

# Investment Staff Report

Q4 2015



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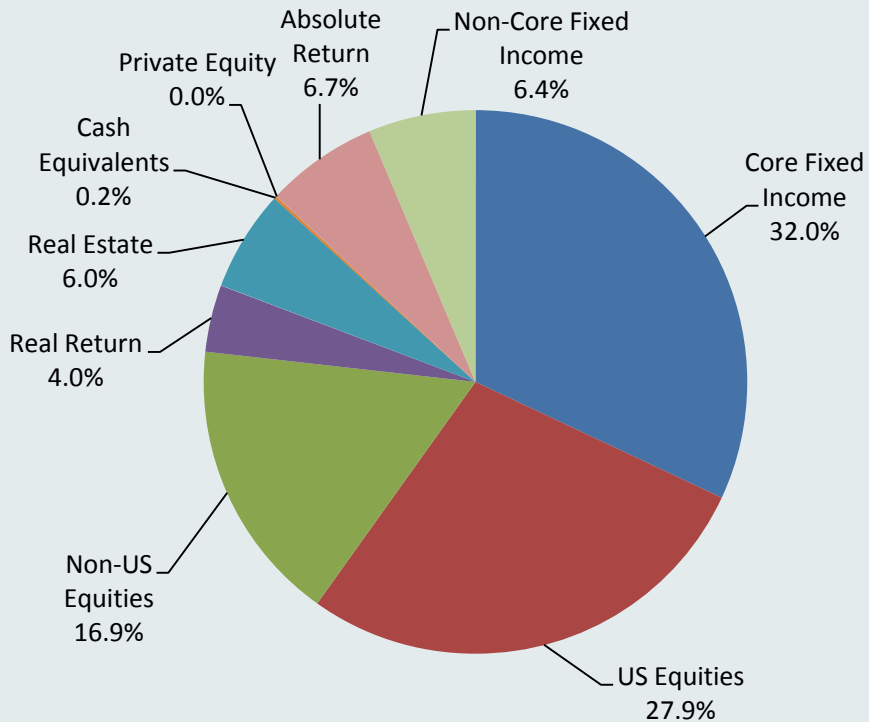
# I. Performance and Asset Allocation



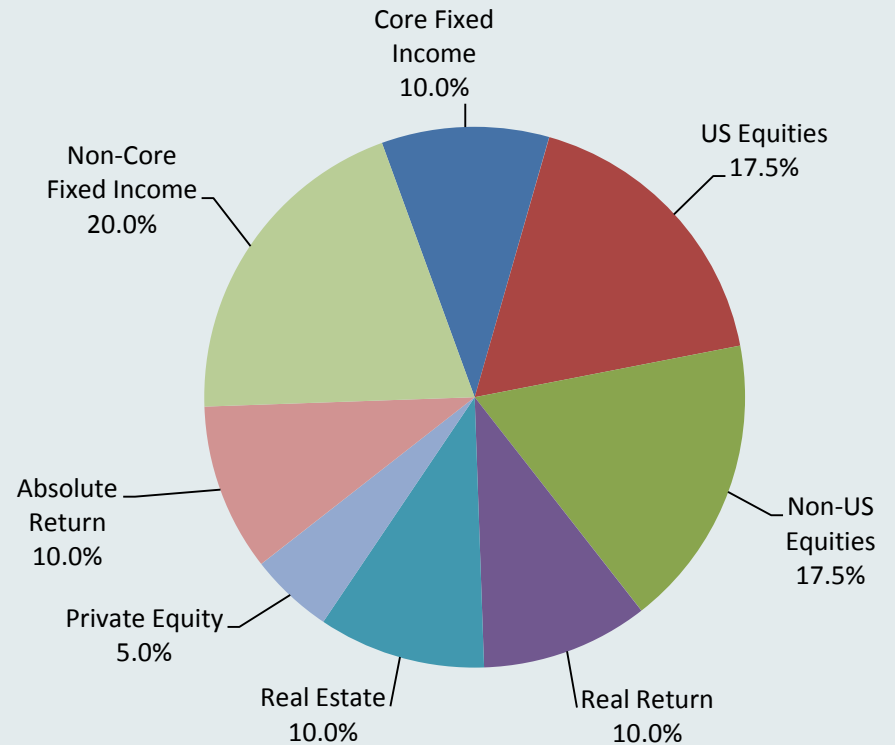
# TMRS INVESTMENT PORTFOLIO

## Asset Allocation

Allocation as of 12/31/15



Target Allocation Adopted July 2015



Total Market Value: \$23.6 Billion

\*Cash equivalents allocation represents unallocated invested cash equivalent instruments.

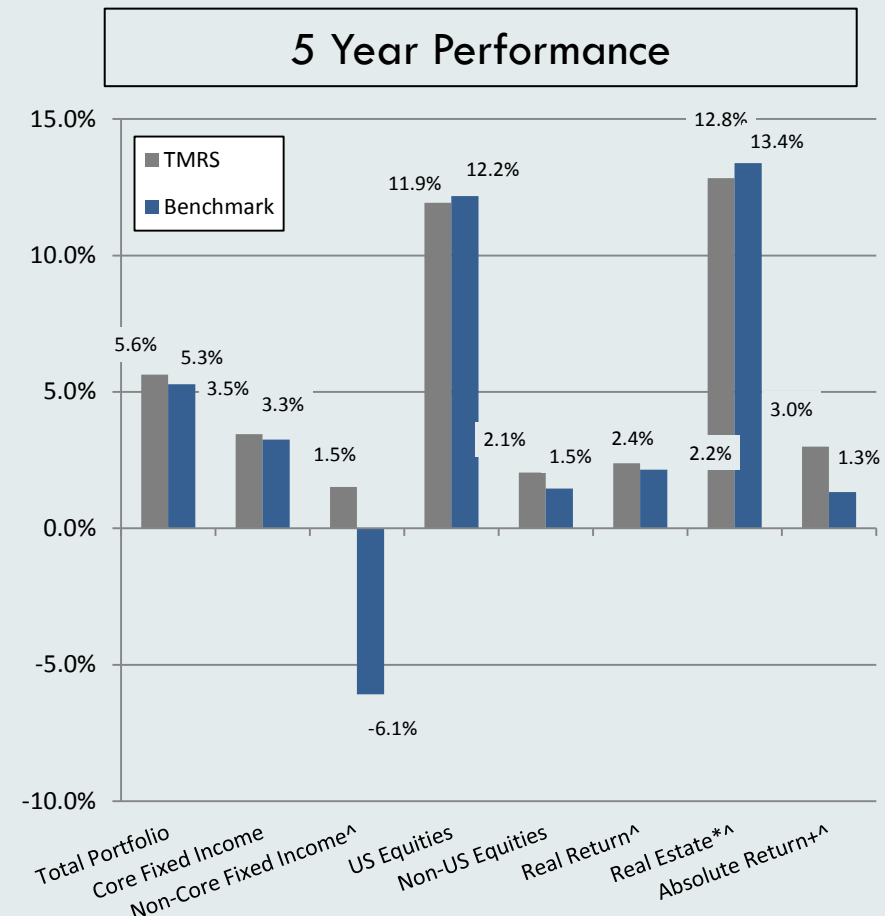
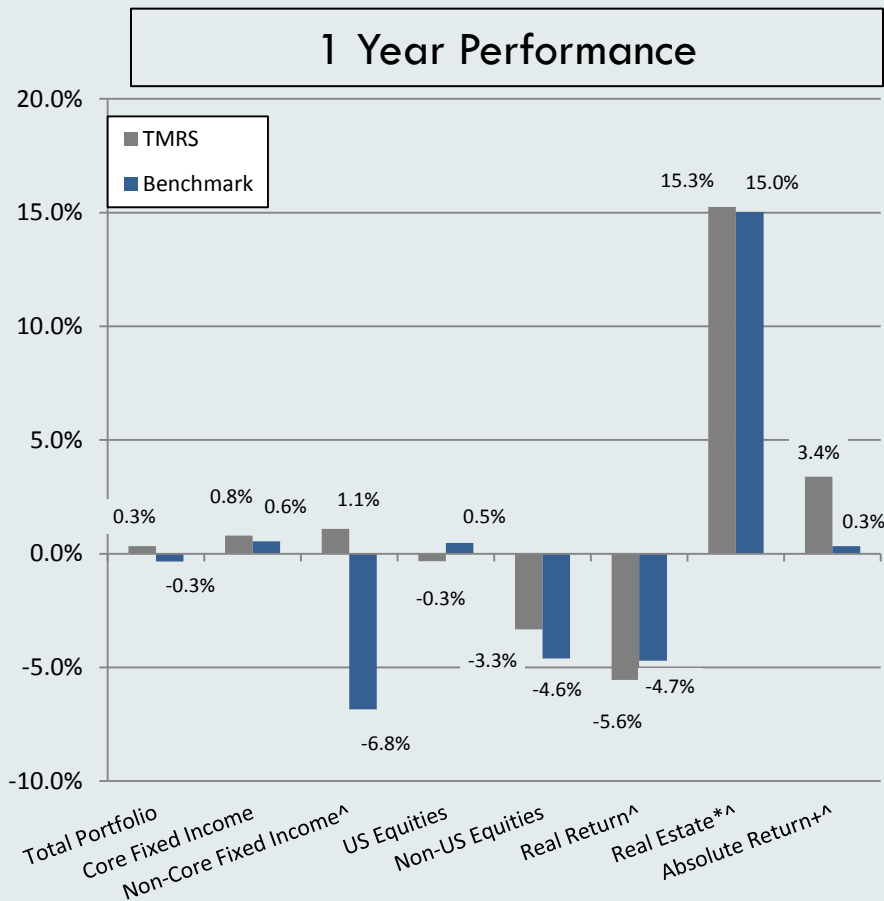
NOTE: The sum of individual asset class allocations may not add up to 100% due to rounding.

Source: State Street Investment Analytics

# TMRS INVESTMENT PORTFOLIO

## Gross Performance By Asset Class

### December 2015



Gross returns

\*Real Estate return as of prior quarter end (real estate returns are available on a quarterly basis only)

+Absolute Return returns are a mix of gross and net.

<sup>^</sup>Non-Core Fixed Income, Real Return, Real Estate, Absolute Return performance are the annualized return since inception, given their performance history are less than 5 years

Source: State Street Investment Analytics

## II. Public Equities



# Public Equities

## Asset Class Overview

### US Equity

- Objective
  - Intended to provide capital appreciation and is structured using a Core-Satellite Approach with the overall objective of exceeding its benchmark performance net of fees over rolling five year periods.
  - Satellite strategies (Active and Rules-Based strategies with an active component) are expected to add excess return within established tracking error limits and will meet quality, diversification, and liquidity guidelines as specified in the Managers' contracts.

### International Equity

- Objective
  - Intended to provide capital appreciation and diversification, and is structured using a Core-Satellite Approach with the overall objective of exceeding its benchmark performance net of fees over rolling five year periods.
  - Satellite strategies (Active and Rules-Based strategies with an active component) are expected to add excess return within established tracking error limits and will meet quality, diversification, and liquidity guidelines as specified in the Managers' contracts or otherwise agreed to in writing between TMRS and the Investment Manager.

