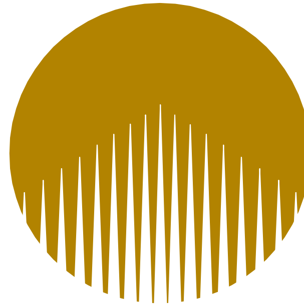

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Asset/Liability Study

Tulare County Employees' Retirement Association

June 23, 2004

BACKGROUND

- This asset/liability study was conducted to evaluate the adequacy of various asset allocations given the current and projected pension liabilities.
- Sensitivity analysis was performed on various asset allocations to determine each mix's impact upon the financial status of the plan, with particular emphasis on the funded status and funding requirements.
- The study was based upon the plan's participant data and the actuarial valuation as of June 30, 2003 and Summit's current capital market assumptions.

DEMOGRAPHIC SUMMARY AND ASSUMPTIONS

Demographic Summary

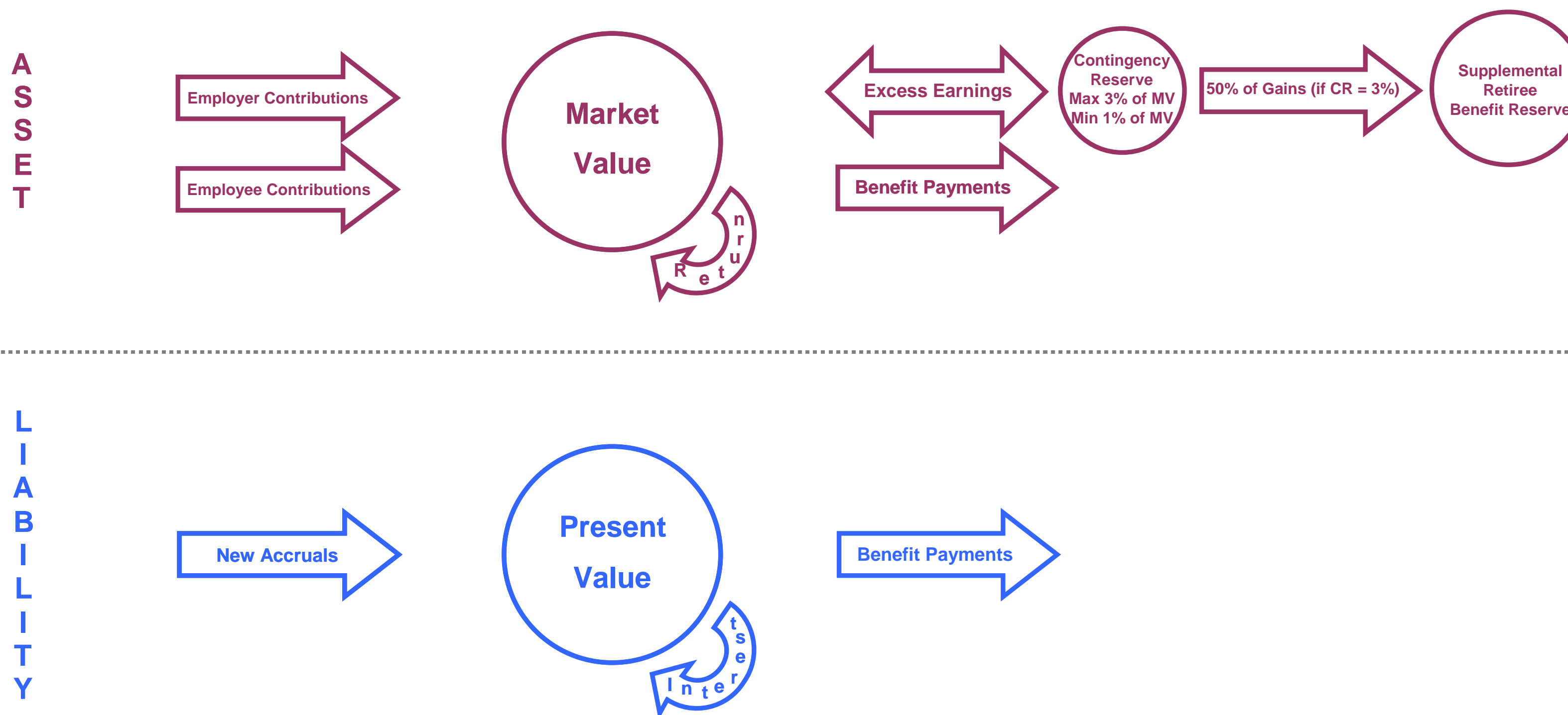
Group	Number	Average Age	Average Service	Average Pay or Benefit
Active Employees	4,165	42.5	7.8	38,991
Retirees	1,601	69.8	-	13,176
Terminated-Vesteds	768	45.3	-	5,857

Assumptions

- The following assumptions were used throughout the study in both the baseline and stochastic projections.
  - Utilized census data as of June 30, 2003.
  - Assumed a stable active population.
  - Funding interest rate (discount rate and expected asset return) of 8.0%.
  - Retirees assumed to receive annual cost of living adjustments (COLAS) consistent with the actuary's valuation assumptions (3.0% for Tier 1 and 2.0% for Tiers 2&3).
  - Utilized actuarial cost methods, asset smoothing methods and decremental assumptions used in the valuation.
  - Utilized the benefit formulas and provisions specific to the plan.
  - Modeled the first year's return deterministically at 15.0%
    - This 15.0% return was the actual plan return for the ten months starting June 30, 2003 and ending April 30, 2004.
  - The assets and liabilities that are presented throughout this study correspond to the regular plan and do not include supplemental asset/liabilities. However, the projection *does* capture the effect of the supplemental reserves on the regular plan:
    - On a semi-annual basis, fifty percent of excess earnings (gains) are allocated to the Supplemental Retiree Benefit Reserve (SRBR) in order to fund supplemental benefits (asset gains impact the SRBR, but losses do not).
    - Assets within the Contingency Reserve are allowed to flow back to the regular plan, provided that the Contingency Reserve does not fall below 1% of market value.

