City of Southfield Fire and Police Retirement System

65th Actuarial Valuation Report

As of June 30, 2017

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November 15, 2017

Retirement Board
City of Southfield
Fire and Police Retirement System
Southfield, Michigan

Dear Board Members:

The results of the ***65th Annual Actuarial Valuation*** of the City of Southfield Fire and Police Retirement System are presented in this report. The purpose of the valuation was to measure the System's funding progress and to determine the employer contribution rate for the ensuing fiscal year.

A separate report will be issued to provide actuarial information for the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68.

The date of the valuation was ***June 30, 2017.***

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the Retirement System only in its entirety and only with permission of the Board. GRS is not responsible for unauthorized use of this report. This report should not be relied upon for any purpose other than those described above.

Your attention is directed to valuation results, comments, conclusions, and recommendations contained in Section A.

The valuation was based upon information, furnished by the City, concerning Retirement System benefits, financial transactions, individual active members, terminated members, retirees and beneficiaries. Data was checked for internal and year-to-year consistency, but was not audited. We are not responsible for the accuracy or completeness of the information provided by the City. This information is summarized in Section B.

The computed contribution rate shown on page A-2 may be considered as a minimum contribution rate that complies with the funding policy adopted by the Board. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

This valuation assumes the continuing ability of the participating employer to make the contributions necessary to fund this system. A determination regarding whether or not the participating employer is actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

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Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. This report does not contain an analysis of the potential range of such future measurements.

To the best of our knowledge, this report is complete and accurate and was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with the provisions of Act 345, as amended. It is our opinion that the actuarial assumptions used for the valuation are reasonable.

Judith A. Kermans, Jeffrey T. Tebeau, and James R. Sparks are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

Judith A. Kermans, EA, FCA, MAAA

Jeffrey T. Tebeau, ASA, EA, MAAA

James R. Sparks, ASA, MAAA

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SECTION A

VALUATION RESULTS

Funding Objective

The funding objective of the Retirement System is to establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year-to-year and will accumulate sufficient assets during each member's period of active service to finance benefits payable throughout retirement.

Contribution Rates

The Retirement System is supported by member contributions, City contributions and investment income from Retirement System assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

(1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section C (the normal cost); and

(2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (unfunded actuarial accrued liability).

Computed contribution rates for the fiscal year beginning July 1, 2018 are shown on page A-2.

Public Act 728 Certification

The Board of Trustees of the City of Southfield Fire and Police Retirement System confirms that the System provides for payment of the required employer contribution as described in Section 20m of Michigan Public Act No. 728.

Contributions to Provide Benefits
Fiscal Year Beginning July 1, 2018

Contributions for	Contributions Expressed as %'s of Active Member Payroll
Normal Cost of Benefits:	
Age & service	16.94%
Disability	1.57
Death before retirement	0.41
Refunds of member contributions	0.08
Expenses	2.00
Total	21.00
Member Contributions (weighted avg.)	2.31
Employer Normal Cost	18.69
*Unfunded Actuarial Accrued Liabilities**	18.76
Computed Employer Rate	**37.45%**
Minimum Dollar Contribution	$7,040,967

* *Unfunded Actuarial Accrued Liabilities were amortized as a level percent-of-payroll over a closed period of 29 years (starting period of 30 years). Includes the effects of the lag between the valuation date and the contribution period.*

Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars and then contributed to the Retirement System. The established procedure is to contribute bi-weekly, as follows:

(a) Bi-weekly covered payroll for all active members.
(b) Employer contribution rate.
(c) Gross contribution dollars: (a) x (b).

The projected employer dollar contribution based on the payroll information provided for the valuation, adjusted to reflect assumed payroll increases between the valuation date and the fiscal year for which the contributions are being determined, is $7,040,967. **Therefore, we suggest a minimum contribution of this amount. Please see comment on page A-10**.

In financing the actuarial accrued liabilities, the valuation assets of $201,584,251 were distributed as shown below. Please see pages B-13 and B-14 for information concerning the development of valuation assets.

	Present Valuation Assets Applied to			
Reserves for	**Member Accrued Liabilities**	**Retired Life Liabilities**	**Contingency Reserve**	**Totals**
Employees' Contributions	$ 9,271,670	$ -	$0	$ 9,271,670
Employer Contributions	26,968,865	0	0	26,968,865
Retired Benefit Payments	0	163,433,450	0	163,433,450
Pension Total	$ 36,240,535	$ 163,433,450	$0	$ 199,673,985
Retiree Health Insurance Fund				0
Reserves for Inflation Equity				1,910,266
Grand Total				$ 201,584,251

Pension Assets were applied against actuarial accrued liabilities in determining Unfunded Actuarial Accrued Liabilities as follows:

	Retired Lives	**Active Members***	**Totals**
Computed Actuarial Accrued Liabilities	$ 163,433,450	$ 92,618,997	$256,052,447
Applied Assets	163,433,450	36,240,535	199,673,985
Unfunded Actuarial Accrued Liabilities	$ none	$ 56,378,462	$ 56,378,462

** Includes terminated members who are vested.*

Derivation of Experience Gain (Loss)
Year Ended June 30, 2017

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is hoped that gains and losses will cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below, along with a year-by-year comparative schedule.

