UNITED STATES BANKRUPTCY COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re:	Chapter 9
	Case No. 13-53846
City of Detroit, Michigan, Debtor	Hon. Steven W. Rhodes

_____/

REPORT OF ALAN PERRY

Pursuant to Federal Rule of Civil Procedure 26(a)(2)(B), made applicable to this proceeding by Federal Rule of Bankruptcy Procedure 7026, debtor the City of Detroit submits this report with respect to the expected expert testimony of Alan Perry.

I.   Introduction

Alan Perry is a Principal and Consulting Actuary at Milliman, as well as a Chartered Financial Analyst designee. It is the City's intention to call Mr. Perry to testify about the use of a 6.75% investment return assumption for the City's two pension plans[1] called for in the Plan of Adjustment of the Debts of the City of Detroit ("POA").

II.   Opinions:

Mr. Perry will offer the following opinions:

> A. Based on policy target asset allocations of DPFRS and DGRS as of December 31, 2013, the best-estimate for the expected investment return for the 10 years ending December 31, 2023, is as follows:

---

[1] The Detroit Police and Fire Retirement System ("DPFRS") and the Detroit General Retirement System ("DGRS").

	DGRS	DPFRS
Best-Estimate Range	3.67% to 9.45%	3.91% to 9.31%
Best-Estimate (Mean)	6.60%	6.65%
Best-Estimate (Median)	6.52%	6.58%

B. Based on asset portfolios of DPFRS and DGRS as of December 31, 2013, the best-estimate for the expected investment return for the 30 years ending December 31, 2043, is as follows:

	DGRS	DPFRS
Best-Estimate Range	5.48% to 8.63%	5.65% to 8.60%
Best-Estimate (Mean)	7.07%	7.14%
Best-Estimate (Median)	7.04%	7.12%

C. The best-estimate range should be based on the 25th and the 75th percentiles of the expected distribution of the annualized rate of return over the measurement period, less investment-related expenses. The best-estimate assumption uses the 50th percentile (median) of the expected distribution of the annualized rate of return over the measurement period. This implies that there is a 50% chance of a higher annualized return and a 50% chance of a lower annualized return than the best estimate.

D. These estimates were based upon Milliman's December 31, 2013 capital markets assumptions, including a 2.5% inflation rate assumption.

E. There is no specific guidance in actuarial literature regarding investment rates to be used on valuing pension plan liabilities in a bankruptcy plan of adjustment. The guidance provided by Actuarial Standard of Practice No. 27 states that, when setting the expected return assumption for a pension plan, the actuary should consider 1) the nature and purpose of the measurement; 2) the characteristics of the obligation to be measured, such as the measurement period and the pattern of plan payments over time; and 3) cash flow timing – the timing of expected contributions and benefit payments may affect the plan's liquidity needs and investment opportunities. Taking such

considerations into account would lead a Plan Sponsor to choose an investment rate at various points within a reasonable range.

F. The 6.75% investment return assumption set forth in the POA to use as the discount rate to value the liabilities of DPFRS and DGRS falls within the best estimate ranges set out in paragraphs II.A. and II.B. above.

III. Basis and Reasons for Opinions

A. <u>Actuarial Standard of Practice No. 27</u>

In reaching his opinions, Mr. Perry utilized Milliman's December 31, 2013 capital market assumptions along with guidance from Actuarial Standard of Practice No. 27 – Selection of Economic Assumptions for Measuring Pension Obligations ("ASOP No. 27").[2]

The investment return assumption is one of the primary determinants in the allocation of the expected cost of a pension plan's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. The valuation investment return assumption should represent the expected rate of return on a pension plan's assets over the measurement period, considering the pension plan's asset allocation policy, expected long-term real rates of return on specific asset classes, the underlying inflation rate, and investment-related expenses.

Recognizing that there is not one "right answer," ASOP No. 27 calls for the actuary to develop a best estimate range for each economic assumption and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

---

[2] A revised ASOP No. 27 has been adopted by the Actuarial Standards Board, but it does not go into effect until September 30, 2014. In any event, the recommended best-estimate assumption above satisfies the revised standard.

B.   A Pension Plan's Investment Policy

Any pension plan's long-term rate of return on its investments will be mostly determined by its allocation to various asset classes. For DPFRS, Mr. Perry used the policy target asset weights shown in Wilshire's Executive Summary of Investment Performance Report dated December 31, 2014, supplemented with details from PFRS's June 30, 2013 Summary Asset Allocation Report. For DGRS, Mr. Perry used the policy target asset weights shown in NEPC's Performance Summary Report contained in their Meeting Materials Report dated February 26, 2014, supplemented with details from DGRS's June 30, 2013 Summary Asset Allocation Report. The asset allocation weights are shown in Exhibits I and II.

