Joint Meeting of the

Board of Trustees and Investment Advisory Committee

December 1, 2016

EMPLOYEES RETIREMENT SYSTEM OF TEXAS

Presented for Review and Approval

February 22, 2017

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JOINT MEETING OF THE
BOARD OF TRUSTEES AND
INVESTMENT ADVISORY COMMITTEE
EMPLOYEES RETIREMENT SYSTEM OF TEXAS

December 1, 2016
ERS Building – Board Room
200 E. 18th Street
Austin, Texas 78701

TRUSTEES PRESENT
I. Craig Hester, Chair
Doug Danzeiser, Vice-Chair
Ilesa Daniels, Member
Cydney Donnell, Member
Brian Ragland, Member
Jeanie Wyatt, Member

IAC PRESENT
James Hille, Chair
Caroline Cooley, Vice Chair
Bob Alley, Member
Ken Mindell, Member
Laura Starks, Member
Lenore Sullivan, Member
Vernon Torgerson, Member

ERS STAFF PRESENT
Porter Wilson, Executive Director
Catherine Terrell, Deputy Executive Director
Tom Tull, Chief Investments Officer
Sharmila Kassam, Deputy Chief Investment Officer
Paula A. Jones, Deputy Executive Director and General Counsel
Leighton Shantz, Investments
Shack Nail, Special Projects and Policy Advisor
Tony Chavez, Internal Auditor
Robin Hardaway, Director of Customer Benefits
Chuck Turner, Chief Information Officer
Kelley Davenport, Executive Office
Liz Geise, Benefits Communications
Jennifer Jones, Executive Office
Betty Martin, Investments
Pablo de la Sierra Perez, Investments
Chineque Sterns, Human Resources
Glenda Workman, Benefits Communication
Tanna Ridgway, Investments
Machelle Pharr, Finance
Keith Yawn, Executive Office
Anthony Curtiss, Investments
John Streun, Investments
Cheryl Scott Ryan, General Counsel
Andrew Hopson, Investments
Wesley Gipson, Investments
Chris Tocci, Investments
Christi Davis, Customer Benefits
Robert Sessa, Investments

Gabrielle Stokes, Procurement and Contract Oversight
Susie Ramirez, Executive Office
Juli Davila, Investments
Amy Chamberlain, Executive Office
Carlos Chujoy, Investments
Brannon Andrews, General Counsel
Mike Ewing, General Counsel
Nancy Lippa, General Counsel
Amanda Burleigh, General Counsel
David Lacy, General Counsel
Kathryn Tesar, Benefits Communication
Lauren Honza, Investments
Stuart Williams, Investments
Satitpong, Chantarajirawong, Investments
Yu Tang, Investments
Joy Seth, Investments
Amy Cureton, Investments
Leah Erard, Executive Office
Kelley Davenport, Executive Office

VISITORS PRESENT
Keith Barnes, Blue Cross Blue Shield of Texas
Cyrus Walker, Blue Cross Blue Shield of Texas
Michael Edwards, JP Morgan
Michael Hood, JP Morgan
Ryan Donahue, JP Morgan
Andrew Clark, Speaker's Office
Kristen Doyle, Aon Hewitt
Jas Thandi, Aon Hewitt
Steve Voss, Aon Hewitt
Michael McCormick, Aon Hewitt
Bobby Wilkinson, Office of the Governor
Sheri Jones, Comptroller of Public Accountants
Kelley Bender, Chapman and Cutler LLP
James Baker, Unite Here
Joe Newton, Gabriel Roeder Smith & Co.
Tom Bevins, Gabriel Roeder Smith & Co.
Tom Heiner, BNY Mellon
Bill Hamilton, Texas State Employees Association
Bob May, Texas State Pension Review Board
Kenneth Herbold, Texas State Pension Review Board
Katy Fallon, Legislative Budget Board
Avery Saxe, Legislative Budget Board

Mr. Jim Hille, Chair of the Investment Advisory Committee (IAC) for the Employees Retirement System of Texas (ERS), called the meeting to order and read the following statement:

> "A public notice of the Joint Meeting of the Board of Trustees and Investment Advisory Committee containing all items in the proposed agenda was filed with the Office of the Secretary of State at 10:58 a.m. on Monday, November 21, 2016, as required by Chapter 551, Texas Government Code, referred to as the Open Meetings law."

Mr. Craig Hester, Chair of the Board of Trustees (Board) for the Employees Retirement System of Texas (ERS), also read the following statement:

> "A public notice of the Joint Meeting of the Board of Trustees and Investment Advisory Committee containing all items in the proposed agenda was filed with the Office of the Secretary of State at

10:58 a.m. on Monday, November 21, 2016, as required by Chapter 551, Texas Government Code, referred to as the Open Meetings law."

I. REVIEW AND APPROVAL OF THE MINUTES TO THE AUGUST 16, 2016 JOINT MEETING OF THE BOARD OF TRUSTEES AND INVESTMENT ADVISORY COMMITTEE

Mr. Jim Hille, Investment Advisory Committee (IAC) Chair, opened the floor for a motion on the approval of the minutes from the August 16, 2016 Joint Meeting of the Board of Trustees and Investment Advisory Committee.

The Investment Advisory Committee then took the following action:

> **MOTION** made by Ms. Caroline Cooley, seconded by Ms. Lenore Sullivan, and carried unanimously by the members present that the Investment Advisory Committee approved the minutes of the August 16, 2016 Joint Meeting of the Board of Trustees and Investment Advisory Committee.

The Board of Trustees then took the following action:

> **MOTION** made by Ms. Cydney Donnell, seconded by Mr. Brian Ragland, and carried unanimously by the members present that the Board of Trustees approved the minutes of the August 16, 2016 Joint Meeting of the Board of Trustees and Investment Advisory Committee.

II. REVIEW AND DISCUSSION OF ERS' ASSET ALLOCATION STUDY

***a. Featured Speaker Michael Hood on Asset Allocation* –** Mr. Michael Hood, Managing Director at JP Morgan Asset Management, spoke and discussed the economic and market outlook**.**

Mr. Hood presented his perspective on macroeconomic trends and market events to help better determine factors involved in ERS' asset allocation. Questions and discussion on the presentation too place among the Board, IAC, and Mr. Hood.

No action item was required on this item.

***b. Presentation of Risk Survey Results* -** Mr. Tom Tull, Chief Investment Officer, Ms. Sharmila Kassam, Deputy Chief Investment Officer, Mr. Steve Voss and Ms. Kristen Doyle, consultants from Aon Hewitt Investment Consulting, presented the review and discussion of Risk Survey Results.

This agenda item is presented as a result of Section 2.2 of the Employee Retirement System of Texas (ERS) Investment Policy which requires formal Asset Liability studies be conducted at least every five years, with annual reviews of the adopted asset allocation based on updated capital market assumptions.

Mr. Tull delivered a brief update regarding what has been accomplished to date on the 2016 Asset Liability Study. He noted that ERS has developed a work plan, completed the risk survey of the Board of Trustees (Board), Investment Advisory Committee (IAC), and Senior Investments Staff (Staff), and agreed upon capital market assumptions among staff in conjunction with Aon Hewitt.

Mr. Tull explained the goal of the survey was to ensure participation and fulfillment of fiduciary duty, gauge risk preferences and objectives, and obtain critical feedback from the Board, IAC, and Staff. He noted the goal for today is to provide overview of the survey and discuss various perspectives.

Mr. Tull presented the average rankings of priorities based on survey responses. He explained the item most important to the Board, IAC, and staff was to *Improve the Funded Ratio over a 10-year Horizon*, while least important was *Performance Relative to Peers*. Looking at average rankings by group, there was strong support to *Maximize Expected Risk Adjusted Return* and *Increasing the Probability of Achieving the Actuarial Assumed Rate of Return*.

In comparison to the priority ranking responses taken in 2012, the largest changes in preferences come from a reduction in the desire to *Maximize Expected Risk Adjusted Return* and a corresponding increase to *Maximize the Probability of Achieving the Actuarial Rate of Return*; however, both remain high priorities. Mr. Tull also noted that a significant reduction in the priority to *Maximize Expected Return of the Portfolio* showed that there wasn't a desire to chase returns. *Improving the Funded Ratio over a 10-year Horizon* remains a high priority as well.

Mr. Hester noted that the Board has changed by 50% since the last risk survey was conducted. Ms. Kassam acknowledged that the 2012 risk survey results are interesting considering Board turnover, but reiterated the current focus on 2016 survey results.

Mr. Alley noted that actuarial returns will become increasingly difficult to achieve and will need to be complemented by state contributions. He noted that we need to look at maximizing risk adjusted returns since other objectives rely upon other factors outside of investment returns.

Ms. Cooley noted it was positive that respondents consistently took risk into account in order to maximize highest risk-adjusted returns. As she noted, it is important to take the appropriate level of risk, rather than the lowest level of risk.