(1)	UAAL* at start of year	$ 52,391,994
(2)	Total normal cost from last valuation	3,843,024
(3)	Actual employer and employee contributions	6,698,820
(4)	Interest Accrual: [(1) + ((2) - (3)) / 2] x 7.50%	3,822,307
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	53,358,505
(6)	Change due to benefit clarifications	0
(7)	Change due to revised actuarial assumptions / methods	0
(8)	Expected UAAL after changes: (5) + (6) + (7)	53,358,505
(9)	Actual UAAL at end of year	56,378,462
(10)	Gain (Loss): (8) - (9)	$ (3,019,957)
(11)	Gain (Loss) as percent of actuarial accrued liabilities at start of year ($248,037,025)	(1.2)%

* *Unfunded Actuarial Accrued Liabilities.*

Valuation Date June 30,	Experience Gain (Loss) as % of Beginning Accrued Liability
2013	0.7 %
2014	2.6 %
2015	(1.5)%
2016	(2.4)%
2017	(1.2)%

Summary Statement of System Resources and Obligations
Pension Only
June 30, 2017

Present Resources and Expected Future Resources

A.	*Present valuation assets:*	
	1. Market value of assets	$ 195,327,451
	2. Reserve for inflation equity	1,910,266
	3. Actuarial adjustment	4,346,534
	4. Valuation assets	201,584,251
B.	*Actuarial present value of expected future contributions:*	
	1. For normal costs	25,033,600
	2. For unfunded actuarial accrued liability	56,378,462
	3. Total	81,412,062
C.	**Total Present and Expected Future Resources**	$ 282,996,313

Actuarial Present Value of Expected Future Benefit Payments

A.	*To retirees and beneficiaries:*	
	1. Current benefits	$ 163,433,450
	2. Reserve for inflation equity	1,910,266
	3. Total	165,343,716
B.	*To vested terminated members*	751,681
C.	*To present active members:*	
	1. Allocated to service rendered prior to valuation date - actuarial accrued liability	91,867,316
	2. Allocated to service likely to be rendered after valuation date	25,033,600
	3. Total	116,900,916
D.	**Total Actuarial Present Value of Expected Future Benefit Payments**	$ 282,996,313

Computed Employer Contributions
Comparative Statement

Valuation Date June 30	Active Members No.	Active Per Retired	Valuation Payroll $ Millions	Valuation Payroll Average	Valuation Payroll % Incr.	Retirees and Beneficiaries No.	Annual Benefits $ Millions	Annual Benefits % of Pay	Fiscal Year Beginning July 1	Employer Contributions as Payroll Percents Pension	Health	Total
1998	265	1.6	$ 16.6	$62,535	3.7%	164	$ 5.4	32.7%	1999	13.27%	8.42%	21.69%
1999 #	263	1.5	16.9	64,603	3.3	173	5.7	33.4	2000	12.85	8.24	21.09
2000 *#	262	1.4	17.9	68,153	5.5	189	7.0	39.2	2001	13.86	8.56	22.42
2001	261	1.3	18.4	70,360	3.2	197	7.3	39.6	2002	14.20	8.63	22.83
2002	262	1.3	19.1	72,961	3.7	198	7.2	37.7	2003	15.39	N/A	15.39
2003 *#	259	1.3	19.6	75,556	3.6	204	7.5	38.3	2004	17.55	N/A	17.55
2004 *#	263	1.3	20.4	77,698	2.8	209	7.6	37.2	2005	17.57	N/A	17.57
2005 *#	257	1.1	19.6	76,107	(2.0)	233	8.8	44.7	2006	16.55	N/A	16.55
2006	253	1.0	19.8	78,366	3.0	247	9.3	47.0	2007	16.30	N/A	16.30
2007	256	1.0	20.1	78,705	0.4	252	9.5	47.2	2008	13.54	N/A	13.54
2008	253	1.0	21.2	83,623	6.2	257	9.7	45.9	2009	13.32	N/A	13.32
2009	250	0.9	20.9	83,669	0.1	264	10.2	48.9	2010	15.94	N/A	15.94
2010	245	0.9	20.7	84,416	0.9	276	10.8	52.1	2011	20.95	N/A	20.95
2011 *#	235	0.8	19.7	83,733	(0.8)	287	11.3	57.2	2012	26.68	N/A	26.68
2012 *	225	0.8	19.0	84,270	0.6	295	11.7	61.5	2013	30.41	N/A	30.41
2013 *#	222	0.7	18.8	84,772	0.6	301	11.9	63.4	2014	31.68	N/A	31.68
2014 *#	214	0.7	18.5	86,227	1.7	308	12.4	67.0	2015	29.28	N/A	29.28
2015	211	0.7	18.6	88,200	2.3	318	13.0	69.6	2016	30.99	N/A	30.99
2016 *	207	0.6	18.7	90,538	2.7	329	13.5	72.1	2017	35.40	N/A	35.40
2017	199	0.6	18.2	91,481	1.0	350	14.6	80.2	2018	37.45	N/A	37.45