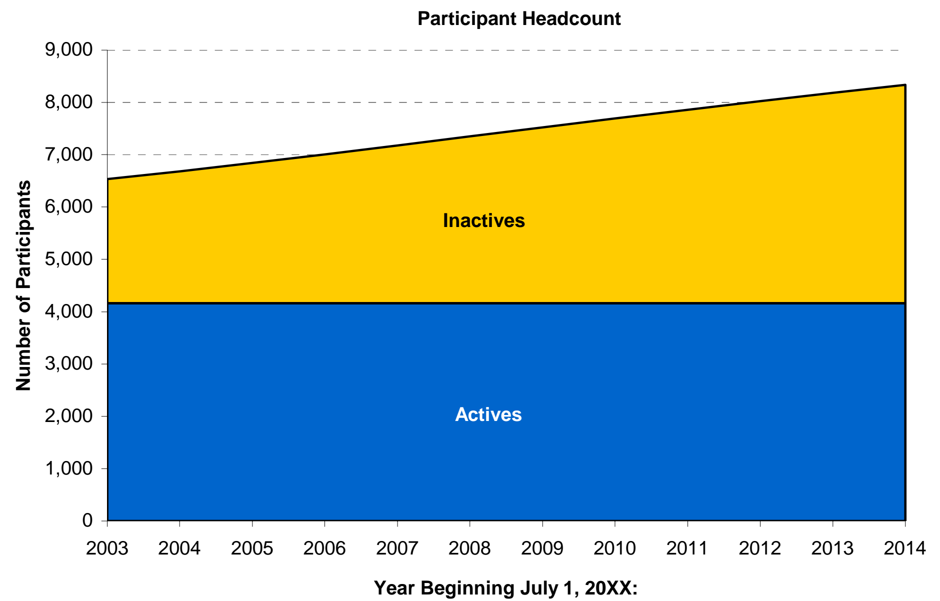
BASELINE PROJECTION OF THE PLAN

- In order to gain an appreciation of the current and projected financial status of the plan, a baseline projection was produced which forecasted the assets and liabilities based upon the plan's current set of assumptions.
  - Active salaries are assumed to evolve with the salary scale (includes both general pay increases and a merit component).
  - The return on assets was set to 15.0% in the first year (plan return 6/30/03 – 4/30/04), and 8.0% thereafter.
  - Projection period is a total of eleven years.
    - Given that the plan already experienced a 15.0% return for the ten months ending April 30, 2004, a ten-year projection was produced in addition to that first year.



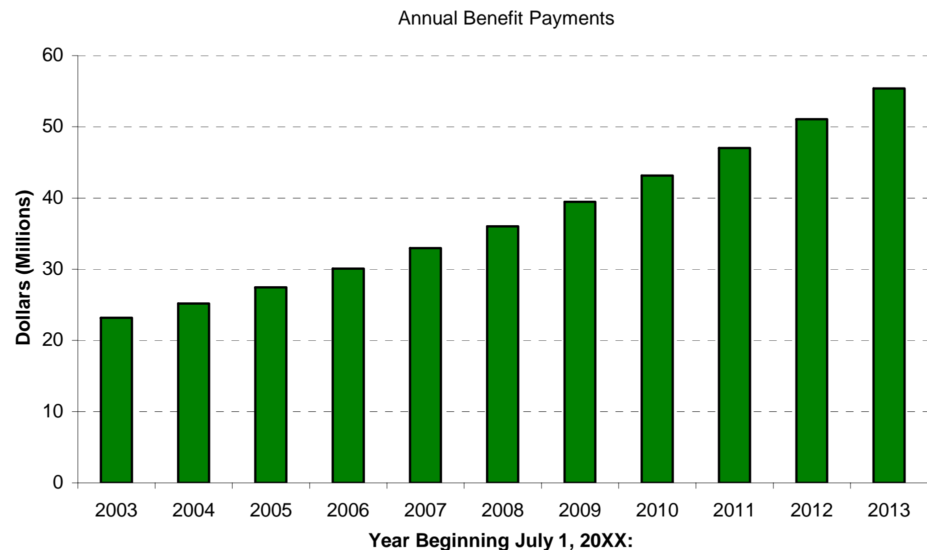
EVOLUTION OF ACTIVE / INACTIVE COMPOSITION

- The active population remains constant at 4,165 employees.
- The active/inactive headcount changes throughout the projection evolving from 64%/36% to 50%/50% over the course of the projection.



BENEFIT PAYMENT PROJECTIONS

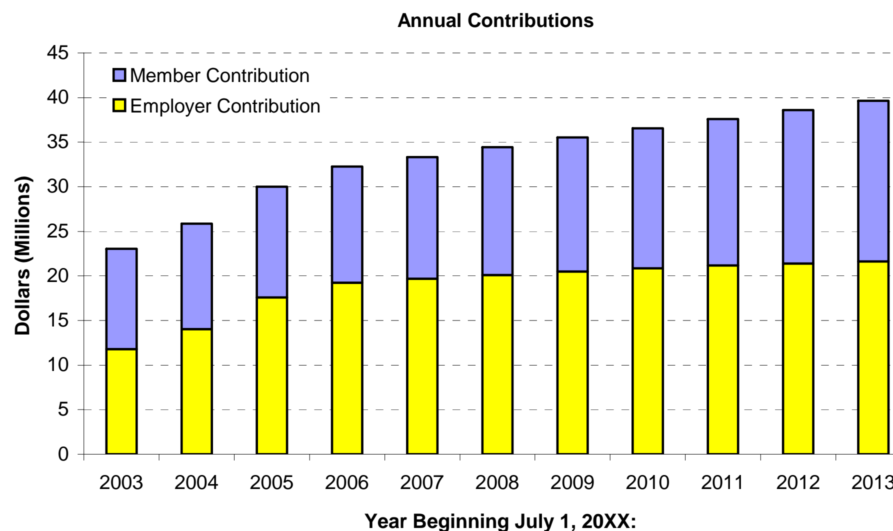
- Annual benefit payments begin the projection at $23.1 million, and rise steadily thereafter to $55.4 million at the end of the projection (projected benefit payments correspond to the regular plan *only* – supplemental benefits are tracked separately).
- The aggregate benefit payment outflows over the ten-year projection period (excluding 2003) are expected to total $387.8 million.

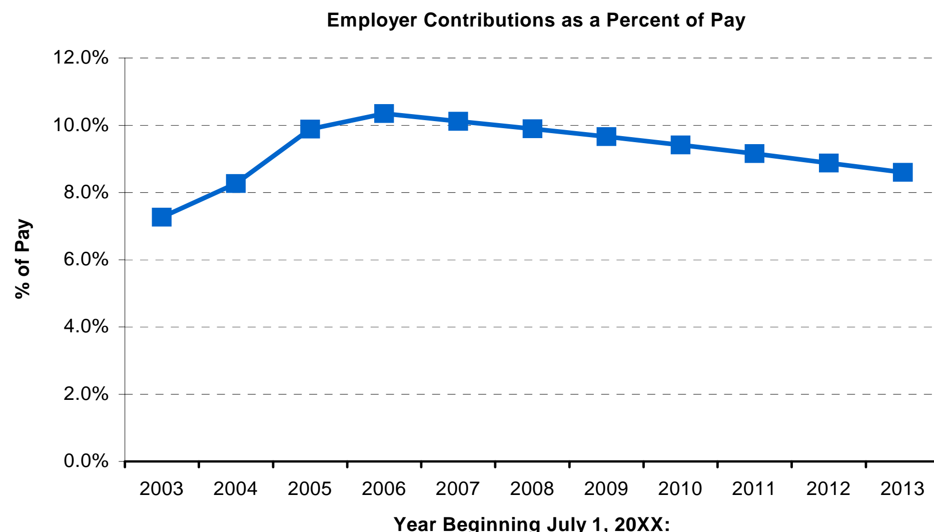


Note: The year beginning July 1, 2003 corresponds to plan year 2004. Therefore, the first bar in the chart above corresponds to the projected benefit payments for plan year 2004.