Milliman's Capital Markets Committee develops long-term capital market assumptions at the beginning of each calendar year and reviews them semi-annually using a well-researched process. The committee is composed of senior investment professionals and actuaries who bring depth of asset class and portfolio experience to the task. The assumptions are intended to form the basis for setting long-term actuarial assumptions for investment returns and inflation for retirement and other benefit plans.

The capital market assumptions that Mr. Perry used in his work consist of expected returns (real and nominal), standard deviations, and correlations for traditional and alternative asset classes used by institutional investors. The expected return assumptions (except for private equity and hedge funds) represent expected market index returns for each asset class and do not include potential excess returns from active management or any adjustments for active management fees.

Milliman uses the Global Capital Asset Pricing Model (Global CAPM) methodology to determine forward-looking expected returns for each asset class. Insight and feedback from Milliman's specialty research groups further refine the return expectations. Historical estimates of volatility (standard deviation) and correlations are used in line with academic research. Milliman adjusts certain capital market assumptions to reflect changed market conditions and/or the nature of the asset class.

C.   Development of Expected Returns

To develop expected return assumptions for portfolios of different asset classes, the following inputs need to be estimated for each asset class:

- Expected return (arithmetic average of annual returns)
- Standard deviation of annual returns
- Correlation between the annual returns of each pair of asset classes

The Global CAPM model requires estimates of the risk-free rate and the excess return of the global market portfolio over the risk-free rate. Mr. Perry estimates these two parameters by independently estimating returns for two key asset classes: U.S. large cap equity and U.S. aggregate fixed income. Mr. Perry then solves for the risk-free rate and market excess return forecasts that, when used as inputs to the CAPM, generate expected returns for U.S. large cap equity and U.S. aggregate fixed income that match the independent forecasts.

Mr. Perry uses capital asset pricing theory to develop expected returns for asset classes. The theory holds that the expected return for an asset class is based on its contribution to the risk of the total market portfolio containing all assets. Assets that bring high risk to the market portfolio have higher expected returns than assets that bring low risk. Risk is measured by the covariance between the asset class and the market portfolio. The level of expected return associated with the amount of risk is calibrated by the expected returns developed below for U.S. large cap equity and U.S. aggregate fixed income.

1. *U.S. Large Cap Equity*

Mr. Perry used the Dividend Discount Model to forecast the long-term return on U.S. large cap equity. According to this model, the expected annualized return on the equity market is the sum of long-term inflation, the current dividend yield (based on next year's expected dividend), and the expected long-term real growth rate in dividends.

The model's long-term assumption for the annualized rate of inflation is 2.50%. This is based on a combination of the difference between yields on long maturity Treasury bonds and inflation-indexed Treasury bonds at the end of December 2013, current forecasts by economists, and historical inflation.

Mr. Perry used 1.75% as the forecast for the annual growth rate in real earnings and dividends. This rate matches the historical average real growth rate in dividends from 1950 through 2013. Over this same time period, the average dividend payout ratio was 45%. Applying the 45% payout ratio to current earnings produces a dividend yield of 2.35%. Therefore, the current dividend yield based on next year's expected dividend is 2.40% (2.35% x 1.0175 = 2.40%). Adding the

dividend growth rate to the yield gives us an expected real return of 4.15% (2.40% + 1.75% = 4.15%). Finally, Mr. Perry added (using geometric addition) expected inflation of 2.50% per year to adjust the real return to a nominal return. This leads to the expected annualized return for U.S. large cap equity of 6.75%.

(1 + 4.15%) x (1 + 2.50%) - 1 = 6.75%.

Mr. Perry then compared the result from the Dividend Discount Model above with results developed from two other equity return forecasting models – the Smoothed Earnings Yield Model and the Equity Risk Premium Model.

The Smoothed Earnings Yield Model (the inverse of the Cyclically-Adjusted Price Earnings (CAPE) ratio), developed by Yale professor Robert Shiller, suggests that the long-term real return supplied by the equity market will be close to the ratio of smoothed earnings (the inflation-adjusted average earnings over the previous 10 years) to the current inflation-adjusted price. This model suggests that the expected real long-term return on the S&P 500 Index as of December 31, 2013 will be approximately 3.95%. Combining this geometrically with expected inflation of 2.50% leads to an expected annualized return of 6.55%.

The Equity Risk Premium Model suggests that the return demanded by investors from the equity market will be close to the current yield to maturity on long Treasury bonds plus a risk premium demanded by equity investors. The yield to maturity on 20-year Treasury bonds was 3.72% at the end of December 2013. Combining this geometrically with the long-term (since 1900) historical world equity risk premium of 3.20% over bonds developed by Dimson, Staunton, and Marsh (Credit Suisse Global Investment Returns Yearbook 2013) produces an expected annualized return of 7.04%.