* *Revised actuarial assumptions or methods.*

\# *Retirement System amended.*

Actuarial Accrued Liabilities and Valuation Assets Comparative Statement

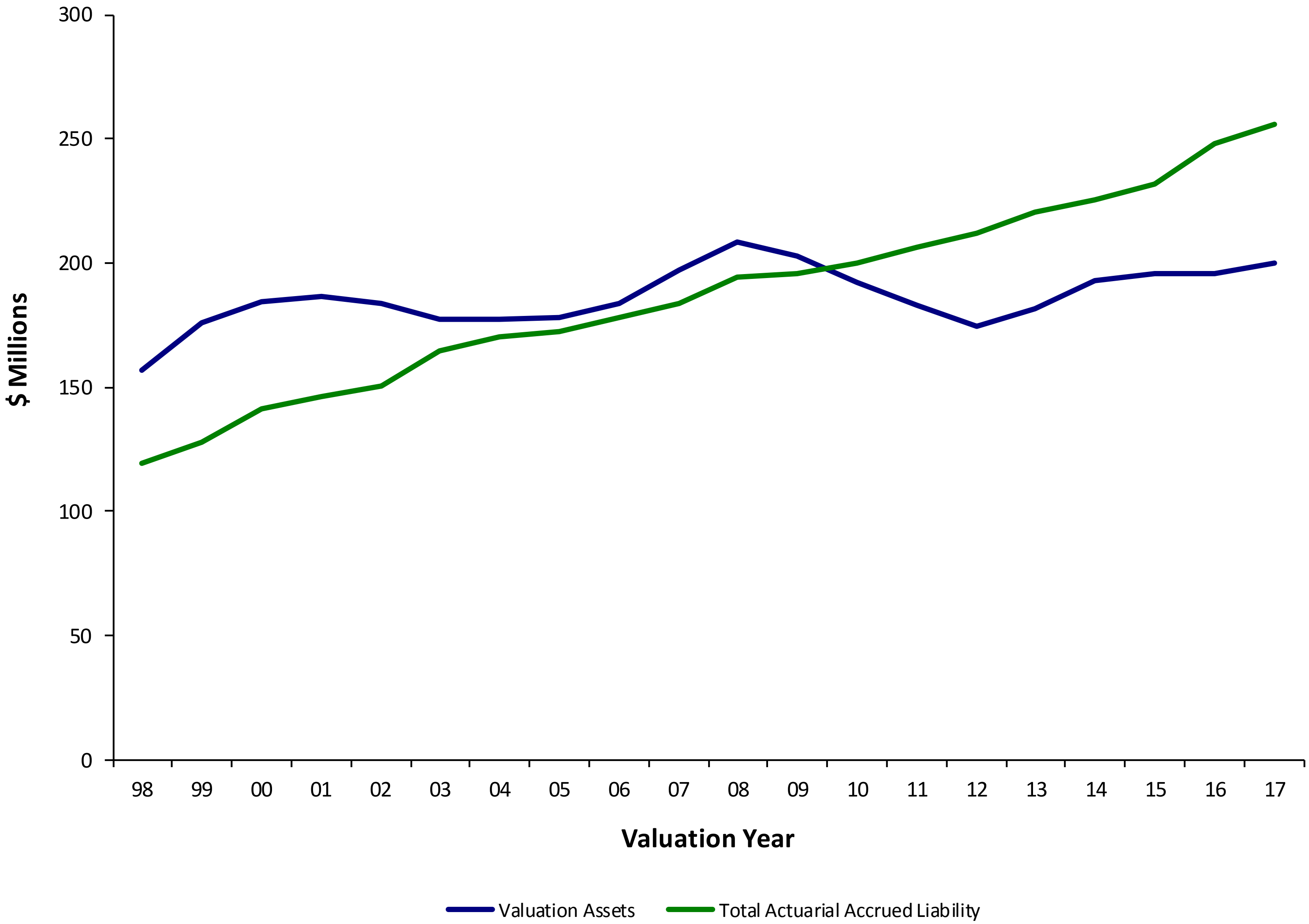
Valuation Date June 30	Actuarial Accrued Liability (AAL) ($ Millions)	Valuation Assets ($ Millions)	Unfunded Actuarial Accrued Liability (UAAL) ($ Millions)	Ratio of Present Assets to AAL	Ratio of UAAL to Valuation Payroll
1998	$ 119.6	$ 157.1	$ (37.5)	131.4%	- %
1999 #	128.0	175.9	(47.9)	137.4	-
2000 *#	141.4	184.4	(43.0)	130.4	-
2001	146.4	186.6	(40.2)	127.5	-
2002	150.8	183.6	(32.8)	121.8	-
2003 *#	164.3	177.3	(13.0)	107.9	-
2004 *#	170.2	177.4	(7.2)	104.2	-
2005 *#	172.3	178.0	(5.7)	103.3	-
2006	178.2	184.0	(5.8)	103.3	-
2007	183.7	197.0	(13.3)	107.2	-
2008	194.2	208.8	(14.6)	107.5	-
2009	195.5	202.6	(7.1)	103.6	-
2010	200.1	192.2	7.9	96.1	38.2
2011 *#	206.4	183.0	23.4	88.7	118.9
2012 *	211.8	174.2	37.6	82.3	198.2
2013 *#	220.7	181.3	39.4	82.2	209.1
2014 *#	225.2	192.7	32.5	85.6	176.0
2015	231.6	195.9	35.7	84.6	191.7
2016 *	248.0	195.6	52.4	78.9	279.6
2017	256.1	199.7	56.4	78.0	309.7

* *Revised actuarial assumptions or methods.*
\# *Retirement System amended.*

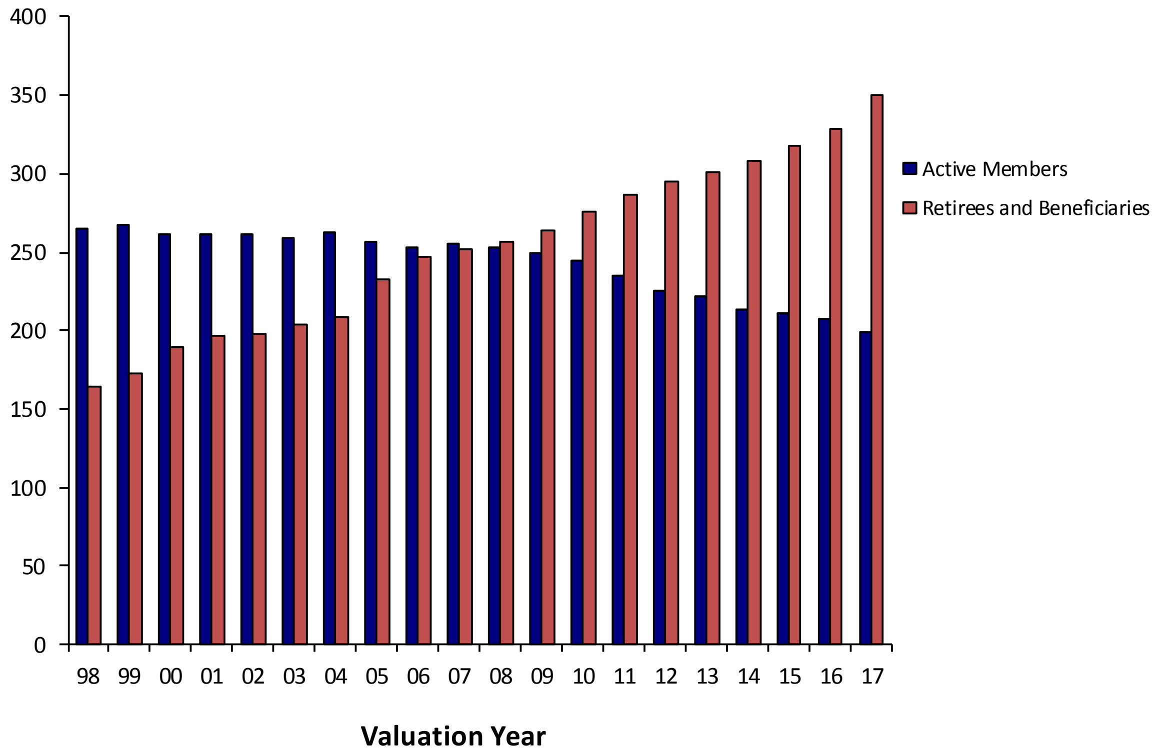
The Ratio of Valuation Assets to AAL is a traditional measure of a System's funding progress. Except in years when the system is amended or actuarial assumptions are revised, this ratio can be expected to gradually trend toward 100%.