CONTRIBUTIONS

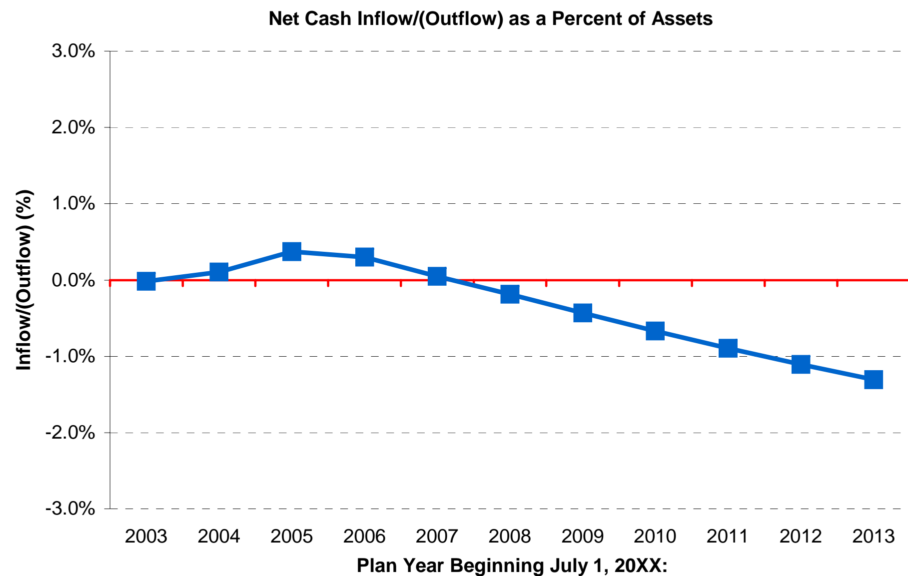
- Assuming the plan earns an 8.0% annual return, projected annual contributions are out as follows:
  - Employer contributions start at $11.8 million, and rise steadily throughout the projection to $21.6 million in 2013.
  - Employee contributions start at $11.3 million and rise to $18.0 million at the end of the projection (employee contribution rate is based on entry age).
  - Therefore, total contributions start at $23.1 million and rise to $39.6 million in 2013.
- Over the ten-year projection period (excluding 2003), projected aggregate contributions are as follows:
  - Aggregate employer contributions are expected to total $196.2 million.
  - Aggregate employee contributions are expected to total $147.6 million
  - Therefore, total aggregate contributions are expected to total $343.8 million.
- Contributions as a percent of pay start out at 7.3% and peak at 10.3% in 2006. The average contribution rate over the projection period is 9.2%.





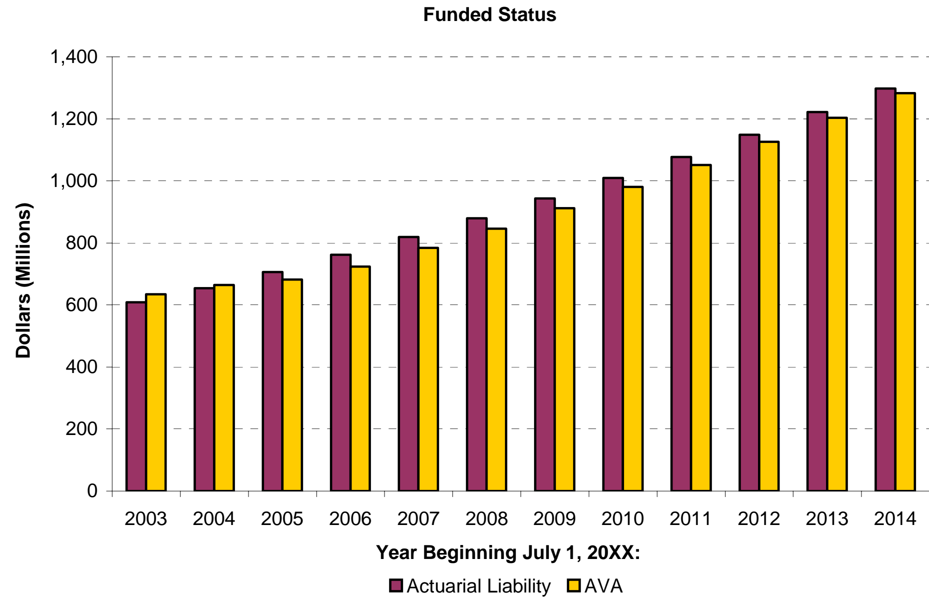
LIQUIDITY NEEDS
Net Cash Inflow/(Outflow) as a Percent of Assets

- The plan is expected to have aggregate inflows (in the form of contributions) that total $343.8 million over the projection period.
- Meanwhile, aggregate outflows (in the form of benefit payments) are expected to total $387.8 million over the projection period.
- As a result, the plan is projected to experience negative cash flows throughout the latter half of the projection period.
- Given that projected net outflows never exceed 1.5% of market value, liquidity is not a concern; liquidity needs of less that 3% can generally be covered with coupon income and dividends generated by the investment portfolio.

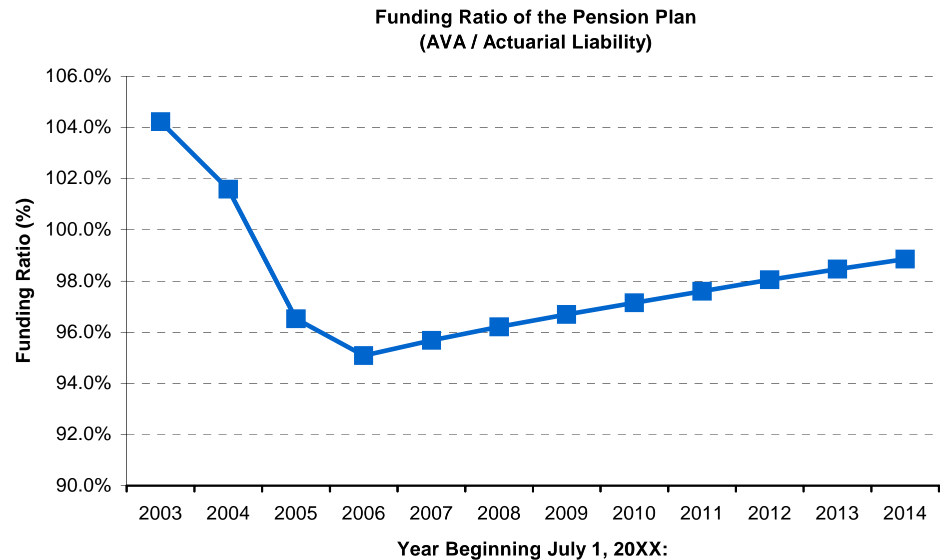


FUNDED STATUS

- The actuarial accrued liability (AAL) begins the projection at $608.5 million and is expected to grow to $1,297.9 million over the next eleven years.
  - In terms of the active/inactive composition, the liability is currently split 51%/49%.
  - This composition is projected to evolve to 45%/55% at the end of the projection.
- Meanwhile, the actuarial value of assets (AVA) begins the projection at $634.2 million and is expected to grow to $1,283.1 million over the next eleven years.
- The projection assumes benefit payments are flowing out of the plan and employer/employee contributions are flowing in.

