

FUND EVALUATION REPORT

Worcester Retirement System

February 8, 2018
Meeting Material



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Interim Update
As of December 31, 2017

PRIT Look Through Analysis
Aggregate Assets
As of December 31, 2017

	Actual Asset Allocation ^{1,2} (%)	PRIT Actual Asset Allocation ¹ (%)
Total Retirement System	NA	NA
Global Equity Assets	48	46
<i>Domestic Equity Assets</i>	22	19
<i>International Developed Market Equity Assets</i>	14	18
<i>International Emerging Market Equity Assets</i>	12	8
Fixed Income Assets	24	20
<i>Core Fixed Income Assets</i> ³	14	12
<i>Value-Added Fixed Income Assets</i> ⁴	10	8
Real Estate Assets	9	9
Private Equity Assets	8	10
Portfolio Completion Strategies / Hedge Funds / GTAA	4	10
Real Assets (Natural Resources, Timber, Infrastructure)	7	4
Cash	<1	1

¹ Numbers may not sum to 100% due to rounding.

² Asset classes include a pro-rata allocation of the System's 13% holding of the PRIT Core Fund.

³ Retirement System figures include investment grade bonds and TIPS.

⁴ Retirement System figures include high yield fixed income and emerging market debt.

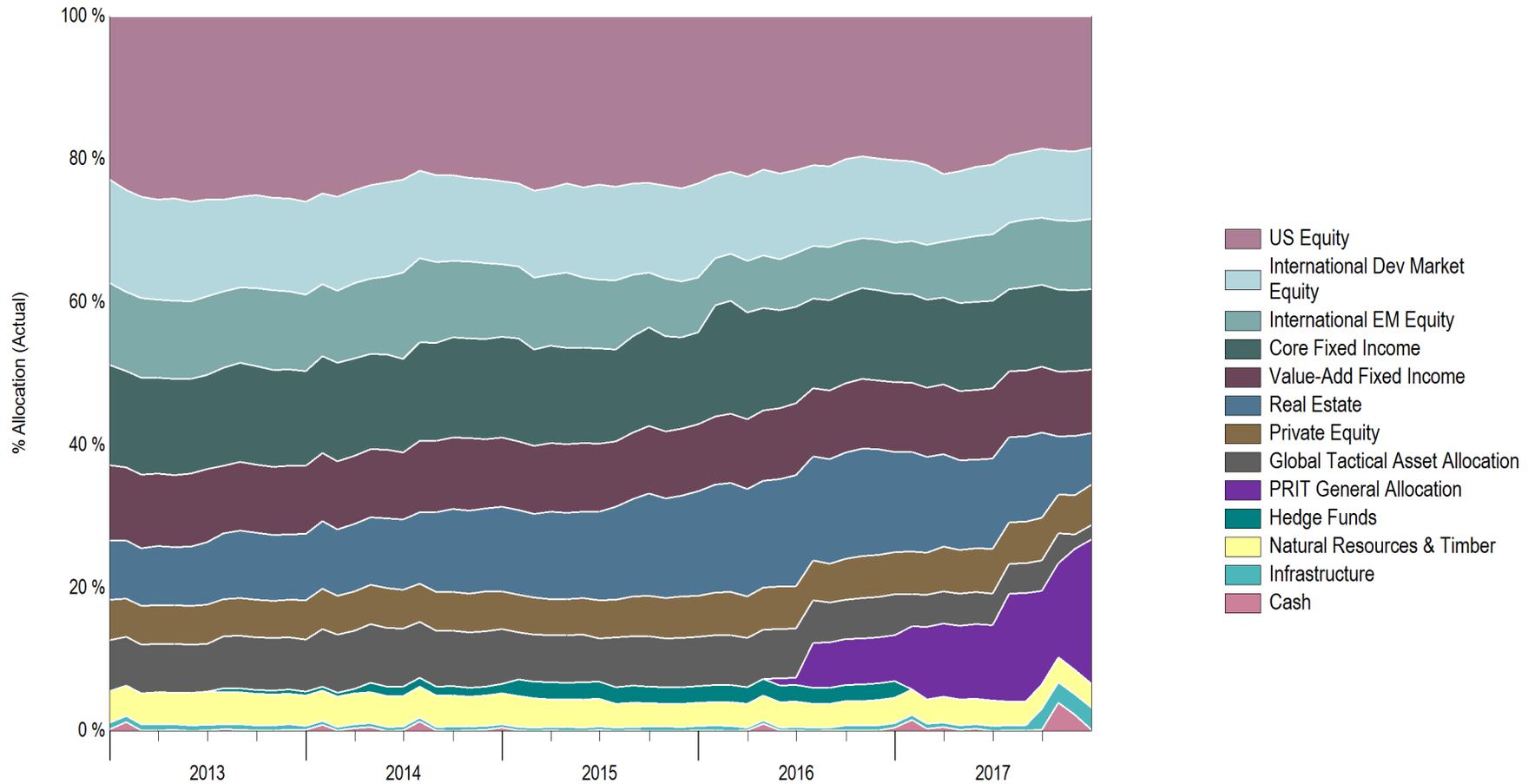


As of December 31, 2017

Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Policy Range	Within IPS Range?
US Equity	\$176,363,919	18%	14%	9% - 19%	Yes
International Dev Market Equity	\$94,451,239	10%	8%	4% - 12%	Yes
International EM Equity	\$93,905,837	10%	8%	4% - 12%	Yes
Core Fixed Income	\$107,775,742	11%	10%	5% - 15%	Yes
Value-Add Fixed Income	\$85,191,425	9%	4%	2% - 6%	No
Real Estate	\$68,526,895	7%	6%	4% - 8%	Yes
Private Equity	\$53,881,434	6%	7%	4% - 10%	Yes
Global Tactical Asset Allocation	\$19,576,937	2%	0%	0% - 0%	No
PRIT General Allocation	\$193,302,394	20%	35%	0% - 50%	Yes
Hedge Funds	--	--	0%	0% - 0%	Yes
Natural Resources & Timber	\$32,008,674	3%	3%	1% - 5%	Yes
Infrastructure	\$29,237,813	3%	5%	2% - 8%	Yes
Cash	\$1,580,001	0%	0%	0% - 5%	Yes
Total	\$955,802,312	100%	100%		