The Ratio of UAAL to Valuation Payroll is another relative index of condition. Unfunded actuarial accrued liabilities represent debt, while active member payroll represents the System's capacity to collect contributions to pay toward debt. The lower the ratio, the greater the financial strength - and vice-versa.

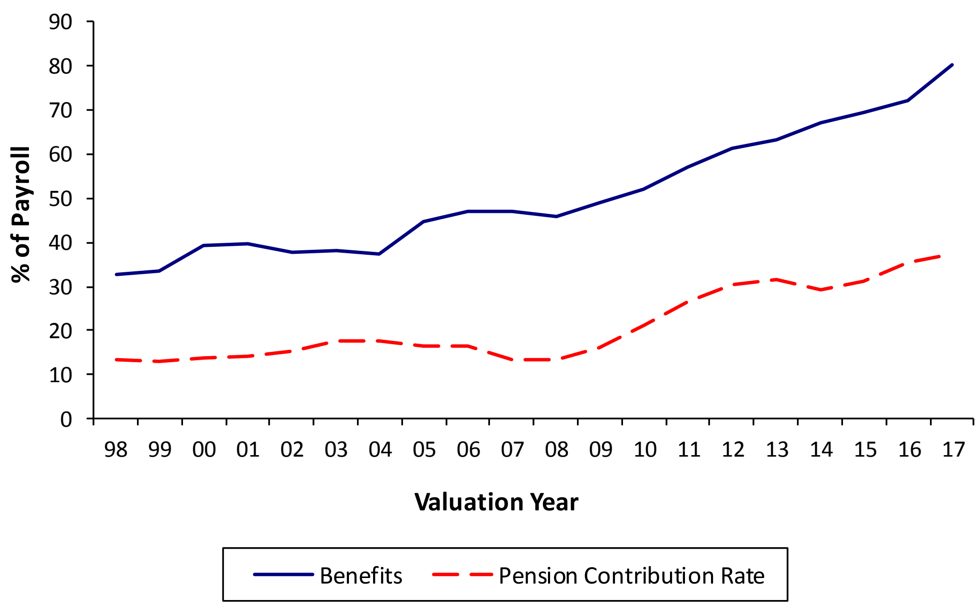
Assets and Accrued Liabilities



Active and Retired Members



Benefits and Pension Contribution Rates as a Percent-of-Payroll



Comments

Status

The Retirement System is 78.0% funded based on the Funding Value of assets and 76.3% funded based on the Market Value of assets. The ratio has decreased slightly on a funding value of assets basis and increased on a market value of asset since the 2016 valuation.

Retirement System Experience

Overall, fund experience was less favorable than assumed during the year ending June 30, 2017, producing a total experience loss of approximately $3.0 million. The $3.0 million total loss was comprised of a $3.5 million loss attributed to member experience during the year (members retiring, salary increases, mortality experience, etc.). The primary source of the member-related experience loss was as a result of larger than expected *individual* salary increases (not total payroll) and more retirements than expected. This loss was partially offset by a $0.4 million gain due to more than assumed investment returns on the **Funding Value** of assets.

The Market Value rate of return during the fiscal year ending June 30, 2017 was 11.08% for the pension only fund value (excluding assets attributable to RIE) which is more than the assumed rate of 7.50%. A portion of the investment gain was recognized in this valuation along with the recognition of portions of the investment gains and losses that occurred during the previous four fiscal years in accordance with the asset valuation method. The net result of this year's **Market Value** gain and carryover gains and losses from prior years is a net gain of $0.5 million on the **Funding Value** of assets and a recognized rate of return on the **Funding Value** of assets of 7.75%.

Asset Smoothing

Under the asset valuation method, gains and losses are spread over a 5-year period (4-year period for gains and losses before June 30, 2012). As of June 30, 2017, the Funding Value of assets is approximately $4.4 million more than the Market Value. Continued recognition of investment losses from prior years will put upward pressure on contribution rates in the next few valuations in the absence of additional investment gains.

Amortization of Unfunded Liabilities

The contribution for the unfunded liability is calculated using a level percent-of-payroll method which assumes that **total payroll** will grow 3.25% per year. Total payroll growth at that rate has not been realized in recent years, and, in fact, payroll decreased since the last valuation. While the contribution rate for the unfunded liability has been adjusted to account for this, we recommend that the actual employer contribution be at least equal to the dollar amount shown on page A-2.

Benefit Changes

There were no benefit changes implemented between July 1, 2016 and June 30, 2017. However, the benefit provisions were clarified in regards to specific dates of eligibility for specific benefit provisions. These clarifications resulted in a no change in accrued liability.

Comments (concluded)

Assumption and Method Changes

During the 2017 Fiscal Year, there were 27 pay periods. Reported pays were adjusted by a factor of 26/27 to account the additional pay period.

Assumed Rate of Investment Return

Capital market assumptions for future investment returns continue to decline, especially over shorter time horizons. In addition, expectations for inflation continue to decrease as well, which affect the foundation of the investment return assumption. While this assumption will be reviewed in the next five-year experience study, the current assumption of 7.50% is at the top end of what is considered reasonable by actuarial standards, and may not continue to be deemed as reasonable until the next study. We will continue to review the assumption on an annual basis and alert the Board ahead of the actuarial valuation if we believe a change is needed. Based on the general trend in capital market assumptions, we expect that the Board may need to lower the assumed rate of return in the near future.

Other Observations

Future Expected System Contributions and Funded Status

Given the System's contribution allocation procedure, *if all actuarial assumptions are met (including the assumption of the System earning 7.50% on the funding value of assets),* it is expected that:

(1) The employer normal cost as a percentage of pay will decrease to the level of the benefit provisions for current new entrants (Police Command hired after 3/1/2014, Police hired after 2/22/2013, and Fire hired after 7/1/2009) as time passes and the majority of the active population is comprised of members hired after these dates.