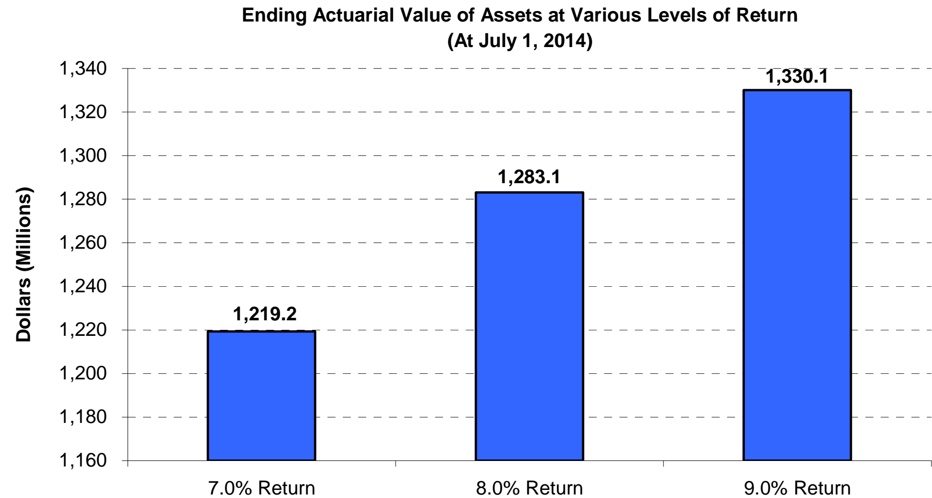


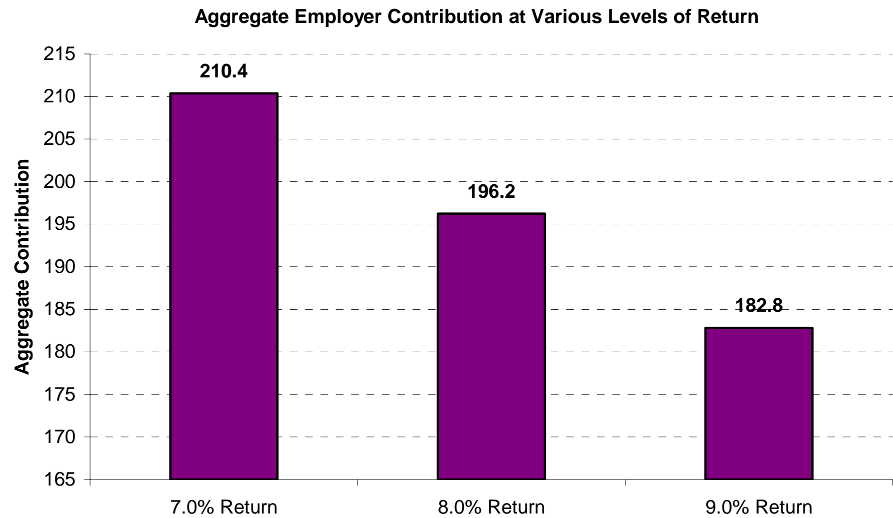
- The plan starts out the projection at 104.2% funded on an AVA basis (based on regular plan assets – excludes SRBR & contingency reserve).
- Despite the 15% return experienced in the first year, asset losses that are already reflected in the market value of assets are smoothed into AVA over the first three years of the projection. As a result, the funded status declines to 95.1% in 2006.
- Assuming that the plan earns a return of 8.0% after the first year, funded status will improve to 98.9% in 2013 (the plan is not fully funded by 2014 because total unamortized gains/losses are smoothed over 15 years).



IMPACT OF AN ASSET RETURN OTHER THAN 8.0%

- As illustrated previously, assuming the plan earns an 8.0% annual return, the AVA at the end of the projection is $1,283.1 million and the aggregate employer contribution is $196.2 million.
- To highlight the impact of earning asset returns other than 8.0%:
  - If the plan earns a 7.0% annual return, the ending AVA is $1,219.2 million and the aggregate employer contribution is $210.4 million.
  - If the plan earns a 9.0% annual return, the ending AVA is $1,330.1 million and the aggregate employer contribution is $182.8 million.