Although these two other models produce different expected equity market returns at the end of December 2013, Mr. Perry believes that they are equally relevant and gives them equal weight in terms of predicting equity returns. The average of the two forecasts is 6.79% which is very close to the 6.75% developed with the Dividend Discount Model.

The 6.75% annualized return is a geometric mean. The expected arithmetic average return is 8.05% (see further discussion below under "Expected Return for a Portfolio of Assets".) This is calculated based on an assumed annual return standard deviation of 18.00%.

2.   *U.S. Aggregate Fixed Income*

Mr. Perry assumed that the yield to maturity of U.S. aggregate fixed income will move over the next five years from its level at December 31, 2013, to a higher expected level. The expected level is equal to the forecasted yield of the 10-year Treasury bond in 5 years (4.90%) based on the consensus forecast from the December 2013 *Blue Chip Financial Forecasts* plus the asset class's average historical yield spread to the 10-year Treasury bond. Expected 10-year and 30-year returns reflect the impact of this yield movement.

The yield to maturity of the Barclays Aggregate Bond Index was 2.49% at the end of December 2013. Its yield spread over the 10-Year Treasury bond has averaged 0.37% since 1990. Applying this process leads to an expected annualized yield of 5.27% in 5 years and an annualized total return of 3.00% over the next 10 years and 4.50% over the next 30 years.

3.   *Other Asset Classes*

A Global CAPM process is used to estimate expected returns of the various other asset classes. Under the CAPM, asset class expected returns are proportional to their systematic risk (beta) relative to the global portfolio, where the global portfolio is defined as the market capitalization-weighted mix of all investable assets. For this purpose, Milliman uses the total investable capital market portfolio developed by UBS Global Asset Management. The returns of market indices representing each of the asset classes in the portfolio are weighted by their current market capitalization weights to create a global portfolio return series. Regression of each individual asset class's historical returns against the global portfolio returns produces a beta for each asset class. Beta is the measure of sensitivity of the asset class return to changes in the global portfolio return (technically the slope of the regression line) and reflects the systematic risk of that asset class.

Assumptions for assets that are valued based on appraisals or privately valued are adjusted through either their standard deviations or their betas (systematic risk), which serves to increase their risk premia. For private investments and strategies such as hedge funds, alpha has been added to reflect investor expectations.

D.   Expected Return for a Portfolio of Assets

The expected long-term arithmetic mean return for a portfolio of different asset classes is estimated by taking an allocation-weighted average of the expected

arithmetic returns of each asset class. The expected standard deviation of the portfolio is estimated by the allocation weights and the expected standard deviations and correlations of the asset classes. The expected annualized long-term return on the portfolio (the geometric mean) is estimated based on the arithmetic mean adjusted downward to account for the expected year-to-year volatility in the returns (the adjustment is approximately equal to one half the variance, i.e., one half the standard deviation squared).

The expected returns as of December 31, 2013 for each of the portfolio's asset classes and the total portfolios are shown in Exhibits I and II. Mr. Perry shows both the expected annualized rate of return (geometric mean) and the expected arithmetic average return for each asset class and the total portfolio. The expected arithmetic average return for each asset class is a necessary input to determine the expected annualized return on the total portfolio. The expected arithmetic average return is the best estimate of the return in any single year, and is always higher than the expected annualized return. The annualized return over a multiple-year period is less than the arithmetic average return due to volatility and the process of compounding. Mr. Perry shows the expected returns over both a 10-year and a 30-year period. Returns for the fixed income asset classes are higher over the longer time period because they reflect the expectation of rising interest rates over the next five years. Rising rates depress the returns on fixed income during the period of increases, but then allow for higher expected returns to be earned over the 25-year period starting in 2019.

Mr. Perry also shows the expected standard deviation of annual returns for each asset class. The standard deviations and the correlations between each pair of assets (not shown) are estimated based on actual quarterly returns since 1990 (or longest time period available).

Since each pension plan's assets accumulate at the long-term annualized rate of return (geometric mean), this is the expected rate of return that should be used as the basis for selecting the investment return assumption.

E.   Active Management and Investment Management Fees

Most pension plans pay considerable fees to active investment managers. If active management fails to outperform an index fund by at least the amount of the difference between active management fees and index fund fees, the pension plan has the option to use index funds. For pension plans this size, index fees are

estimated to be about 10 basis points, or 0.10%, and have been incorporated in this analysis at that level.

F.   Basis for Analysis

Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to actual plan experience deviating from the actuarial assumptions, and changes in plan provisions, actuarial assumptions, and applicable law. An assessment of the potential range and cost effect of such differences is beyond the scope of Mr. Perry's analysis.