(2) The unfunded actuarial accrued liabilities will increase for several years before decreasing and will be fully amortized after 29 years (June 30, 2047), and

(3) The funded status of the plan will decrease for several years and then will increase gradually towards a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations (for example, transferring the liability to an unrelated third party in a market value type transaction).

(2) The measurement is dependent upon the actuarial cost method which, in combination with the System's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. The current funded status is 78.0%. Even if the funded status measurement in this report was 100%, it would not be synonymous with no required future contributions. If the funded status were 100%, the System would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

SECTION B

SUMMARY OF BENEFIT PROVISIONS AND VALUATION DATA

Brief Summary of Act 345 Benefit Provisions (June 30, 2017)

Eligibility	Amount
SERVICE RETIREMENT	
20 or more years of service regardless of age.	
Police Command hired before March 1, 2014, Police Patrol Officers hired before February 22, 2013, and Firefighters hired before September 12, 2011.	Straight life pension equals 2.8% of highest 3-year AFC in last 10 years times years of service up to 25 years.
Police Command hired on or after March 1, 2014.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
Police Patrol Officers hired on or after February 22, 2013.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
Firefighters hired on or after September 12, 2011.	Straight life pension equals 2.5% of highest consecutive 5-year AFC in last 10, times years of service up to 25 years.
DEFERRED RETIREMENT	
10 or more years of service.	Computed as service retirement but based upon service, AFC and plan provisions in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.
DEFERRED RETIREMENT OPTION PLAN (DROP)	
20 or more years of service regardless of age. (Closed to Police Command hired after March 1, 2014 and Police Patrol hired after June 16, 2014. See page B-4 for additional information.)	Computed as a service retirement but based on service, AFC and plan provisions at the time of DROP election. Monthly pension benefits and annuity withdrawal account value at DROP date accumulate in hypothetical accounts and accrue interest at a rate of 4% (2% for eligible Police Patrol and Command who DROP on or after June 16, 2014) from date of DROP election to date of retirement. At retirement the hypothetical accounts may be paid out by any distribution alternatives available under the Premium Member Annuity Withdrawal Plan and the monthly benefit (previously computed) is paid to the member in the form of a straight life pension (with survivor benefit option, if applicable).
DEATH AFTER RETIREMENT SURVIVOR'S PENSION	
Payable to surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later. Includes members who DROP effective July 1, 1999.	Spouse's pension equals 60% of the straight life pension the deceased retiree was receiving. Must be married to spouse at time of retirement for spouse to be eligible for survivor benefits.

Brief Summary of Act 345 Benefit Provisions (Continued) (June 30, 2017)

Eligibility	Amount
NON-DUTY DEATH-IN-SERVICE SURVIVOR'S PENSION	
Payable to a surviving spouse, if any, upon the death of a member with 10 or more years of service.	Accrued straight life pension actuarially reduced in accordance with an Option I election.
DUTY DEATH-IN-SERVICE SURVIVOR'S PENSION	
Payable to a surviving spouse and eligible children of a member who died in the line of duty.	Straight life pension, calculated with a minimum of 25 years of service, actuarially reduced in accordance with Option 1 election. Workers' Compensation offset.
NON-DUTY DISABILITY	
Payable upon the total and permanent disability of a member with 5 or more years of service.	To age 55: 1.5% of AFC times years of service. At age 55: 2.0% of AFC times years of service.
DUTY DISABILITY	
Payable upon the total and permanent disability of a member in the line of duty… Police:	
…who is unable to perform any occupation	To age 55: 100% of base salary at time of retirement, minimum 85% of active base. At age 55: Frozen at age 55 rate.
…who is unable to perform own occupation	To age 55: 60% of base salary at time of retirement, minimum 51% of active base. At age 55: Frozen at age 55 rate.
Fire:	To age 55: Either 1) 80% of base salary for the first 5 years, then 60% of base salary, or, 2) 60% of base salary with 51% minimum. At age 55: Frozen at age 55 rate.

POST-RETIREMENT INCREASES

An ad-hoc increase was granted during the year ended June 30, 2000.

Brief Summary of Act 345 Benefit Provisions (Concluded) (June 30, 2017)

Eligibility	Amount
MEMBER CONTRIBUTIONS	
Fire Chief	3.00% of pay, non-refundable.
Police Chief	5.00% of pay, non-refundable.
Fire hired before September 12, 2011. Police Patrol Officers hired before February 22, 2013. Police Command and Deputy Chiefs hired before March 1, 2014.	3.00% of pay, non-refundable.
Fire hired on or after September 12, 2011. Police Patrol Officers hired on or after February 22, 2013. Police Command and Deputy Chiefs hired on or after March 1, 2014.	5.00% of pay, non-refundable.
	All members are eligible for annuity withdrawal with no reduction upon retirement for refundable contributions only. Non-refundable contributions remain in the Retirement System. All members in the DROP no longer contribute.
INTEREST ON MEMBER ACCOUNTS	
Active or Former members who have not DROPped.	Interest at the rate of 2% per annum is paid on member contributions from date of hire to the earlier of DROP date or retirement date.
DROPped members.	Interest at the rate of 4% (2% for eligible Police Patrol and Command hired as Police Patrol prior to June 16, 2014, that DROP on or after June 16, 2014) per annum is paid on DROP account and annuity withdrawal account from DROP date to retirement date.
ITEMS INCLUDED IN AFC	
All members.	Overtime, longevity, pay in lieu of holiday time, education pay, and FLSA.
Police and Police Command.	75% of annual excess (over 1,200 hrs.) sick leave, paid compensatory time, and early report time.
Deputy Chiefs.	Up to 900 hours of unused sick/vacation/comp. leave.

Summary of DROP Provisions

Effective Date

July 1, 1999.