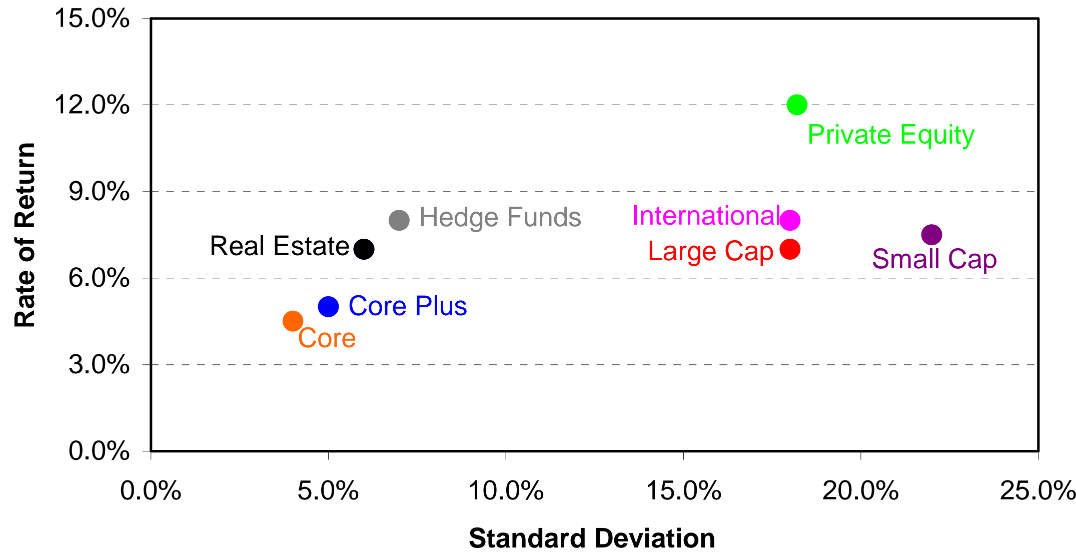




PORTFOLIO CONSTRUCTION

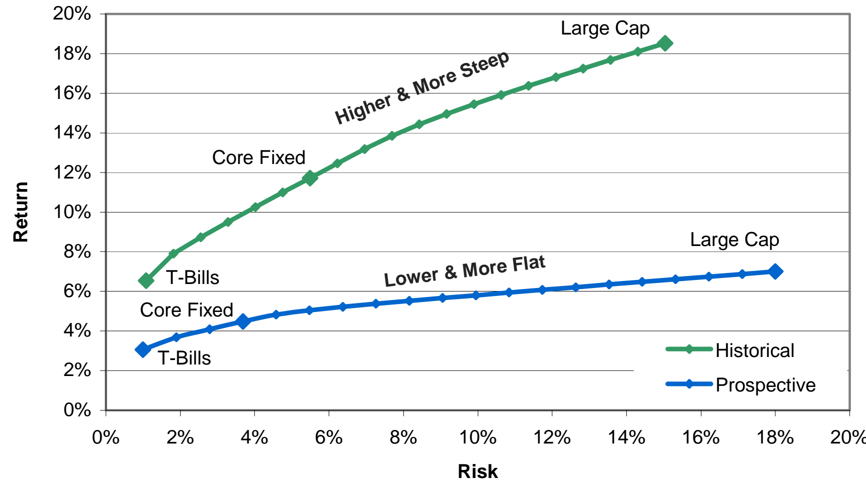
- Now that a baseline projection has been produced, various asset mixes (and their inherent volatility) are folded into the plan to analyze the viability of each asset mix.
- The following page outlines all of the assets classes that are considered throughout the analysis.
- The documentation used to derive the capital market assumptions for each asset class is contained in the appendix.

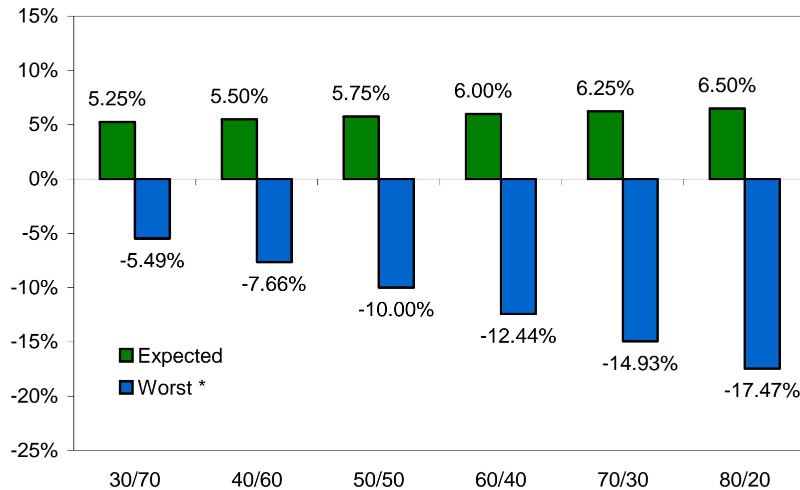
ASSET CLASS RISK/RETURN PROFILE



Asset Class	Return	Standard Deviation	Comments Regarding Return Assumptions
Core Fixed Income	4.5%	4.0%	Current Yield Curve
Core Plus Fixed Income	5.0%	4.0%	Current Yield Curve
Large Cap Equity	7.0%	18.0%	Long-term Expected, Fundamental/Risk-Premium Based
Small Cap Equity	7.5%	22.0%	Long-term Expected, Fundamental/Risk-Premium Based
International Equity	8.0%	18.0%	Long-term Expected, Fundamental/Risk-Premium Based
Private Equity	12.0%	18.0%	40% Buyout / 40% Venture / 20% Mezzanine
Hedge Funds	8.0%	7.0%	Risk Free Rate + Alpha – Fees
Real Estate	7.0%	6.0%	Cap Rate Based

CURRENT ASSUMPTIONS VERSUS HISTORICAL EXPERIENCE





- Based upon Summit's current capital market assumptions, capital market returns are below their historical level while risk has shifted slightly outward.
- In other words, Summit believes that investors are no longer rewarded for taking risk to the extent that they once were.
- The large cap equity risk-premium has dropped from 6.5% (historical) to 2.5% (prospective).
- As a result, the incremental return pick-up generated by increasing the equity allocation has decreased while the incremental risk has not.
- This generic example uses only three asset classes:
  - Cash
  - Fixed Income
  - Large Cap Equity

* 5.0% of observations are more extreme than the worst case

ALPHA ASSUMPTIONS

- Given Summit's current capital market assumptions, the required return of 8.0% cannot easily be achieved without incorporating an active management (alpha) assumption.
- The following table summarizes the alpha assumptions used throughout the study.

Asset Class	Benchmark Expected Return	Benchmark Expected Volatility	Manager Alpha	Manager Tracking Error[1]	Total Return	Total Standard Deviation[2]
Core Fixed Income	4.5%	4.0%	0.25%	0.5%	4.75%	4.0%
Core Plus Fixed Income	5.0%	5.0%	0.50%	1.0%	5.50%	5.1%
Large Cap Core	7.0%	18.0%	1.00%	2.0%	8.00%	18.1%
Small Cap Core	7.5%	22.0%	2.50%	5.0%	10.00%	22.6%
International Core	8.0%	18.0%	3.00%	6.0%	11.00%	19.0%
Private Equity[3]	12.0%	18.0%	0.00%	0.0%	12.00%	18.0%
Hedge Funds[3]	8.0%	7.0%	0.00%	0.0%	8.00%	7.0%
Private Real Estate[3]	7.0%	6.0%	0.00%	0.0%	7.00%	6.0%

[1] Tracking error is assumed to be 2 * (manager alpha) resulting in an information ratio of .5
[2] The total standard deviation calculation assumes that manager alpha *is not* correlated to the benchmark
[3] The alpha assumption for each of the alternative assets is embedded in the benchmark expected return (alpha is inherent in the benchmark performance for these asset classes)