# Public Equities -Portfolio Management Structure

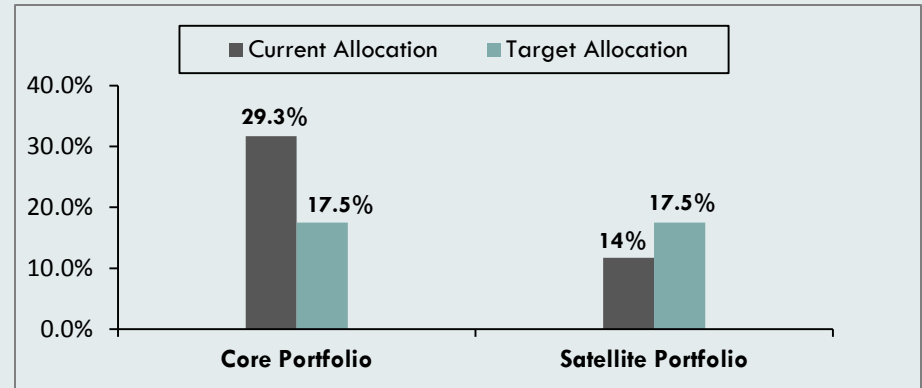
ASSET CLASS	STRATEGY	MANAGER	PORTFOLIO BENCHMARK
<b>Domestic Equities</b> US Core/Passive	Passive Broad Market Index	Northern Trust Asset Management	Russell 3000 Index
US Rules-Based	Passive Fundamental Index	State Street Global Advisors	Russell US Fundamental Index
US Rules-Based	Passive Minimum Volatility	UBS Global Asset Management	MSCI US Min Vol Index
US Satellite/Active	US Traditional All Cap	Epoch Investment Partners, Inc.	Russell 3000 Index
US Satellite/Active	US Opportunistic All Cap	Sasco Capital, Inc.	Russell Mid Cap Value Index
US Satellite/Active	US Mid Cap Opportunistic	The Boston Company	Russell Mid Cap Index
US Satellite/Active	US Mid Cap Core	Champlain Investment Partners	Russell Mid Cap Index
US Satellite/Active	US Small Cap Opportunistic	The Boston Company	Russell 2000 Index
US Satellite/Active	US Small Cap Opportunities	Wellington Management	Russell 2000 Index
<b>International Equities</b> Non-US Core/Passive	Passive Broad Market Index	Northern Trust Asset Management	All Country World (ACW) ex US Investable Market Index (IMI)
Non-US Rules-Based	Passive Fundamental Index	State Street Global Advisors	Russell Fundamental Global ex US
Non-US Rules-Based	Passive Minimum Volatility	UBS Global Asset Management	MSCI World ex US Min Vol Index
Non-US Satellite/Active	Non-US Opportunistic Relative Value	Wellington Management	MSCI ACWI ex US Index
Non-US Satellite/Active	Non-US Opportunistic Core	Lazard Asset Management	MSCI ACWI ex US Index
Non-US Satellite/Active	Non-US Emerging Markets	Acadian Asset Management	MSCI Emerging Markets (EM) Index
Non-US Satellite/Active	Non-US Emerging Markets	William Blair & Company	MSCI Emerging Markets (EM) Index
Non-US Satellite/Active	Non-US Small Cap Opportunities	Wellington Management	MSCI EAFE Small Cap Index
Non-US Satellite/Active	Non-US Small Cap Growth	Wasatch Advisors	MSCI AC World ex. US Small Cap Index



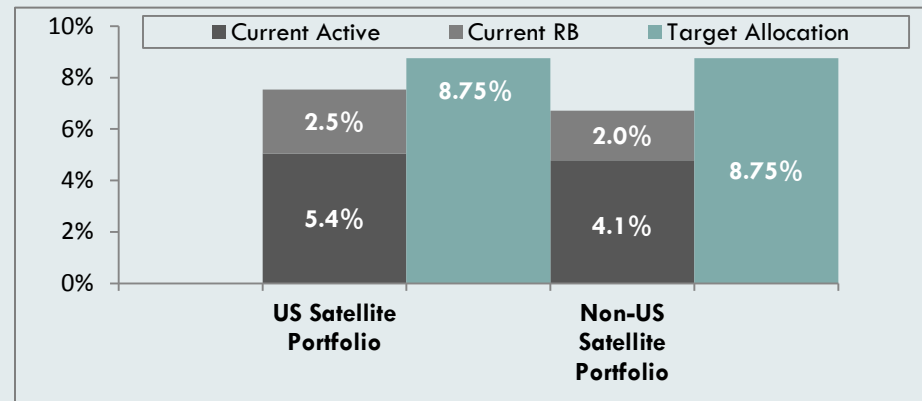
# Core/Satellite Structure Allocation

*% of Total Fund as of 12/31/2015*

CORE Portfolio Managers	Market Value	% of Total Portfolio
<b>US CORE EQUITY:</b> NTGI Russell 3000	4,700,744,318	19.9%
<b>NON-US CORE EQUITY:</b> NTGI ACW ex. US IMI	2,327,133,008	9.4%
<b>TOTAL:</b>	<b>7,027,877,326</b>	<b>29.3%</b>



SATELLITE Portfolio Managers	Market Value	% of Total Portfolio
<b>US RULES-BASED EQUITY:</b>	590,559,621	2.5%
<b>US ACTIVE EQUITY:</b>	1,271,457,253	5.4%
<b>NON-US RULES-BASED EQUITY:</b>	462,803,393	2.0%
<b>NON-US ACTIVE EQUITY:</b>	1,196,451,955	4.1%
<b>TOTAL:</b>	<b>3,521,272,222</b>	<b>14.0%</b>



# Public Equities

## Performance - Domestic

Period ending December 31, 2015(Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL DOMESTIC EQUITY	6,562,446,289.73	27.84	-2.25	5.93	-0.42	-0.42	14.28	11.88	14.82		7.01	1/1/2008
TMRS - RUSSELL 3000 DAILY			-2.05	6.27	0.48	0.48	14.74	12.18	15.04		7.19	
EXCESS			-0.2	-0.34	-0.9	-0.9	-0.46	-0.3	-0.22		-0.18	
TMRS - RUSSELL 3000 INDEX FUND (NL)	4,700,665,970.35	19.94	-2.05	6.29	0.46	0.46	14.71	12.15	15.01		15.13	12/1/2008
RUSSELL 3000 (DAILY)			-2.05	6.27	0.48	0.48	14.74	12.18	15.04		15.15	
EXCESS			0	0.02	-0.02	-0.02	-0.03	-0.03	-0.03		-0.02	
SSGA RUSSELL FUNDAMENTAL US	283,949,671.71	1.20	-2.31	5.33	-2.79	-2.79					11.82	2/1/2013
Russell Fundamental US Index			-2.3	5.45	-2.76	-2.76					11.98	
EXCESS			-0.01	-0.12	-0.03	-0.03					-0.16	
UBS US EQUITY MIN VOL FUND NL	306,609,949.63	1.30	0.48	6.29	5.5	5.5	15.41				15.41	1/1/2013
MSCI USA Minimum Volatility Index-Net			0.44	6.11	4.92	4.92	14.74				14.74	
EXCESS			0.04	0.18	0.58	0.58	0.67				0.67	
EPOCH U.S. CHOICE	235,086,705.93	1.00	-2.36	8.7	-0.33	-0.33					6.95	1/1/2014
RUSSELL 3000 (DAILY)			-2.05	6.27	0.48	0.48					6.35	
EXCESS			-0.31	2.43	-0.81	-0.81					0.6	
SASCO U.S. CONTRARIAN VALUE	190,441,421.51	0.81	-4.6	0.05	-13.96	-13.96					-3.91	1/1/2014
Russell Midcap Value Total Return Index			-3.1	3.12	-4.78	-4.78					4.53	
EXCESS			-1.5	-3.07	-9.18	-9.18					-8.44	
THE BOSTON COMPANY OPP VALUE	186,243,516.79	0.79	-3.92	2.09	-9.79	-9.79					-7.59	12/1/2014
RUSSELL MIDCAP (DAILY)			-2.68	3.62	-2.44	-2.44					-2.06	
EXCESS			-1.24	-1.53	-7.35	-7.35					-5.53	
CHAMPLAIN MID-CAP CORE	203,587,963.10	0.86	-2.89	5.56	1.83	1.83					0.72	12/1/2014
RUSSELL MIDCAP (DAILY)			-2.68	3.62	-2.44	-2.44					-2.06	
EXCESS			-0.21	1.94	4.27	4.27					2.78	
WELLINGTON US SMALL CAP OPP	225,740,830.74	0.96	-4.44								-4.44	12/1/2015
RUSSELL 2000 (DAILY)			-5.02								-5.02	
EXCESS			0.58								0.58	
BOSTON CO US SM CAP OPPORTUNISTIC VALUE	229,879,275.90	0.98	-4.73	4.49							-2	9/1/2015
RUSSELL 2000 (DAILY)			-5.02	3.59							-1.49	
EXCESS			0.29	0.9							-0.51	

Source: State Street Investment Analytics

# Public Equities

## Performance - International

Period ending December 31, 2015(Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL INTERNATIONAL EQUITY	3,986,163,279.70	16.91	-1.59	3.46	-3.41	-3.41	2.84	2	6.75		-1.1	1/1/2008
INTL EQ ACTIVE WEIGHTED INDEX(DAILY)			-1.61	3.52	-4.6	-4.6	2.02	1.46	6.29		-1.51	
EXCESS			0.02	-0.06	1.19	1.19	0.82	0.54	0.46		0.41	
NTGI ACWI ex. US IMI (NL)	2,327,050,581.79	9.87	-1.63	3.52	-4.42	-4.42	2.23	1.46			4.67	9/1/2010
TMRS MSCI ACWI ex-US IMI NET (DAILY)			-1.61	3.52	-4.6	-4.6	2.02	1.27			4.49	
EXCESS			-0.02	0	0.18	0.18	0.21	0.19			0.18	
SSGA RUSSELL FUND GLOBAL EX-US	207,036,893.15	0.88	-2.44	2.84	-6.77	-6.77					0.66	2/1/2013
Russell Fundamental Glb Ex-US Index NET			-2.43	2.99	-6.71	-6.71					0.68	
EXCESS			-0.01	-0.15	-0.06	-0.06					-0.02	
UBS WORLD EX US MIN VOL FD NL	255,766,500.05	1.09	0.1	4.44	4.72	4.72	8.39				8.39	1/1/2013
MSCI world ex USA Minimum Volatility-Net			0.12	4.47	4.75	4.75	8.4				8.4	
EXCESS			-0.02	-0.03	-0.03	-0.03	-0.01				-0.01	
LAZARD INT'L EQUITY PLUS	187,549,585.55	0.80	-2.01	3.3	-1.26	-1.26					-5.9	9/1/2014
MSCI AC WORLD ex US (NET)			-1.88	3.24	-5.66	-5.66					-10.46	
EXCESS			-0.13	0.06	4.4	4.4					4.56	
WILLIAM BLAIR EMERGING MARKETS	169,001,009.49	0.72	-2.77	1.85							0.88	9/1/2015
MSCI EMERGING MARKETS			-2.23	0.66							-2.37	
EXCESS			-0.54	1.19							3.25	
ACADIAN EMERGING MARKETS	162,576,418.97	0.69	-2	-1.22							-3.56	9/1/2015
MSCI EMERGING MARKETS			-2.23	0.66							-2.37	
EXCESS			0.23	-1.88							-1.19	
WASATCH INT'L SMALL CAP GROWTH	236,414,221.38	1.00										12/1/2015
MSCI ACWI Ex US Small Cap (DAILY)			0.1								0.1	
EXCESS												
WELLINGTON INT'L SMALL CAP OPP	235,616,349.17	1.00										12/1/2015
MSCI EAFE SMALL CAP NET			0.73								0.73	
EXCESS												
WELLINGTON INT'L HORIZONS	205,151,720.15	0.87	-0.62	7.63	5.33	5.33					0.69	9/1/2014
MSCI AC WORLD ex US (NET)			-1.88	3.24	-5.66	-5.66					-10.46	
EXCESS			1.26	4.39	10.99	10.99					11.15	

