td>Chief Investment Officer</td>
</tr>
<tr>
<td>Deputy Chief Investment Officer</td>
</tr>
<tr>
<td>Chief Benefit Officer</td>
</tr>
<tr>
<td>Chief Financial Officer</td>
</tr>
<tr>
<td>General Counsel</td>
</tr>
<tr>
<td>Chief Audit Executive</td>
</tr>
<tr>
<td>Chief Information Officer</td>
</tr>
<tr>
<td>Deputy Chief Information Officer</td>
</tr>
<tr>
<td>Chief Healthcare Officer/Director of Health Care Policy and Administration</td>
</tr>
<tr>
<td>Director of Strategic Initiatives</td>
</tr>
<tr>
<td>Director of General Accounting &amp; Budgeting</td>
</tr>
<tr>
<td>Director of Investment Accounting</td>
</tr>
</tbody>
</table>

Further resolved, That all employees who hold a voting position on the Internal Investment Committee at any time during a reporting period are determined to be key employees subject to all applicable requirements for key employees;

Further resolved, That all Investment Management Division employees who hold the working title of Director or higher during a reporting period are determined to be key employees and subject to all applicable requirements for key employees;
Further resolved, That all employees who have authority to approve or execute securities trades in the TRS order management system during a reporting period are determined to be key employees and subject to all applicable requirements for key employees;

Further resolved, That all employees who hold authority during a reporting period under the Board’s General Authority Resolutions (TRS-477) either through direct delegation from the Board or otherwise are determined to be key employees and subject to all applicable requirements for key employees;

Further resolved, That the Executive Director is authorized to designate, upon notice to the General Counsel, an employee not identified above to be a supplemental key employee if the Executive Director determines that it would be prudent for TRS to have the employee subject to the key employee requirements because of the influence the employee exercises, the nature of the employee’s job, the information to which the employee has access, or another appropriate reason; at the next meeting of the Board after any supplemental key employee designations, the Executive Director shall notify the Board of the designations for the Board to consider ratification of the designations;

Further resolved, That the foregoing resolutions and all applicable key employee requirements, including submitting enhanced disclosures required by the Employee Ethics Policy, are effective for the 2014-2012 reporting year and shall remain effective until modified by the Board.
WHEREAS, In accordance with section 825.104 of the Texas Government Code, the Board of Trustees (the "Board") of the Teacher Retirement System of Texas ("TRS") has previously granted authority to certain persons to approve and sign vouchers for payment from accounts of TRS; and

WHEREAS, The Board desires to re-designate those persons to whom this authority has been granted and to update certain position titles, add Arlene Caballero as Employee Benefits & Payroll Manager as an additional authorized designee; now, therefore, be it

RESOLVED, That the Board designates the following persons to approve and sign vouchers for payment from accounts of TRS from and after May 1, 2015 November 20, 2014, and until the designated person separates from employment with TRS, is no longer employed in any capacity for which authority is granted under this resolution, or is not re-designated by the Board, whichever occurs first:

Brian K. Guthrie, Executive Director
Ken Welch, Deputy Director
Don Green, Chief Financial Officer
Jamie Pierce, Director of General Accounting & Budget
Scot Leith, Director of Investment & Benefit Accounting
Janie Duarte, Assistant Director of General Accounting & Budget
Cindy Haley, Manager of Financial Reporting
Arlene Caballero, Manager of Employee Payroll & Benefits
Vicki Garcia, Team Leader of Investment Accounting

ATTESTED:

Signed: ____________________________ Date: May 1, 2015 November 20, 2014
R. David Kelly, Nanette Sissney, Board Vice-Chair & Presiding Chair

Signed: ____________________________ Date: May 1, 2015 November 20, 2014
Brian K. Guthrie, Executive Director
Investment Group

Resolved, That Investment Division employees holding the following TRS working titles are members of the “Investment Group”:

- Chief Investment Officer
- Senior Managing Director
- Senior Director
- Senior Investment Manager

Resolved further, That the Executive Director is authorized and directed to designate in writing those individual members of the Investment Group who are authorized within the investment areas designated by the Executive Director, in addition to the Chief Investment Officer and the Deputy Chief Investment Officer, to take any one or more of the following actions authorized below in accordance with these resolutions until the authority is revoked.

Resolved further, That the Executive Director is authorized and directed to designate in writing, by investment area and category or item designation, the specific authorities granted to each authorized member of the Investment Group, until the authority is revoked.

A. General Authority for Investment Matters other than Derivatives

Resolved further, That the Chief Investment Officer, Deputy Chief Investment Officer, and any other member of the Investment Group designated by the Executive Director as having such authority, in addition to any other authority expressly designated by the Executive Director under these resolutions, may act on behalf of TRS to:

A.1 Buy, sell, or give orders or instructions for transactions in currencies and securities, and any amendments or modifications of such orders or instructions.
A.2 Direct Investment Operations personnel to deliver, pay, expend, or receive cash, currencies, monies, securities (including restricted or Rule 144A securities) in connection with a contract to buy or sell securities.
A.3 Give directions and instructions to members of the Trading Group or external managers relating to execution, brokerage, clearing or settlement of securities transactions.
A.4 Direct Investment Operations personnel to fund subscribed investment funds or capital called by investment funds; transfer funds or assets between custodial accounts, including external manager separate accounts; transfer funds to pay fees under an investment contract; and to instruct other cash movements, including movements of cash to and from custodial accounts held by the Comptroller of Public Accounts and transfers of assets in kind for investment under an investment contract.

Notwithstanding any provision of this Section A, authority granted under this Section A does not extend to transactions in derivatives, which are governed exclusively by Section C of these resolutions.