Ms. Kassam presented the trade-off results from the survey, which contained more detailed questions to assess risk preferences when considering two different spectrums for a particular objective. She explained that few participants placed much importance on peer performance, which aligns with the results and discussion of the priority rankings. She noted this is consistent with the Board and IAC focus to date of being mindful of peers but not pressured to follow them.

In terms of liquidity, feedback showed respondents believe ERS can withstand lower levels of liquidity given a tradeoff for increased returns. Ms. Kassam noted that liquidity has been a focus of the Board and IAC as we have moved into alternative investments, so staff has been proactively managing liquidity. Staff has followed the Board and IAC direction to use liquidity both for benefit payments, since the Trust is a mature plan with more distributions than contributions, and for buying opportunities during market downturns.

The results showed strong support for monitoring and maximizing net-of-fee performance rather than only seeking the lowest cost investment options. As a result, Ms. Kassam noted that staff has taken the Board and IAC direction to aggressively focus on fee negotiations. As part of the program overview of each asset class, staff reports to the Board the results of fee savings.

On unconventional strategies, there is a clear appreciation of exploring alternatives as opposed to only traditional investments. Ms. Kassam noted that discussions with the Board and IAC over the past few years have led to questioning which other investment strategies should be considered.

There was strong support for diversification and a preference for active management. Ms. Kassam noted that discussion has taken place with the Board and IAC regarding passive versus active management, with a board focus on active management in strategies that make the most sense for returns.

Finally, regarding fixed income, participants believed the fixed income portfolio should represent a hedge to the overall fund rather than an investment to maximize returns.

Regarding active management during periods of underperformance, there is a broad level of comfort with active managers so long as staff has confidence in the management teams and processes; however, it is important to note that staff must follow a disciplined process in making these conclusions.

There were mixed views on the willingness to be an early adopter of new investment strategies. Most respondents expressed a preference away from early adoption but with flexibility for adopting uncommon strategies. However, there was also strong support from other participants toward early adoption. Ms. Kassam noted that the takeaway appears that staff should consider unconventional strategies and even being an early adopter of such strategies but doing so with a deep appreciation of the risk and consequences.

On the subject of reporting, most respondents said that the level of detail provided in reports was appropriate to make decisions. Ms. Kassam noted that staff has worked on refining reporting and continues to work towards improving reporting practices and welcomes any feedback the Board or IAC have with regards to these reports.

Most respondents answered that the time horizons in the performance reports were appropriate and well aligned with the decision making process. Some individuals, however, expressed an over-emphasis on short term performance for decision making.

Finally, in regards to areas which the Board and IAC would like staff to focus future educational efforts, alternative investments, asset allocation, risk management, and peer practices continue to be areas of interest. Ms. Kassam noted that staff has focused on providing these opportunities either internally or by seeking out external resources.

Mr. Tull presented final comments and feedback. Overall, there is a belief that strong investment results and governance will help maintain the financial health of the system. Several comments were made related to a risk/reward framework for investment decision making: that active management should be used where the greatest inefficiencies exist and that early adoption should be seen as an opportunity versus a risk. Also, with regards to the performance objective, it should be stated as maximizing the return for a given (chosen) level of risk, it should seek to minimize large drawdowns and losses, and it should focus on the long term funded status of the Trust, with strong risk adjusted returns as a framework. Additional takeaways from the survey included an openness to exploring innovative investment strategies while recognizing the potential for unintended consequences and the desire for a robust process associated with manager selection and new investment ideas.

Mr. Tull closed by explaining the results are generally consistent with the 2012 survey and responses did not include any large deviations from expectations. In summary, the most important concerns to the Board, IAC, and staff are strong returns at a reasonable level of risk, diversification, allowing for illiquidity to enhance returns, and interest in new strategies to improve risk-adjusted return and the funded ratio.

Mr. Tull opened the discussion to questions and comments.

Mr. Mindell added that in terms of priorities, a focus on strategies that minimize drawdown risk is important in these discussions and in developing investment policy.

Ms. Kassam noted that there were additional comments made by respondents regarding the tactical implementation of investment strategy. These comments will be raised during future discussions on the Asset Liability Study.

Mr. Porter Wilson, Executive Director, asked how to determine an appropriate level of risk and where we fall relative to peers. Ms. Doyle responded that the Asset Liability Study is the key component in determining the appropriate or desired level of risk. The economic costs of our plan will be discussed later in the Asset Liability Study. Comparing risk levels to peers can be done by looking at similar peers with similar Trust size, levels of funding status, internal and external management, and active and passive strategies to provide a more relevant comparison. Ms. Doyle recommends focusing on our economic costs and liability to determine appropriate level of risk.

Mr. Danzeiser asked a question regarding delegation and ERS' ability to find and take advantage of new investment opportunities relative to our peers. Ms. Doyle answered that she would rate the level of delegation, Board's comfort with delegation, and skill level of ERS staff to be very high on a spectrum relative to peers, which she noted is best practice within the industry. This is because the implementation of the asset allocation is better delegated to staff that are closest to the information.

Ms. Donnell added that she has been satisfied with the actions taken by staff over the last decade to invest in accordance with the policy and tolerances developed by the Board. She commented that she focuses on the areas where staff spends their time versus where their strengths lie. She concluded that while staff may not be the nimblest, they do not waste time and correctly focus on the direction given by the Board.

Mr. Tull elaborated that the delegation from the Board to the Executive Director to the chief Investment Officer to staff is a process that is not taken lightly. ERS spends a considerable amount of due diligence in analyzing investments before taking them to an internal investment committee. He noted that we don't want to be too aggressive. Ms. Kassam noted that staff takes very seriously the guidance given by the Board and IAC through the investment policy and seek to maximize their effectiveness within that direction.

Mr. Hester added that he is satisfied not only with the competency of the staff, but more importantly, with the procedures and controls in place for the Board to monitor and stay informed of the process. He does not believe it is practical for the Board to delegate individual investment decisions. Rather, he strongly believes we have effective policies in place to allow for appropriate execution by staff.

Ms. Cooley noted that she is interested not just in volatility risk but also drawdown risk. Mr. Voss confirmed this risk will be addressed in the stress testing during the next steps of the process. Discussion by Mr. Voss and Ms. Doyle followed regarding how risk can be defined in various ways and how the risk survey is valuable to help determine how the Board and IAC consider risk.

Ms. Starks asked which innovative strategies are being considered by staff to raise risk adjusted returns. Mr. Tull responded that opportunities will present themselves, but it will be a process to determine the appropriate strategies to implement. Ms. Kassam added staff has developed more expertise and skill in implementation today versus prior Asset Liability Studies conducted before alternative investments were included. This increase of internal capability will lend itself towards better exploration of new investment opportunities.

Mr. Alley noted that the current ERS structure, with investment, accounting, and legal staff, along with the monitoring process, has been vetted and well thought out. He congratulated staff on this organization. Mr. Hester noted that the change with Internal Audit reporting directly to the Board is also an important improvement as part of governance.

Mr. Tull and Mr. Hester emphasized that the IAC is an important part of the process advising the Board and staff.

There were no questions or further discussion, and no action was required on this item.

c. Presentation of Capital Market Assumptions – Mr. Tom Tull, Chief Investment Officer, Sharmila Kassam, Deputy Chief Investment Officer, and Steve Voss, Kristen Doyle, and Jas Thandi, consultants at Aon Hewitt, presented the review and discussion of Capital Market Assumptions.

Mr. Tull introduced a brief overview of the Capital Market Assumptions study. The objective is to provide a foundation to the Board of Trustees (Board) and Investment Advisory Committee (IAC) for discussion of thoughts on current market conditions and expectations. ERS Staff (Staff) and Aon Hewitt Consultants (Aon) have discussed and agreed upon the capital market assumptions as a start, while recognizing that the current environment is one of change. The study presents a 10-year outlook for the purpose of asset allocation. Mr. Tull finished by encouraging the Board and IAC to discuss the assumptions presented.

Ms. Kassam briefly presented the agenda for the presentation of Capital Market Assumptions. This includes the review of the asset liability process, introduction of capital market assumptions methodology, review of current capital market assumptions, discussion on the presidential elections, and a review of the asset liability process timeline.

Ms. Kassam discussed that the asset liability process begins with defining objectives and researching the context of current market and plan conditions. This background will distill into an asset allocation that is approved by the Board and IAC for implementation and inclusion in the investment policy.

Ms. Kassam presented various methods of developing capital market assumptions and described the process utilized by ERS. She explained that rather than utilizing a historical or Equilibrium methodology, ERS deemed it more appropriate to use a building block approach. This method looks at the drivers of each return and volatility expectation. In addition to building blocks, judgement expertise is also utilized in bringing ERS' capital market assumptions to fruition.

Ms. Kassam presented the 2016 capital market assumptions as summarized in exhibit 1. She reminded the Board that the process for arriving at the capital market assumptions is more the topic of discussion than the actual numbers themselves, which are presented as a reasonable estimate rather than a precise prediction.