ASSET/LIABILITY ANALYSIS

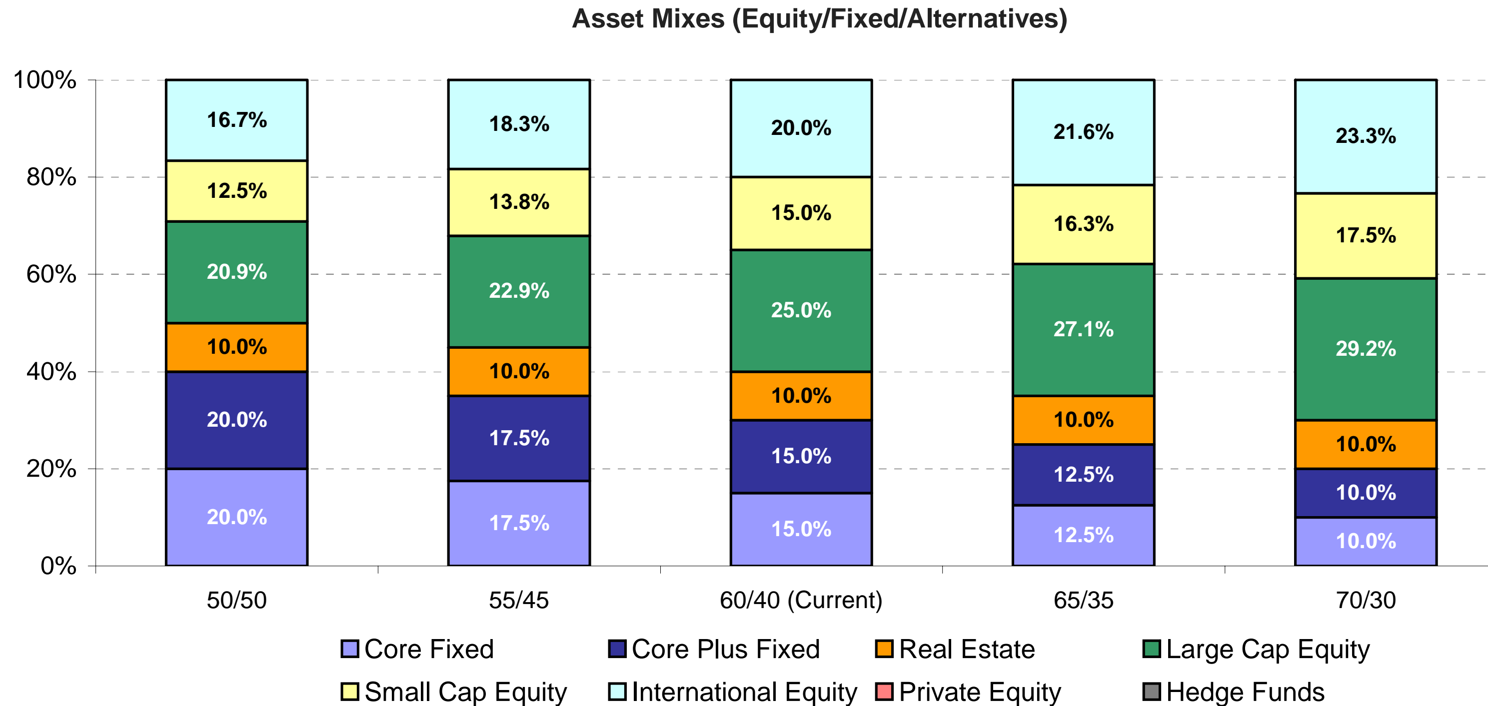
- The following section integrates a ten-year stochastic projection of portfolio returns with the liability projection to analyze the impact upon asset value, contributions and funded status.
  - The first year is modeled deterministically at an asset return of 15.0%.
  - Stochastic analysis is a multi-scenario simulation technique which models the range of possible annual returns for each portfolio over the ten-year projection and integrates them with the liabilities to identify the impact on market value, contributions and funded status[1].

[1] For a more detailed discussion of stochastic modeling, see 'An Introduction to Stochastic Modeling' available at www.summitstrategies.com

PHASE I

- The most important decision with regard to asset allocation is the choice of allocation between equity and fixed income. Phase I compares the current allocation to several different options. The only difference between each of the options is the overall weighting to equity and fixed income.
- The following page illustrates the five portfolios (current & four options) compared in Phase I of the study.
  - Each option represents an incremental 5% change in the public equity allocation (holding the 10% real estate allocation constant).
  - Each portfolio uses a predetermined "optimal" (maximum return per unit of risk) equity allocation. Page 17 illustrates that the current 42/25/33 equity allocation (42% large cap / 25% non-large cap / 33% international) recommended in the last study remains the optimal equity allocation.
- Phase II will consider the inclusion of hedge funds and private equity as fixed income and equity surrogates, respectively.

PORTFOLIO COMPARISON – Current vs. Other Portfolios[1]



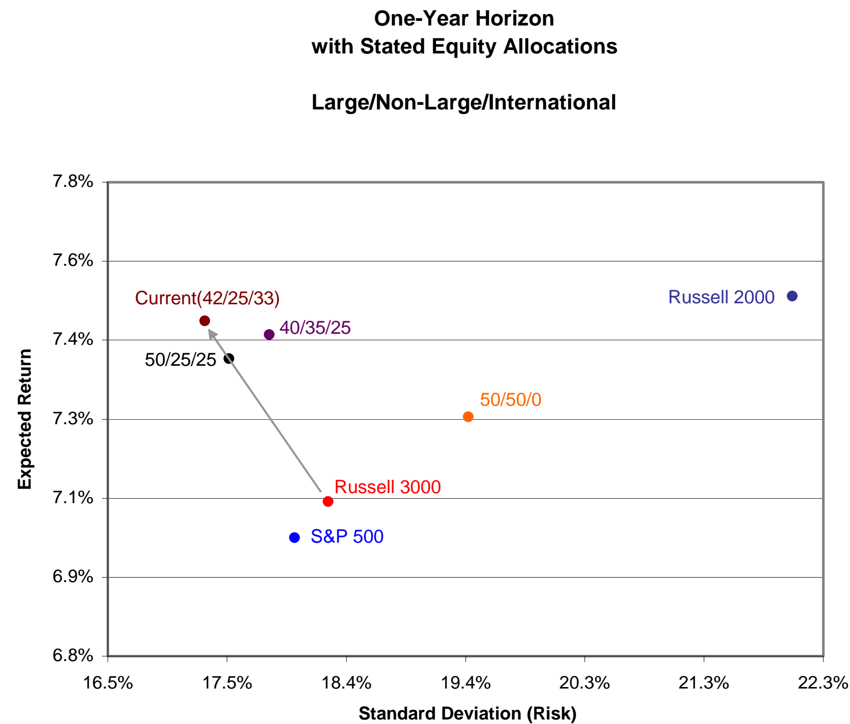
Geometric Expected Return & Standard Deviation

	50/50	55/45	60/40 (Current)	65/35	70/30
Expected Return	7.1%	7.3%	7.4%	7.6%	7.7%
Standard Deviation	9.2%	10.0%	10.8%	11.7%	12.5%

[1] For all portfolios the equity allocation is split 42% large cap, 25% non-large cap and 33% international.

EQUITY ALLOCATION – RATIONALE FOR 42/25/33

- The current equity allocation of 42% large cap, 25% non-large cap and 33% international represents the optimal allocation as it enhances the return of the portfolio relative to the aggregate domestic equity market (basically 82% large cap and 18% non-large) with less risk.