IV. Materials Considered in Reaching Opinions

Mr. Perry considered the following in reaching his opinions:
- Milliman's capital market assumptions
- Actuarial Standard of Practice No. 27
- Global Capital Asset Pricing Model
- Dividend Discount Model
- Smoothed Earnings Yield Model
- Equity Risk Premium Model
- Blue Chip Financial Forecasts from Dec. 2013
- Barclays Aggregate Bond Index in Dec. 2013
- Materials from Prof. Robert Shiller[3]
- Wilshire's Executive Summary of Investment Performance Report dated December 31, 2014 (excerpt attached as Ex. III)
- PFRS's June 30, 2013 Summary Asset Allocation Report (excerpt attached as Ex. IV)
- NEPC's Performance Summary Report contained in their Meeting Materials Report dated June 4, 2014 (excerpt attached as Ex. V)
- DGRS's June 30, 2013 Summary Asset Allocation Report (excerpt attached as Ex. VI)

---

[3]*Available at* www.econ.yale.edu/~shiller/data.htm

V.   Qualifications

Mr. Perry is a member of the American Academy of Actuaries, a Fellow of the Society of Actuaries, and is a Chartered Financial Analyst. He is also the Chairman of Milliman's Capital Markets Committee.   His biography is attached as Exhibit VII.

VI.   Prior Expert Testimony

Mr. Perry has not previously testified as an expert.

VII. Compensation

Mr. Perry is not being compensated individually for this expert report. Rather, his compensation is part of Milliman's engagement with the City. His billable rate is $474 per hour.

July 8, 2014

Respectfully Submitted,

Alan Perry, FSA,CFA, MAAA
Principal and Consulting Actuary

Exhibit I - PFRS

Asset Class	Dec 31, 2013 Policy Target Allocation* (%)	Milliman 10-Year Assumptions as of December 31, 2013			Milliman 30-Year Assumptions as of December 31, 2013		
		Geometric Mean** (%)	Arithmetic Mean (%)	Standard Deviation** (%)	Geometric Mean** (%)	Arithmetic Mean (%)	Standard Deviation** (%)
U.S. Large/Mid Cap Equity	12.00	6.85	8.25	18.45	6.85	8.20	17.85
U.S. Small Cap Equity	7.00	7.00	9.20	23.35	7.00	9.90	26.20
Non-U.S. Developed Large Cap Equity	10.00	6.75	8.55	21.25	6.75	8.55	20.40
Non-U.S. Developed Small Cap Equity	5.00	7.25	9.25	22.20	7.25	9.15	20.95
Emerging Markets Equity	4.00	7.25	10.70	29.85	7.25	11.25	31.15
U.S. Core Fixed Income	17.50	3.00	3.10	4.45	4.50	4.70	6.45
High Yield Bonds	8.00	5.50	6.00	11.00	6.15	6.70	10.95
Cash	1.00	2.50	2.50	1.30	3.00	3.00	1.65
MLPs	5.00	7.00	8.25	17.70	7.00	8.40	18.00
Public Real Estate	5.00	6.50	8.60	22.95	6.50	8.15	19.50
Private Real Estate Equity	8.00	6.00	6.60	12.00	6.00	6.75	13.00
Private Mortgages	2.50	4.65	4.95	8.30	5.75	6.10	8.70
Private Equity	10.00	8.00	11.45	30.00	8.00	11.70	30.00
Hedge Funds	5.00	6.95	7.25	8.75	6.95	7.35	9.85
Total Portfolio - Standard Devation*				12.75			12.10
Total Portfolio - Expected (Mean) Return		6.75	7.43		7.24	7.89	
Total Portfolio - Median (50th Percentile) Return		6.68			7.22		
Net of 0.10% investment management fees		**6.58**			**7.12**		

* Policy Target Allocation based on Wilshire's Executive Summary of Investment Performance Report dated December 31, 2013, supplemented with details from PFRS's June 30, 2013 Summary Asset Allocation Report.

** The derivation of the portfolio's annualized rate of return (geometric mean) and standard deviation are complicated and cannot be calculated by what is provided in the above table.

This exhibit is an attachment to the expert witness report submitted by Alan Perry dated July 8, 2014 . Please refer to that letter for more information, including explanatory notes and statements of reliance.