Ms. Kassam directed attention to the inflation expectation, which is the building block of all other return assumptions. The inflation expectation for the 2016 study is 2.5%. This assumption came as the result of discussions with not only Aon, but also, other credible sources.

Ms. Kassam presented the estimated risk and return of the overall portfolio using the 2016 capital market assumptions and current asset allocation mix. She reminded the Board that risk is presented as a measure of standard deviation, or return dispersion, and Sharpe ratio is a measure of excess returns over risk used to look at risk adjusted returns.

Mr. Hester asked why the assumptions show lower volatility. Ms. Doyle answered that volatility and correlations do consider historical results because they tend to be stickier than returns. She reminded the Board that the 2012 assumptions reflected the volatility coming from the 2008 credit crisis. The 2016 assumptions come after the current prolonged period of lower volatility across capital markets. Mr. Thandi joined the discussion to add that volatility measures also consider forward looking measures such as option pricing and the derivatives market. A look at those measures in 2012 versus 2016 shows that volatility expectations have decreased substantially.

Ms. Kassam continued the discussion of the 2016 capital market assumptions. Given current allocation and 2016 capital market assumptions, the overall portfolio's estimated return is 6.8% with estimated risk of 12.0%. This is down 70 and 90 basis points (bps) respectively. Ms. Kassam noted that, with respect to the individual asset classes, there is a bifurcation into return seeking assets and risk reduction assets. Nearly all classes are seeing a reduction in the risk and return expectations relative to the 2012 assumptions, with the exception of high yield credit assets.

Ms. Kassam also highlighted that the capital market assumptions for the private equity, real estate, infrastructure, and absolute return portfolio asset classes have been noted as reflecting, in addition to Aon's base assumptions, the portfolio construction that ERS pursues. Private equity has a global portfolio with meaningful co-investments, potentially growing secondary allocations, and emerging market exposure. Real estate focuses on many non-core areas and has a global allocation. Investment policy dictates, as has been approved by the Board, that infrastructure is seeking non-core investments with a meaningful emerging market exposure. The absolute return portfolio seeks to diversify the overall Trust assets with a beta goal of 0.4 relative to the rest of the Trust. Ms. Kassam also noted the inclusion of private credit, which was previously not included in the capital market assumptions in 2012.

Ms. Kassam presented a graphical representation of the 2016 risk and returns for each asset class relative to 2012. It depicted how expectations are lower returns with lower levels of risk.

Ms. Donnell joined to add that as expectations for returns fall, ERS will need to begin disseminating education to constituents reflecting the message that it will be difficult to improve the funded ratio. It will become more difficult to improve the funded ratio given the actuarial versus return expectations. Mr. Hester joined to explain that ERS does what it can but only deals with the assets side of the balance sheet. At some point, the liabilities of the plan will need to be addressed. Mr. Voss followed up that investment earnings represent two-thirds of the Trust growth.

Mr. Voss then presented an update on the Asset Liability process and the framework used to arrive at the capital market assumptions. He reiterated the use of forward looking indicators and current market drivers over historical data. He also noted that Aon updates capital market assumptions on a quarterly basis, allowing them to capture current interest rate environments and valuations. Aon customized the assumptions for ERS to reflect the specifically unique way we construct our portfolios.

Mr. Thandi presented the inflation estimate practices used to develop the capital market assumptions. He noted that inflation is the one assumption that affects all asset classes. As with all assumptions, there are various approaches that can be used to develop an estimate. With inflation, there are the historical market pricing, break-even (difference between nominal treasuries and TIPS), and consensus methodologies. Aon implements a consensus approach due to issues with the other two methods. Mr. Thandi further explained that Aon incorporates short term estimates and long term estimates in developing its 10 year inflation measure. Aon takes inflation pricing information from many industry publications and expects to arrive at a 1 year, 2 year, and long term inflation estimate. Then, they do a compound average of those estimates with a 10% weight on the 1 year estimate, 10% weight on the 2 year estimate, and 80% weight on the long term estimate.

Ms. Cooley asked a question regarding the range of estimates. Mr. Thandi explained that Aon filters the outliers and places a higher weight on more relevant, quality estimates. He also responded to another question regarding timing of the estimates in relation to the US presidential election and subsequent changes to economic forecasts. He stated that Aon updates their capital market assumptions on a quarterly basis, and the numbers presented are from the second quarter of the 2016 calendar year.

Ms. Doyle added that there have been discussions with ERS staff regarding the impact of the election, but due to uncertainty as to the short and long term economic effects, they have not yet incorporated any changes. They have built flexibility into the estimates to make adjustments as they are deemed necessary. Mr. Voss expanded on this point, adding that the goal of the day was to present the framework in building these estimates. The framework won't change, but the outcome of the framework will vary with changes in economic conditions. Finally, Ms. Doyle encouraged the Board to remember that the 10 year estimate is built with a 20% weighting on short term inflation and 80% weighting on the long term estimate. So while recent changes will have an impact on inflation, it is important to recall that this is a longer term assumption.

Ms. Doyle presented the building block approach to develop the equities capital market assumption. For example, the basis for the equity assumption looks at the payout of earnings yield and then combines that with the real earnings growth. The inflation assumption is then added on top of that to arrive at the total, forward looking equity assumption. This process is completed for each region, and then the assumption for each region is rolled into the global public equity assumption. Ms. Doyle also noted that the estimates for each region not only include the growth for their own region, but also, consider the growth in regions which they are highly invested.

Ms. Doyle presented the building block approach to develop the government bonds capital market assumption. Aon begins with the current yield and then adds in the expected change in yield over time. This expected change includes both capital gains/losses as well as increase/decrease in actual yield (income component). Mr. Hester asked a question regarding the term of the bond being used for the assumption. Ms. Doyle responded that they are using the 5 year term bonds. Finally, Aon adds in the roll return, the return associated with selling the bond and buying a new one to maintain the length of time to maturity on the bond, and arrives at the final capital market assumption for government bonds.

Ms. Doyle presented the building block approach to develop the corporate bond and aggregate index capital market assumptions. She noted that corporate bonds, along with some other asset classes, anchor their assumptions with the government bond assumptions. So for corporate bonds, Aon begins with the current government bond yield assumption and adds in the current spread plus or minus the expected change in spreads. Then, they add in the capital gain/loss associated with that spread and subtract out any returns associated with defaults/downgrades to arrive at the final assumption for corporate bonds.

Mr. Hille asked a question regarding how ERS invests capital into each asset class relative to the capital market assumptions and in light of difficulty implementing the asset allocation. Mr. Tull joined the discussion to explain that the capital market assumptions lead to where capital should be invested; however, if ERS is unable to find sufficient risk adjusted returns within these classes, staff will not deploy that capital until a time at which they can. He further elaborated that the assumptions provide a roadmap or guidelines.

Ms. Doyle added that there are many factors to consider other than returns when deciding to allocate funds, such as diversification, the ability to be opportunistic, and other opportunities in the market. Ms. Kassam added that ERS is looking at the asset allocation study within bands, where staff is able to use their discretion to be opportunistic and reach the given targets appropriately.

Ms. Donnell challenged with regards to real estate that some elements of the building block approach may need to be revisited. She mentioned changes to asset pricing based on levels of leverage and liquidity, resulting in an associated risk premium. Due to this, she believes the Aon's proposed expected return may not hold. She extended this to private equity and any other asset classes where there is a question of transaction volume and liquidity.

Mr. Mindell asked for clarification regarding the use of leverage in the portfolio. Mr. Thandi responded that as a building block, the underlying index used for the initial yield has a leverage component; however, when adding in expected growth, Aon does not consider leverage in this calculation. On the volatility side, when considering private assets, classes will often show a higher level of volatility relative to generally stable indices. This causes drawdowns and leverage which can result in higher volatilities than historical averages in real estate.

Mr. Mindell asked a question regarding the use of a 1-year perspective and fund of funds in the hedge fund asset class. He also commented that he believes hedge funds will be linked to bond assumptions. Ms. Doyle responded that Aon's general assumptions for hedge funds include many strategies that are not employed by the ERS portfolio, so the expectation was customized to fit only those strategies which are appropriate. Discussion between Mr. Mindell, Ms. Cooley, and staff followed regarding the use of Treasury Securities and risk premiums to determine appropriate expectations.

Mr. Hille noted that a defined process using quantitative analysis should be implemented to eliminate bias as much as possible. He cautioned that everyone has biases, but it is important to step back from them and approach assumptions as quantitatively as possible with a focus on methodology.

Mr. Thandi presented the assumptions on volatility and correlation. In terms of setting volatility and correlation assumptions, Aon looks at both historical results and forward looking markets, while considering the big shifts in play. Mr. Thandi explained that recently, one of the big shifts has been that volatility assumptions have decreased from their 2008-2010 levels. This has been reflected in options pricing and expert volatility numbers shifting lower. For the correlation side, a big shift has been that equity/bond correlations are becoming less negative.

