Memorandum

To	Employees Retirement System of Texas
From	RVK, Inc.
Subject	Asset/Liability Study – Executive Summary
Date	May 20, 2025

Introduction

The purpose of this memorandum is to summarize the key inferences we draw from the Asset/Liability ("A/L") study of the Employees Retirement System of Texas (ERS or System). While this memorandum refers directly to points raised within the study, we emphasize that a full understanding of the A/L study and its implications requires a close review of the study in its entirety.

Background and Key Conclusions

As of the fiscal year ending August 31, 2024, the date of the most recent actuarial valuation and the start date of the projections in this study, the System was approximately 75% funded (on a market value basis). In short, this means that assets were available to cover 75% of the System's liabilities as currently estimated by the System's actuary. This equates to a shortfall of approximately $12.3 billion. The System faces significant challenges, however, improvements in funding are likely in the future as legacy payments begin to increase the asset base. The positive results of this study rest heavily on the additional funding. Absent legacy payments, the trajectory of the System would be materially different. Additionally, the immaturity of the System is a positive contributing factor to its long-term health going forward.

While the System faces a challenging decade, as highlighted below, this study suggests that continued diversification in the investment of the System's assets is desirable. The study, however, suggests caution in assuming that increased pursuit of higher expected returns, through even more aggressive (and hence even more volatile) asset allocations, is always beneficial. High expected return and high expected risk approaches also bring increased risk of large declines in the value of the System's assets and increased volatility in required contributions.