Asset Allocation History
5 Years Ending December 31, 2017



As of December 31, 2017

Asset Class Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Retirement System	955,802,312	100.0	1.8	3.8	16.4	7.4	8.0	5.1	7.7	Oct-95
Total Retirement System (Net of Fees)			1.8	3.8	16.3	7.2	7.8	4.9	7.5	
<i>Custom Benchmark - Target Allocation</i>			1.7	4.0	15.3	7.7	8.4	5.6	--	Oct-95
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>			1.1	3.9	17.1	6.5	6.8	4.3	6.3	Oct-95
Domestic Equity	176,363,919	18.5	1.0	6.4	20.7	11.3	15.6	8.6	6.4	Aug-00
<i>Russell 3000</i>			1.0	6.3	21.1	11.1	15.6	8.6	6.1	Aug-00
International Developed Market Equity	94,451,239	9.9	1.9	4.7	28.6	10.0	9.6	3.3	5.7	Aug-00
<i>MSCI EAFE</i>			1.6	4.2	25.0	7.8	7.9	1.9	4.0	Aug-00
International Emerging Market Equity	93,905,837	9.8	3.2	6.6	39.9	10.2	5.5	4.0	8.2	Aug-06
<i>MSCI Emerging Markets</i>			3.6	7.4	37.3	9.1	4.3	1.7	6.3	Aug-06
Core Fixed Income	107,775,742	11.3	0.5	0.5	3.1	2.3	1.1	4.3	4.4	May-05
<i>Custom Benchmark - Fixed Income</i>			0.5	0.4	3.0	2.1	1.5	3.7	3.9	May-05
Value Added Fixed Income	85,191,425	8.9	1.1	1.1	9.0	5.7	4.5	5.9	7.5	May-05
<i>Custom High Yield Benchmark</i>			0.7	0.9	8.1	5.3	--	--	--	May-05
Real Estate	68,526,895	7.2	1.1	2.3	8.3	10.0	10.6	5.5	7.7	Oct-00
<i>NCREIF ODCE</i>			2.1	2.1	7.6	10.4	11.5	5.0	8.1	Oct-00
Private Equity	53,881,434	5.6	6.9	6.8	19.9	6.7	8.3	7.1	9.3	Oct-00
<i>Cambridge Associates Fund of Funds Composite 1-Quarter Lag</i>			3.6	3.6	12.8	9.7	11.4	7.7	6.0	Oct-00
Global Tactical Asset Allocation	19,576,937	2.0	0.8	0.7	5.5	-0.5	0.0	2.0	2.1	Aug-07
<i>Spliced Benchmark</i>			1.1	3.9	17.1	6.3	2.8	3.0	3.3	Aug-07
PRIT General Allocation	193,302,394	20.2	1.8	3.9	17.2	--	--	--	13.9	Jun-16
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>			1.1	3.9	17.1	6.5	6.8	4.3	11.9	Jun-16
Real Assets	61,246,487	6.4	2.2	2.5	12.8	3.8	5.5	3.5	3.6	Oct-06
<i>CPI+3%</i>			0.4	1.4	5.1	4.6	4.4	4.6	4.8	Oct-06