Mr. Thandi asserted that correlation and volatility assumptions can be much more art than science to determine. For every change in correlation or volatility, there are many different factors in play. Therefore, when developing estimates for these measures, it can be difficult to determine which factors are reasonable and appropriate to anchor the assumption. Mr. Thandi explained that rather than just considering point estimates, it can be useful to utilize stress testing and consider the impact of various scenarios to the portfolio. Also, for illiquid asset classes such as real estate, de-smoothing techniques are employed when assessing historic volatility levels.

Mr. Hille asked a question regarding the falling volatility estimates and whether they were considering future expectations or just current market conditions. Mr. Thandi explained that while Aon does anticipate some level of mean reversion, all the factors are considered and calculated using very large mathematical models with thousands of data points and trials. The volatility estimate presented is an average of those numbers.

Ms. Cooley asked a question regarding consistency in estimates and where Aon falls in comparison to other consultants, specifically with regards to the correlation of bonds to equities. Mr. Thandi responded that most consultants use a similar process to develop estimates, so in his experience, Aon and other consultants have results that aren't far from each other's. In regards to bonds becoming positively correlated with the market, he explained that this is a significant concern over the next two years, but for a 10-year outlook, it is unlikely. He noted that short term risks such as this confirm the importance of having flexibility in investment policy.

Ms. Doyle presented the historical positioning of Aon's capital market assumptions versus peers. She emphasized that Aon remains fairly conservative when developing their estimates, illustrated by their proximity to average estimates versus any extremes.

Mr. Tull discussed the impact of the US presidential election results and key items to consider. In regards to tax and spending plans, it will still be a while before staff knows the reality of what will transpire. That being said, according to a bipartisan think tank, The Committee for a Responsible Federal Budget, the expectation is that there will be an additional $5.3 trillion added to the national debt over the next 10 years. This addition will change the rates environment and, eventually, could have an effect on the strength of the US dollar.

Policy changes are expected to include reduction or reforms to taxes, regulations, the affordable care act, trade, and immigration. Another issue to be aware of is Federal Reserve policy, especially with regards to members of the Board of Governors. There are currently two vacancies, and both the Chair and Vice-Chair's terms are set to expire in 2018. Other concerns are the independence of the US Central Bank and changes to members of the Supreme Court.

In general, political and policy uncertainty is higher. ERS' recommended approach is to continue investing in diversified portfolios that have sufficiently managed risks from different economic scenarios and to review and update capital market assumptions as more information and certainty becomes available.

Mr. Tull closed by thanking the Board and IAC for their contributions. He presented the proposed schedule for the remainder of the Asset Liability process. Ms. Donnell recalled that during the last Asset Allocation Study in 2012, there were additional sessions needed in order to complete the process. Mr. Tull responded that the schedule was developed with that in mind and that staff will do all they can to keep to the timeline. Ms. Kassam noted that this is a Board driven process and emphasized that sufficient time will be devoted to it in the coming meetings. Mr. Porter Wilson added that if at any point, additional sessions are needed to elaborate on any of the issues presented, ERS will find the time to do so.

There were no questions or further discussion, and no action was required on this item.

III. DISCUSSION AND TRAINING REGARDING ETHICS AND FIDUCIARY RESPONSIBILITY

Ms. Paula Jones, Deputy Executive Director and General Counsel, noted that annual ethics training is required by the ERS Investment Policy. Ms. Jones spoke about preserving the highest ethical culture at ERS because all operational monies supporting ERS are from the Trust fund. She informed the Board that the recent Survey of Employee Engagement reflects ERS staff's belief that employees at all levels of ERS are held accountable for adhering to ethical standards, employees feel comfortable reporting ethics violations, and employees feel that ERS leadership regularly shows that it cares about ethical issues and concerns. In addition, through new employee orientation and personnel policies and procedures, ERS works hard to maintain that ethical culture.

Ms. Jones introduced Kelley Bender, Partner from the law firm of Chapman and Cutler, LLP. Ms. Bender made a presentation to the meeting of the ERS Board of Trustees and Investment Advisory Committee regarding fiduciary duties.

Ms. Bender began her presentation by explaining that a fiduciary is a person who is required to act for the benefit of another person on all matters within the scope of their relationship, and who owes to that person the duties of good faith, trust, confidence and candor. ERS's fiduciaries include Board members, members of the Investment Advisory Committee, the Executive Director and Deputy Executive Directors, investment staff, and some providers and vendors.

Next Ms. Bender explained the elements of fiduciary duty: the duty to administer the ERS trust fund in accordance with its plan documents (primarily the Texas Constitution, statutes and Texas Administrative Code, supported by common law principles), the duty of prudence and care, the duty of loyalty, and certain other more narrow duties (impartiality; segregation of trust assets; income productivity).

Discussion focused on the duties of prudence/care and the duty of loyalty. First, Ms. Bender reminded the Board that Texas law provides that investment decisions must be made taking into consideration the investment of all assets of the trust rather than considering the prudence of a single investment of the trust. In connection with the duty of prudence/care, Ms. Bender observed that modern fiduciary and trust law dictates that a fiduciary may be required to delegate its authority to a third party if the fiduciary does not have the required subject matter expertise. As an example, Ms. Bender discussed the Board's delegation of investment authority, subject to parameters and limits established by the Board, to the Executive Director and ERS investment staff.

In discussions regarding the duty of loyalty, Ms. Bender advised Trustees to "hang up every other hat" that they wear and to act solely in the best interest of the collective membership of the Trust, not on behalf of individual members or member groups, employers, lawmakers, taxpayers, private businesses or anyone else who may have an interest in the outcome of a decision. Mr. Hester, chair, and other Trustees acknowledged that they receive feedback on issues from many different groups, and seeking such feedback is part of the fulfillment of their duty of prudence and care. In response to a question raised by Mr. Danzeiser, vice-chair, Ms. Bender confirmed that the duty of loyalty requires Board members to make decisions solely in the best interests of the members and retirees of ERS. Mr. Porter Wilson, executive director, emphasized that the Board's fiduciary duty runs to both members and retirees, and that the Board should not prioritize one group over another (by, for example, providing a cost of living adjustment to retirees at the expense of active employees).

Next Ms. Bender reviewed with the Trustees a list of actions to be avoided by any fiduciary, including acting in the interests of anyone other than the trust and its beneficiaries, violating the ERS Investment Policy (including Code of Ethics), repeatedly neglecting duty to attend to the trust's business, and permitting breaches of fiduciary duty by co-trustees, then reviewed potential consequences for any breach, including disciplinary action.

The final portion of the presentation was focused on alternative investments in the private equity context. Ms. Bender reviewed the delegation of investment authority that the Board has made to private equity investment staff, including the various thresholds and concentration limits. Mr. Hester made additional inquiries regarding the Board's duty to delegate, and the potential consequences for not doing so. Ms. Bender noted that certain of her clients that require Board approval of each investment cannot move quickly enough to participate in some popular, top-quartile funds. The Board discussed that failure to delegate in this scenario may be viewed as a breach of the duty of prudence and care. When asked by Mr. Hester if ERS' delegation thresholds seem appropriate in light of the size of the Trust and the experience of investment staff, she replied that ERS thresholds seem reasonable if not perhaps on the low side.

There were no further questions and discussion related to the presentation, and no action was required on this item. The presentation was posted on the ERS website.

V. <u>REVIEW AND DISCUSSION OF THE INVESTMENT PERFORMANCE OF THE SYSTEM'S ASSETS</u>:

a. Fiscal Year 2016 Investment Performance – Ms. Betty Martin, Director of Investment Services, and Mr. Tom Heiner from BNY Mellon, presented the review and discussion of the investment performance for fiscal year 2016.

Ms. Martin explained that annually ERS' custodian, Bank of New York Mellon Asset Servicing (BNY Mellon), who is the official book of record, provides fiscal year-end performance reviews to the Board of Trustees (Board) and Investment Advisory Committee (IAC). The Board of the Employees Retirement System of Texas (ERS) regularly reviews the performance of the Fund.

Mr. Heiner presented an overview of ERS' investment performance for fiscal year 2016 as summarized in exhibits 2 and 3. He began with the overall performance of the Total Fund and followed with the performance of each individual asset class and their associated indices. Asset classes are categorized as either Return Seeking or Risk Reducing, and Mr. Heiner incorporated the aggregate performance for both of these categories.

Mr. Heiner explained the drivers of the performance of the fund relative to the benchmark. The largest impact to the fund's relative performance came from the Global Public Equity class, with selection being the significant driver of underperformance. Rates and Private Real Estate were the only two asset classes that had positive impacts on benchmark-relative performance for fiscal year 2016.