Eligibility

A member of the Southfield Fire and Police Retirement System who has satisfied the minimum requirements for a normal service retirement under the FPRS. This eligibility is currently 20 years of service. The DROP is closed to Police Command hired or promoted after March 1, 2014. However, if a promoted Command member was a Patrol member hired prior to June 16, 2014, they retain the ability to DROP. In addition, if a Patrol member is promoted while in the DROP, the member may remain in the DROP.

Election of DROP

A member satisfying DROP eligibility conditions would be permitted to either:

1) Retire; or
2) Continue working and retire at a future date with a pension based on credited service and Average Final Compensation (AFC) at date of termination of employment; or
3) Irrevocably elect to participate in the DROP and retire at a date no more than 5 years in the future with a pension based on AFC and service at date of election to participate in the DROP.

DROP Credits

The account of a participating member is credited with:

- The pension payments the member would have been paid if the member had retired on the date of DROP election; and
- Interest credits at the rate of 4% (2% for Police Patrol and Command (who were Police patrol prior to June 16, 2014) who DROP on or after June 16, 2014) per annum.

Retirement from DROP

Upon termination of employment the frozen monthly pension begins and the member can elect any of the distribution alternatives available under the Premium Member Annuity Withdrawal Plan for the DROP account.

Summary of DROP Provisions
(Concluded)

Disability or Death during DROP Participation

Benefits payable to a member (or surviving spouse) if death or disability occurs during the DROP participation period will be computed in the same manner as if the member had retired from the DROP plan the day prior to the death or disability.

Covered Payroll

The payroll of DROP participants will be included in the covered compensation upon which regular City contributions are based. However, member contributions will cease upon election of DROP.

Revocation of DROP Election

Under certain, limited circumstances, members who become disabled in the line of duty, or who die in the line of duty, may revoke the DROP election and be treated as if they never participated in the DROP plan.

Summary of Reserve for Inflation Equity (RIE) Provisions

Effective Date

October 25, 1999 for Fire and July 1, 2000 for Police Command.

Coverage of Program

All members retiring after July 1, 1999 for Fire and July 1, 2000 for Police Command.

Accumulation Formula

Each year, beginning July 1, 1999 for Fire and July 1, 2000 for Police Command, funds will be credited to the RIE fund in accordance with the following formula: 55% of the 5-year average of the funding value rate of return over a threshold of 8.0% as of June 30th, not to exceed 3.0%, multiplied by the System assets of retired member and members who have elected to participate in the Deferred Retirement Option Plan (DROP), who will be eligible to receive distributions from the RIE program either now or in the future. (This Accumulation Formula can be found on page B-15 of this report.) The RIE receives 7.50% interest each year.

Point Accumulation

Each covered member shall accumulate points in accordance with the following formula:

a) One point for each full year of service, not to exceed 25; plus
b) Two points for each full year since retirement.

Eligibility for Distribution

A covered member will be eligible for an immediate distribution on the later of (a), (b), or (c) below:

a) The first July 1st, which is at least five years after the member's retirement, defined as the later of the date that a member either separated from service or began to receive a pension.
b) The year after the member's pension has lost 15% of its original purchasing power, defined as a 15% increase in the Consumer Price Index for All Urban Consumers (CPI-U), U. S. City average, all items 1982-1984 = 100.
c) The member's accumulation of 35 points.

Distributable Reserve

No more than 35% of the funds in the RIE fund shall be distributed in any given year.

Summary of Reserve for Inflation Equity (RIE) Provisions

Individual Distributions

Each benefit recipient's share will be computed by dividing the benefit recipient's total points by the total points of all eligible benefit recipients and multiplying the result by the Distribution Reserve. The maximum amount payable to any benefit recipient is the amount which would restore 85% of the member's original purchasing power. A surviving spouse of a member will receive 60% of the amount which would have been payable to the member had the member survived.

Distribution Date

Distributions of RIE Program benefit checks shall be determined by the City of Southfield Fire and Police Retirement Board for years in which sufficient funds are available for distribution.

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Schedule

Year	Added to Rolls		Removed from Rolls		Rolls End of Year			
Ended June 30	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions	Average Pensions	Actuarial Present Value of Pensions
1998	8	$ 300,514	3	$ 62,127	164	$ 5,421,549	$33,058	$ 58,999,887
1999	13	344,928	4	83,908	173	5,682,569	32,847	61,095,749
2000	19	1,391,574 *	3	82,421	189	6,991,722	36,993	73,774,229
2001	9	325,140	1	43,199	197	7,273,663	36,922	76,214,081
2002	7	159,227	6	233,271	198	7,199,619	36,362	74,620,482
2003	6	291,862			204	7,491,481	36,723	76,980,093
2004	11	334,099	6	220,863	209	7,604,717	36,386	77,198,240
2005	30	1,387,608	6	241,514	233	8,750,811	37,557	91,796,051
2006	16	653,409	2	83,928	247	9,320,292	37,734	97,367,873
2007	5	187,442			252	9,507,734	37,729	98,106,085
2008	10	369,849	5	156,481	257	9,721,102	37,825	102,542,904
2009	12	657,359	5	140,338	264	10,238,123	38,781	106,846,499
2010	15	651,237	3	112,260	276	10,777,100	39,047	112,131,334
2011	16	626,106	5	146,013	287	11,257,193	39,224	117,349,975
2012	13	628,673	5	218,358	295	11,667,508	39,551	120,894,365
2013	8	384,217	2	114,181	301	11,937,544	39,660	122,796,805
2014	12	599,147	5	177,256	308	12,359,435	40,128	127,796,315
2015	15	773,603	5	174,207	318	12,958,831	40,751	133,403,324
2016	22	972,319	11	411,480	329	13,519,670	41,093	146,779,745
2017	29	1,335,915	8	261,632	350	14,593,953	41,697	163,433,450

** Additions to annual pensions include post-retirement increases of $8,422.*

Retirees and Beneficiaries June 30, 2017
Tabulated by Type of Benefit Being Paid

Pension Benefits

Type of Benefit	No.	Annual Amount
Age and Service Pensions		
Regular Pension - terminating at death	72	$ 2,341,261
- auto. 60% to spouse	214	10,666,579
Option I - 100% Joint and Survivor	7	205,384
Option II - 50% Joint and Survivor	2	58,507
Survivor Beneficiary	44	1,097,683
Age and Service Totals	339	$ 14,369,414
Casualty Pensions		
Duty Disability	8	178,983
Non-Duty Disability	2	12,512
Non-Duty Death-Survivor Benefit	1	33,044
Casualty Totals	11	$ 224,539
Total Pensions	**350**	**$ 14,593,953**