PHASE I RESULTS – CRITICAL METRICS (10-YEARS ENDING 7/1/2014)

		50/50	55/45	60/40 (Current)	65/35	70/30	Baseline
Annualized Return	Expected	7.1%	7.3%	7.4%	7.6%	7.7%	8.0%
	Worst	2.4%	2.1%	1.8%	1.5%	1.2%	-
	Best	11.9%	12.5%	13.1%	13.7%	14.2%	-
Ending Actuarial Value of Assets	Expected	1,196.4	1,199.5	1,204.7	1,210.3	1,216.4	1,283.1
	Worst	871.7	855.0	836.6	818.0	796.4	-
	Best	1,486.7	1,520.0	1,555.6	1,597.3	1,639.3	-
Funded Status (AVA/AAL)	Expected	92.2%	92.4%	92.8%	93.3%	93.7%	98.9%
	Worst	67.2%	65.9%	64.5%	63.0%	61.4%	-
	Best	114.5%	117.1%	119.9%	123.1%	126.3%	-
Aggregate Employer Contributions	Expected	216.6	215.3	213.9	212.7	211.0	196.2
	Worst	326.3	333.2	341.2	348.8	356.3	-
	Best	122.2	112.9	103.9	95.6	88.6	-

- All five portfolios underperformed the baseline for each of the four metrics (baseline results outlined earlier in the presentation are reproduced on this page in the red boxes).
- Given that Summit's capital market expectations for both equity and fixed income are below their long term averages (see page 12), it is not surprising that all five portfolios do not achieve the required return of 8.0%.

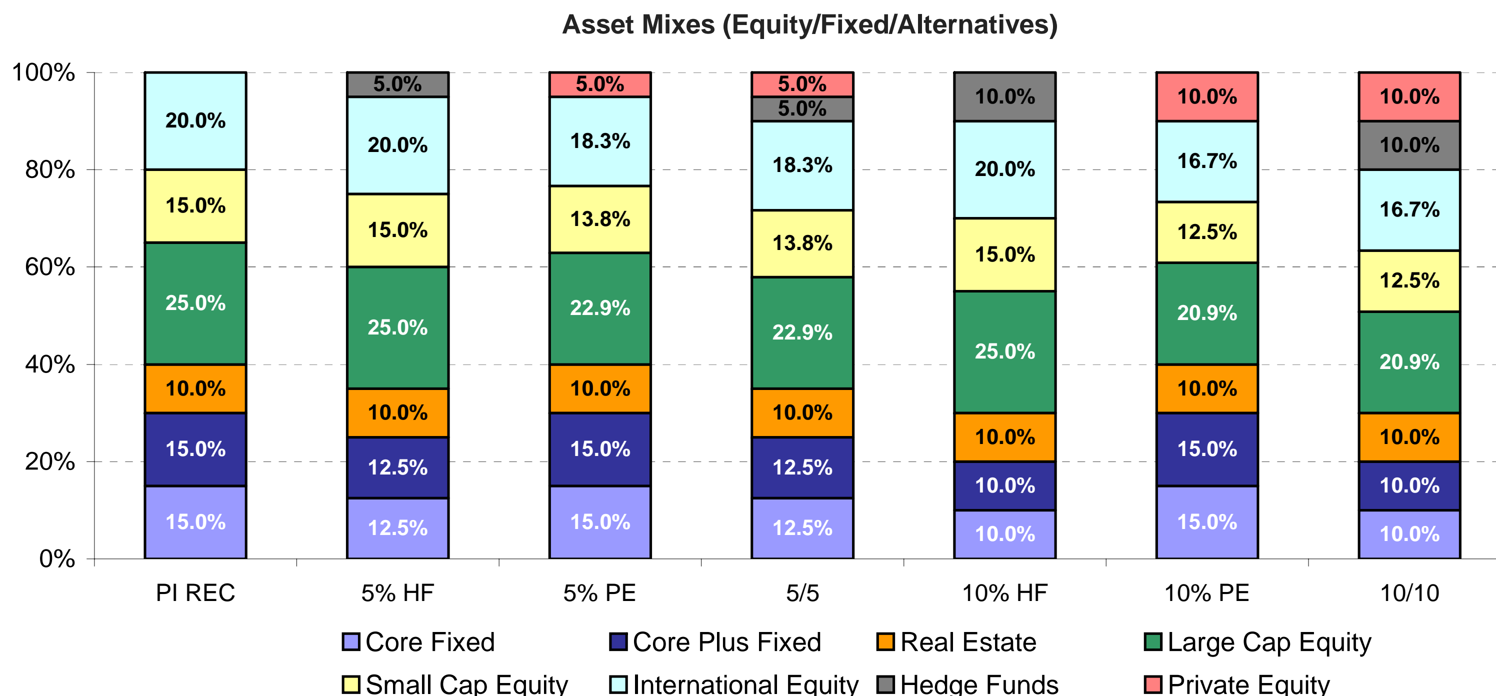
PHASE I ASSET ALLOCATION RECOMMENDATION

- Summit believes that the plan must take on a moderate level of risk in order to approach the 8.0% return objective.
- However, this does not mean that the plan should take on an inordinate amount of risk. As indicated on page 12, the plan will not be rewarded for taking on incremental risk to the same extent as was historically the case.
- As a result, Summit believes that the current 60/40 portfolio is a well diversified portfolio that strikes a proper balance between risk and return. This portfolio will "work hard" without taking on an unnecessary amount of risk. While this portfolio does not yet meet the 8% return target, Phase II of this study will incorporate additional asset classes in an attempt to achieve this return target while simultaneously reducing risk.

PHASE II

- Phase II of the study compares the recommended 60/40 allocation from Phase I (the current portfolio) to various portfolios that incorporate hedge funds and private equity.
- The following page illustrates the seven portfolios (Phase I recommended & six options) analyzed in Phase II of the study. In each case the new asset class is incorporated as follows:
  - For hedge funds (fixed income surrogate) the incremental allocation is pulled equally from core fixed income and core plus fixed income.
  - For private equity (equity surrogate) the incremental allocation is pulled proportionately from large, small and international equities.