Mr. Heiner presented an overview of current asset allocation versus the tactical targeted allocation. The Global Public Equity asset class had the largest overweight relative to the tactical allocation, whereas Rates had the largest underweight. All other asset classes had very small over or underweights relative to the tactical allocation.

There were no questions or further discussion, and no action was required on this item.

b. Fiscal Year 2016 Global Investment Performance – Ms. Betty Martin, Director of Investment Services, and Mr. Michael Shoop, Investment Operations Manager, presented the review and discussion of the Global Investment Performance Standards (GIPS) Verification Report for fiscal year 2016.

Ms. Martin presented a brief summary of the GIPS Standards. These are voluntary, ethical standards for the calculation and presentation of an investment firm's performance results. They were advanced to encourage investment managers to present their performance history in a fair and comparable way. The GIPS standards help create both a level playing field on which managers can compete and an environment in which investors can reinforce the governance of their manager selection decisions. While originally developed for investment managers, the standards were introduced for asset owners three years ago, and several asset owners have now committed to the principles as a way to voluntarily follow industry standards.

Mr. Shoop presented the GIPS verification process, which verifies whether the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and whether the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. While verification does not ensure the accuracy of any specific composite presentation, the ERS' compliance consultant, ACA Compliance Group, has procedures to determine the reasonableness of performance numbers.

Mr. Shoop presented the GIPS Standards fund composite performance over the past seven years. It is important to note that ERS custodian, Bank of New York Mellon, reports “net of fees” as net of transaction costs and management fees. GIPS defines “net of fees” as net transaction costs, management fees, and internal Investment Division costs. Also noteworthy is the increase in the percent of externally managed funds over the past few years is directly related to growth in the private markets, as those are considered externally managed.

There were no questions or further discussion, and no action was required on this item.

c. Third Calendar Quarter of 2016 – Ms. Sharmila Kassam, Deputy Chief Investment Officer at ERS, Mike McCormick and Kristen Doyle, consultants at AON Hewitt Investment Consulting, presented the review and discussion of the investment performance for the third calendar quarter of 2016.

Ms. Doyle gave a brief performance snapshot of the Trust fund as of September 30, 2016. The performance for the total fund for the calendar year to date was 5.4%, underperforming the benchmark by -140 bps, and for the fiscal year to date was 0.6%, outperforming the benchmark by 10 bps. Ms. Doyle noted that outperformance by the Private Real Estate asset class added to relative performance while Domestic Equity and Private Equity detracted from relative performance over the period.

Ms. Doyle presented the total fund cash flows as of September 30, 2016. Over the most recent one-year period, $894 million was deducted from the Fund through new additions/withdrawals and $1.93 billion was added in investment earnings. One year ago, the Trust started at approximately $24.5 billion and ended the period with a market value of $25.6 billion, providing growth of $1.04 billion. During this quarter, $219 million was deducted from the Fund through new additions/withdrawals and $1.10 billion was added in investment earnings. The Trust started the quarter at approximately $24.7 billion and ended the period with a market value of $25.6 billion, providing growth of $885 million.

Ms. Doyle presented the total fund asset allocation as of September 30, 2016. The actual asset allocation was in line with the path of transition projected for all asset classes with a slight underweight in the Rates asset class. Ms. Doyle reminded the Board that the amount allocated towards the Rates asset class is being reduced in favor of credit and other return seeking portfolios. Relative to the long-term policy allocation, ERS is still working towards more being allocated to Global Credit and Real Assets.

Ms. Doyle discussed the total fund performance relative to the Total Fund Policy Benchmark (Benchmark) and the Long Term Public Benchmark (Long Term Benchmark). The total fund underperformed the benchmark for the quarter, year to date, and the one-year periods, but slightly outperformed the benchmark for the fiscal year to date. The total fund showed strong outperformance of the long term benchmark over the longer ten-year period.

Ms. Doyle presented the attribution analysis of the total fund, the Total Fund Policy Benchmark, and the Long Term Public Benchmark. For the quarter, the underperformance was mainly driven by the Public Equity and Private Equity portfolios. For the one-year period, it was also Public Equity and Private Equity that mainly contributed to underperformance, with Public Equity a significantly larger driver.

Ms. Doyle explained that this underperformance is mostly attributed to Domestic Equity, specifically the Large Cap Core portfolio managed internally by ERS. This is due to an underweight in defensive stocks, such as utilities and healthcare. Defensive stocks are typically unattractive to active managers due to poor fundamentals and low growth prospects but have recently increased in value as investors seek alternatives to low interest rates. Additionally, the Large Cap Core portfolio has a growth orientation, and over the period, value has outperformed relative to growth stocks.

Underperformance relative to the benchmark in Private Equity is attributed to relative high performance in Global Public Equity. Private Equity uses the MSCI ACWI Investable Market Index (IMI) plus 300 bps as its benchmark. IMI returned 12%, which translates to Private Equity seeking a 15% return to meet the benchmark. Further, the underperformance can be attributed to a lag in Private Equity valuations relative to Global Public Equity markets.

Mr. John Streun, Director of Global Public Equities, joined the presentation to answer questions regarding recent performance of Global Public Equities since the close of the quarter. During the recent months since quarter close, Global Public Equities outperformed their benchmark. This is largely due to an overweight in US small cap, which has performed well since the November Presidential Election. Other portfolios within the asset class have yielded mixed results, but in the aggregate, the asset class is outperforming the benchmark.

He further discussed challenges faced by Global Public Equities during calendar year 2016, such as unexpected volatility in commodities and interest rates. Moving forward, as political and economic expectations change, funds will be rotated into appropriate sectors as opportunities arise.

Ms. Doyle presented the risk analysis of the total fund. For the five-year period ending September 30, 2016, the total fund had a similar return to the benchmark, 8.79% compared to 8.91%, with slightly lower associated risk (standard deviation), 6.61% vs 7.17%. For the ten-year period, the total fund had a slightly higher return and lower level of risk relative to the benchmark.

Mr. McCormick presented the analysis and discussion of the long term investment results. The total fund outperformed the long term benchmark since inception earning a return of 7.7% annually compared to 6.3%. The total fund also outperformed the long term benchmark for the 10-year period, 5.6% versus 5.3%, 20-year period, 6.7% versus 5.9%, and 25-year period, 7.3% versus 6.7%. For the 15-year period, the fund underperformed relative to the benchmark, 6.4% compared to 6.6%; however, the underperformance over this period is misleading due to the timing of returns. Mr. McCormick noted that by rolling back one quarter, the Total Fund return gains 20 basis points, meeting its long term benchmark.

Mr. McCormick commented that for all asset classes, the one-year returns for the period ending September 30, 2016 were very close to the median value of one-year returns over the last 10 years. He also noted that for all actively managed multi-cap funds, only 8% of managers outperformed their benchmarks through June 2016, indicating it has been a very challenging year.

There were no questions or further discussion, and no action was required on this item.

VI. REVIEW AND DISCUSSION OF THE RISK MANAGEMENT AND APPLIED RESEARCH PROGRAM

Mr. Carlos Chujoy, Senior Risk Management Portfolio Manager, and Mr. Stuart Williams, Risk Management Portfolio Manager, presented the review and discussion of the Risk Management and Applied Management (RMAR) Program.

Mr. Williams presented an overview of the RMAR Program. He reminded the Board that risk is a measure of uncertainty and volatility in the returns of an investment and is expressed as a measure of the standard deviation of expected or historical returns. Risk is mitigated by diversifying among asset classes, and the purpose of the program is to diversify and combine asset classes to balance the amount of return per unit of risk.

Mr. Williams presented the risk management process. The purpose of risk monitoring and risk management within the Investments division is to identify uncertainties that could make the greatest difference to Trust Fund performance, and then measure, monitor and manage those risks. For this endeavor, the Trust employs a Risk Committee and the RMAR Team to consider relevant information and recommend actions that will either strive to avoid negative outcomes or enhance positive outcomes. A second, but equally important function is to assure that the risk constraints established by the ERS Board of Trustees (Board) in the ERS Investment Policy are being observed.

While risk monitoring and risk management takes place at all levels of the Investment Program, Asset Class Directors and Portfolio Managers are keenly aware of the risks they are taking; they are given latitude to prudently take risks they believe are appropriate and will enhance performance within the guidelines of the ERS Investment Policy. In this regard, the asset classes have specialized methods and tools to help managers identify risks and make informed decisions.

As a result, the process begins with the investment policies set by the Board. The Risk Committee (Committee), which is a group of investment department professionals, meets to further refine risk targets and ensure compliance within appropriate risk limits. Additionally, the committee makes reasonable efforts to assess the impact of extraordinary exogenous/systemic risks. The RMAR team serves two functions. They provide risk status reports to assist the committee monitor ongoing risks, and they perform ad hoc research when exogenous events occur. Finally, asset class heads are also responsible for monitoring the risks associated with their respective asset classes and developing strategies to maximize the risk/return tradeoff.