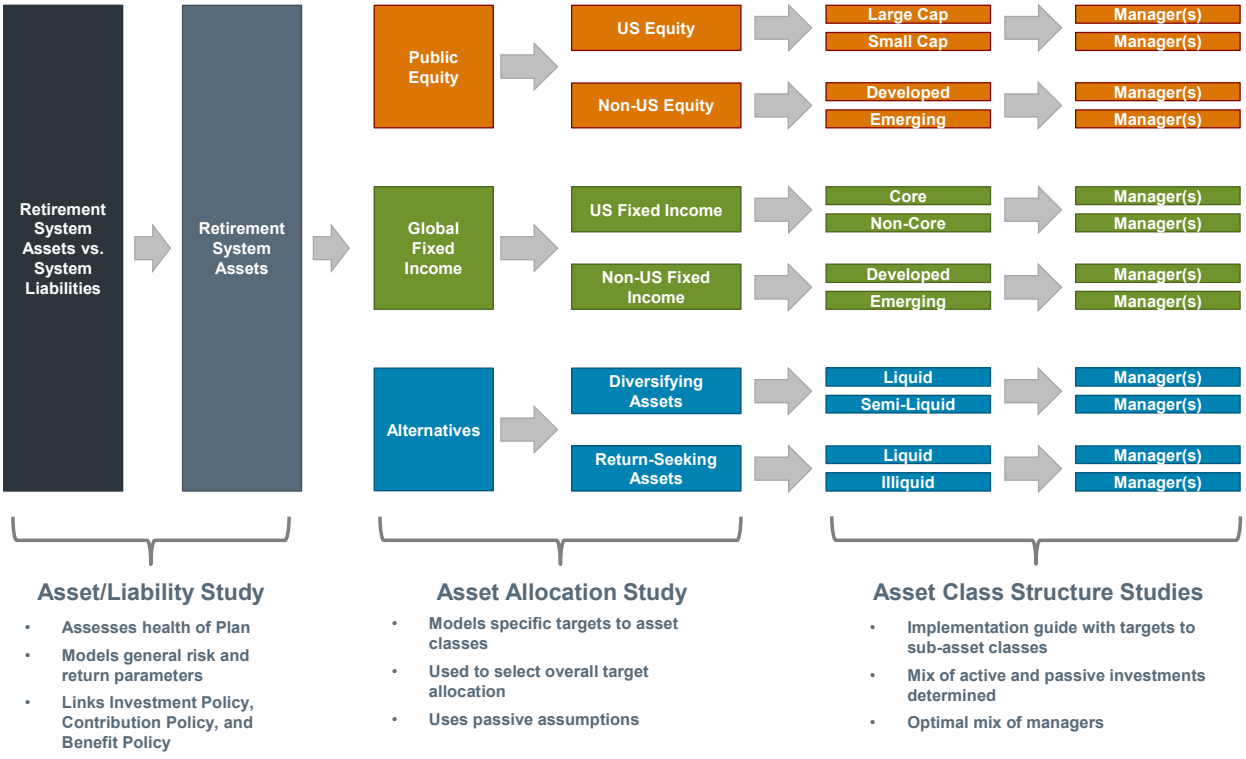
The Purpose of an Asset/Liability Study

The central purpose of an A/L study is to examine the probable future consequences, over extended periods of time, of applying alternative asset allocation strategies to the System's investment assets in order to fund the liabilities created by the benefit provisions of the System. A/L studies are unique in their ability to combine in a single analysis the three critical factors that drive the financial health of the System—benefit policy (liabilities), contribution policy, and investment strategy (asset allocation). Certainly, this type of forward-looking study cannot indicate with any reliability what will happen in any given year over this extended period of time, and its insights are dependent on the assumptions used. However, we have high conviction that the results of the study paint a highly reliable view of the core

long-term trends in the System's financial health.

Best practice, in our judgment, is to take the general direction suggested as most appropriate by this study with its unique consideration of liabilities, contribution policy, and trending liquidity needs and refine it in an asset allocation study where implementing the System's structure can reflect the pragmatic considerations of investing in the capital markets present at any given point in time.

While this study does not suggest meaningfully modifying the risk profile of the current asset allocation strategy, refinements to asset allocation may be beneficial to the long-term outcomes of the System. Asset allocation and asset class structure will be evaluated as the Board moves through the activities and decision points from left to right in the below investment decision framework.



Deterministic versus Stochastic

In this study, we examined a series of related questions associated with this central purpose, projecting future outcomes under two distinctly different methodologies:

1. a **deterministic** basis (all underlying assumptions, liabilities, contributions, and most critically

investment returns, are achieved precisely and without variance in each and every year); and

2. a **stochastic** basis (outcomes for investment returns vary each year according to estimated volatility with contribution *requirements* following suit while *actual* contribution policy and liabilities remain in their current form).

Key Results

Below you will find a series of important findings, forecasts, and conclusions drawn from the body of the study. While the remarks are presented here to allow a quick assessment of some of the key findings, they represent only a sampling of the fundamental elements of the study. We emphasize that a solid understanding of each element requires that they be reviewed as they are presented in the study itself within their surrounding context (please note the frequent page references to the full A/L study). This is especially important to understanding the findings which represent *probable, but not certain*, outcomes as analyzed in the stochastic section of the study.

At the Outset: Before projecting and analyzing possible future paths of the System, it is important to understand the current positioning and circumstances.

- As of August 31, 2024 (the date of the actuarial valuation used to model liabilities), the System's market value funded ratio (available assets to fund benefit obligations) was approximately 75% (page 6).
- The number of active members currently exceeds the number of benefit receiving members by approximately 14%. Although it will vary to some degree through time, this ratio is projected to remain relatively constant through the 20-year projection period (page 8). This favorable demographic positioning is an important factor when considering the findings on System risk/return options and the projected status of the System's liquidity. All else equal, more contributing members leads to better cash flow profiles and allows for additional opportunities to take advantage of illiquidity premiums.

Deterministic Analysis: A deterministic analysis assumes full certainty about the future, in particular, certainty of investment returns. Its virtues are that it is simple and that the findings reflect what will happen if the future turns out to be precisely as forecasted—no better, but also no worse.

- Even with a stable projected retiree and beneficiary population, inflation causes benefit payments to System participants to increase by 65% over the next 20 years (page 9). Annual increases are projected to average approximately 3%.
- Annual dollar contributions (employer and employee) based on actuarially required rates are projected to increase by 32% during the projection period (page 10). However, the general trend

in contributions levels as weighted average of salary are projected to remain roughly constant through the projection period. Please note however, that precise actuarially required rates as they unfold are the purview of the System's actuary and are affected by factors other than investment returns and resulting asset values of the System.

- Aggregate benefit payments are expected to increase by about 65% over the next 20 years but decline as a percentage of System assets over this same time period (pages 9 and 12). Not only do benefit payments as a percentage of System assets not increase, they are in our judgement also healthy and sustainable on an absolute basis during this period (payout ratio is measured on a "gross" basis defined as benefit payments divided by market values of assets). This is an important and positive indication, because increased payout ratios, if they rise sufficiently high, can potentially impose liquidity constraints on the management of the portfolio. Specifically, high payout ratios can inhibit the ability of the System to invest with a long-term horizon, therefore limiting the opportunity to invest in less liquid asset classes regardless of their potential return or risk reducing diversification benefits. The payout ratio is projected to decline from 9% now to 6% through the end of the projection period (page 12). These levels do not, in our opinion, materially inhibit investment opportunities for the System. However, should the payout ratio begin to rise, or exceed projections, asset liquidity will need to be carefully monitored. RVK considers a payout ratio above 15% as a cause for concern.