Source: State Street Investment Analytics

# Public Equities

## Pacing Plan Update

Year	Pacing Plan Update
2010-2011	<ul style="list-style-type: none"> <li>• Market volatility causes completion of target allocation (40%) to be extended to Dec. 2011 from Dec. 2010;</li> <li>• NTGI's bi-monthly redemptions for the lending funds was completed in June 2010;</li> <li>• Diversification expands; conversion from EAFE to ACW ex. US IMI NL fund began in Aug. 2010;</li> <li>• In 2011, investment staff begins analyzing additional strategies to further diversify the equity portfolio;</li> <li>• Full conversion from EAFE to ACW ex. US IMI NL fund was completed in 2011;</li> <li>• <b>33% allocation to equities as of Dec. 2010; equity portfolio reached full target allocation of 40% in 2011.</b></li> </ul>
2012-2013	<ul style="list-style-type: none"> <li>• Mar. 2012, Trustees approve core/satellite structure with initial allocation to rules-based strategies;</li> <li>• Sept. 2012, Trustees approve selection of two managers for rules-based strategies, Fundamental Indexing and Minimum Volatility; Min Vol portfolios funded in Dec. 2012 &amp; Fundamental Indexing funded in Jan. 2013;</li> <li>• Sept. 2013, the Board approved Epoch and Sasco for U.S. All Cap (AC) active strategies for the satellite allocation of the equity portfolio; a 4% allocation was funded from the core portfolio in Dec. 2013.</li> <li>• <b>42.7% allocation to equities as of Dec. 2012; 40.7% core (passive), 2% satellite (active) rules-based strategies.</b></li> <li>• <b>48.6% allocation to equities as of Dec. 2013; 42.4% core (passive), 6.2% satellite (active) strategies.</b></li> </ul>
2014	<ul style="list-style-type: none"> <li>• Phase I non-U.S. manager recommendations (Lazard &amp; Wellington) were approved by the Board at the March 2014 Board meeting; performance started September 1<sup>st</sup>.</li> <li>• Phase II of the equity re-structure's focus is on U.S. mid-cap and non-U.S. emerging markets; US Mid Cap managers recommendations (The Boston Company and Champlain) were approved by the Board at the June 2014 Board meeting; performance started on December 1<sup>st</sup>.</li> <li>• Phase II non-U.S. emerging markets search began in May 2014 and manager recommendations (Acadian and William Blair) were approved by the Board at the September Board meeting; FUNDING COMPLETED in 2015.</li> <li>• <b>45.1% allocation to equities as of Dec. 2014; 35.4% core (passive), 9.7% satellite (active) strategies.</b></li> </ul>
2015	<ul style="list-style-type: none"> <li>• 2014 Phase II non-US emerging markets onboarding for Acadian &amp; William Blair – FUNDING COMPLETED;</li> <li>• Q1/Q2 2015 search project Tax Consultant/Tax Advisor to assist with emerging markets sub-custodian setup and sec lending - PENDING;</li> <li>• 2015 Phase III US Small Cap manager recommendations – June 2015 Board meeting; FUNDING COMPLETED</li> <li>• 2015 Phase III non-US Small Cap manager recommendations – Sept 2015 Board meeting; FUNDING COMPLETED</li> <li>• 2015 Equity Core/Satellite Target Allocation – remaining target satellite allocation of 2.5%-3% to be completed in 2016;</li> <li>• 2015 Equity Asset Class Review presented at December 2015 Board meeting; COMPLETED</li> <li>• <b>43.3% allocation to equities as of Dec 31, 2015; 29.3% core (passive), 14% satellite (active) strategies.</b></li> </ul>

# III. Fixed Income



# Core Fixed Income

## Asset Class Overview

- US Core Fixed Income
  - Objective
    - Purpose is to enhance total return and provide diversification to the overall investment portfolio.
    - US Core performance objective is to exceed the Barclay's US Aggregate Bond Index net of fees and rank above the median manager in peer universe, over rolling 5-year periods and be within tracking errors as specified in the manager contracts.
    - US Core Plus performance objective is to exceed Barclay's Aggregate Index by 35 bps net of fees with a maximum expected tracking error of 150 bps and rank above the median manager in peer universe, over rolling 5-year periods.
  - Investment Philosophy- BlackRock
    - Top down determination of investment themes are based on bottom-up inputs. Investment themes establish parameters for sector, sub-sector and security selection. Macro overlays for duration and volatility are viewed as a separate sector and used opportunistically.
  - Investment Philosophy- PIMCO
    - PIMCO's investment philosophy is driven by diversifying strategies and focuses on longer term secular (3-5 year) trends.
    - Seek to add value through top down strategies including interest rate exposures, duration, volatility, yield curve positioning and sector rotation.
    - Employ "bottom-up" strategies through in depth credit analysis and specific security selection.

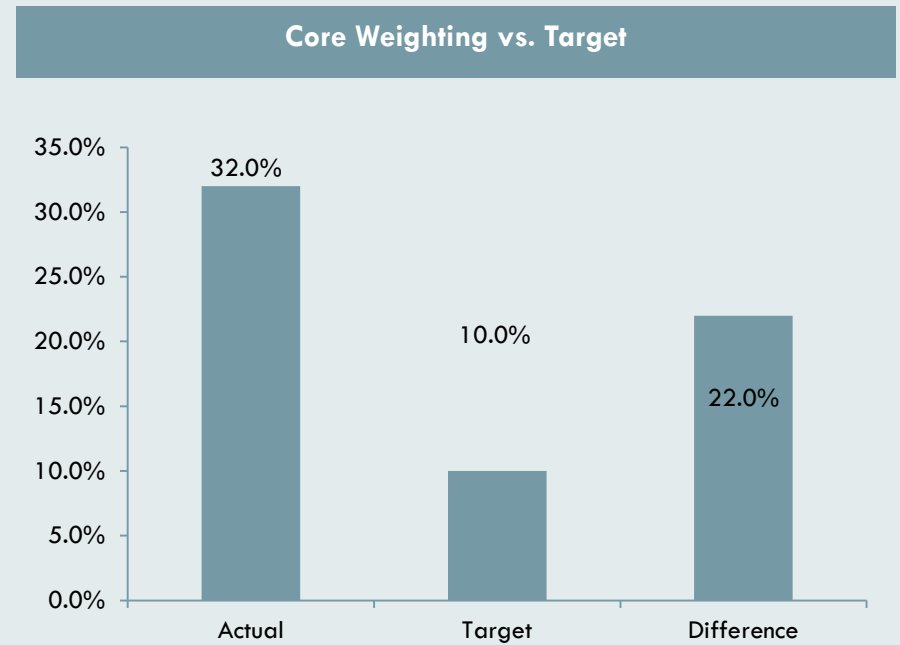
# Core Fixed Income Portfolio Management Structure

STRATEGY	MANAGER	PORTFOLIO BENCHMARK
US Core (enhanced index)	BlackRock	Barclays US Aggregate Bond Index
Active Core Plus	PIMCO	Barclays US Aggregate Bond Index

# Core Fixed Income Allocation

As of December 31, 2015

Mandate	Market Value	% of Total Fund
<b>CORE FIXED INCOME</b>		
BlackRock	\$5,499,067,808	23.33%
PIMCO	\$2,042,385,767	8.66%
<b>TOTAL</b>	<b>\$7,541,453,574</b>	<b>31.99%</b>





# Core Fixed Income Performance

Period ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL CORE FIXED INCOME	7,541,453,574.50	31.99	-0.42	-0.45	0.72	0.72	1.42	3.38	4.27	4.02	8.01	1/1/1989
TMRS - Total Fixed Income Index (Daily)			-0.32	-0.57	0.55	0.55	1.44	3.25	3.28	4.06	7.44	
EXCESS			-0.1	0.12	0.17	0.17	-0.02	0.13	0.99	-0.04	0.57	
TMRS - BLACKROCK CORE FIXED INCOME	5,499,067,807.89	23.33	-0.4	-0.44	0.83	0.83	1.59	3.39			3.75	10/1/2009
TMRS-Custom Core Fixed Income Index (Dai			-0.32	-0.57	0.55	0.55	1.44	3.25			3.67	
EXCESS			-0.08	0.13	0.28	0.28	0.15	0.14			0.08	
TMRS PIMCO CORE PLUS FIXED INC	2,042,385,766.60	8.66	-0.5	-0.48	0.42	0.42	0.83	3.36			3.79	2/1/2010
Barclays Aggregate (Daily)			-0.32	-0.57	0.55	0.55	1.44	3.25			3.58	
EXCESS			-0.18	0.09	-0.13	-0.13	-0.61	0.11			0.21	

# Core Fixed Income Pacing Plan Update

Year	Pacing Plan Update
2010	<ul style="list-style-type: none"> <li>February – Board education piece on Derivatives presented</li> <li>Core Fixed Income continues to fund Equities</li> </ul>
2011	<ul style="list-style-type: none"> <li>Core Fixed Income continues to fund diversification of total plan including Equities, Real Return and Real Estate</li> </ul>
2012	<ul style="list-style-type: none"> <li>August – Board approved changing the target allocation from 35% to 30% in conjunction with the Asset Allocation Study</li> <li>Core Fixed Income continues to fund diversification of the total plan</li> </ul>
2013	<ul style="list-style-type: none"> <li>September – Board approved Non-Core Fixed Income managers (Loan/CLO) \$750M to be funded from Core Fixed Income</li> <li>Core Fixed Income continues to fund diversification of the total plan</li> </ul>
2014	<ul style="list-style-type: none"> <li>June – Board approved Non-Core Fixed Income managers (RMBS/CMBS) \$750M to be funded from Core Fixed Income</li> <li>September – December- ongoing funding of Loan/CLO portfolios</li> <li>December – \$500M RMBS/CMBS portfolios fully funded</li> <li>Core Fixed Income continues to fund diversification of the total plan</li> </ul>
2015	<ul style="list-style-type: none"> <li>February - \$500M CLO/Loan portfolios fully funded</li> <li>March – Board approved reallocating previously approved allocation of \$250M each for Bank Loan/CLO and RMBS/CMBS strategies to existing managers to be funded from Core Fixed Income</li> <li>April – May – reallocation of RMBS/CMBS fully funded</li> <li>August Bank Loan/CLO portfolios fully funded</li> <li>Core Fixed Income continues to fund diversification of the total plan</li> </ul>

# Non Core Fixed Income Asset Class Overview

- Objective
  - The purpose is to enhance total return through income and capital appreciation and provide diversification to the total investment portfolio. This allocation may be managed actively and/or passively through multiple managers in consideration of manager concentration risk.
  - The Performance Objectives is to exceed the returns of a blended benchmark comprised of the Barclays US Corporate High Yield Index 50%, the JPM GBI-EM Global Diversified Index (USD Unhedged) 25%, and JPM CEMBI Broad Diversified Index 25%, net of fees over rolling five-year periods and within tracking errors as specified in the manager contracts or otherwise agreed to in writing, determined according to the specific strategies employed.