Mr. Williams introduced the members of the RMAR team and the committee. The RMAR team consists of Carlos Chujoy, Senior Portfolio Manager, Mr. Williams, Portfolio Manager, Joy Seth and Satitpong Chantarajirawong, Investment Analysts, and Yu Tang, Intern. The committee is composed of voting members Tom Tull, Chief Investment Officer, Sharmila Kassam, Deputy Chief Investment Officer, Carlos Chujoy, Senior Portfolio Manager, Leighton Shantz, Director of Fixed Income, John Streun, Director of Public Equities, and Anthony Curtiss, Interim Director of Hedge Funds, and nonvoting members Wesley Gipson, Director of Private Equity, and Robert Sessa, Director of Real Estate.

Mr. Chujoy presented the list of asset classes and Trust risk monitoring categories. The RMAR program has established standards and is currently measuring and monitoring ten categories of risk along each of the asset classes, with the exception of when a given risk category is not applicable to a specific asset class. Mr. Chujoy presented two risk categories in which tools and standards are still under development at the overall Trust level. These included sector/factor risk and financial leverage risk. These risk categories are currently monitored at the asset class level and further work will be performed in order to assess, monitor and manage these risk categories at the Trust level. There is no financial leverage taken at the Trust level.

Mr. Chujoy presented the RMAR program review of fiscal year 2016. The program continued to address plan-wide investment risk at monthly Risk Committee meetings and enhanced and expanded the analytical capabilities of the group. They developed tools for the equity team that enable a disciplined evaluation of companies' financial ratios. The RMAR team led research efforts in equity derivative strategies, including developing a framework to generate relative volatility equity option ideas. The team also published a research paper with the Chicago Board Options Exchange on the use of options-based strategies by a 60/40 pension fund.

Finally, the RMAR team launched a Tactical Asset Allocation Quantitative driven fund with options overlay. Mr. Chujoy noted that the options overlay is currently a paper portfolio awaiting further approval prior to fund deployment. He stated that the RMAR program uses the four stages of the business cycle, *recovery, boom, decelerating, and bust*, along with PMI as a signal. The group is able to better understand how to position the equity portfolio given the different stages. The volatility regime utilizes the CBOE Volatility Index (VIX) to determine whether the fund should be using options to extract option premiums. The combination of these two helps to run the options overlay.

Mr. Williams presented the motivation for the Tactical Quantitative Portfolio (TQP) with options overlay. Mr. Williams explained that analysts use financial ratios to understand the condition of a company or the prospects for its stock. There are too many ratios spread across too many stocks for analysts to use in practice. The Tactical Quantitative portfolio contains algorithms that use data to help pick stocks. The economic model predicts the near-term economic environment, and then, picks industries based on how they performed in similar environments in the past. The industry financial statement model predicts industry performance using financial statement ratios and stock price/sentiment indicators. The company financial statement model picks stocks within each industry. And the derivative models improve returns and reduce risk.

Mr. Williams presented the RMAR investment process for the TQP with options overlay. Within the universe of possible equity investments, in this case, the S&P 500, the team scores each industry and stock based on 15 to 20 financial ratios depending on the stock or industry. Then, based on those scores, they apply trading rules, such as no weight to stocks or industries falling in the bottom quintile and double weight on those in the top quintile. Those rules then generate the equity portfolio.

For the options overlay, the RMAR group runs a tactical asset allocation, a model that uses 30 financial ratios to assess the attractiveness of equities. Then, they select strategies to employ and calculate margin and cash maintenance levels. Finally, they enact the trade (currently, only on paper).

Mr. Mindell asked a question regarding the options overlay. Mr. Chujoy explained that the options overlay employs a variety of options based strategies so that the portfolio is not subject to the risk of any single strategy. Through careful analysis, the RMAR team was able to develop a composite of options strategies that enhanced the likelihood of consistent returns.

Ms. Cooley asked a question regarding the implementation of the options overlay strategy and its placement within the different asset classes. Mr. Tull joined the discussion to answer that staff is still exploring the logistics of implementation and how that will impact the fund moving forward. Mr. Chujoy added that they plan to only utilize a 25% notional value as to not exert too much pressure on the returns of the equity book.

Ms. Jeanie Wyatt, Board Member, asked a question regarding the attribution of performance derived from the overlay. Mr. Chujoy responded that the team is tracking the performance of the equity book and the options book. They have developed a system that provides an attribution analysis of how each of the individual options strategies performed from a profit and loss standpoint.

Mr. Chujoy noted that RMAR has also developed, separate from the overlay in the TQP, a custom publication for equity derivatives to assess opportunities across multiple market and display assets that look attractive or unattractive. The RMAR team also created a spreadsheet that provides the end user access to this system with the flexibility to upload lists of interests and change parameters to help other derivative users.

Mr. Chujoy continued his presentation to discuss the analysis of the total plan's portfolio risk. He began with the plan's sensitivity to the market (beta). Mr. Chujoy noted that they observed deviations over time of the total plan's beta, due to the increasing allocation toward alternative investments. Consequently, the team separated the liquid from the illiquid portions of the fund for analysis. The liquid portion had a beta close to one, but the team could not conclude anything from the analysis of the illiquid portion due to extremely low R^2 values.

Another aspect of portfolio risk was to understand the concentration risk that came as a result of one asset class exhibiting an ever increasing level of correlation to total plan returns. After conducting an analysis on the portfolio of that asset class, it was determined that this was due to the plan increasing the level of overall risk as opposed to the specific performance of that portfolio.

Mr. Chujoy presented a list of the exogenous/systematic risks addressed by the Risk Committee during fiscal year 2016. From a market related standpoint, the committee addressed the effect of negative interest rates and the probability of default in energy oil companies and noted the probability was very low. In July 2016, Tom Tull, Chief Investment Officer, called an emergency meeting to address the exit of the UK from the European Union (Brexit), and this will be discussed in more detail later in the presentation. Additional items addressed were the valuation of currency market risk and the drivers of diversification/concentration risk in August 2016 and the drivers of tracking error and a review of market signals in September 2016.

Mr. Chujoy revisited the discussion of concentration risk. He reminded the Board that the goal of diversification is to have correlations of individual asset classes vary relative to the total plan return. Mr. Chujoy noted that for fiscal year 2016, most of the individual asset class correlations relative to the total plan return began to cluster together.

Mr. Chujoy presented an analysis of the drivers of tracking error. In September 2015, the Global Private Equity benchmark was changed from the actual portfolio returns to the MSCI ACWI IMI Gross plus 300 bps. Prior to this change, Global Public Equity accounted for nearly all the tracking error in the portfolio. After the change, Global Private Equity jumped to become the largest contributor to tracking error (55.6%), yet Global Public Equity still contributed the second largest portion by far (36.0%). Together, Global Private Equity and Global Public Equity are the most volatile asset classes and account for the bulk of tracking error of the portfolio, but it is important to note that they deliver the largest returns over the long run. Mr. Chujoy noted that there had not been any violations of policy limits on tracking error.

Mr. Williams presented the review and discussion of Brexit. He highlighted three key points – the process, the economic effects, and the implication of increased nationalism. The process is going to be complicated and difficult. It will involve two parties with different agendas and will result in high levels of emotion and uncertainty in the market. The economic consequences in the United Kingdom (UK) are expected to be a rise in inflation and uncertainty regarding trade, tariffs, and European Union access. This could result in a decrease in Gross Domestic Product (GDP) growth over the coming years. Mr. Williams noted that the Plan has reduced its UK exposure.

Mr. Chujoy presented the RMAR program outlook for fiscal year 2017. The group will continue to measure and monitor risk with an emphasis on measurement development. They will expand risk management capabilities with a focus on systemic and financial contagion risk, measuring of exposure risk at the factor and position level, relative value trades, systematic investment strategies, and currency overlays.

There were no questions or further discussion, and no action was required on this item.

VII. REVIEW, DISCUSSION, AND CONSIDERATION OF ERS' EMERGING MANAGER PROGRAM

Ms. Sharmila Kassam, Deputy Chief Investment Officer, and Ms. Amy Cureton, Real Estate Portfolio Manager, presented the review, discussion, and consideration of ERS' Emerging Manager Program.

Ms. Kassam presented a background and general overview of the Emerging Manager Program. Emerging Managers, as defined by the Texas Legislature, are private professional investment managers with assets under management of $2 billion or less. Staff has determined that, over the long term, inclusion of emerging managers should enhance and diversify ERS' portfolio and complement ERS' internal investment management.

Ms. Kassam responded to a question regarding the impact of Emerging Manager programs on plans similar to ERS and whether that experience will be mirrored in ERS' Emerging Manager program. She notes that the statute for ERS has asked for a “good faith effort.” She explained that this means the staff is not obligated to implement the program. Regardless, they do where they believe opportunities exist. ERS primarily considers the size, performance, and strategies of fund managers, which will be discussed later in the presentation but takes into account including the most diverse range of managers to note that women and minorities are included in this opportunity set.

