AGENDA ITEM III.A.

TO: State Investment Board ("SIB")
FROM: RIO Investment Staff
DATE: March 17, 2017
SUBJECT: **Improving Risk Adjusted Returns by Increasing U.S. Centric Debt Mandates**

Background:

RIO has conducted extensive due diligence on over a dozen investment firms which specialize in providing senior, secured loans directly to middle market companies – a lending market which has become increasingly underserved following the 2008 recession largely due to government regulation. Middle market companies generally have a more difficult time accessing the public debt markets due to their smaller size making it unattractive to most major banks from a regulatory capital perspective. In short, the lack of competition from the major banking institutions has created an attractive risk adjusted return opportunity for those investors willing to accept a lack of liquidity in the private debt markets. During this same time frame, international debt has become increasingly less attractive due to unprecedented monetary policy by central banks (resulting in negative interest rates) and escalating foreign currency volatility due to uncertain geopolitical risks. **As a result, we recommend that our international fixed income investments be replaced with U.S. centric debt mandates.**

Given concern for a rising U.S. interest rate environment, we also recommend that our U.S. centric debt mandates be tilted towards floating rate exposure noting the direct lending sector is predominantly floating rate. These sector changes within fixed income were reviewed with Callan Associates without material concern while noting that Callan's Capital Market Assumptions support the reduction of our international fixed income mandates (as evidenced by a negative Sharpe Ratio in the table below). Callan's latest Capital Market Assumptions were used to demonstrate the impact of RIO's recommendation on Projected Return and Risk (see next page). RIO notes that JPMorgan's latest long-term capital market assumptions also support our recommendation to increase U.S. centric debt mandates using the Direct Lending sector.

2017 Capital Market Expectations—Return and Risk

Summary of Callan's Long-Term Capital Market Projections (2017 – 2026)

		PROJECTED RETURN			PROJECTED RISK		
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**Sharpe Ratio**	**Projected Yield**
Equities							
Broad Domestic Equity	Russell 3000	8.30%	6.85%	4.60%	18.25%	0.332	2.00%
Large Cap	S&P 500	8.05%	6.75%	4.50%	17.40%	0.333	2.10%
Small/Mid Cap	Russell 2500	9.30%	7.00%	4.75%	22.60%	0.312	1.55%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.95%	7.00%	4.75%	21.00%	0.319	3.10%
International Equity	MSCI World ex USA	8.45%	6.75%	4.50%	19.70%	0.315	3.25%
Emerging Markets Equity	MSCI Emerging Markets	10.50%	7.00%	4.75%	27.45%	0.301	2.65%
Fixed Income							
Short Duration	Barclays G/C 1-3	2.60%	2.60%	0.35%	2.10%	0.167	2.85%
Domestic Fixed	Barclays Aggregate	3.05%	3.00%	0.75%	3.75%	0.213	3.50%
Long Duration	Barclays Long G/C	3.75%	3.20%	0.95%	10.90%	0.138	4.50%
TIPS	Barclays TIPS	3.10%	3.00%	0.75%	5.25%	0.162	3.35%
High Yield	Barclays High Yield	5.20%	4.75%	2.50%	10.35%	0.285	7.75%
Non-U.S. Fixed	Barclays Global Aggregate ex US	1.80%	1.40%	-0.85%	9.20%	-0.049	2.50%
Emerging Market Debt	EMBI Global Diversified	4.85%	4.50%	2.25%	9.60%	0.271	5.75%
Other							
Real Estate	Callan Real Estate	6.90%	5.75%	3.50%	16.35%	0.284	4.75%
Private Equity	TR Post Venture Cap	12.45%	7.35%	5.10%	32.90%	0.310	0.00%
Hedge Funds	Callan Hedge FOF Database	5.35%	5.25%	2.80%	9.15%	0.339	2.25%
Commodities	Bloomberg Commodity	4.25%	2.65%	0.40%	18.30%	0.109	2.25%
Cash Equivalents	90-Day T-Bill	2.25%	2.25%	0.00%	0.90%	0.000	2.25%
Inflation	CPI-U		2.25%		1.50%		

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

The Sharpe Ratio is a commonly used measure of risk-adjusted return. It is calculated by subtracting the risk-free return (usually the 3 month Treasury bill) from a portfolio's return and then dividing this excess return by the portfolio's standard deviation. The ratio thus represents the return gained per unit of risk taken with a higher positive number preferred over a smaller positive number or negative value. *Source: Callan College Glossary of Terms*

Overview of Proposed Asset Allocation Changes to Fixed Income Sectors:

The **PENSION TRUST – Fixed Income** table demonstrates how RIO's recommendation to **increase U.S. Investment Grade (IG) by 3.0% to 16.3% and Diversified Credit (DC) by 2.4% to 7.0% will improve Projected Returns for Fixed Income from 3.0% to 3.5% while reducing Projected Risk from 6.3% to 5.7%.** The 5.4% increase (3% for IG and 2.4% for DC or HY) will be funded by reducing International Fixed Income (down 5.4%) in a prudent, reasonable and timely manner.