Retirees and Beneficiaries June 30, 2017
Tabulated by Attained Age and Type of Retirement

	Age & Service		Casualty		Totals	
Attained Age	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions
40 - 44	2	$ 46,585			2	$ 46,585
45 - 49	23	1,136,838			23	1,136,838
50 - 54	35	1,478,242	1	$ 7,528	36	1,485,770
55 - 59	38	1,939,639	3	72,908	41	2,012,547
60 - 64	59	2,958,805	1	26,916	60	2,985,721
65 - 69	49	1,930,105	1	4,984	50	1,935,089
70 - 74	67	2,535,717	2	46,351	69	2,582,068
75 - 79	39	1,367,538	2	55,272	41	1,422,810
80 - 84	15	563,571	1	10,580	16	574,151
85 - 89	9	320,814			9	320,814
90 - 94	3	91,560			3	91,560
Totals	**339**	**$ 14,369,414**	**11**	**$ 224,539**	**350**	**$14,593,953**

Average Age at Retirement: 51.2 years

Average Age Now: 66.1 years

Active Members in Pension Valuation - Comparative Statement

Year Ended June 30	Number Added During Year A	Number Added During Year E	Normal Retirement A	Normal Retirement E	Disabled A	Disabled E	Died-in-Service A	Died-in-Service E	Withdrawals Vested A	Withdrawals Other A	Withdrawals Total A	Withdrawals Total E	End of Year	Valuation Payroll	Averages Annual Pay $	Averages Annual Pay Change	Averages Age	Averages Service
2003	3	6	6	20.8	0	0.6	0	0.4	0	0	0	4.4	259	$19,568,895	$75,556	3.6	41.3 yrs.	14.1 yrs.
2004	8	4	3	22.2	0	0.6	1	0.4	0	0	0	4.1	263	20,434,525	77,698	2.8	41.7	14.5
2005	19	25	25	22.2	0	0.7	0	0.5	0	0	0	3.6	257	19,559,486	76,107	(2.0)	40.2	12.8
2006	13	17	12	7.3	3	0.7	0	0.3	1	1	2	3.8	253	19,826,520	78,366	3.0	40	12.6
2007	9	6	4	7.1	0	0.7	0	0.3	0	2	2	4.0	256	20,148,421	78,705	0.4	40.4	13.1
2008	3	6	6	7.1	0	0.7	0	0.3	0	0	0	3.9	253	21,156,661	83,623	6.2	41.0	13.6
2009	8	11	10	8.7	1	0.7	0	0.4	0	0	0	3.4	250	20,917,249	83,669	0.1	41.0	13.6
2010	7	12	10	8.8	0	0.7	0	0.4	0	2	2	3.3	245	20,681,885	84,416	0.9	41.3	13.6
2011	0	10	9	7.4	0	0.6	0	0.3	0	1	1	2.9	235	19,677,191	83,733	(0.8)	42.0	14.3
2012	0	10	10	6.1	0	0.7	0	0.1	0	0	0	1.3	225	18,960,852	84,270	0.6	42.7	14.9
2013	6	9	7	6.6	0	0.6	0	0.1	2	0	2	1.0	222	18,819,454	84,772	0.6	43.2	15.3
2014	2	10	8	8.2	0	0.6	0	0.1	1	1	2	1.2	214	18,452,501	86,227	1.7	43.8	15.8
2015	6	9	9	7.8	0	0.6	0	0.1	0	0	0	1.0	211	18,610,174	88,200	2.3	43.8	15.9
2016	10	14	12	11.2	0	0.4	0	0.1	1	1	2	1.2	207	18,741,427	90,538	2.7	43.6	15.6
2017	16	24	21	12.2	0	0.4	0	0.3	0	3	3	1.6	199	18,204,757 *	91,481	1.0	42.6	14.6
5-Yr. Totals			57	46.0	0	2.6	0	0.7			9	6.0						
10-Yr. Totals			102	84.1	1	6.0	0	2.2			12	20.8						

A = actual
E = expected

**Reported pays were adjusted by 26/27 to account an additional pay period during the 2017 Fiscal Year.*

Active Members June 30, 2017
By Attained Age and Years of Service

Attained	Years of Service to Valuation Date								Valuation
Age	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Payroll*
20-24	10							10	$ 493,406
25-29	13	2						15	899,672
30-34	6	5	6					17	1,344,209
35-39	5	3	20	1				29	2,555,203
40-44	1	4	13	14	4			36	3,322,246
45-49	1		5	12	12	3		33	3,391,288
50-54			1	8	22	7		38	4,157,340
55-59					16	1		17	1,654,509
60					1			1	80,288
61		1				1		2	183,846
64					1			1	122,750
Totals	**36**	**15**	**45**	**35**	**56**	**12**	**0**	**199**	**$ 18,204,757**

**Reported pays were adjusted by 26/27 to account an additional pay period during the 2017 Fiscal Year.*

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages*:

Age: 42.6 years
Service: 14.6 years
Annual Pay: $91,481

**Reported pays were adjusted by 26/27 to account an additional pay period during the 2017 Fiscal Year.*

The valuation includes 2 vested terminated members with total estimated annual benefits of $74,964.