MILLIMAN

Exhibit II - GRS

Asset Class	Dec 31, 2013 Policy Target Allocation* (%)	Milliman 10-Year Assumptions as of December 31, 2013			Milliman 30-Year Assumptions as of December 31, 2013		
		Geometric Mean** (%)	Arithmetic Mean (%)	Standard Deviation** (%)	Geometric Mean** (%)	Arithmetic Mean (%)	Standard Deviation** (%)
U.S. Large/Mid Cap Equity	17.00	6.85	8.25	18.45	6.85	8.20	17.85
U.S. Small Cap Equity	6.00	7.00	9.20	23.35	7.00	9.90	26.20
Non-U.S. Developed Large Cap Equity	12.00	6.75	8.55	21.25	6.75	8.55	20.40
Non-U.S. Developed Small Cap Equity	2.00	7.25	9.25	22.20	7.25	9.15	20.95
Emerging Markets Equity	8.00	7.25	10.70	29.85	7.25	11.25	31.15
U.S. Core Fixed Income	10.00	3.00	3.10	4.45	4.50	4.70	6.45
High Yield Bonds	3.00	5.50	6.00	11.00	6.15	6.70	10.95
Emerging Markets Debt	5.00	5.40	6.35	15.25	6.10	7.05	14.75
Cash	1.00	2.50	2.50	1.30	3.00	3.00	1.65
Global Asset Allocation (60% Global Equity)	7.20	6.95	8.45	19.35	6.95	8.35	17.85
Global Asset Allocation (40% Global Fixed)	4.80	2.10	2.40	8.50	3.50	3.85	8.45
Real Assets (50% as Infrastructure)	2.50	7.00	8.40	18.50	7.00	8.60	19.15
Real Assets (50% as Commodities)	2.50	5.00	6.65	20.00	5.00	6.70	19.55
Real Estate Equity	5.50	6.00	6.60	12.00	6.00	6.75	13.00
Real Estate Debt	2.00	4.65	4.95	8.30	5.75	6.10	8.70
Mortgages	0.50	3.70	3.75	3.55	5.10	5.35	7.40
Private Equity	6.00	8.00	11.45	30.00	8.00	11.70	30.00
Hedge Funds	5.00	6.95	7.25	8.75	6.95	7.35	9.85
Total Portfolio - Standard Deviation*				13.70			12.95
Total Portfolio - Expected (Mean) Return		6.70	7.48		7.17	7.91	
Total Portfolio - Median (50th Percentile) Return		6.62			7.14		
Net of 0.10% investment management fees		**6.52**			**7.04**		

* Policy Target Allocation based on NEPC's Performance Summary Report contained in their Meeting Materials Report dated February 26, 2014, supplemented with details from DGRS's June 30, 2013 Summary Asset Allocation Report.

** The derivation of the portfolio's annualized rate of return (geometric mean) and standard deviation are complicated and cannot be calculated by what is provided in the above table.

This exhibit is an attachment to the expert witness report submitted by Alan Perry dated July 8, 2014 . Please refer to that letter for more information, including explanatory notes and statements of reliance.

MILLIMAN

Exhibit III

Asset Allocation Review

Wilshire

As of December 31, 2013

Asset Class	Policy (%)	Actual (%)
US Equity	19.0	25.3
Non-US Equity	19.0	16.8
Private Equity	10.0	5.0
Core (Plus) Fixed Income [1]	17.5	12.4
Opportunistic Fixed Income [2]	10.5	11.1
Cash	1.0	7.0
Private Real Estate	8.0	9.8
Public Real Estate	5.0	4.5
Master Limited Partnerships	5.0	5.4
Hedge Funds	5.0	2.6
Expected Return (%)	**7.2**	**6.8**
Standard Deviation of Return, Risk (%)	**11.1**	**10.5**
Sharpe Ratio	0.51	0.49
Contribution to Risk		
Public / Private Equity	76.7	75.6
Fixed Income	8.6	8.8
Real Assets	12.3	14.3
Hedge Funds	2.4	1.3