- As assets grow each and every year without exception at the assumed rate of return (7.00%), the funding ratio on a market value basis is expected to gradually increase to approximately 100% by 2043 from the current value of 75% (pages 17-19). Progress towards full funding occurs gradually at first before accelerating in later years.

Deterministic Scenario Analysis: One of the key advantages of deterministic analysis is the ability to evaluate scenarios that isolate a particular projection variable. In the context of an A/L study, this allows for insights into how various capital market environments and return profiles change the projected outcomes for the System.

	Value in 2044					
	Baseline	Inflation	Reduced Return	V	W	Loss then Low
Projected Payout Ratio	6%	7%	8%	9%	11%	11%
Projected Employer Contributions (billions)	$1.5	$2.6	$2.0	$2.0	$2.0	$2.0
Projected Benefit Payments/Projected Total Contributions	176%	147%	176%	176%	175%	175%
Projected Actuarial Accrued Liabilities (billions)	$80.1	$95.1	$79.2	$79.2	$78.7	$78.4
Projected Market Value of Assets (billions)	$82.6	$90.0	$64.0	$59.6	$48.1	$46.5
Projected Deficit (billions)	($2.5)	$5.1	$15.2	$19.6	$30.6	$31.9
Projected Market Funded Ratio	103%	95%	81%	75%	61%	59%
	20 Year Cumulative Total					
Projected Cumulative Employer Contributions (billions)	$24.8	$30.1	$24.8	$24.8	$24.8	$24.8
Projected Legacy Payments (billions)	$10.7	$10.7	$10.7	$10.7	$10.7	$10.7

- Assuming the current contribution policy remains unchanged, the System would need to experience annual returns in excess of 8.3% over the next 10 years or 6.9% over the next 20 years without exception in each and every year in order to reach full funding (page 20). Many public pension plans require returns well in excess of their assumed rate of return every single year for the next several decades in order to achieve full funding. This can force funds to attempt to reach for return targets that are unrealistic or require taking substantially more risk. The current position of the System allows the Board to consider many more options when making investment decisions when compared to many other public pension funds.

- Experiencing a return of 100 basis points below the System's current assumed rate of return of 7.00% (i.e., 6.00%) each year for the 20-year projection period would result in a significant decline in the projected market funding ratio to 81% in year 20 versus 103% at the current assumed rate of return (page 21). Given the widely shared concerns about the prospects for a low-return environment in the capital markets over the foreseeable future, this is a conclusion that should be thoroughly understood and appreciated. In the event that capital markets do not support returns commensurate with the assumed rate of return, significant upward pressure would be placed on the legacy payment.

- Investment strategies that introduce increasing volatility in the System's returns over the next 20 years also suggest meaningfully worse outcomes compared to the baseline deterministic projections. Scenarios C and D shown on page 21 of the full A/L study illustrate this point. These scenarios show a decrease in ending projected funded ratios at 75% and 61%, respectively. Scenario C illustrates a V-patterned scenario and assumes a return of -20% in the first projection year and +20% in the second projection year followed by the assumed rate of return thereafter (7.00%). Scenario D projects a W-patterned scenario and assumes a return pattern of -10%, +10%, -10%, +10% followed by the assumed rate of return thereafter (7.00%). The key conclusion from this part of the study is that volatility – specifically declines and subsequent recoveries in the System's assets – and when they occur can have a significant effect on cumulative contributions.

- Scenario A assumes returns of 7.00% per year, similar to the base case scenario. However, in this scenario, the expected return is met but achieved in an environment where inflation is projected to be 4.00% per year rather than the base projection of 2.50%. This scenario, particularly relevant currently, generates a significantly higher projected actuarial accrued liability, approximately 19% higher than the base case. This scenario shows that inflation also plays a material role in the outcome of the System going forward. Stated more directly, persistently high inflation increases System liabilities and weakens the financial health of the System.