Cash	1,580,001	0.2								

As of December 31, 2017

Trailing Performance

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Retirement System	955,802,312	100.0	100.0	1.8	3.8	16.4	7.4	8.0	5.1	7.7	Oct-95
Total Retirement System (Net of Fees)				1.8	3.8	16.3	7.2	7.8	4.9	7.5	
<i>Custom Benchmark - Target Allocation</i>				1.7	4.0	15.3	7.7	8.4	5.6	--	Oct-95
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				1.1	3.9	17.1	6.5	6.8	4.3	6.3	Oct-95
Domestic Equity	176,363,919	18.5	18.5	1.0	6.4	20.7	11.3	15.6	8.6	6.4	Aug-00
<i>Russell 3000</i>				1.0	6.3	21.1	11.1	15.6	8.6	6.1	Aug-00
SSgA S&P 500 Index (Net of Fees)	67,126,479	7.0	38.1	1.1	6.7	21.9	11.5	15.8	8.6	6.6	Aug-98
<i>S&P 500</i>				1.1	6.6	21.8	11.4	15.8	8.5	6.6	Aug-98
SSgA Russell 1000 Growth Index (Net of Fees)	43,972,178	4.6	24.9	0.8	7.9	30.1	13.8	17.3	--	16.0	Nov-09
<i>Russell 1000 Growth</i>				0.8	7.9	30.2	13.8	17.3	10.0	16.0	Nov-09
SSgA Russell 1000 Value Index (Net of Fees)	40,624,538	4.3	23.0	1.5	5.4	13.8	8.8	14.1	7.2	7.8	Jul-05
<i>Russell 1000 Value</i>				1.5	5.3	13.7	8.7	14.0	7.1	7.8	Jul-05
SSgA S&P Midcap 400 Index (Net of Fees)	12,430,850	1.3	7.0	0.2	6.2	16.2	11.1	15.0	10.0	10.2	Sep-06
<i>S&P 400 MidCap</i>				0.2	6.3	16.2	11.1	15.0	10.0	10.2	Sep-06
Lee Munder Small Cap Value (Net of Fees)	12,209,874	1.3	6.9	0.2	3.0	8.6	11.8	14.4	--	14.0	Nov-09
<i>Russell 2000 Value</i>				-1.0	2.0	7.8	9.5	13.0	8.2	13.6	Nov-09
International Developed Market Equity	94,451,239	9.9	9.9	1.9	4.7	28.6	10.0	9.6	3.3	5.7	Aug-00
<i>MSCI EAFE</i>				1.6	4.2	25.0	7.8	7.9	1.9	4.0	Aug-00
SSgA MSCI EAFE Index	68,484,515	7.2	72.5	1.6	4.2	25.5	8.1	8.2	2.3	6.7	Sep-04
<i>MSCI EAFE</i>				1.6	4.2	25.0	7.8	7.9	1.9	6.4	Sep-04
Acadian Non-U.S. Small Cap Equity (Net of Fees)	25,966,724	2.7	27.5	2.8	6.1	37.9	17.0	14.8	6.1	9.5	Feb-05
<i>MSCI EAFE Small Cap</i>				2.7	6.1	33.0	14.2	12.9	5.8	7.8	Feb-05