Ms. Kassam presented the investments and commitments to the Emerging Manager program as of September 30, 2016. Of the $8.6 billion that is externally managed, $984 million (11%) is invested with Emerging Managers. That $984 million, broken out by asset class, has 55% invested in Hedge Funds, 19% in Private Equity, 11% in Private Real Estate, 10% in Global Public Equity, and 5% Fixed Income. Public Equity, Private Equity, and Private Real Estate have formal Emerging Manager programs. Hedge Funds and Fixed Income do not yet have formalized programs; however, the predominance of funds directed towards Emerging Managers in the Hedge Funds asset class is incidental to their core business and illustrates the group's preference towards smaller managers.

Ms. Kassam answered a question regarding the performance tracking and value added by individual asset classes in the program as a whole. She explained that the inception date for each asset class is different and that they operate under different fee and revenue models. Additionally, many portfolios are still at an early stage. Still, the program plans to develop tracking and accountability measures in the coming year to present the performance and value added by the Emerging Manager program for each of the individual asset classes and the program as a whole. Staff plans to present an overall view of performance and fees for the overall emerging manager program in future discussions in fiscal year 2017.

Mr. Tull noted that Emerging Managers are evaluated on the same basis as any other external manager contracted with the firm from a relative performance standpoint. Ms. Kassam added that from a due diligence perspective, ERS does not lower the standard when hiring an Emerging Manager as compared to any other external manager. She further clarified that with respect to the portfolios and value added, ERS will be developing a report to deliver in 2017.

Ms. Kassam presented the calendar year 2016 highlights. She described the evolution of the team aspect of the ERS Emerging Manager program. Specifically, the group continues to develop their ability to talk to each other and transfer knowledge between members in each asset class who may encounter similar obstacles or challenges. Also in 2016, the program has been able to utilize and leverage the ERS External Advisor website to assist with the process of sorting through the very large number of requests from managers. ERS has been able to leverage partnerships with managers of Emerging Managers, such as Legato, Oak Street, and GCM Grosvenor. Staff continued efforts towards industry outreach and exposure at emerging manager conferences, including asset class conferences and the joint annual emerging manager conference with the Teachers Retirement System of Texas, among others. Finally, the program has a goal to have a 10% of externally managed funds invested with emerging managers, and currently that figure is at 11%.

Ms. Kassam presented the calendar year 2017 initiatives. The program will continue to refine the process for emerging managers with access to ERS, to develop and enhance the ERS External Advisor website, and to participate at industry conferences to expand ERS' network of emerging managers and to promote program best practices. The group will focus on relevant direct relationships with emerging managers in ERS portfolios and, finally, promote program best practices by working with investors.

Ms. Kassam shifted the presentation to highlight specific asset class success with emerging managers by introducing Ms. Cureton, who is involved with the Private Real Estate Emerging Manager Program. Diversification and alpha are critical benefits of the program. With regards to diversification, investing with emerging managers provides access to a different part of the real estate market. These funds tend to include smaller assets, managers with regional expertise, and middle market to lower-middle market investments. In regards to the opportunity for outperformance, since 2005, first of second time funds have returned, on average, over 250 bps of outperformance versus their later stage peers. Since 2000, funds less than $300 million in size have produced, on average, 378 bps of outperformance relative to those funds greater than $1 billion in size. That being said, the group recognizes that there can be a larger dispersion of returns with emerging managers and that manager selection is critical in the investment process.

Ms. Cureton presented an overview of the program structure and initiatives. ERS has chosen to access the emerging manager space in the Real Estate program through a customized fund of fund model, an indirect approach to investing in underlying funds. This structure provides diversification, expertise, and oversight. Goals of the program include promoting growth and proliferation of best in class, institutional quality, emerging manager platforms through capital and non-economic initiatives. On the capital side, these include financial viability and alignment of incentives. For non-economic initiatives, peer-to-peer and industry relationship building through ERS, TRS, and partner firms is the main focus.

Ms. Cureton presented the program portfolio composition. The portfolio consists of the main fund of funds and two side cars. Ms. Cureton reminded the Board that the side cars are overage investments with more established managers where ERS was looking for more exposure and to avoid disrupting the concentration in the main fund. The total commitment for the fund and two side cars is $90 million. The main fund is fully committed to date, with a diversified portfolio of eleven underlying funds. Regarding performance, the fund is tracking upper quartile results and has produced a 1.45x multiple to date in the main fund and 1.85x in the side cars to date. For 2016, the fund is producing a 23% net Internal Rate of Return (IRR) and a 1.55x multiple. 196 underlying deal realizations have produced a 35% gross IRR and a 2.1x gross multiple since 2010.

Ms. Cureton presented the Fund II and the Direct Follow-on Funds. She reminded the Board that this is the next stage of the Emerging Manager Private Real Estate program. In January 2016 $50 million commitment was made to Fund II, and to date, $17 million of that has been committed to three underlying funds. The strategy seeks alpha through investments with early stage/small cap investors, anchors frequently for first-time funds and creative structures offering reduced fees, and focuses on operationally intensive strategies. With regards to direct follow-on funds, investments made directly with those managers whose performance in the main fund warranted further investment, three funds and one co-investment have been made to date, with one additional follow-on investment in underwriting.

Ms. Cureton responded to a question regarding opportunities to co-invest. She stated that there were co-investments made in the original fund and that the program continuously monitors opportunities to co-invest more. Each opportunity is evaluated on a case by case and deal specific basis, but the group is very open to doing co-investments, particularly with managers with whom the program has high conviction. Ms. Kassam added that in the Private Equity portfolio, the Emerging Manager program started doing co-investments in the first mandate and has a significant portion of the second mandate committed to co-investments.

There were no questions or further discussion, and no action was required on this item.

VIII. <u>CHIEF INVESTMENT OFFICER'S REPORT</u>

Mr. Porter Wilson, Executive Director, and Mr. Tom Tull, Chief Investment Officer, presented the Chief Investment Officer's report.

Mr. Tull began his report with the objective and philosophy of the Investments Division. Investment staff continues to work with the Executive Director, Board, IAC, and other divisions within the agency to build a premier and competitive investment organization in the best interest of the Trust and its Beneficiaries. Philosophy remains to position the Trust for the future for the sole benefit of its members and retirees and to establish investment policies, objectives, and strategies for the purpose of earning a competitive risk-adjusted rate of return at a reasonable cost.

He described investment challenges for fiscal year 2017. A new presidential administration causes a recalibration of economic growth prospects with anticipated changes to monetary policy, fiscal policy, and higher inflation expectations. Interest rates and the risk of political uncertainties are expected to increase. The reality of a stronger dollar is positive for exporting inflation but challenging for trade exports. Brexit, along with other international elections, will cause a lot of uncertainty and volatility in the coming year. Energy prices have very recently become volatile, up 9% during the week of the Board meeting. Implications of a honeymoon period after the election cycle are already being seen, and it is expected that the market will pull back with the revealing of more cabinet members and policy implementations. There will be geopolitical risk in terms of previously shunted classes of people seeking to have more influence on future decisions, leading to the possibility of less pragmatic economic policies.

Mr. Tull presented the investment opportunities of the division for fiscal year 2017. Credit is an area of opportunity. Also, as large amounts of money continue to chase private equity, secondaries is an area that is expected to have some profitable pieces of opportunity. The division will be looking at Global Tactical Asset Allocation going forward. Currency overlays are another possibility. And finally, infrastructure assets present a significant opportunity.

Mr. Tull presented the major initiatives of the Investments division. The asset liability study, most importantly the asset allocation mix, is a major initiative for the division. Staff will support legislative initiatives, such as ERS' Sunset Review and alternatives for addressing unfunded pension liabilities. The division will continue to advance the derivative program and concentrate on current and future savings through diligent negotiation of the best economic terms. Finally, ERS will strive to leverage internal investment resources to assist investment product monitoring in the Texa$aver Program and continue discussions on management of a customized Texa$aver fund offering.

Mr. Tull presented the staffing report for the Investment Division. There have been ten promotions within the division and nine other adjustments in terms of new employees, retirements, and separations.

He discussed the state of the fund and asset allocation. Transition to the new asset allocation is almost complete. Credit and Infrastructure are the two outliers. Infrastructure has not experienced the flow of viable opportunities to be more aggressive as of late; however, the team is very capable and with more time, Mr. Tull is confident the group will find the opportunities to achieve the desired asset allocation. Private Real Estate and Private Equity have met the asset allocation guidelines as targeted. Realized savings from the negotiations of fee and terms in the private market investments for the calendar year are $28 million.

Mr. Tull reported on tactical asset allocation opportunities from fiscal year 2016. The division reduced the Trust's UK exposure, utilized options in both fixed income and equities to enhance trade execution for a net profit of $3.5 million, and increased the use of exchange traded funds as a placeholder until capital could be deployed effectively.