PORTFOLIO COMPARISON – Phase I Recommended vs. Other Portfolios



Geometric Expected Return & Standard Deviation

	PI REC	5% HF	5% PE	5/5	10% HF	10% PE	10/10
Expected Return	7.4%	7.6%	7.6%	7.7%	7.7%	7.8%	8.0%
Standard Deviation	10.8%	11.0%	10.5%	10.7%	11.2%	10.3%	10.7%

PHASE II RESULTS – CRITICAL METRICS (10-YEARS ENDING 7/1/2014)

		PI REC	5% HF	5% PE	5/5	10% HF	10% PE	10/10	Baseline
Annualized Return	Expected	7.4%	7.6%	7.6%	7.7%	7.7%	7.8%	8.0%	8.0%
	Worst	1.8%	1.8%	2.1%	2.1%	1.9%	2.4%	2.4%	-
	Best	13.1%	13.3%	13.1%	13.3%	13.6%	13.1%	13.6%	-
Ending Actuarial Value of Assets	Expected	1,204.7	1,211.5	1,219.3	1,226.2	1,220.8	1,232.2	1,245.6	1,283.1
	Worst	836.6	838.8	855.0	853.5	834.5	871.3	873.6	-
	Best	1,555.6	1,570.1	1,557.6	1,571.3	1,587.5	1,555.8	1,589.3	-
Funded Status (AVA/AAL)	Expected	92.8%	93.3%	93.9%	94.5%	94.1%	94.9%	96.0%	98.9%
	Worst	64.5%	64.6%	65.9%	65.8%	64.3%	67.1%	67.3%	-
	Best	119.9%	121.0%	120.0%	121.1%	122.3%	119.9%	122.5%	-
Aggregate Employer Contributions	Expected	213.9	211.8	210.5	208.8	209.9	208.0	203.9	196.2
	Worst	341.2	341.9	335.4	335.4	341.1	330.6	330.4	-
	Best	103.9	101.3	105.8	102.9	98.6	106.2	99.5	-

- In the expected case, the 10/10 portfolio (10% hedge funds / 10% private equity) exhibits superior results across all metrics relative to the other portfolios presented in Phase II.
- Relative to the Phase I recommended portfolio, this portfolio has superior expected, worst case and best case results for all four metrics.
- Interestingly, despite the fact that the expected annualized return for the 10/10 portfolio matches the required return (baseline = 8%), the other metrics underperform the baseline in the expected case. This is a direct result of the way the SRBR is structured. Fifty percent of positive asset experience is siphoned off to the SRBR, while none of the adverse asset experience impacts the SRBR (the SRBR assets will always evolve at no less than 8% per year). Ending AVA falls short of the baseline by $37.5 million as a result.

PHASE II ASSET ALLOCATION RECOMMENDATION

- Summit recommends that the plan utilize the portfolio with 10% hedge funds (pulled from fixed) and 10% private equity (pulled from equity).
- Relative to the Phase I recommendation (current portfolio), the Phase II recommended portfolio's 10-year expected and worst case results improve as follows:
  - Compound returns improve by 60 bps in both cases.
  - Market value improves by $41 million and $37 million, respectively.
  - Funded status improves by 3% in both cases.
  - Aggregate contributions improve by $10 million and $11 million, respectively.
- Summit believes that this recommended portfolio provides sufficient protection against a broad spectrum of possible economic scenarios.

ASSET ALLOCATION RECOMMENDATION

- Summit recommends that the plan utilize the 60/40 portfolio, with a 10% allocation to hedge funds and a 10.0% allocation to private equity.
- Both the current and recommended portfolios are summarized below:

	Current		Recommended	
Large Cap Equity	25.0%	60% Equity	20.9%	60% Equity
Small Cap Equity	15.0%		12.5%	
Developed International Equity	20.0%		16.6%	
Private Equity	0.0%		10.0%	
Core Fixed Income	15.0%	40% Fixed	10.0%	40% Fixed
Core Plus Fixed Income	15.0%		10.0%	
Real Estate	10.0%		10.0%	
Hedge Funds	0.0%		10.0%	

ATTRIBUTION ANALYSIS – RECOMMENDED VS. CURRENT

- The current and recommended asset allocations are compared below from a risk-budgeting perspective. Each asset class is analyzed with regard to its contribution to total portfolio risk and return. The 'Return Component' column shows the actual return contributed by each asset class, the sum of which equals the total portfolio return (the same applies to the risk component column).

	Current					Recommended				
Asset Class	Allocation	Return Component	% of Total Return	Risk Component	% of Total Risk	Allocation	Return Component	% of Total Return	Risk Component	% of Total Risk
Core Fixed	15.0%	0.7%	9.9%	0.2%	1.7%	10.0%	0.5%	6.1%	0.1%	0.9%
Core Plus	15.0%	0.9%	11.5%	0.1%	1.0%	10.0%	0.6%	7.1%	0.0%	0.5%
Large Cap Core	25.0%	1.8%	23.7%	4.3%	39.5%	20.9%	1.5%	18.2%	3.6%	33.5%
Small Cap Core	15.0%	1.3%	17.5%	3.0%	28.0%	12.5%	1.1%	13.4%	2.6%	23.8%
Developed Int Core	20.0%	2.1%	27.7%	3.2%	29.7%	16.7%	1.7%	21.5%	2.6%	23.9%
Private Real Estate	10.0%	0.7%	9.7%	0.0%	0.1%	10.0%	0.7%	9.0%	0.0%	0.3%
Hedge Funds	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.8%	10.1%	0.5%	4.9%
Private Equity	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	1.2%	14.7%	1.3%	12.3%
Total Portfolio	**100.0%**	**7.4%**	**100.0%**	**10.8%**	**100.0%**	**100.0%**	**8.0%**	**100.0%**	**10.7%**	**100.0%**

RECOMMENDED ALLOCATION VS. PEERS

- The current and recommended asset allocations are summarized and compared against the asset allocation of the public defined benefit plan universe in the following table.
- As shown, relative to the public fund universe, the recommended allocation results in higher commitments to international equity, private equity, real estate and hedge funds.

Plan's Asset Allocations vs. Peer Universe

Asset Class	Current Allocation	Recommended Allocation	Public Fund Universe*
Large Cap Equity	25.0%	20.9%	N/A
Small Cap Equity	15.0%	12.5%	N/A
Domestic Equity	***40.0%***	***33.4%***	***44.9%***
International Equity	20.0%	16.6%	12.6%
Private Equity	0.0%	10.0%	3.1%
Total Equity	***60.0%***	***60.0%***	***60.6%***
Core Fixed Income	15.0%	10.0%	N/A
Core Plus Fixed Income	15.0%	10.0%	N/A
Total Public Fixed Income	***30.0%***	***20.0%***	***33.8%***
Real Estate	10.0%	10.0%	4.2%
Hedge Funds	0.0%	10.0%	1.4%
Total Fixed Income	***40.0%***	***40.0%***	***39.4%***
Total	**100.0%**	**100.0%**	**100.0%**

*Source: Greenwich Associates 2004 Survey of 327 Public Funds.

IMPLEMENTATION AND NEXT STEPS

- Regarding implementation, Summit believes the following steps are appropriate:
  - Further refinement of this study, if necessary.
  - Additional education on private equity and hedge funds if necessary.
  - Adoption of an asset allocation.
  - Amendment and adoption of the investment policy statement.
  - The plan's new structure should be implemented, specifically addressing:
    - Private equity structure and implementation.
    - Hedge fund structure and implementation.