Total Retirement System

	As of December 31, 2017										
	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
International Emerging Market Equity	93,905,837	9.8	9.8	3.2	6.6	39.9	10.2	5.5	4.0	8.2	Aug-06
<i>MSCI Emerging Markets</i>				3.6	7.4	37.3	9.1	4.3	1.7	6.3	Aug-06
PRIT Emerging Markets (Net of Fees)	93,905,837	9.8	100.0	3.2	6.6	39.8	--	--	--	26.4	Sep-16
<i>MSCI Emerging Markets</i>				3.6	7.4	37.3	9.1	4.3	1.7	24.0	Sep-16
Core Fixed Income	107,775,742	11.3	11.3	0.5	0.5	3.1	2.3	1.1	4.3	4.4	May-05
<i>Custom Benchmark - Fixed Income</i>				0.5	0.4	3.0	2.1	1.5	3.7	3.9	May-05
IR&M Aggregate Bond	72,406,164	7.6	67.2	0.5	0.4	3.8	2.6	--	--	3.3	Feb-14
<i>BBgBarc US Aggregate TR</i>				0.5	0.4	3.5	2.2	2.1	4.0	2.8	Feb-14
IR&M Intermediate TIPS	35,369,578	3.7	32.8	0.5	0.5	1.9	1.8	--	--	1.3	Feb-14
<i>BBgBarc US TIPS 1-10 Yr TR</i>				0.5	0.5	1.9	1.8	0.1	2.8	1.3	Feb-14
Value Added Fixed Income	85,191,425	8.9	8.9	1.1	1.1	9.0	5.7	4.5	5.9	7.5	May-05
<i>Custom High Yield Benchmark</i>				0.7	0.9	8.1	5.3	--	--	--	May-05
High Yield Bonds	48,240,644	5.0	56.6	0.3	0.8	6.5	5.0	4.8	--	6.4	Jun-08
<i>50% BBgBarc US High Yield/ 50% Credit Suisse Leveraged Loans</i>				0.3	0.8	5.9	5.4	5.1	6.3	6.8	Jun-08
Loomis Sayles High Yield	25,109,792	2.6	52.1	0.4	0.7	9.1	5.8	6.1	7.9	8.2	Jan-96
<i>BBgBarc US High Yield TR</i>				0.3	0.5	7.5	6.4	5.8	8.0	7.2	Jan-96
Loomis Sayles Bank Loans	23,130,852	2.4	47.9	0.3	0.9	3.6	4.4	3.9	4.3	4.3	Oct-05
<i>Credit Suisse Leveraged Loans</i>				0.4	1.2	4.2	4.5	4.3	4.6	4.6	Oct-05
Lazard Emerging Market Debt Blend	30,161,581	3.2	35.4	1.5	0.8	12.5	3.9	--	--	2.1	Aug-13
<i>50% JPM EMBI GD / 50% JPM GBI-EM</i>				1.4	1.0	12.7	4.9	1.5	5.5	3.5	Aug-13
Mezzanine Debt	6,789,200	0.7	8.0	4.6	4.6	11.4	14.4	9.6	8.5	--	
Northstar Mezzanine Partners VI	3,638,505	0.4	53.6								
Newstone Capital Partners II	981,892	0.1	14.5								