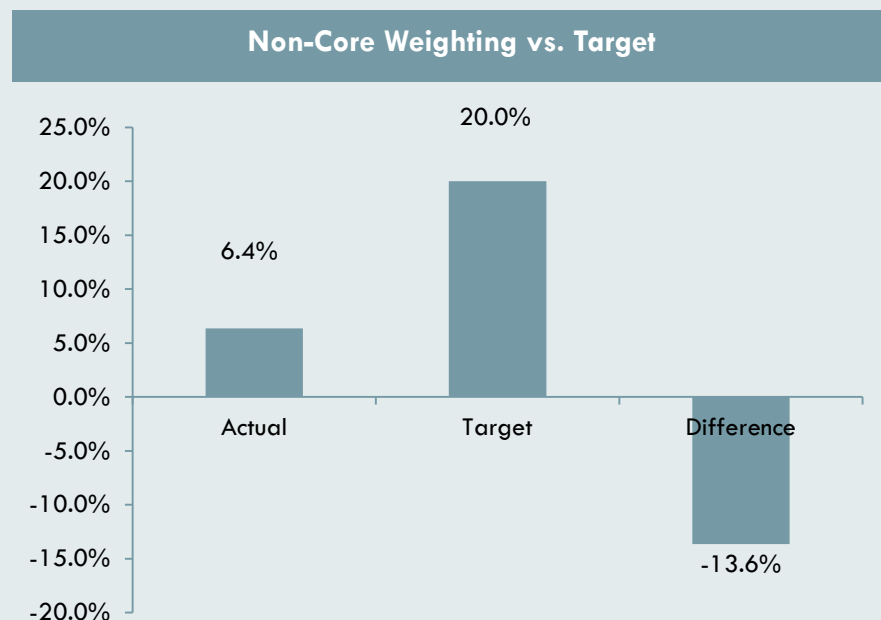
# Non-Core Fixed Income Portfolio Management Structure

STRATEGY	MANAGER	PORTFOLIO BENCHMARK
Bank Loan/CLO Debt	Highland Capital	Credit Suisse Leveraged Loan Index
Bank Loan/CLO Debt	Guggenheim	Credit Suisse Leveraged Loan Index
RMBS/CMBS	Voya Investment Management (formerly ING Investment Mgmt)	33% Barclays US Agg Corp Index and 67% Barclays US Corp High Yield Index
RMBS/CMBS	Ellington Management Group	33% Barclays US Agg Corp Index and 67% Barclays US Corp High Yield Index

# Non-Core Fixed Income Allocation

As of December 31, 2015

Mandate	Market Value	% of Total Fund
<b>NON-CORE FIXED INCOME</b>		
Guggenheim	\$376,403,328	1.60%
Highland	\$363,139,238	1.54%
Voya Investment Management	\$382,621,465	1.62%
Ellington Management Group	\$379,284,476	1.61%
<b>TOTAL</b>	<b>\$1,501,448,507</b>	<b>6.37%</b>



# Non-Core Fixed Income Performance

Period Ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TOTAL NON-CORE FIXED INCOME	1,501,448,507.05	6.37	-0.81	-1.72	0.37	0.37					0.87	10/1/2014
TOT NON-CORE FIXED INCOME INDEX			-2.12	-2.08	-6.84	-6.84					-6.09	
EXCESS			1.31	0.36	7.21	7.21					6.96	
BANDERA II - GUGGENHEIM	376,403,327.54	1.6	-0.34	-1.08	0.61	0.61					1.1	10/1/2014
CS Leveraged Loan Index			-0.95	-2.62	-1.48	-1.48					-0.6	
EXCESS			0.61	1.54	2.09	2.09					1.7	
BANDERA I - HIGHLAND	363,139,238.17	1.54	-1.81	-5.01	-2.81	-2.81					-1.5	10/1/2014
CS Leveraged Loan Index			-0.95	-2.62	-1.48	-1.48					-0.6	
EXCESS			-0.86	-2.39	-1.33	-1.33					-0.9	
VOYA NON CORE FIXED INCOME	382,621,465.17	1.62	0.06	0.16	2.48	2.48					2.48	1/1/2015
Non Agency RMBS/CMBS Strategy Index			-1.94	-1.56	-3.18	-3.18					-3.18	
EXCESS			2	1.72	5.66	5.66					5.66	
ELLINGTON NON CORE FIXED INC	379,284,476.17	1.61	-1.17	-0.93	1.56	1.56					1.56	1/1/2015
Non Agency RMBS/CMBS Strategy Index			-1.94	-1.56	-3.18	-3.18					-3.18	
EXCESS			0.77	0.63	4.74	4.74					4.74	

Source: State Street Investment Analytics

# Non-Core Fixed Income Pacing Plan Update

Year	Pacing Plan Update
2012	<ul style="list-style-type: none"> <li>• August – Board approved segregating Non-Core Fixed Income from Core Fixed Income and making it a separate asset classes for better transparency and control. Board also approved 10% target allocation to Non-Core in conjunction with the Asset Allocation study.</li> </ul>
2013	<ul style="list-style-type: none"> <li>• March – Educational session presented to Board (Intro to Non Core)</li> <li>• June – Board approved Non-Core Fixed Income allocation and authorized manager search for the Bank Loan/CLO strategy</li> <li>• September – Board approved Manager selections for Bank Loan/CLO strategy</li> <li>• December – Board approved 2014 Pacing Plan, including a manager search for the RMBS/CMBS strategy</li> </ul>
2014	<ul style="list-style-type: none"> <li>• May – Board approved increasing the sector allocation limit from 25% to 40% of the Non-Core Fixed Income asset class. Board also approved manager selections for RMBS/CMBS strategy.</li> <li>• December – Board approved Pacing Plan, including a manager search for Emerging Market Debt (EMD) Managers</li> </ul>
2015	<ul style="list-style-type: none"> <li>• February – Emerging Market Debt Manager search completed</li> <li>• March – Board approved reallocating previously approved allocation of \$250M each for Bank Loan/CLO and RMBS/CMBS strategies to existing managers</li> <li>• May – Board approved Emerging Market Debt Manager recommendations</li> <li>• December – Board approved 4 Direct Lending Manager recommendation for a total of \$950 M</li> </ul>

# IV. Securities Lending



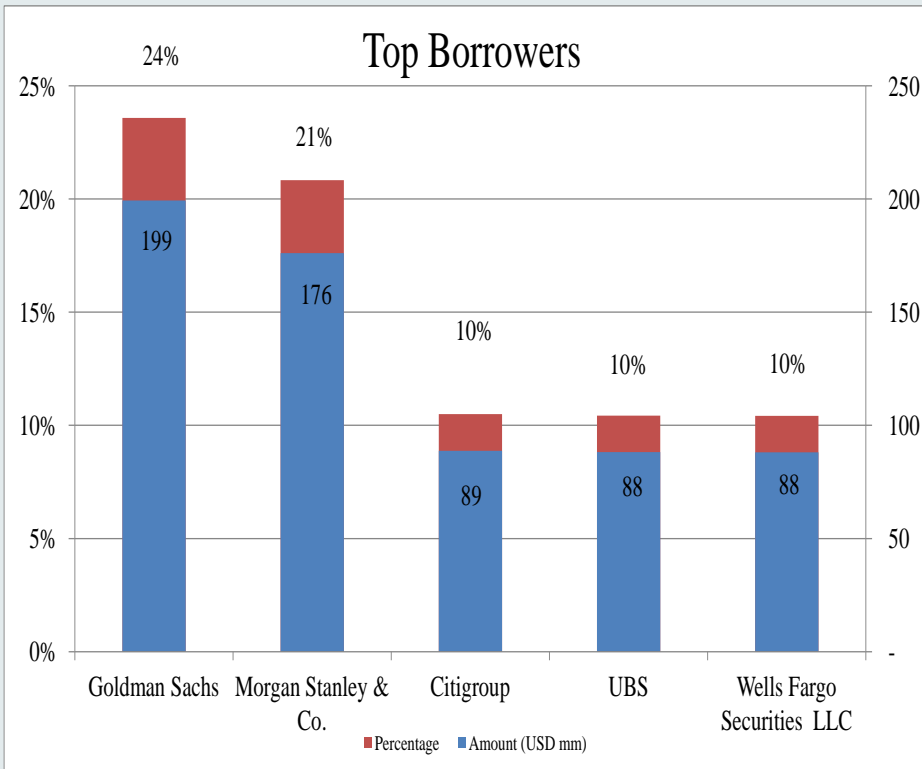


# Securities Lending

## Asset Class Overview

- Objective
  - To generate incremental income from overnight and certain term loans of securities held, subject to guidelines described in the Investment Policy Statement, utilizing a high-quality and reasonably conservative cash collateral re-investment program that safeguards the return of principal and maintains adequate daily liquidity to support trade settlement activity and portfolio restructuring activities.
- Guidelines
  - TMRS investment staff will work with the securities lending agent to create and maintain a custom approved borrower list. TMRS investment staff will review the custom borrower list with the lending agent on at least a semi-annual basis to make revisions as agreed upon by TMRS and the lending agent.
  - The market value of TMRS' securities loans outstanding to an approved borrower at the end of each business day should be no greater than 25% of the total market value of TMRS' securities on loan. Market price volatility and fluctuating demand for securities may cause the market value of TMRS' securities lent to an approved borrower to temporarily exceed these limitations. If such an event occurs, the securities lending agent will reduce the amount of loans outstanding to that borrower to comply with the stated limits.
  - Because the securities lending agent provides borrower default indemnification, the securities lending agent has the ability to reduce the amount of loans it makes to borrowers on TMRS' behalf, without approval from TMRS staff.
  - The Securities Lending Agent will collect and maintain proper overcollateralization as follows:
    - Domestic (United States domiciled and Non-US domiciled issued in US dollars) securities: Initial Margin of 102%
    - International (non-United States domiciled) securities: Initial Margin of 105%
  - Eligible Collateral: Cash (US dollars) and US Government Securities

# Securities Lending Portfolio Update December 2015



<b>Portfolio Statistics</b>	
Total Cash Collateral	\$866,991,326
Overnight Assets	\$823,047,915
Term Legacy Assets	\$43,943,411
Non-Cash Govt Security Collateral	\$0.00
Overnight Liquidity	95%
Total Loan Portfolio MV	\$845,378,297
Number of Loans	413
Collateralization	102.56%
Lendable Base	\$8,986,833,525
Utilization of Lendable Base	9.41%
Asset DTM - to reset	19.42
Liability DTM - to reset	1.05
Average Rebate (bps) MTD	0.10
Average Reinvest (bps) MTD	0.31
Average Spread (bps) MTD	0.21
Revenue Earned MTD	\$154,681
Revenue Earned Fiscal YTD	\$1,949,359

# V. Real Estate



# Real Estate Asset Class Overview

- **Objective**
  - To enhance total return and provide diversification to the overall investment portfolio.
  - Due to the illiquid and cyclical nature of the real estate asset class, Staff and the Real Estate Investment Consultant recommend that the target allocation be invested over a multi-year period in order to avoid considerable vintage year risks.
- **Performance Objective**
  - Long term performance objective is a real rate of return (adjusted for inflation) of five percent (5%) net of investment management fees.
  - The real estate portfolio is expected to generate returns net of all fees and expenses, in excess of their respective indices, over rolling five year investment time horizons.

# Real Estate Portfolio Management Structure

Manager	Strategy	Allocated/Committed	Drawn / Invested (Quarterly)
Abacus Core Income Fund I	Core	\$ 75,000,000	\$ 47,733,088
Harrison Street Core Property Fund	Core	\$ 150,000,000	\$ 150,000,000
Invesco US Core Income Fund	Core	\$ 150,000,000	\$ 150,000,000
Smart Markets Fund	Core	\$ 200,000,000	\$ 200,000,000
Walton Street Debt Fund	Core Debt	\$ 100,000,000	\$ 20,000,000
Tristan EPISO 4*	Opportunistic	\$ 32,586,000	\$ 1,558,447
Abacus Multi-Family Fund II	Value Add	\$ 50,000,000	\$ 47,121,636
Abacus Multi-Family Fund III	Value Add	\$ 75,000,000	\$ 16,903,790
Greenfield Acquisition Partners VI	Value Add	\$ 75,000,000	\$ 71,948,697
Greenfield Acquisition Partners VII	Value Add	\$ 100,000,000	\$ 55,955,494

\*30MM Euro commitment, converted to USD at month end rates (source: Bloomberg, Dec 2015)

# Real Estate Portfolio Management Structure, Cont.

Manager	Strategy	Allocated/Committed	Drawn / Invested (Quarterly)
Miller Global	Value Add	\$ 75,000,000	\$ 51,655,559
Rubenstein Properties II	Value Add	\$ 75,000,000	\$ 31,133,737
Rubenstein Properties III	Value Add	\$ 75,000,000	\$ -
Stockbridge Value Fund I	Value Add	\$ 75,000,000	\$ 58,983,571
Stockbridge Value Fund II	Value Add	\$ 75,000,000	\$ 39,781,591
Lubert-Adler Fund VII	Opportunistic	\$ 100,000,000	\$ 40,000,000
Moorfield Real Estate Fund III ***	Opportunistic	\$ 73,680,000	\$ 12,410,092
H/2 CP	Core	\$ 125,000,000	\$ 125,000,000
H/2 Core RE Debt	Core	\$ 75,000,000	\$ -
Walton Street	Opportunistic	\$ 75,000,000	\$ 53,544,858
Alcion	Value Add	\$ 50,000,000	\$ 4,954,690