Mr. Wilson joined to present the Sunset Review update. He discussed the staff's Sunset recommendations, which were given at the August meeting, and stated that they were unanimously adopted without amendment at the second Sunset Commission hearing on November 10, 2016.

He also presented three additional requirements developed by the commission at this hearing. Moving forward, the commission recommends a statutory change to require adoption of the experience and actuarial assumptions study every four years rather than five as is currently the statute. The commission also recommends a management action that ERS direct the 2017 internal audit review of investment governance to consider industry and peer best practices. Specifically, composition of internal investment committees, delegated investment authority, veto authority, Board oversight, and use of the IAC should be reviewed. Mr. Wilson added that these were goals and actions already planned by ERS. More so, the change is that they will now be mandated. Finally, the commission recommends a statutory change that will require Board approval of alternative investments over $100 million. Mr. Wilson explained that the $100-million dollar level will be evaluated in conjunction with the investment governance audit conducted by ERS Internal Audit to ensure it is in line with industry best practices. He also mentioned at various times that the study of industry best practices will provide useful insight and education in developing this policy.

There were no questions or further discussion, and no action was required on this item.

IX. <u>ADJOURNMENT OF THE BOARD OF TRUSTEES AND INVESTMENT ADVISORY COMMITTEE AND RECESS OF THE BOARD OF TRUSTEES</u>

The December 1, 2016 Joint Meeting of the ERS Board of Trustees and Investment Advisory Committee adjourned at 4:25 pm.

EXHIBITS

Exhibit 1 – Capital Market Assumptions

		Policy	2012 AL Study		2016 Assumptions	
		Weight	Return	Risk	Return	Risk
Return Seeking Assets:		**79%**				
Global Equity		55%				
	Public Equity	45%	8.0%	21.0%	7.2%	18.5%
	Private Equity*	10%	10.0%	28.5%	9.3%	24.5%
Global Credit		10%				
	High Yield	10%	5.2%	14.0%	6.1%	12.0%
	Private Credit	0%	--	--	5.5%	9.5%
Real Assets		14%				
	Real Estate*	10%	8.0%	16.5%	7.5%	15.0%
	Infrastructure*	4%	8.7%	18.5%	7.0%	12.0%
Risk Reduction Assets:		**21%**				
Absolute Return		5%				
	Absolute Return Portfolio*	5%	5.6%	4.5%	5.0%	3.6%
Rates		15%				
	Intermediate Treasuries	15%	1.7%	2.0%	1.6%	2.0%
Cash		1%				
	Cash	1%	1.5%	1.0%	1.5%	1.0%
Inflation*			3.0%		2.5%	
Estimated Return (Nominal)			7.5%		6.8%	
Estimated Risk			12.9%		12.0%	
Sharpe Ratio			0.469		0.444	

*Custom assumption of ERS Staff and AHIC

Exhibit 2 – Fiscal Year 2016 Performance

	Market Value 8/31/2016	1 Year Ending 8/31/2016	3 Year Ending 8/31/2016	5 Year Ending 8/31/2016	10 Year Ending 8/31/2016
Return Seeking (continued)					
Real Assets	**2,823,485,288**	**10.10**	**10.27**	**10.34**	
Real Estate - Public	720,685,319	15.49	9.25	9.35	3.41
Total Public RE Blended Benchmark [d]		16.83	10.60	10.18	3.16
Variance		(1.34)	(1.35)	(0.83)	0.25
Real Estate - Private	1,757,317,432	12.80	13.11	12.03	
Private RE Custom Benchmark [h]		10.80	9.34	8.71	
Variance		2.00	3.77	3.32	
Private Infrastructure	345,482,537	(16.35)	(2.92)		
Special Situations	**101,930,428**				
Risk Reduction	**5,920,193,537**	**2.69**	**2.69**	**1.99**	
Rates	**4,055,950,593**	**3.34**	**2.65**		
Barclays Treasury Intermediate Index		3.11	2.41		
Variance		0.23	0.23		
Cash	**676,342,152**	**0.76**	**1.58**	**0.41**	
91 Day Treasury Bill		0.23	0.10	0.09	
Variance		0.53	1.48	0.32	
Absolute Return	**1,187,900,792**	**1.47**	**4.04**		
Hedge Fund custom benchmark [i]		4.23	4.10		
Variance		(2.76)	(0.06)		
Texas Employees Group Benefits Program (TEGBP)	***431,924,144***	***3.82***	***2.12***	***1.56***	***3.12***
Group Benefits Program Policy Benchmark [e]		***2.49***	***1.80***	***1.35***	***2.80***
Variance		***1.33***	***0.32***	***0.21***	***0.32***

	Market Value 8/31/2016	1 Year Ending 8/31/2016	3 Year Ending 8/31/2016	5 Year Ending 8/31/2016	10 Year Ending 8/31/2016
Total Fund	***$ 25,499,105,144***	***5.28***	***6.61***	***7.54***	***5.70***
Total Fund Policy Benchmark [c]		***7.23***	***6.87***	***7.64***	***5.40***
Variance		***(1.95)***	***(0.26)***	***(0.10)***	***0.30***
Return Seeking	**19,578,911,607**	**6.02**	**7.72**	**9.01**	
Global Equity	**14,668,983,686**	**5.03**	**7.69**	**9.65**	
MSCI All Country World Index		7.24	6.74	8.32	
Variance		(2.21)	0.95	1.33	
Global Public Equity	12,111,394,524	4.77	6.68	9.14	4.87
Global Public Equity Floating Benchmark [a]		7.73	7.01	9.14	4.76
Variance		(2.96)	(0.33)	(0.00)	0.11
Domestic Public Equity	*5,661,463,713*	*8.43*	*10.99*	*13.87*	*7.23*
S&P 1500/S&P 500 Blended Index		*12.54*	*12.19*	*14.65*	*7.60*
Variance		*(4.11)*	*(1.20)*	*(0.78)*	*(0.37)*
International Public Equity	*5,327,370,919*	*1.29*	*1.90*	*3.76*	*2.12*
MSCI EAFE/MSCI ACWI ex US Blended Index [b]		*2.92*	*2.03*	*3.31*	*1.51*
Variance		*(1.63)*	*(0.13)*	*0.45*	*0.61*
Global Public Equity Special Situations	*719,798,273*	*12.22*			
Directional Growth Portfolio	*322,755,168*	*2.29*			
Global Equity Tactical	*80,006,451*	*(5.41)*			
Private Equity	2,557,589,162	5.82	12.40	11.20	
Global Private Equity Benchmark [j]		8.03	13.47	12.65	
Variance		(2.21)	(1.07)	(1.45)	
Global Credit	**1,984,512,205**	**8.08**	**5.84**		
Barclays U.S. High Yield 2% Issuer Cap Index		9.12	5.41		
Variance		(1.04)	0.43		

Exhibit 3 – FY 2016 Global Public Equity and Global Credit, Internal vs External Performance

	Market Value 8/31/2016	1 Year Ending 8/31/2016	3 Year Ending 8/31/2016	5 Year Ending 8/31/2016	10 Year Ending 8/31/2016
Global Public Equity	12,111,394,524	4.77	6.68	9.14	4.87
Global Public Equity Floating Benchmark		7.73	7.01	9.14	4.76
Variance		(2.96)	(0.33)	(0.00)	0.11
*Global Public Equity - Internal***	*8,963,147,961*	*6.02*	*7.63*	*9.89*	5.61
Internal Global Public Equity Benchmark [f]		*8.81*	*7.63*	*9.80*	*5.24*
Variance		*(2.79)*	*(0.00)*	*0.09*	0.37
*Global Public Equity - External***	*3,148,246,563*	*2.08*	*4.65*	*7.50*	
External Global Public Equity Benchmark [g]		*4.60*	*5.33*	*7.55*	
Variance		*(2.52)*	*(0.68)*	*(0.05)*	
Domestic Public Equity - Internal	*4,876,136,342*	*8.49*	*11.13*	*13.95*	*7.71*
Domestic Public Equity - External	*785,327,371*	*8.17*	*10.37*	*13.61*	*5.39*
International Public Equity - Internal	*3,287,206,895*	*2.25*	*1.94*	*2.98*	*1.70*
International Public Equity - External	*2,040,164,024*	*(0.19)*	*1.79*	*4.65*	*2.46*
Global Credit	1,984,512,205	8.08	5.84		
Barclays U.S. High Yield 2% Issuer Cap Index		9.12	5.41		
Variance		(1.04)	0.43		
Global Credit - Internal	*1,658,820,405*	*9.42*	*6.31*		
Barclays U.S. High Yield 2% Issuer Cap Index		*9.12*	*5.41*		
Variance		*0.30*	*0.90*		
Global Credit - External	*325,691,800*	*1.63*	*4.51*		
Barclays U.S. High Yield 2% Issuer Cap Index		*9.12*	*5.41*		
Variance		*(7.49)*	*(0.90)*		