As of December 31, 2017

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Northstar Mezzanine Partners V	1,698,597	0.2	25.0								
Northstar Mezzanine Partners IV	357,699	0.0	5.3								
Newstone Capital Partners	17,663	0.0	0.3								
Northstar Mezzanine Partners III	94,844	0.0	1.4								
Real Estate	68,526,895	7.2	7.2	1.1	2.3	8.3	10.0	10.6	5.5	7.7	Oct-00
<i>NCREIF ODCE</i>				2.1	2.1	7.6	10.4	11.5	5.0	8.1	Oct-00
Open-End Real Estate	58,690,916	6.1	85.6	1.3	2.5	8.4	9.6	10.4	4.3	7.3	Jan-99
PRIT Real Estate	58,690,916	6.1	100.0	1.3	2.5	8.4	9.3	10.7	--	11.8	Apr-10
<i>NCREIF-ODCE</i>				2.1	2.1	7.6	10.4	11.5	5.0	12.9	Apr-10
<i>NCREIF ODCE Equal Weighted</i>				2.1	2.1	7.8	10.7	11.6	4.8	12.9	Apr-10
<i>Custom Benchmark</i>				1.9	2.4	8.6	9.8	11.0	5.5	12.6	Apr-10
Non-Core Real Estate	9,835,979	1.0	14.4	0.4	0.4	7.5	15.3	15.1	9.9	12.3	Oct-05
AEW Partners VII	7,145,810	0.7	72.6								
AEW Partners VI	2,677,118	0.3	27.2								
AREA Property Partners Fund II	13,051	0.0	0.1								
Private Equity	53,881,434	5.6	5.6	6.9	6.8	19.9	6.7	8.3	7.1	9.3	Oct-00
<i>Cambridge Associates Fund of Funds Composite 1-Quarter Lag</i>				3.6	3.6	12.8	9.7	11.4	7.7	6.0	Oct-00
Buyouts	39,745,714	4.2	73.8	8.3	8.3	25.0	9.5	9.3	9.3	12.1	Oct-05
American Securities Partners VI	4,193,392	0.4	10.6								
Riverside Capital Appreciation Fund VI	6,538,231	0.7	16.5								
Vitruvian Investment Partnership I	4,817,956	0.5	12.1								

As of December 31, 2017

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Riverside Micro Cap Fund III	6,611,781	0.7	16.6								
Ridgemont II	5,671,500	0.6	14.3								
Capital International Private Equity Fund VI	5,652,790	0.6	14.2								
Harvest Partners V	1,726,277	0.2	4.3								
TA XII	2,185,448	0.2	5.5								
Riverside Capital Fund V	1,050,363	0.1	2.6								
Riverside Europe III	528,075	0.1	1.3								
Charlesbank Equity Fund VI	479,293	0.1	1.2								
2000 Riverside Capital Appreciation	207,812	0.0	0.5								
2003 Riverside Capital Appreciation	72,261	0.0	0.2								
Charlesbank Equity Fund V	10,535	0.0	0.0								
Fund of Funds	2,864,023	0.3	5.3	3.5	1.1	-0.7	-10.9	-5.3	-5.1	6.7	Oct-05
PRIT Vintage Year 2016	1,760,611	0.2	61.5								
PRIT Vintage Year 2017	925,842	0.1	32.3								
European Strategic Partners	89,128	0.0	3.1								
INVESCO Private Capital II	88,443	0.0	3.1								
Venture Capital Funds	11,271,697	1.2	20.9	3.0	3.0	6.1	0.0	6.1	4.4	7.1	Oct-05
Ascent Venture Partners V	4,724,017	0.5	41.9								
Asecent Venture Partners VI	2,531,444	0.3	22.5								