\*\*\* £50MM commitment, converted to USD at month end rates (source: Bloomberg, Dec 2015)

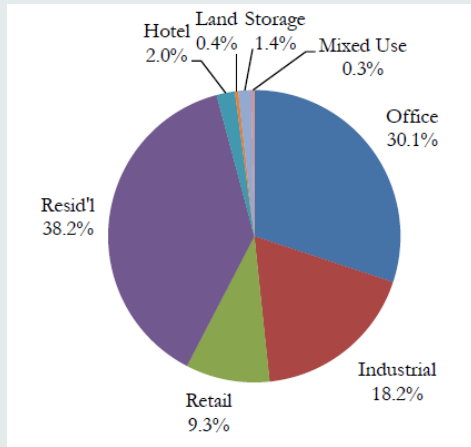
# Real Estate

## Portfolio Management Structure, Cont.

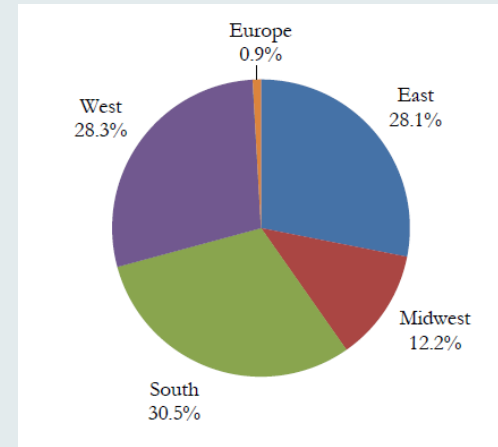
Manager	Strategy	Allocated/Committed	Drawn / Invested (Quarterly)
Torchlight Debt Fund V	Value Add	\$ 75,000,000	\$ 11,250,000
TPG Real Estate Partners II	Opportunistic	\$ 100,000,000	\$ 8,425,602
USAA Eagle Fund	Core	\$ 250,000,000	\$ 99,182,181
TOTAL		\$ 2,306,000,000	\$ 1,297,543,034

# Real Estate Portfolio Diversification

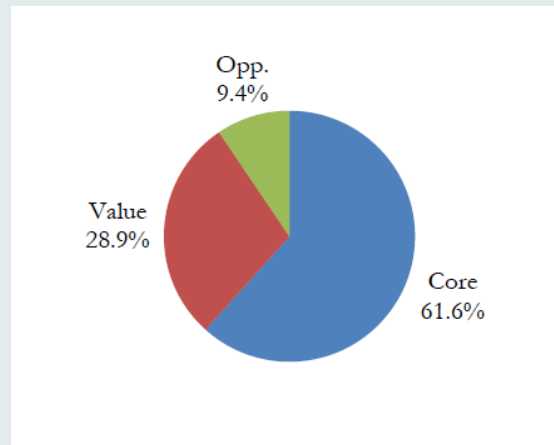
**Property Type Diversification Based on Market Value**



**Geographic Diversification Based on Market Value**



**Sector Diversification Based on Market Value**





# Real Estate Performance

## Period Ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL REAL ESTATE	1,412,675,366.10	5.99	2.79	2.79	12.97	12.97	13.83				11.08	11/1/2011
TOTAL REAL ESTATE INDEX			3.68	3.68	15.02	15.02	13.48				13.39	
EXCESS			-0.89	-0.89	-2.05	-2.05	0.35				-2.31	
TMRS - TOTAL REAL ESTATE EX HARRISON	1,412,675,366.09	5.99	2.79	2.79	14.07	14.07	14.66				11.67	11/1/2011
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				13.37	
EXCESS			-0.89	-0.89	-0.86	-0.86	1.21				-1.7	
SMART MARKETS FUND LP	277,315,949.95	1.18	2.57	2.57	12.15	12.15	12.73				11.39	1/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				12.98	
EXCESS			-1.11	-1.11	-2.78	-2.78	-0.72				-1.59	
HARRISON ST REAL ESTATE - CORE OPEN END	204,398,416.70	0.87	2.09	2.09	9.58	9.58	10.05				9.34	1/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				12.98	
EXCESS			-1.59	-1.59	-5.35	-5.35	-3.4				-3.64	
GREENFIELD ACQUISITION PTRS VI	55,477,054.44	0.24	1.86	1.86	16.44	16.44	17.06				14.68	7/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				13.1	
EXCESS			-1.82	-1.82	1.51	1.51	3.61				1.58	
STOCKBRIDGE VALUE FUND	45,403,306.26	0.19	3.8	3.8	29.22	29.22	26.51				24.23	10/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				13.29	
EXCESS			0.12	0.12	14.29	14.29	13.06				10.94	
WALTON ST REAL ESTATE FUND VII	67,012,361.89	0.28	2.43	2.43	21.55	21.55					20.33	7/1/2013
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					14.03	
EXCESS			-1.25	-1.25	6.62	6.62					6.3	
ABACUS MULTI-FAMILY PTRS II	34,528,370.66	0.15	1.67	1.67	26.64	26.64	27.02				23.43	8/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				13.44	
EXCESS			-2.01	-2.01	11.71	11.71	13.57				9.99	
RUBENSTEIN PROPERTIES FUND II	31,012,963.25	0.13	3.61	3.61	11.03	11.03					19.51	4/1/2013
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					13.77	
EXCESS			-0.07	-0.07	-3.9	-3.9					5.74	

# Real Estate Performance

## Period Ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
MILLER GLOBAL FUND VII	43,909,975.19	0.19	1.63	1.63	9.05	9.05	15.13				13.88	10/1/2012
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93	13.45				13.29	
EXCESS			-2.05	-2.05	-5.88	-5.88	1.68				0.59	
LUBERT-ADLER FUND VII	37,780,892.07	0.16	0.2	0.2	7.22	7.22					-0.39	1/1/2014
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					13.65	
EXCESS			-3.48	-3.48	-7.71	-7.71					-14.04	
ABACUS CORE INCOME FUND I LP	49,464,016.86	0.21	0.78	0.78	8.75	8.75					5.4	1/1/2014
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					13.65	
EXCESS			-2.9	-2.9	-6.18	-6.18					-8.25	
INVESCO ADVISERS, INC.	164,531,323.17	0.7	4.71	4.71	15.17	15.17					11	1/1/2014
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					13.65	
EXCESS			1.03	1.03	0.24	0.24					-2.65	
GREENFIELD ACQ PART VII LP	61,773,171.11	0.26	1.2	1.2	12.64	12.64					12.64	1/1/2015
NCREIF ODCE 1 QTR LAG			3.68	3.68	14.93	14.93					14.93	
EXCESS			-2.48	-2.48	-2.29	-2.29					-2.29	
STOCKBRIDGE VALUE FD II LP	40,537,854.04	0.17	1.88	1.88							8.21	2/1/2015
NCREIF ODCE 1 QTR LAG			3.68	3.68							14.93	
EXCESS			-1.8	-1.8							-6.72	
ABACUS MULTI-FAMILY III	16,289,672.57	0.07	4.04	4.04							-13.92	2/1/2015
NCREIF ODCE 1 QTR LAG			3.68	3.68							14.93	
EXCESS			0.36	0.36							-28.85	
MOORFIELD REAL ESTATE III	12,827,356.07	0.05	-4.2	-4.2							1.52	2/1/2015
NCREIF ODCE 1 QTR LAG			3.68	3.68							14.93	
EXCESS			-7.88	-7.88							-13.41	
H/2 CP, LP	123,093,625.00	0.52	0								0	11/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	

# Real Estate Performance

## Period Ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
WALTON STREET REAL ESTATE DEPT FUND	18,288,008.39	0.08	0								0	12/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	
TORCHLIGHT DEBT OPP FUND V,LP	11,250,000.00	0.05	0								0	12/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	
TPG REAL ESTATE PART II, LP	11,951,236.18	0.05										12/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS												
ALCION RE PART FD III-B,LP	4,954,690.00	0.02	0								0	11/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	
EUROPEAN PROPERTY INV SPECIAL	1,692,941.29	0.01	0								0	12/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	
USAA EAGLE REAL ESTATE FD	99,182,181.00	0.42	0								0	12/1/2015
NCREIF ODCE 1 QTR LAG			3.68								3.68	
EXCESS			-3.68								-3.68	

# Real Estate

## Pacing Plan Update

Year	Pacing Plan Update
2009	<ul style="list-style-type: none"> <li>February – Board educational session presented to Board</li> <li>September – Board authorized Real Estate Consultant search</li> </ul>
2010	<ul style="list-style-type: none"> <li>May – Board approved ORG as Real Estate Consultant</li> <li>October – Board educational session presented to Board</li> </ul>
2011	<ul style="list-style-type: none"> <li>March - Board approved selection of three managers and the 2011 Pacing Plan</li> <li>June – Board educational session presented to Board (Real Estate: Fee Structures)</li> <li>September – Board approved selection of four managers</li> <li>December – 2012 Pacing Plan approved by Board</li> </ul>
2012	<ul style="list-style-type: none"> <li>March – Board approved selection of four managers</li> <li>December – Board approved selection of four managers and the 2013 Pacing Plan</li> </ul>
2013	<ul style="list-style-type: none"> <li>March – Board approved selection of three managers</li> <li>September – Board approved selection of four managers</li> <li>December – Board approved 2014 Pacing Plan</li> </ul>
2014	<ul style="list-style-type: none"> <li>March – Board approved selection of three managers</li> <li>September – Board approved selection of five managers</li> <li>December – Board authorized the Real Estate Consultant search and approved 2015 Pacing Plan.</li> </ul>
2015	<ul style="list-style-type: none"> <li>March – Board approved Courtland as the Real Estate Consultant</li> <li>July – Board approved selection of 7 new funds and termination of one manager</li> </ul>

# VI. Real Return



# Real Return Asset Class Overview

## Global Linkers

- **Objective**
  - Purpose is to enhance total return and provide diversification and hedge against inflation risks to the overall investment portfolio.
  - Performance objective is to exceed the Barclay's Capital World Government Inflation-Linked Bond Index Unhedged in US Dollars net of fees.
- **Investment Philosophy – Colchester**
  - Colchester has a value-oriented philosophy. The firm believes that investment should be valued in terms of the income they will generate in real terms.
  - Seek to add value through high quality global sovereign bonds providing the highest real yields.
  - Benefits of specialization and unique use of smaller markets increase diversity and add potentially higher return opportunities.