(1) **Projected Return is 3.0%** in the **CURRENT** framework (top table in chart).
(2) **Projected Return is 3.5%** in the **PROPOSED** recommendation (bottom table).
(3) **Projected Risk is 6.3%** in the **CURRENT** framework (top table in chart).
(4) **Projected Risk is 5.7%** in the **PROPOSED** recommendation (bottom table).

PENSION TRUST - Fixed Income Only

Fixed Income Restructuring to Improve Returns and Reduce Risk

CURRENT	Target		Projected		Projected		
Pension Trust	Allocation		Return		Risk		
U.S. Investment Grade	13.3%		3.0%		3.8%		
U.S. High Yield Debt	4.6%		4.8%		10.4%		
International Debt	**5.4%**		1.4%		9.2%		
Fixed Income	23.3%	(1)	**3.0%**		**6.3%**	(3)	
							$4,834
PROPOSED	Target		Projected		Projected		Pension $
Pension Trust	Allocation		Return		Risk		$4.8 billion
U.S. Investment Grade	16.3%		3.0%		3.8%		$788
Diversified Credit	7.0%		4.8%		10.4%		$339
International Debt (a)	**0.0%**		1.4%		9.2%		$0
Fixed Income	23.3%	(2)	**3.5%**		**5.7%**	(4)	**$1,127**

RIO's Fixed Income Recommendation:

If International Debt (a) is eliminated while U.S. Investment Grade and Diversified Credit are increased by 3% and 2.4%, respectively, Projected Return would increase from 3.0% (1) to 3.5% (2), while Projected Risk would decline from 6.3% (3) to 5.7% (4).

Key Point: RIO's Recommendation Increases Projected Returns 0.5% and Decreases Projected Risk 0.6% of "Fixed Income" in the Pension Trust.

KEY POINT: The overall impact on the Pension Trust is a 0.1% increase in Projected Return and a 0.1% decrease in Projected Risk. The impact on the Pension Trust is less than shown above since Fixed Income only represents 23% of the Pension Trust (versus 58% Equity and 19% Real Assets).

Improving Risk Adjusted Returns

By Eliminating a Sector with Projected Return of 1.4% and Projected Risk of 9.2%

PENSION TRUST - Fixed Income Only

Fixed Income Restructuring to Improve Returns and Reduce Risk

CURRENT Pension Trust	Target Allocation		Projected Return	Projected Risk		
U.S. Investment Grade (IG)	13.3%		3.0%	3.8%		
U.S. High Yield Debt (HY)	4.6%		4.8%	10.4%		
International Debt	5.4%		1.4%	9.2%		
Fixed Income	23.3%	(1)	3.0%	6.3%	(3)	

PROPOSED Pension Trust	Target Allocation		Projected Return	Projected Risk		$5,000 Pension $ $5 billion
U.S. Investment Grade (IG)	16.3%		3.0%	3.8%		$815
Diversified Credit (DC)	7.0%		4.8%	10.4%		$350
International Debt (a)	0.0%		1.4%	9.2%		$0
Fixed Income	23.3%	(2)	3.5%	5.7%	(4)	$1,165

RIO's Fixed Income Recommendation:

If International Debt (a) is eliminated while U.S. Investment Grade and Diversified Credit are increased by 3% and 2.4%, respectively, Projected Return would increase from 3.0% (1) to 3.5% (2), while Projected Risk would decline from 6.3% (3) to 5.7% (4).

Key Point: RIO's Recommendation Increases Projected Returns 0.5% and Decreases Projected Risk 0.6% of "Fixed Income" in the Pension Trust.

De-Risking Recommendation:

Step 1 - Cut Int'l. Debt -5.4%
Step 2 – Increase IG +3.0%
Step 3 – Increase DC +2.4%
No Change to Fixed Income %

The Projected Return of the Fixed Income portion of the Pension Trust will increase from 3.0% to 3.5% by replacing International Debt with U.S. Investment Grade (IG) Debt and Diversified Credit (DC) because International Debt has a Projected Return of 1.4% vs. 3% for IG and 4.8% for DC.

The Projected Risk of the Fixed Income portion of the Pension Trust will decrease from 6.3% to 5.7% by replacing International Debt with U.S. Investment Grade (IG) Debt and Diversified Credit (DC) because International Debt has Projected Risk of 9.2% vs. 3.8% for IG and 10.4% for DC.

2017 Capital Market Expectations—Return and Risk

Summary of Callan's Long-Term Capital Market Projections (2017 – 2026)

Non-U.S. Fixed has the lowest Projected Return of any Callan Asset Class and the only sector with a negative Real Return and Sharpe Ratio due to a low Projected Return (1.4%) and High Projected Risk (9.2%).