B. Investment Contracting Authority other than Derivatives

Resolved further, That the Chief Investment Officer, Deputy Chief Investment Officer, and any other member of the Investment Group designated by the Executive Director as having such authority, in addition to any other authority expressly designated by the Executive Director under these resolutions, may act on behalf of TRS to:

B.1 Make, execute, deliver, waive, modify, amend, renew, extend, assign, terminate, or transfer, in each case in writing, investment-related documents, including without limitation, written contracts, investment management agreements, subscription agreements, capital commitments, account agreements, consents, certificates, powers of attorney, notes, deeds, security agreements, pledges, mortgages, endorsements, directions and instructions to amend, modify, fix, and execute written investment guidelines in investment management agreements with external managers and fund managers, and any and all documents necessary or proper to effectuate the authority granted in this Section B.1.
B.2 Jointly with a member of the Financial Group or the Executive Group, execute investment fund redemption and withdrawal notices and instructions for the transfer or delivery by wire or physical transfer of cash or securities to a TRS account by a third-party fund, external manager, account, debtor, except that an authorized member of the Investment Group may be the sole TRS signatory on subscription agreements, side letter agreements, or other investment-related documents executed by TRS in connection with a new investment, and any amendments or modifications to such documents and agreements other than redemption and withdrawal notices and corresponding instructions for the transfer or delivery by wire or physical transfer of cash or securities.

Notwithstanding any provision of this Section B, the authority granted under this Section B does not extend to transactions in derivatives, which are governed exclusively by Section C of these resolutions.

C. Derivatives Authority

Resolved further, That the Chief Investment Officer or the Deputy Chief Investment Officer and any member of the Investment Group who is designated by the Executive Director as a member of the derivatives team, in addition to any authority expressly designated by the Executive Director under these resolutions is authorized may act on behalf of TRS to:

C.1 Negotiate, make, fix, execute, waive, amend, modify, renew, extend, transfer, assign, endorse, or terminate, in each case in writing, documents related to derivatives transactions, including without limitation, master agreements, schedules, credit support annexes, collateral-management agreements, transaction confirmations, account agreements, and clearing agreements, and deliverables relating to such documents and agreements.

C.2 Make, execute, waive, amend, modify, renew, extend, transfer, assign, endorse, or terminate, in each case in writing, disclosures, questionnaires, elections, certifications, or other administrative documents and deliverables related to derivatives accounts or transactions.

C.3 Jointly with a member of the Financial Group or the Executive Group, execute, amend, modify, or terminate documents, directions, and instructions to deliver and pay cash, currencies, monies, or securities, to margin, collateralize, or settle derivatives transactions.

C.4 Direct Investment Operations personnel to receive cash, currencies, monies, or securities, to margin, collateralize, or settle derivatives transactions.

C.5 Buy, sell, or give orders or instructions for transactions in derivatives, and any amendments or modifications of such orders or instructions.

C.6 Give directions and instructions to members of the Trading Group or external managers relating to execution, brokerage, clearing or settlement of derivatives transactions.

Financial Group

Resolved further, That the “Financial Group” comprises employees holding the following TRS working titles:

<table>
<thead>
<tr>
<th>Chief Financial Officer</th>
<th>Director of Investment and Benefit Accounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of General Accounting and Budgeting</td>
<td>Team Leader of Investment Accounting</td>
</tr>
<tr>
<td>Manager of Financial Reporting</td>
<td>Assistant Director of General Accounting and Budgeting</td>
</tr>
</tbody>
</table>

Resolved further, That each member of the Financial Group is authorized and empowered on behalf of TRS, jointly with an authorized member of the Investment Group or the Executive Group, to execute redemption and withdrawal notices and instructions for the transfer or delivery by wire or physical transfer of cash, collateral, margin, or securities to a TRS account by a third-party fund, account, debtor, or derivatives counterparty, except that an authorized member of the Investment Group may be the sole TRS signatory on subscription agreements and side letter agreements and any amendments to subscription agreements or side letter agreements.

Resolved further, That each member of the Financial Group is authorized and empowered on behalf of TRS, to execute authorizations to fund subscribed investment funds or capital called by investment funds; transfer funds or assets between custodial accounts, including external manager separate accounts; transfer funds to pay fees under an investment contract; instruct other cash movements, including movements of assets to and from custodial accounts held by the Comptroller of Public Accounts and transfers of assets in kind for investment under an investment contract.

Resolved further, That each member of the Financial Group is authorized and empowered on behalf of TRS to authorize and direct members of the Investment Accounting team to verify or confirm to a custodian or prime broker any order for the transfer or delivery of currencies, monies, securities, or contracts to any other person.
Executive Group

Resolved further, That the “Executive Group” comprises employees holding the TRS working titles of Executive Director and Deputy Director, and each member of the Executive Group is authorized and empowered to perform, with respect to a particular matter or transaction, any and all of the acts that any and all employees in the Investment Group or the Financial Group are authorized to perform, except that when joint action by a member of the Investment Group and a member of the Financial Group is required, only one member of the Executive Group may act jointly with a member of either of the Investment Group or the Financial Group.

Trading Group

Resolved further, That the “Trading Group” comprises the employees holding the following TRS working titles: Director – Trading Center, and Trader. Each member of the Trading Group is authorized and empowered on behalf of TRS to take the following actions: to place orders or agree with brokers, dealers and market-makers to purchase or sell securities, derivatives, forward contracts, or currency; to monitor and supervise execution and settlement of such orders or agreements; and to negotiate, fix, and vary the commissions, spreads, or discounts for individual orders or agreements to purchase or sell securities, derivatives, forward contracts, or currency.