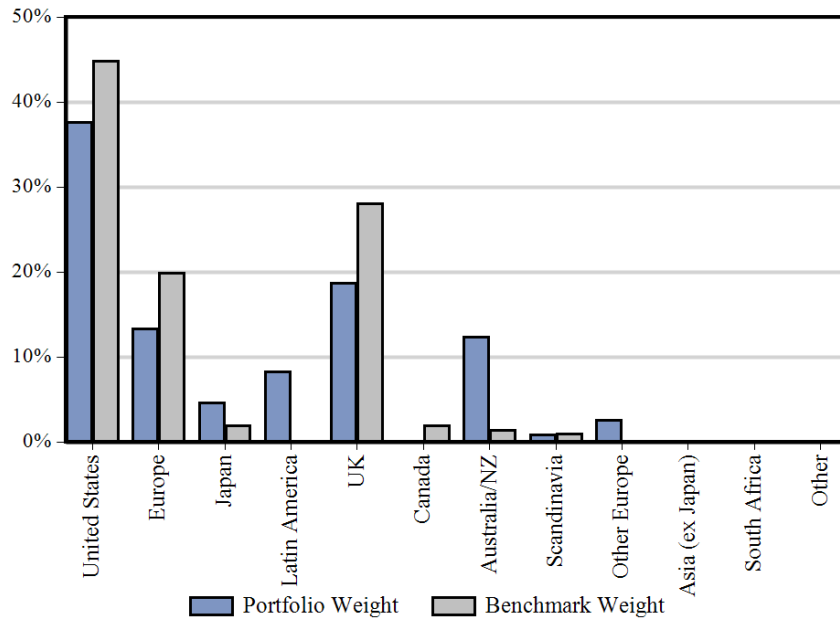
# Real Return Portfolio Management Structure

STRATEGY	MANAGER	PORTFOLIO BENCHMARK
Active Global Linkers	Colchester	Barclays World Govt Infl-Linked Bond Index

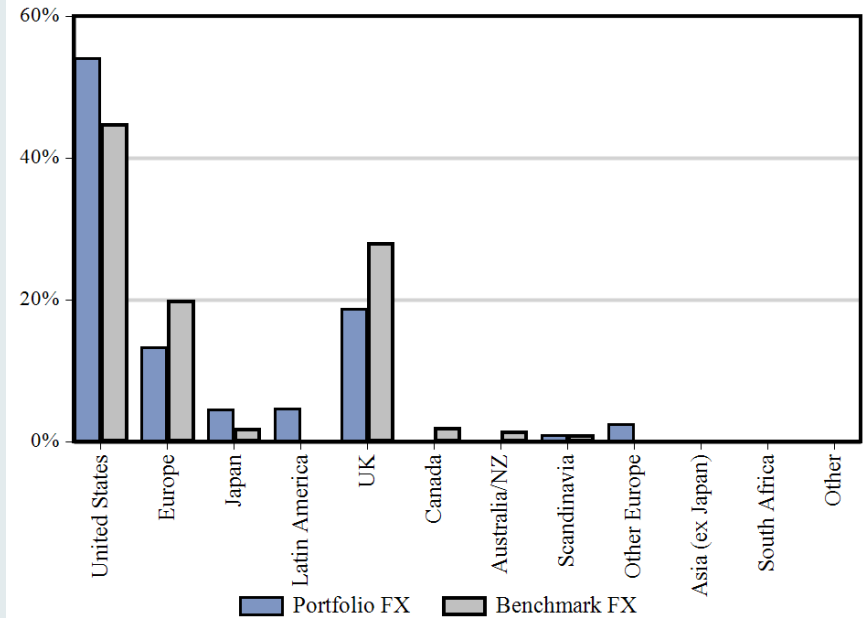
# Real Return Allocation

## December 2015

### Country Exposure (%)



### Currency Exposure (%)



\*Source: Colchester

1. Barclays World Government Inflation-Linked Bond Index USD Unhedged
2. TMRS inception date Feb. 1, 2011
3. Annualized returns since inception



# Real Return Performance

Period Ending December 31, 2015 (Net All)

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL REAL RETURN	939,661,780.96	3.99	-1.62	-1.93	-5.71	-5.71	-1.98				2.22	2/1/2011
Barclays World Inflation Linked Bonds TR			-1.76	-2.31	-4.7	-4.7	-1.91				2.15	
EXCESS			0.14	0.38	-1.01	-1.01	-0.07				0.07	
COLCHEST GLBL INFLTN-LINK BNDS	939,661,780.96	3.99	-1.62	-1.93	-5.71	-5.71	-1.98				2.22	2/1/2011
Barclays World Inflation Linked Bonds TR			-1.76	-2.31	-4.7	-4.7	-1.91				2.15	
EXCESS			0.14	0.38	-1.01	-1.01	-0.07				0.07	

# Real Return Pacing Plan Update

Year	Pacing Plan Update
2010	<ul style="list-style-type: none"> <li>• June – Board approved Real Return Interim Target Allocation and ratification of Manager Search</li> <li>• September – Board approved Colchester as Real Return Manager</li> </ul>
2011	<ul style="list-style-type: none"> <li>• Fully funded through Global Inflation-Linked Bond (GILB) strategy</li> </ul>
2014	<ul style="list-style-type: none"> <li>• March - Real Return transferred from Fixed Income to Real Estate</li> <li>• June – Educational session presented to Board; Board authorized Real Return Consultant search</li> <li>• October - Board approved selection of Albourne America, LLC., as the Real Return Consultant</li> <li>• December – Educational session presented to the Board</li> </ul>
2015	<ul style="list-style-type: none"> <li>• March - The contract with Albourne America was successfully executed</li> <li>• July – Board approved increase in Real Return allocation target from 5% to 10%</li> </ul>

## VII. Absolute Return



# Absolute Return Asset Class Overview

- **Objective**

- Purpose is to diversify equity and credit market risk by targeting hedge fund return streams that are independent of the directionality of the broad stock and bond markets. The ARS portfolio will be invested in a wide variety of hedge fund strategies, with specific constraints on overall portfolio risk and individual manager exposure.
- Performance objective is to exceed the benchmark, defined as the HFRI Fund of Funds Diversified Index, net of fees, and to earn in excess of cash (90-day Libor) plus 5% on an ongoing rolling 5-year period.

- **Investment Philosophy**

- Predicated on manager skill in:
  - Rotating (long/short trading) market factors based on valuation
  - Navigating less liquid, non public and opaque markets
  - Navigating special situations
  - Predicting and capturing market trends
- Accordingly, ARS is not an “asset class” (or market sector)

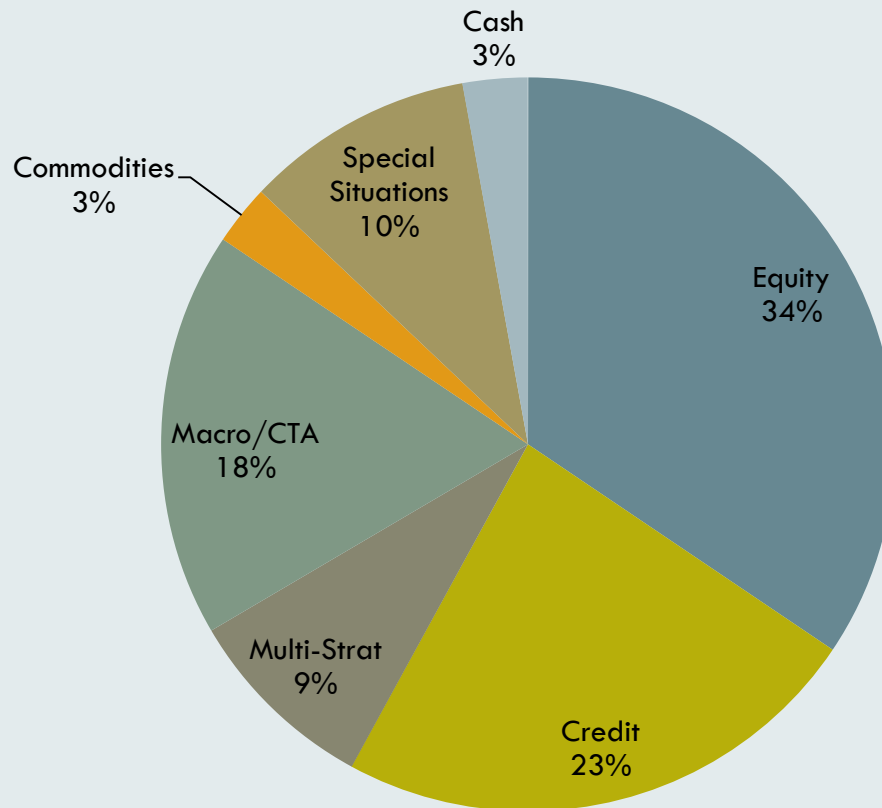
# Absolute Return Portfolio Management Structure

Strategy	Manager	Portfolio Benchmark
Customized Fund of One	Blackstone	HFRI Fund of Funds Diversified Index
Direct Manager	Alyeska Fund*	
Direct Manager	Graticule Asia Macro Fund*	
Direct Manager	Varde Investment Partners*	
Direct Manager	Myriad Opportunities Fund*	
Direct Manager	Roystone Capital Fund*	
Direct Manager	Southpoint Fund*	

\*Indicates manager has been approved, but not funded as of December 31, 2015

# Current BAAM Allocation (Strategy Exposures)

## Aggregated Manager Exposures



# Absolute Return Performance

Period Ending December 31, 2015 (Net All)\*

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
TMRS - TOTAL ABSOLUTE RETURN	1,575,416,819	6.68	-0.61	-0.31	2.99	2.99					2.64	8/1/2014
HFRI FUND OF FUNDS DIVERSIFIED INDEX			-0.52	-1.12	0.33	0.33					1.33	
EXCESS			-0.09	0.81	2.66	2.66					1.31	
TMRS - BLACKSTONE	1,575,416,819	6.68	-0.61	-0.31	2.99	2.99					2.64	8/1/2014
HFRI FUND OF FUNDS DIVERSIFIED INDEX			-0.52	-1.12	0.33	0.33					1.33	
EXCESS			-0.09	0.81	2.66	2.66					1.31	

\*Source: State Street Investment Analytics

# Absolute Return

## Pacing Plan Update (1 / 2)

2011

- October – Educational Session (ARS Part I: Intro to Absolute Return)

2012

- February – Educational Session (ARS Part II: Hedge Fund Strategies)
- June – Educational Session (ARS Part III: Risks and Risk Mitigation)
- October – Educational Session (ARS Part IV: Implementation Options)

2013

- September – Absolute Return Manager Search authorized by the Board

2014

- February – Educational Session (Introduction to ARS: Educational Series Overview); Board authorized the creation of a GP/LP type of partnership; custom fund of one advisor recommendation approved by Board (Blackstone BAAM))
- June – Absolute Return Consultant search authorized by the Board
- August – Board ratified and approved the final BAAM fund structure, the document execution and implementation of the investment; Absolute Return program funded.
- October – Consultant recommendation approved by the Board (Albourne America)
- December – Director of Absolute Return Strategies hired



# Absolute Return

## Pacing Plan Update (2/2)

2015

- March – Contract with Albourne America signed.
- July – Board approved new TMRS portfolio asset allocation increasing ARS to 10% (from 5%)
- October – Board approved the first group of 6 direct ARS (or hedge fund) investments

2016

- January – Executed legal documents and funded 4 of the approved 6 direct hedge fund investments
- February – Executed legal documents and funded the remaining 2 of the approved 6 direct hedge fund investments
- March – Recommend another 7 direct hedge fund investments for Board approval
- September – Recommend 5-7 direct hedge fund investments for Board approval

# VIII. Private Equity



# Private Equity Asset Class

- Objective

- The primary objective is to enhance the total return of the overall investment portfolio, and secondarily to provide diversification. Private Equity investments are commingled funds structured as limited partnerships with capital commitments that are drawn down over time based on manager discretion. Potential distributions are made as a fund matures and investments are typically realized over an 8-12 year horizon.
- The long term policy objective is to meet or exceed the Russell 3000 + 3.00% over periods of five years or greater.