		PROJECTED RETURN			PROJECTED RISK		
Asset Class	Index	1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Sharpe Ratio	Projected Yield
Equities							
Broad Domestic Equity	Russell 3000	8.30%	6.85%	4.60%	18.25%	0.332	2.00%
Large Cap	S&P 500	8.05%	6.75%	4.50%	17.40%	0.333	2.10%
Small/Mid Cap	Russell 2500	9.30%	7.00%	4.75%	22.60%	0.312	1.55%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.95%	7.00%	4.75%	21.00%	0.319	3.10%
International Equity	MSCI World ex USA	8.45%	6.75%	4.50%	19.70%	0.315	3.25%
Emerging Markets Equity	MSCI Emerging Markets	10.50%	7.00%	4.75%	27.45%	0.301	2.65%
Fixed Income							
Short Duration	Barclays G/C 1-3	2.60%	2.60%	0.35%	2.10%	0.167	2.85%
Domestic Fixed	Barclays Aggregate	3.05%	3.00%	0.75%	3.75%	0.213	3.50%
Long Duration	Barclays Long G/C	3.75%	3.20%	0.95%	10.90%	0.138	4.50%
TIPS	Barclays TIPS	3.10%	3.00%	0.75%	5.25%	0.162	3.35%
High Yield	Barclays High Yield	5.20%	4.75%	2.50%	10.35%	0.285	7.75%
Non-U.S. Fixed	Barclays Global Aggregate ex US	1.80%	1.40%	-0.85%	9.20%	-0.049	2.50%
Emerging Market Debt	EMBI Global Diversified	4.85%	4.50%	2.25%	9.60%	0.271	5.75%
Other							
Real Estate	Callan Real Estate	6.90%	5.75%	3.50%	16.35%	0.284	4.75%
Private Equity	TR Post Venture Cap	12.45%	7.35%	5.10%	32.90%	0.310	0.00%
Hedge Funds	Callan Hedge FOF Database	5.35%	5.25%	2.80%	9.15%	0.339	2.25%
Commodities	Bloomberg Commodity	4.25%	2.65%	0.40%	18.30%	0.109	2.25%
Cash Equivalents	90-Day T-Bill	2.25%	2.25%	0.00%	0.90%	0.000	2.25%
Inflation	CPI-U		2.25%		1.50%		

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

JPMorgan Long-Term Capital Market Assumptions - 2017

RIO notes that Callan does not offer Capital Market Assumptions for certain Alternative sectors such as Direct Lending. As such, RIO referenced JPMorgan's Long-Term Capital Market Assumptions for 2017 to gain assurance that U.S. High Yield and Direct Lending offer comparable return and risk characteristics. On a relative basis, JPM assumes that U.S. High Yield and Direct Lending are projected to generate a Compound Return of 5.75% and 6.75%, respectively, whereas the related Annualized Volatility is projected at 9.00% and 9.75%, respectively. In comparison, Callan has a lower Projected Return for High Yield of 4.8%, but a higher Projected Risk of 10.4%.

		Compound Return 2017 (%)	Arithmetic Return 2017 (%)	Annualized Volatility
FIXED INCOME	Inflation	2.25	2.26	1.25
	U.S. Cash	2.00	2.00	0.50
	U.S. Intermediate Treasuries	2.25	2.44	6.25
	U.S. Long Treasuries	2.00	2.81	13.00
	TIPS	3.50	3.66	5.75
	U.S. Aggregate Bonds	3.00	3.06	3.50
	U.S. Short Duration Government/Credit	3.25	3.26	1.75
	U.S. Long Duration Government/Credit	3.25	3.66	9.25
	U.S. Inv Grade Corporate Bonds	3.25	3.44	6.25
	U.S. Long Corporate Bonds	3.75	4.25	10.25
	U.S. High Yield Bonds	5.75	6.13	9.00
	U.S. Leveraged Loans	5.00	5.16	5.75
	World Government Bonds hedged	1.75	1.79	3.00
	World Government Bonds	2.00	2.21	6.50
	World ex-U.S. Government Bonds hedged	1.75	1.79	3.00
	World ex-U.S. Government Bonds	2.00	2.31	8.00
	Emerging Markets Sovereign Debt	5.50	5.95	9.75
	Emerging Markets Local Currency Debt	6.50	7.25	12.75
	Emerging Markets Corporate Bonds	5.50	5.84	8.50
	U.S. Muni 1-15-Yr Blend	2.50	2.54	3.00
	U.S. Muni High Yield	4.25	4.48	7.00
	Direct Lending	6.75	7.19	9.75

Source: J.P. Morgan Asset Management; data as of September 30, 2016, except hedge funds, private equity, real estate and infrastructure, as of June 30, 2016. Alternative asset index. The return estimates for these alternative asset classes and strategies are estimates of the industry average, net of manager fees. The dispersion of return among managers some of the alternative asset classes this year. U.S. Core Direct Real Estate is equivalent to U.S. Direct Real Estate last year. Similar changes are made across real estate assets. rounded to 2 significant figures, which may cause a loss of information. All returns are nominal. For reference index information, please visit our website.