As of December 31, 2017

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Boston Millennia Partners III	2,235,837	0.2	19.8								
Boston Millennia Partners II	971,710	0.1	8.6								
Ascent Venture Partners II	24,159	0.0	0.2								
Ascent Venture Partners IV	483,139	0.1	4.3								
Ascent Venture Partners III	281,029	0.0	2.5								
Boston Capital Venture III	20,363	0.0	0.2								
Global Tactical Asset Allocation	19,576,937	2.0	2.0	0.8	0.7	5.5	-0.5	0.0	2.0	2.1	Aug-07
<i>Spliced Benchmark</i>				1.1	3.9	17.1	6.3	2.8	3.0	3.3	Aug-07
William Blair Macro Allocation Strategy (Net of Fees)	19,576,937	2.0	100.0	0.8	0.7	5.5	--	--	--	-1.7	Jun-15
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				1.1	3.9	17.1	6.5	6.8	4.3	6.7	Jun-15
PRIT General Allocation	193,302,394	20.2	20.2	1.8	3.9	17.2	--	--	--	13.9	Jun-16
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				1.1	3.9	17.1	6.5	6.8	4.3	11.9	Jun-16
PRIT General Allocation Fund (Net of Fees)	193,302,394	20.2	100.0	1.8	3.9	17.2	--	--	--	13.9	Jun-16
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				1.1	3.9	17.1	6.5	6.8	4.3	11.9	Jun-16
Real Assets	61,246,487	6.4	6.4	2.2	2.5	12.8	3.8	5.5	3.5	3.6	Oct-06
<i>CPI+3%</i>				0.4	1.4	5.1	4.6	4.4	4.6	4.8	Oct-06
Natural Resources Assets	17,068,136	1.8	27.9	1.2	2.1	22.4	-2.6	0.4	--	--	
<i>S&P Global Natural Resources Index TR USD</i>				5.7	8.6	22.7	7.2	2.5	-0.4	--	
Natural Resources (Public)	8,436,977	0.9	49.4	5.7	7.7	18.9	4.3	0.0	--	-2.7	May-11
SSgA Global Natural Resources Stock Index	8,436,977	0.9	100.0	5.7	7.7	18.9	4.3	0.0	--	-2.7	May-11
<i>S&P Global LargeMidCap Commodity and Resources GR USD</i>				5.7	7.7	18.7	4.4	0.1	-0.5	-2.3	May-11

Total Retirement System

As of December 31, 2017

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Natural Resources (Private)	8,631,159	0.9	50.6	-2.8	-2.8	26.3	-11.7	-2.7	--	8.5	Jul-10
White Deer Energy II	7,399,077	0.8	85.7								
White Deer Energy	1,232,082	0.1	14.3								
Timber	14,940,538	1.6	24.4	-2.1	-2.1	-3.5	-1.4	1.7	0.5	1.6	Oct-05
<i>NCREIF Timberland</i>				1.5	1.5	3.6	3.8	6.2	4.4	7.1	Oct-05
RMK Select Timberland Investment Fund I	5,230,644	0.5	35.0								
Hancock Timberland VII	4,922,986	0.5	33.0								
RMK Select Timberland Investment Fund II	3,595,743	0.4	24.1								
RMK Balanced Timberland B	1,191,165	0.1	8.0								
Infrastructure	29,237,813	3.1	47.7	5.3	5.2	22.3	31.6	29.2	--	16.2	Jun-08
<i>DJ Brookfield Global Infrastructure Net TR USD</i>				-1.2	0.5	15.8	3.7	--	--	--	Jun-08
IFM Global Infrastructure (Net of Fees)	21,298,845	2.2	72.8								
Global Infrastructure Partners	4,581,712	0.5	15.7								
Global Infrastructure Partners III	3,357,256	0.4	11.5								
Cash	1,580,001	0.2	0.2								
State Street STIF - Cash	1,580,001	0.2	100.0								