- Investment Philosophy

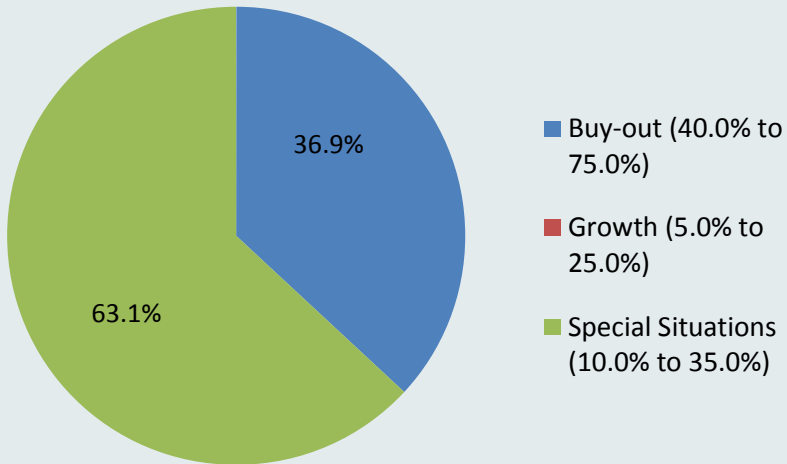
- Manager selection is critical, and managers add value through:
  - Reducing agency conflicts and aligning equity holder/executive incentives
  - Investment structuring and balance sheet management
  - Deep sector experience and creating operating efficiencies
  - Navigating non-public information and capturing illiquidity premia
- *Note: Due to the illiquid nature of the Private Equity asset class, the target allocation will be invested over a multi-year period in order to avoid considerable vintage year risks.*

# Private Equity Portfolio Management Structure

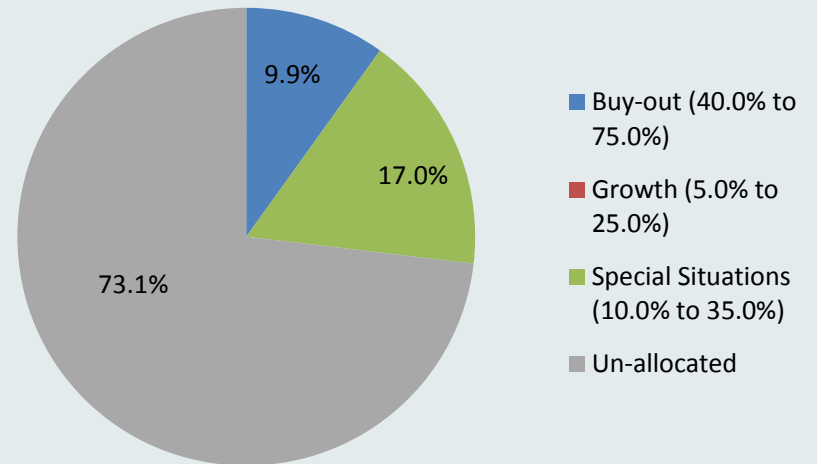
STRATEGY	MANAGER	PORTFOLIO BENCHMARK
Buy-out	Tritium	Russell 3000 + 3%
Buy-out	Harvest	Russell 3000 + 3%
Buy-out	Searchlight	Russell 3000 + 3%
Special Situations	H.I.G. Bayside	Russell 3000 + 3%
Special Situations	Carlyle	Russell 3000 + 3%
Special Situations	TPG	Russell 3000 + 3%

# Private Equity Allocation

**Figure 1 : Private Equity Strategy Diversification by Commitment**



**Figure 2 : Private Equity Target Diversification**

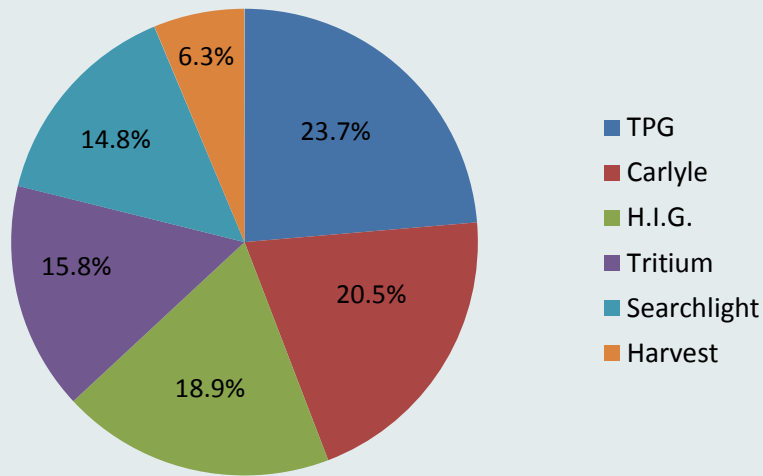


## Policy Strategy Range

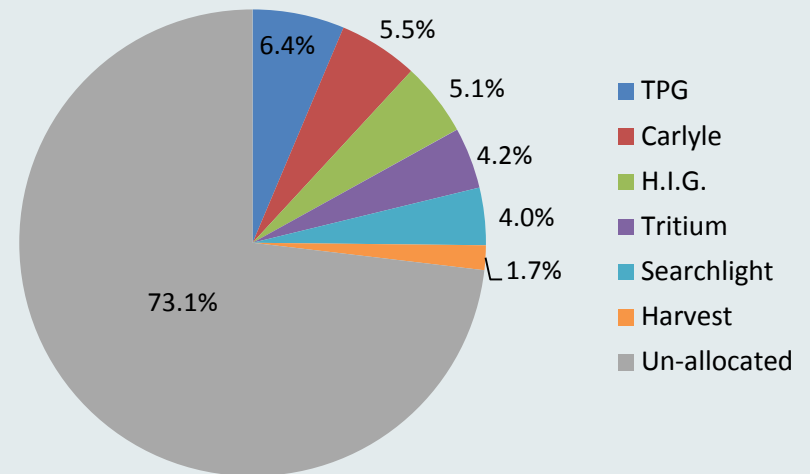
Control/Buy-out	40.0% to 75.0%
Venture/Growth/Minority	5.0% to 25.0%
Special Situations/Opportunistic	10.0% to 35.0%

# Private Equity Allocation

**Figure 3: Private Equity Manager Diversification by Commitment**



**Figure 4 : Private Equity Target Manager Diversification**



## Policy Guidelines

No more than 35% with any one investment manager  
 No more than 25% in any one investment vehicle

# Private Equity Performance

Period Ending December 31, 2015 (Net All)\*

	MKT VAL	% of Plan	1 Mo.	QTR	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.	ITD	Incept Date
<b>TMRS – TOTAL PRIVATE EQUITY</b>	<b>11,704,634</b>	<b>0.05</b>	<b>0.00</b>								<b>0.00</b>	<b>12/1/2015</b>
BUYOUT TOTAL	11,704,634	0.05	0.00								0.00	
TRITIUM I	11,704,634	0.05	0.00								0.00	

\*Source: State Street Investment Analytics

# Private Equity Pacing Plan Update

Year	Pacing Plan Update
2014	<ul style="list-style-type: none"> <li>• August – Educational session presented to the Board</li> <li>• December – Hired Director of Private Equity</li> </ul>
2015	<ul style="list-style-type: none"> <li>• February - Staff private equity education session</li> <li>• July - The contract with StepStone Group was successfully executed</li> <li>• Private Equity Analyst search completed and hiring made</li> <li>• Approximately October 2015: First private equity manager recommendation               <ul style="list-style-type: none"> <li>• Group of 5-6 managers / approximately \$350 M</li> </ul> </li> </ul>
*2016	<ul style="list-style-type: none"> <li>• Approximately Q1 2016: Additional private equity allocation               <ul style="list-style-type: none"> <li>• Group of 1-3 managers / approx. \$150 M</li> </ul> </li> <li>• Approximately Q2 2016: Additional private equity allocation               <ul style="list-style-type: none"> <li>• Group of 1-3 managers / approx. \$150 M</li> </ul> </li> <li>• Approximately Q3 2016: Additional private equity allocation               <ul style="list-style-type: none"> <li>• Group of 1-3 managers / approx. \$150 M</li> </ul> </li> <li>• Approximately Q4 2016: Additional private equity allocation               <ul style="list-style-type: none"> <li>• Group of 1-3 managers / approx. \$150 M</li> </ul> </li> </ul>

\* Subject to Board Approval in December



# IX. Compliance



# Compliance Overview

- **IPS Objectives**
  - The primary objective of Compliance is to implement a detailed compliance program which uses a combination of daily, weekly and monthly testing of all testable parameters of the Investment Policy Statement and all Manager guidelines at the Manager, asset class and total fund level, as appropriate.
  - Testing may be completed either through systematic resources (automated custodial compliance) or manually if necessary.
  - Compliance personnel shall create and present a quarterly report to the Board with the results of the testing performed during each period.

# Investment Guideline Compliance

## December 2015

Policy Guidelines	Core Fixed Income	Non-Core Fixed Income	Real Return	Domestic Equities	Global Equities
Credit Quality					
Liquidity/Cash Management					
Permissible/Prohibited Investments					
Concentration Risk					
Country/Region & Currency					
Issue/Issuer					
Sector & Asset Type					
Interest Rate Risk				N/A	N/A
Spread Risk				N/A	N/A

- 273 separate compliance tests were run on TMRS portfolios as of December 31, 2015. There were no active violations and all funds were in compliance with TMRS guidelines.

# Compliance Pacing Plan Update

Topic	Update
Automate Tests	Tests for State Street's new compliance system, MIG21, have been developed. Beta testing is currently underway. Expected completion by the end of Q1.
Total Fund Annual Compliance Audit	A complete audit of guidelines (including internal procedures) & compliance tests for the total fund aggregate is in progress as part of the MIG21 implementation process.
Asset Class Annual Compliance Audit	A complete audit of guidelines & compliance tests for all funds & fund aggregates is in progress as part of the MIG21 implementation process. Fund level audit is complete.
TMRS Standards of Excellence	Using fi360's global fiduciary standards as a foundation, develop a formal basis for the TMRS compliance function.

# X. Risk Management



# Risk Management Overview December 2015

- Objective
  - Identification, evaluation and management of all risks related to investment results.
- Responsibilities:
  - Defining the policy and strategy for investment risk management
  - Building a risk aware culture within the organization
  - Analytical tools for investment risk management
  - Reporting on investment risk to the Board
- Risk Report: Q4 2015
  - One year outlook market volatility is still a lot lower than long term expectations
  - Forward looking Tracking Error has changed very little at 1.59%, with 1.07% due to pending policy allocations

We show total fund risk to see what current market risk levels are relative to our long term assumptions.

## Total Fund Risk December 2015

Extreme or persistent differences may cause us to rethink our long term assumptions (RVK makes small adjustments every year) otherwise it just provides background information as to the state of the markets.

	BarraOne – One year outlook			Policy Benchmark			RV Kuhns
	Portfolio						Long Term Assumptions <sup>1</sup>
	Weight (%)	Risk	Contribution to Total Risk	Weight (%)	Risk	Contribution to Total Risk	Benchmark
							Risk
<b>Total</b>	<b>100.0%</b>	<b>6.66</b>	<b>100.0%</b>	<b>100.0%</b>	<b>7.54</b>	<b>100.0%</b>	<b>11.4</b>
Cash Assets	0.2%	0.00	0.0%	0.0%	0.00	0.0%	3.0
Equity - US	28.3%	13.08	52.4%	17.5%	13.14	27.7%	17.8
Equity - Non US	17.2%	15.06	36.1%	17.5%	15.98	34.7%	20.6
Core Fixed Income	31.4%	3.60	3.0%	10.0%	3.97	0.3%	6.0
Non-Core Fixed Income	6.5%	5.08	1.9%	20.0%	6.34	13.8%	11.7
Real Estate	4.4%	7.29	2.2%	10.0%	12.62	7.4%	14.6
Real Return	4.1%	5.67	1.5%	10.0%	6.44	3.8%	8.8 <sup>2</sup>
Absolute Return	8.0%	3.40	2.7%	10.0%	3.98	3.4%	9.5
Private Equity	0.1%	15.68	0.2%	5.0%	15.68	9.0%	26.0

- Projected short term (one year) volatility continues to be significantly lower than our strategic (long term) volatility assumptions

NOTES: 1. RVK forward -looking risk assumptions as presented in the July 2015 Asset Allocation Study

2. Assumes a Real Return asset class benchmark of 100% Global Inflation Linked Bonds until the new Policy Benchmark is implemented

Here we are looking at Active Risk (Tracking Error), by asset class and for the total fund

## Total Fund Tracking Error December 2015

We break down the Active Risk based on the investment decision it is associated with