Stochastic Analysis: Unlike a deterministic analysis, a stochastic analysis does not assume an unvarying stream of expected investment returns year after year. Instead, it reflects the realistic view that pension plan investment returns are—like the investment markets themselves—volatile and always uncertain. This means that there are a range of possible outcomes for the System; some are more likely, others less likely, but still possible.

The deterministic approach is useful for gauging the general direction of change and associated consequences, but adding the element of uncertainty—more specifically year to year variability in the performance of the capital markets and the value of the System's assets over time—can offer additional insights, albeit along with considerable complexity.

Uncertainty in future investment returns is taken into account via a stochastic analysis of five different investment approaches (in the table below and on page 26) ranging from highly conservative (low risk, asset protective) to highly aggressive (high return-seeking with substantial associated risk), including the current Target Allocation of the System. The reason for testing such a broad range of approaches is that at the heart of the System's situation is a simple question that is difficult to answer: whether the System is better off following a strategy that:

(A) Falls in the general category of higher prospective return with greater risk (i.e., potential for more widely varying outcomes – good or bad), or
(B) Falls in the general category of lower prospective return with concomitantly lower risk (i.e., a tighter band of likely outcomes).

	100% Rates	Decreased Private Exposures	Current Target Allocation	Increased Private Exposures	7% Geometric	Passive Index	100% S&P500
Large/Mid Cap US Equity	0	0	0	0	0	0	100
Global Equity	0	43	35	31	25	80	0
ERS Private Equity	0	8	16	18	20	0	0
Public Credit	0	12	9	7	12	0	0
Private Credit	0	2	3	5	6	0	0
Public Real Estate	0	7	3	1	1	0	0
ERS Private Real Estate	0	5	9	11	11	0	0
ERS Private Infrastructure	0	3	5	7	8	0	0
Rates	100	15	12	10	7	20	0
Cash Equivalents	0	2	2	2	2	0	0
ERS Hedge Funds	0	3	6	8	8	0	0
Total	100	100	100	100	100	100	100
Capital Appreciation	0	65	63	61	63	80	100
Capital Preservation	100	17	14	12	9	20	0
Alpha	0	3	6	8	8	0	0
Inflation	0	15	17	19	20	0	0
Expected Arithmetic Return	**3.75**	**6.88**	**7.27**	**7.43**	**7.62**	**6.42**	**6.00**
Expected Risk (Standard Deviation)	**3.21**	**11.51**	**11.50**	**11.48**	**11.58**	**13.06**	**16.00**
Expected Compound Return	**3.70**	**6.27**	**6.66**	**6.82**	**7.00**	**5.63**	**4.81**
Expected Return (Arithmetic)/Risk Ratio	1.17	0.60	0.63	0.65	0.66	0.49	0.38
RVK Expected Eq Beta (LCUS Eq = 1)	-0.01	0.67	0.63	0.61	0.60	0.78	1.00
RVK Liquidity Metric (T-Bills = 100)	95	69	56	50	44	91	95
Allocation to Private Assets	0	18	33	41	45	0	0

Essential to answering this question is to ask precisely how the System and its broader constituencies define what "better off" means. The metrics we use for each to determine whether the System is "better off" under one approach versus another are as follows:

(1) The effect on funding ratio (and thus on contribution rates which decline with higher funding ratios).
(2) The effect on System liquidity (i.e., the System's ability to pay annual benefits without major disruption of its strategic asset allocation, the driver of its investment strategy).
(3) The effect on the trend line and stability of annual contributions.
(4) The risk of large, sudden, and highly disruptive short-term declines in the System's assets over the course of time and the associated effects on contributions and potential investment decisions as well.

The results of this analysis are displayed on pages 28 through 47 of the accompanying A/L study. For purposes of this summary, the consequences of choosing A versus B, as described on the prior page, are summarized most clearly in the tables on pages 31 and 47 of the study (copied below followed by explanatory comments).