[1] Modeled using Wilshire's 2014 core bond assumptions

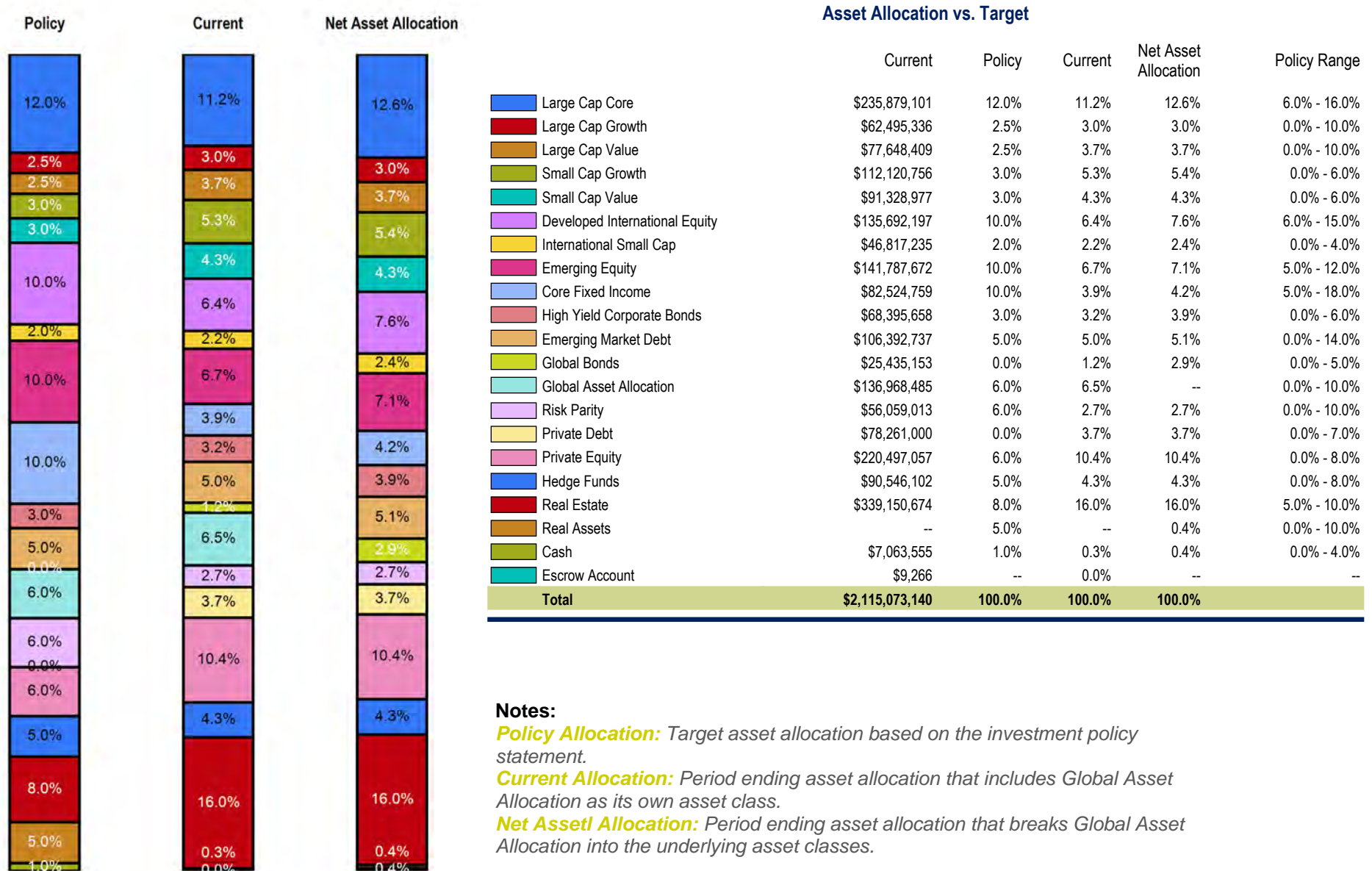[2] Modeled using Wilshire's 2014 high yield assumptions

Exhibit IV

Police & Fire Retirement System of the City of Detroit
Summary Asset Allocation Report
June 30, 2013