Asset Class	Policy Benchmark	Strategic Target Allocation (%)	Portfolio Allocation (%)	Allocation Difference (%)	Pending Policy Allocations	Four Sources of Active Risk:			
						Contribution of Pending Policy Allocation Decisions <sup>1</sup>	Contribution of Investment Allocation Decisions <sup>2</sup>	Contribution of Strategy Benchmark Decisions <sup>3</sup>	Contribution of Active Manager Decisions <sup>4</sup>
Cash Assets	30 Day T- Bill	0.0%	0.2%	0.2%		0.00	0.01	0.00	0.00
Equity - US	Russell 3000	17.5%	28.3%	10.8%	- 10%	-0.01	0.00	-0.04	0.02
Equity - Non US	MSCI ACWI ex USA IMI	17.5%	17.2%	-0.3%		0.00	0.01	0.03	0.06
Core Fixed Income	Barclays U.S. Agg	10.0%	31.4%	21.4%	- 21%	1.07	0.02	0.00	-0.08
Non-Core Fixed Income	50% Barclay's High Yield, 50% JPM EM Global Diversified Govt Bond Index	20.0%	6.5%	-13.5%	+ 13.5%	-0.09	0.00	0.00	0.24
Real Estate	NCREIF ODCE	10.0%	4.4%	-5.6%	+ 5%	0.19	0.02	0.00	0.19
Real Return	Barclays World Govt Inflation Linked Bond Index	10.0%	4.1%	-5.9%	+5.5%	-0.10	-0.01	0.00	0.02
Absolute Return	HFN FOF Multi Strat (risk proxy: HFRI FOF Diversified)	10.0%	8.0%	-2.0%	+2%	-0.07	0.00	0.00	0.01
Private Equity	Russell 3000 +3% (risk proxy: RUSSELL 2000)	5.0%	0.1%	-4.9%	+ 5%	0.08	0.00	0.00	0.00
<b>Active Total Risk</b>		<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>		<b>1.07</b>	<b>0.05</b>	<b>-0.01</b>	<b>0.47</b>
						<b>Sum of Contributions to Active Risk = 1.59</b>			

If Active Risk, from investment decisions, gets close to the Active Risk Budget (currently 2%) we must evaluate the reasons and decide if we need to adjust the allocation of the risk budget across asset classes or managers

NOTES: 1. Amount of active risk due to Pending Policy Allocations

2. Amount of active risk due to allocation difference from Policy Benchmark target allocations due to investment decisions

3. Amount of active risk due to the difference between manager benchmarks chosen by Investment Staff and the Policy Benchmark for the Asset Class

4. Amount of active risk due to manager portfolio holdings different from holdings of the Manager Benchmark



Here we are showing manager and asset class level Active Risk and checking it against manager Active Risk Targets

## Manager and Asset Class Level Tracking Error

(Selection Contribution to Total Fund Tracking Error)  
December 2015

Fixed Income-Core	Tracking Error Target	Tracking Error	Allocation (%)	Contribution of Strategy Benchmark Decisions <sup>1</sup>	Contribution of Active Manager Decisions <sup>2</sup>
TMRS PIMCO CORE PLUS FIXED INC	1.5	1.38	28.09%	0.00	0.36
TMRS-BLACKROCK FIXED INCOME	0.5	0.42	71.91%	0.00	0.27
<b>Active Total Risk</b>					<b>0.63</b>

Fixed Income- Non Core	Tracking Error Target	Tracking Error	Allocation (%)	Contribution of Strategy Benchmark Decisions <sup>3</sup>	Contribution of Active Manager Decisions <sup>2</sup>
ELLINGTON NON CORE FIXED INC	6.0	9.44 <sup>4</sup>	25.24%	0.00	2.29
GGJA - RED RIVER II- GUGGENHEIM	4.5	4.23	25.05%	0.00	0.89
PY4A - RED RIVER STRATEGIC LN PT I	5.0	5.41	24.25%	0.00	1.20
VOYA NON CORE FIXED INCOME	4.5	7.48 <sup>4</sup>	25.46%	0.00	1.84
<b>Active Total Risk</b>					<b>6.22</b>

- When manager Active Risk (Tracking Error) exceeds the manager Tracking Error Target we must identify what caused the result and then decide if we need to make corrections, adjustments to guidelines/targets or potentially make manager changes
- Note the Ellington and Voya Accounts have been footnoted since Active Risk (Tracking Error) exceeds the manager Tracking Error Target. The increased risk was due to technical reasons which are being corrected.

NOTES: 1. Risk Contribution of strategy benchmark decisions relative to the Asset Class only; see Total Fund Tracking Error page for the contribution relative to the total fund  
 2. Selection Risk Contribution relative to the Asset Class only; see Total Fund Tracking Error page for the Selection Risk Contribution relative to the total fund  
 3. The Non-Core Fixed Income manager benchmarks are not yet included in BarraOne, so their active risk cannot yet be separated into active manager decisions and strategy benchmark decisions.  
 4. Recent improvement in the model was misapplied to these accounts, causing tracking error estimates to be too high; the model is currently being corrected

# Manager and Asset Class Level Tracking Error

## December 2015

Equity - US	Tracking Error Target	Tracking Error	Allocation (%)	Contribution of Strategy Benchmark Decisions <sup>1</sup>	Contribution of Active Manager Decisions <sup>2</sup>	Total Contribution
BOSTON CO US SM CAP OPPORTUNISTIC VALUE	8.00	6.64	3.55%	0.11	0.04	0.15
CHAMPLAIN MID-CAP CORE	4.60	4.24	3.11%	0.06	0.03	0.08
EPOCH U.S. CHOICE	4.00	3.31	3.49%	0.00	0.01	0.01
SASCO U.S. CONTRARIAN VALUE	6.00	6.00	3.07%	0.06	0.04	0.10
THE BOSTON COMPANY OPP VALUE	8.00	4.61	2.94%	0.05	0.03	0.08
SSGA Russell Fundamental US	4.00	2.21	4.35%	0.02	0.00	0.02
TMRS RUSSELL 3000 NON-LENDING	0.00	0.00	74.84%	0.00	0.00	0.00
UBS US EQUITY MIN VOL FUND-NL	10.00	4.51	4.65%	0.02	0.00	0.02
<b>Active Total Risk</b>				<b>0.32</b>	<b>0.14</b>	<b>0.46</b>

Equity - Non US	Tracking Error Target	Tracking Error	Allocation (%)	Contribution of Strategy Benchmark Decisions <sup>1</sup>	Contribution of Active Manager Decisions <sup>2</sup>	Total Contribution
ACADIAN EMERGING MARKETS	7.00	7.81	4.28%	0.21	0.03	0.24
LAZARD INTL EQUITY PLUS	5.00	2.53	4.72%	-0.01	0.06	0.05
NGTI ACWI EX. US IMI-NL	0.00	0.00	70.12%	0.00	0.00	0.00
SSGA Russell Fund Global Ex-US	4.00	2.19	5.24%	-0.07	0.00	-0.07
UBS WORLD EX-US MIN VOL FD NL	10.00	5.65	6.37%	0.19	0.00	0.19
WELLINGTON INTL HORIZONS	5.00	4.13	4.95%	-0.01	0.07	0.06
WILLIAM BLAIR EMERGING MARKETS	7.80	8.57	4.32%	0.21	0.07	0.28
<b>Active Total Risk</b>				<b>0.54</b>	<b>0.23</b>	<b>0.77</b>

NOTES: 1. Risk Contribution of strategy benchmark decisions relative to the Asset Class only; see Total Fund Tracking Error page for the contribution relative to the total fund  
 2. Selection Risk Contribution relative to the Asset Class only; see Total Fund Tracking Error page for the Selection Risk Contribution relative to the total fund  
 3. Revised from initial assumptions

# Manager and Asset Class Level Tracking Error

December 2015

<b>Real Estate</b>	<b>Tracking Error Target</b>	<b>Tracking Error</b>	<b>Allocation (%)</b>	<b>Contribution of Strategy Benchmark Decisions<sup>1</sup></b>	<b>Contribution of Active Manager Decisions<sup>2</sup></b>
ABACUS CORE INCOME FUND I LP	N/A	15.60	4.89%	0.00	0.61
ABACUS MULTI-FAMILY III	N/A	12.62	0.00%	0.00	0.00
Abacus Multi-Family Ptrs II	N/A	6.22	3.42%	0.00	0.17
Greenfield Acquisition Ptrs VI	N/A	5.58	5.49%	0.00	0.20
H-2 CP, LP	N/A	12.62	0.00%	0.00	0.00
Harrison Real Estate-Core Open	N/A	8.23	20.22%	0.00	1.23
Harrison Street Securities	N/A	12.62	0.00%	0.00	0.00
INVESCO ADVISERS, INC.	N/A	15.14	16.28%	0.00	2.08
LUBERT-ADLER FUND VII	N/A	14.40	3.74%	0.00	0.45
MOORFIELD REAL ESTATE III	N/A	12.62	0.00%	0.00	0.00
Miller Global Fund VII	N/A	11.22	4.34%	0.00	0.19
RUBENSTEIN PROPERTIES FD II	N/A	12.62	3.07%	0.00	0.34
SMART MARKETS FUND LP	N/A	4.47	27.44%	0.00	1.07
Stockbridge Value Fund	N/A	4.47	4.49%	0.00	0.18
TORCHLIGHT DEBT OPP FUND V,LP	N/A	12.62	0.00%	0.00	0.00
WALTON ST REAL ESTATE FUND VII	N/A	12.62	6.63%	0.00	0.73
WALTON STREET REAL ESTATE DEPT FUND	N/A	12.62	0.00%	0.00	0.00
<b>Active Total Risk</b>					<b>7.24</b>

<b>Real Return</b>	<b>Tracking Error Target</b>	<b>Tracking Error</b>	<b>Allocation (%)</b>	<b>Contribution of Strategy Benchmark Decisions<sup>1</sup></b>	<b>Contribution of Active Manager Decisions<sup>2</sup></b>
COLCHEST GLBL INFLTN-LINK BNDS	3.00	2.03	100%	0.00	2.03
<b>Active Total Risk</b>					<b>2.03</b>

- NOTES: 1. Risk Contribution of strategy benchmark decisions relative to the Asset Class only; see Total Fund Tracking Error page for the contribution relative to the total fund  
 2. Selection Risk Contribution relative to the Asset Class only; see Total Fund Tracking Error page for the Selection Risk Contribution relative to the total fund  
 3. Tracking Error Targets are generally not set for Private Real Estate because returns are reported quarterly based on appraised property values.  
 4. Percent allocations may lag actual allocations due to lagged quarterly reporting

# Risk Management Update

## December 2015

Topic	Update
Board and Internal Risk Reporting	Providing quarterly Board Risk Reports for the total fund and internal asset class reports analyzing active risk taken by our public market managers.
Specialized Risk Analysis	Applying and further developing specialized risk analysis solutions for Alternative Asset Class investments
Performance Attribution	Performance Attribution allows us to better distinguish manager skill from luck by breaking down (attributing) monthly returns to specific manager decisions. Refining attribution measures, adding new accounts and strategies, and working on summary observations.
Security Level Data Management	A daily security level portfolio data management solution is necessary to support risk and performance analytics. Have implemented the initial version. Currently being used to provide daily holdings and transaction data to the performance attribution system.
Performance Reporting	Expanding Performance Reporting procedures and methodology to incorporate new asset types, new investment vehicles, and increased transparency. Planning a move from monthly close of portfolio accounting books by our custodian to a daily close and adding un-lagged performance reporting which shows returns for all accounts properly aligned with the time periods when they were earned <sup>1</sup> .
Quantitative Portfolio Analysis	Monitoring advances in quantitative portfolio analysis to ensure that risk and performance analysis remain current at TMRS

1. Private market asset classes, like Real Estate, are priced quarterly with a quarter lag due to use of appraised value pricing in the absence of market prices. For some asset class funds in less liquid public markets this is also true, although to a lesser extent and the lag is only one month