20 Years	Probability of Full Funding in 2044	Probability of < 75% (Current) Funding in 2044	Probability of < 50% Funding in 2044	Maximum 1 Year Investment Loss
100% Rates	0%	100%	95%	-4%
Decreased Private Exposures	40%	42%	30%	-24%
Current Target Allocation	47%	37%	28%	-26%
Increased Private Exposures	50%	36%	26%	-26%
7% Geometric	52%	34%	24%	-27%
Passive Index	33%	53%	42%	-29%
100% S&P500	26%	65%	57%	-43%

20 Years	Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Millions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	Year 20 Median	Years 1 to 20 Peak	Years 1 to 20 Trough
100% Rates	42%	27%	60%	$36,447	$39,192	$34,278	16%	24%	8%
Decreased Private Exposures	86%	16%	236%	$36,484	$39,535	$34,297	8%	41%	3%
Current Target Allocation	96%	16%	264%	$36,484	$39,513	$34,297	7%	40%	3%
Increased Private Exposures	99%	17%	268%	$36,484	$39,513	$34,295	7%	39%	2%
7% Geometric	104%	18%	280%	$36,484	$39,438	$34,295	6%	36%	2%
Passive Index	70%	2%	240%	$36,538	$40,369	$34,319	9%	100%	3%
100% S&P500	49%	0%	282%	$36,825	$50,763	$36,538	14%	100%	2%

- The stochastic projections generally suggest worse outcomes when compared to the determinist analysis. This is a result of the current contribution policy's lack of adjustment for asset volatility and periods of returns below the assumed rate or return. This is similar to the observations of the deterministic scenario analysis. These outcomes suggest two critical findings. First, asset volatility reduction is critical to the long-term health of the System. Second, and perhaps more importantly, downside protection must be carefully monitored and minimized.

- The 100% Rates, Passive Index, and 100% S&P 500 portfolios all result in a median expected funding ratio at the end of the 20-year study period that is lower than the current funding level (75%) (pages 30, 31, and 47). The 100% Rates portfolio and 100% S&P 500 portfolio end the projection period significantly worse off than current levels. This is supportive of the continued utilization of a diversified investment approach.

- With the exception of the 100% Rates portfolio, all portfolios analyzed show a moderate (from 26% to 52%) probability of full funding in 20 years (page 31). The 100% Rates portfolio has zero probability of full funding in 20 years. Again, this supports a diversified approach.

- The 100% Rates and 100% S&P 500 portfolios show median payout ratios of 16% and 14%, respectively. This is not sustainable (page 47). None of the other portfolios show a significant probability of extreme median payout ratios over the next 20 years (pages 32-38 and 47). However, each of the portfolios do indicate liquidity may be a concern at some point in the future following a market decline. Each of the portfolios has a peak payout ratio of at least 24% at some point during the projection period. High payout ratios severely limit the System's ability to invest in illiquid strategies and may inhibit the System's ability to invest with a long-term focus reducing the potential return opportunities. In short, a heavy reliance on illiquid investments risks could turn even normal asset value declines into disruptive events. Payout ratios of 100% indicate a probability of asset depletion at some point in the projection period. While the probability of this is low, it should be noted as an outcome observed in the models.

- As the expected risk and return of the System are incrementally increased, the outcomes do appear to very marginally improve at the cost of reduced worst-case outcomes. This is a direct result of significant increases in portfolio volatility associated with diminishing increases in return. The benefits taper off and costs increase though as expected risk increases. This implies the tradeoff for additional upside likely becomes less attractive the more risk is increased. The range or dispersion of potential outcomes—particularly for the market funded ratio and cumulative employer contributions—increases as incremental risk is added to the System. This does not, in our opinion, directly support increasing risk at this time.

Final Comments

Although this A/L study shows that the System currently has a shortfall of approximately $12.5 billion, it also suggests significant improvements in financial health are possible under the current assumptions. The System can best meet its objectives through the continued use of a well-diversified investment portfolio. However, positive outcomes are extremely dependent on the contribution policy. The incremental cost of additional volatility does not justify the potential increase in median outcomes. Reducing volatility and downside risk, where possible to maintain return, can have a materially positive impact on the long-term health of the System.

The study is not supportive of a long-term, ultra-conservative approach as the protection such a strategy provides to current System assets comes with the heavy cost of considerably higher contributions. Conversely, the increasing potential for large one-year declines suggests that there is likely a limit to the net benefits of adding increased risk in pursuit of additional return.

Progress should be monitored periodically through studies such as these, particularly if the System encounters a sustained period of lower returns in the capital markets (and thus for the System's assets) as well as material changes in contribution policy or benefit levels.

Additionally, this study assumes no further changes are made to the benefit policy at any point during the 20-year projection period. Such changes would fall outside the reach of an Asset/Liability study. However, we do note that even small changes to the benefit policy can have a meaningful long-term impact on the likely future outcomes of the System if they are adopted without a corresponding change in assets or contributions.