	Market Value	% of Total	Target %	Target Amount	Over (Under) Funded
Large Cap Passive	255,291,236	8.36%	9.00%	274,718,036	(19,426,800)
Large Cap Core	149,141,318	4.89%	0.00%	0	149,141,318
Large Cap Value	79,676,886	2.61%	1.50%	45,786,339	33,890,546
Large Cap Growth	115,010,034	3.77%	1.00%	30,524,226	84,485,808
Energy	22,415,378	0.73%	0.50%	15,262,113	7,153,265
Large Cap	**621,534,851**	**20.36%**	**12.00%**	**366,290,715**	**255,244,137**
Mid Cap	**71,243,997**	**2.33%**	**0.00%**	**0**	**71,243,997**
Small Cap Value	219,735,000	7.20%	3.00%	91,572,679	128,162,321
Small Cap Growth	92,270,276	3.02%	1.00%	30,524,226	61,746,050
Small Cap	**312,005,276**	**10.22%**	**4.00%**	**122,096,905**	**189,908,371**
North Pointe	102,950,831	3.37%	3.00%	91,572,679	11,378,152
DOMESTIC EQUITY	**1,107,734,956**	**36.29%**	**19.00%**	**579,960,298**	**527,774,658**
Developed Large Cap	342,561,282	11.22%	10.00%	305,242,262	37,319,020
Developed Small Cap	118,121,163	3.87%	3.50%	106,834,792	11,286,371
Emerging Markets	0	0.00%	4.00%	122,096,905	(122,096,905)
North Pointe	55,959,335	1.83%	1.50%	45,786,339	10,172,996
INTERNATIONAL EQUITY	**516,641,780**	**16.93%**	**19.00%**	**579,960,298**	**(63,318,518)**
EQUITY	1,624,376,735	53.22%	38.00%	1,159,920,596	464,456,139
ENERGY/MLPs	0	0.00%	5.00%	152,621,131	(152,621,131)
Corporate Bonds	263,686,615	8.64%	9.00%	274,718,036	(11,031,421)
Government Bonds	69,072,324	2.26%	2.50%	76,310,566	(7,238,241)
Convertible Bonds	44,044,842	1.44%	1.50%	45,786,339	(1,741,498)
Public Mortgages	121,494,314	3.98%	4.00%	122,096,905	(602,590)
Fixed Income	**498,298,095**	**16.32%**	**17.00%**	**518,911,846**	**(20,613,750)**
North Pointe	21,164,076	0.69%	0.50%	15,262,113	5,901,963
CORE FIXED INCOME	**519,462,171**	**17.02%**	**17.50%**	**534,173,959**	**(14,711,788)**
HIGH YIELD	**203,970,155**	**6.68%**	**8.00%**	**244,193,810**	**(40,223,655)**
FIXED INCOME	723,432,326	23.70%	25.50%	778,367,768	(54,935,442)
CASH	9,477,647	0.31%	1.00%	30,524,226	(21,046,579)
PUBLIC REAL ESTATE	0	0.00%	5.00%	152,621,131	(152,621,131)
PRIVATE REAL ESTATE	436,612,405	14.30%	10.50%	320,504,375	116,108,030
Real Estate Equity	284,838,565	9.33%	8.00%	244,193,810	40,644,756
Real Estate Debt	144,030,952	4.72%	2.50%	76,310,566	67,720,387
Private Debt / Mortgages	7,742,888	0.25%	0.00%	0	7,742,888
PRIVATE EQUITY	172,015,703	5.64%	10.00%	305,242,262	(133,226,559)
HEDGE FUNDS	86,507,804	2.83%	5.00%	152,621,131	(66,113,327)
TOTAL PLAN ASSETS	3,052,422,621	100.00%	100.00%	3,052,422,621	(0)
Total Plan Assets - Prior Month	3,123,633,808				

Exhibit V

General Retirement System of the City of Detroit

Total Plan Asset Allocation vs. Policy Targets

Asset Allocation vs. Target

	Current	Policy	Current	Net Asset Allocation	Policy Range
Large Cap Core	$235,879,101	12.0%	11.2%	12.6%	6.0% - 16.0%
Large Cap Growth	$62,495,336	2.5%	3.0%	3.0%	0.0% - 10.0%
Large Cap Value	$77,648,409	2.5%	3.7%	3.7%	0.0% - 10.0%
Small Cap Growth	$112,120,756	3.0%	5.3%	5.4%	0.0% - 6.0%
Small Cap Value	$91,328,977	3.0%	4.3%	4.3%	0.0% - 6.0%
Developed International Equity	$135,692,197	10.0%	6.4%	7.6%	6.0% - 15.0%
International Small Cap	$46,817,235	2.0%	2.2%	2.4%	0.0% - 4.0%
Emerging Equity	$141,787,672	10.0%	6.7%	7.1%	5.0% - 12.0%
Core Fixed Income	$82,524,759	10.0%	3.9%	4.2%	5.0% - 18.0%
High Yield Corporate Bonds	$68,395,658	3.0%	3.2%	3.9%	0.0% - 6.0%
Emerging Market Debt	$106,392,737	5.0%	5.0%	5.1%	0.0% - 14.0%
Global Bonds	$25,435,153	0.0%	1.2%	2.9%	0.0% - 5.0%
Global Asset Allocation	$136,968,485	6.0%	6.5%	--	0.0% - 10.0%
Risk Parity	$56,059,013	6.0%	2.7%	2.7%	0.0% - 10.0%
Private Debt	$78,261,000	0.0%	3.7%	3.7%	0.0% - 7.0%
Private Equity	$220,497,057	6.0%	10.4%	10.4%	0.0% - 8.0%
Hedge Funds	$90,546,102	5.0%	4.3%	4.3%	0.0% - 8.0%
Real Estate	$339,150,674	8.0%	16.0%	16.0%	5.0% - 10.0%
Real Assets	--	5.0%	--	0.4%	0.0% - 10.0%
Cash	$7,063,555	1.0%	0.3%	0.4%	0.0% - 4.0%
Escrow Account	$9,266	--	0.0%	--	--
Total	**$2,115,073,140**	**100.0%**	**100.0%**	**100.0%**	

Notes:

Policy Allocation: Target asset allocation based on the investment policy statement.

Current Allocation: Period ending asset allocation that includes Global Asset Allocation as its own asset class.

Net Assetl Allocation: Period ending asset allocation that breaks Global Asset Allocation into the underlying asset classes.

Exhibit VI

General Retirement System of the City of Detroit
Summary Asset Allocation Report
June 30, 2013

	Market Value	% of Total	Target %	Target Amount	Over (Under) Funded
Large Cap Passive	174,356,508	8.23%	12.00%	254,148,133	(79,791,625)
Large Cap Core	27,836,064	1.31%	0.00%	0	27,836,064
Large Cap Value	137,252,502	6.48%	2.50%	52,947,528	84,304,974
Large Cap Growth	145,653,588	6.88%	2.50%	52,947,528	92,706,060
Large Cap	485,098,662	22.90%	17.00%	360,043,188	125,055,474
Small Cap Value	76,312,153	3.60%	3.00%	63,537,033	12,775,120
Small Cap Growth	92,544,156	4.37%	3.00%	63,537,033	29,007,123
Small Cap	168,856,309	7.97%	6.00%	127,074,066	41,782,243
DOMESTIC EQUITY	653,954,971	30.88%	23.00%	487,117,254	166,837,716
Developed Large Cap	117,094,242	5.53%	12.00%	254,148,133	(137,053,890)
Developed Small Cap	40,177,909	1.90%	2.00%	42,358,022	(2,180,113)
Developed Markets	157,272,152	7.43%	14.00%	296,506,155	(139,234,003)
Emerging Markets	114,476,040	4.74%	7.00%	148,253,077	(33,777,038)
Emerging Markets - Small Cap	24,515,299	1.82%	1.00%	21,179,011	3,336,288
Emerging Markets	138,991,339	6.56%	8.00%	169,432,088	(30,440,750)
INTERNATIONAL EQUITY	296,263,490	13.99%	22.00%	465,938,243	(169,674,753)
EQUITY	950,218,461	44.87%	45.00%	953,055,498	(2,837,036)
GAA	125,713,228	5.94%	6.00%	127,074,066	(1,360,839)
RISK PARITY	55,832,458	2.64%	6.00%	127,074,066	(71,241,609)
Core Fixed Income	84,362,111	3.98%	10.00%	211,790,111	(127,428,000)
High Yield	64,405,924	3.04%	3.00%	63,537,033	868,891
DOMESTIC FIXED INCOME	148,768,035	7.02%	13.00%	275,327,144	(126,559,109)
Global Bonds	43,253,600	2.04%	1.00%	21,179,011	22,074,589
Emerging Market Debt	75,142,247	3.55%	4.00%	84,716,044	(9,573,797)
GLOBAL FIXED INCOME	118,395,848	5.59%	5.00%	105,895,055	12,500,792
FIXED INCOME	267,163,883	12.61%	18.00%	381,222,199	(114,058,316)
CASH	10,605,421	0.50%	1.00%	21,179,011	(10,573,590)
REAL ASSETS	0	0.00%	5.00%	105,895,055	(105,895,055)
REAL ESTATE	429,861,848	20.30%	8.00%	169,432,088	260,429,760
Real Estate Equity	314,112,077	12.06%			
Real Estate Debt	57,893,364	4.79%			
Mortgages	73,141,779	3.45%			
PRIVATE EQUITY	194,925,202	9.20%	6.00%	127,074,066	67,851,136
HEDGE FUNDS	83,580,605	3.95%	5.00%	105,895,055	(22,314,450)
TOTAL PLAN ASSETS	2,117,901,106	100%	100%	2,117,901,106	0
Total Plan Assets - Prior Month	2,174,026,495				

Alan H. Perry
FSA, MAAA, CFA
Principal, Consulting Actuary

Exhibit VII

CURRENT RESPONSIBILITY

Alan is a principal and consulting actuary with the Philadelphia office of Milliman. He joined the firm in 1990.

EXPERIENCE

Alan's experience covers retirement plans, college prepaid tuition and savings plans, endowments, foundations, and insurance organizations. He specializes in the analysis and management of financial risk. Alan performs asset/liability studies, including stochastic modeling and investment policy work. He also performs valuations of employee stock options.

PRESENTATIONS

Alan is a frequent speaker on asset/liability management and investment policy at industry conferences.

PROFESSIONAL DESIGNATIONS

- Fellow, Society of Actuaries
- Member, American Academy of Actuaries
- Chartered Financial Analyst

AFFILIATIONS

- Alan is currently on the American Academy of Actuaries' Task Force on Employee Stock Options.
- He is a member of the Financial Analysts of Philadelphia.

EDUCATION

- BBA, Economics, Wharton School, University of Pennsylvania
- MS, Actuarial Science, Temple University

1550 Liberty Ridge Drive, Suite 200
Wayne, PA 19087-5572
Tel +1 610 687.5644 **Fax** +1 610 995.9321
Email alan.perry@milliman.com

milliman.com