Actuarial Value of Assets

Actuarial Value of Assets		Reserve for (1)	
US Cash	$ 7,431,191	Employee's Contributions	$ 9,271,670
US Fixed Income	41,692,820	Employers Contribution	24,532,597
US Equity	68,818,596	Retired Benefit Payments	163,433,450
International Equity	33,759,727	Funding Value Adjustment	4,346,534
Hedge Fund	23,064,793	**Actuarial Value of Assets**	**$ 201,584,251**
US Private Real Estate	22,723,472		
Accounts Payable/Receivable*	(252,882)	Funding Value of Pension Assets (2)	$ 199,673,985
		Funding Value of Health Assets (3)	-
Funding Value Adjustment	4,346,534	Reserve for Inflation Equity	1,910,266
Actuarial Value of Assets	**$201,584,251**	**Actuarial Value of Assets**	**$ 201,584,251**

**Includes an adjustment of $75,934 to match the reported total market value of $197,237,717.*

(1) *Note that these reserve amounts were not supplied by staff. We have set the Employee's Contributions Reserve to the sum of the employee contributions submitted for each individual in the valuation. The Retired Benefit Payments Reserve has been set equal to the liability for retired members. The Employer Contribution Reserve is the balancing item.*

(2) *The funding value of pension assets includes $12,364,019 of retiree account balances to be disbursed ($866,110 of outstanding employee contributions and $11,497,909 of outstanding DROP account balances).*

(3) *The Retiree Health Insurance Fund has been exhausted.*

Market value of assets was reported to be $197,237,717.

Revenues and Expenditures

	Pension	Reserve for Inflation Equity	Health	Totals
Actuarial Value 6/30/2016	$ 195,645,031	$ 2,026,961	$ 0	$ 197,671,992
Revenues				
Employee Contributions	457,293	0	0	457,293
Employer Contributions	6,241,527	0	0	6,241,527
Income (net of investment expenses)	14,739,932	142,309	0	14,882,241
Total Revenues	$ 21,438,752	$ 142,309	$ 0	$ 21,581,061
Expenditures				
Benefit Payments	17,287,469	259,004	0	17,546,473
Refund of Member Contributions	(32,735)	0	0	(32,735)
Health Insurance Premiums	0	0	0	0
Expenses Paid from System	155,064	0	0	155,064
Total Expenditures	$ 17,409,798	$ 259,004	$ 0	$ 17,668,802
Actuarial Value 6/30/2017	**$ 199,673,985**	**$ 1,910,266**	**$ 0**	**$ 201,584,251**
Nominal Rate of Return*	7.75%	7.50%		7.74%

* *The nominal rate of return was computed using the approximate formula: i = I divided by 1/2 (A+B-I), where I is recognized investment income, plus the additional market value adjustment, A is the beginning of year asset value and B is the end of year asset value.*

Derivation of Funding Value of Retirement System Assets

Beginning of Year Value	June 30, 2017	June 30, 2018	June 30, 2019	June 30, 2020	June 30, 2021
(1) Market Value	$ 186,014,070				
(2) Funding Value	195,645,031				
(3) Non Investment Cash Flow	(10,710,978)				
(4) Assumed Interest Rate	7.50%				
Expected Income	14,271,716				
(5) Actual Income	20,024,359				
(6) Gain/(Loss)	$ 5,752,643				
(7) Recognized Income					
(a) Expected	$ 14,271,716				
(b) 0.20 x Gain/(Loss)	1,150,529				
(c) Base from 1 year ago	(2,542,652)	$ 1,150,529			
(d) Base from 2 years ago	(2,327,319)	(2,542,652)	$ 1,150,529		
(e) Base from 3 years ago	3,333,949	(2,327,319)	(2,542,652)	$ 1,150,529	
(f) Base from 4 years ago	853,709	3,333,950	(2,327,321)	(2,542,654)	$ 1,150,527
(g) Total Income Recognized	$ 14,739,932	$ (385,492)	$ (3,719,444)	$ (1,392,125)	$ 1,150,527
End of Year Values					
(8) Market Value	$ 195,327,451				
(9) Funding Value (2) + (3) + (7)(g)	$ 199,673,985				
(10) Funding Value as a Percent of Market Value	102.23%				
(11) Rate of Return on Funding Value During Year	7.75%				
(12) Rate of Return on Market Value During Year	11.08%				

Beginning June 30, 2012, all values exclude assets and activity associated with retiree health assets and RIE assets.

The funding value in (9) is applied to the financing of actuarial accrued liabilities. The funding value is intended to give recognition to long-term changes in asset values while minimizing the effect of short-term fluctuations in the capital markets. After the initial year, the funding value treats realized and unrealized capital gains and losses in the same manner.

Derivation of Reserve for Inflation Equity

		7/1/2015	7/1/2016	7/1/2017
Rate of investment return:				
1.	Actual return on funding value of assets:			
	(a) from prior year	6.65%	5.33%	7.75%
	(b) from 1 year ago	11.41%	6.65%	5.33%
	(c) from 2 years ago	8.88%	11.41%	6.65%
	(d) from 3 years ago	0.29%	8.88%	11.41%
	(e) from 4 years ago	0.29%	0.29%	8.88%
	(f) 5-year average	5.50%	6.51%	8.00%
2.	Threshold	8.00%	8.00%	8.00%
3.	Fifty-five percent of excess, if any, of 1(f) over 2, but not more than 3.0%	0.00%	0.00%	0.00%
4.	Actuarial present value of pensions #:			
	(a) For current DROP members	$30,831,963	$32,266,869	$30,745,761
	(b) For retirees since RIE inception*	63,313,659	69,206,929	80,330,179
	(c) Total	94,145,622	101,473,798	111,075,940
5.	Dollars available for allocation	0	0	0
6.	Reserve Balance - start of year	2,192,991	2,115,290	2,026,961
	Disbursements from reserve during year	238,419	242,853	259,004
	Current year addition	0	0	0
	Interest	160,718	154,524	142,309
	Reserve Balance - end of year	2,115,290	2,026,961	1,910,266

		7/1/2015	7/1/2016	7/1/2017
#	*Included Participants*			
	DROP			
	- Fire	*19*	*20*	*20*
	- Police Command	*12*	*12*	*11*
	Retirees			
	- Fire	*65*	*65*	*72*
	- Police Command	*41*	*44*	*51*

* *July 1, 1999 for Fire, July 1, 2000 for Police Command.*

SECTION C

SUMMARY OF ACTUARIAL COST METHODS AND ASSUMPTIONS

Actuarial Cost Methods

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual entry-age actuarial cost method having the following characteristics:

- the annual normal costs for each individual active member, payable from the date of employment to the date of retirement are sufficient to accumulate the value of the member's benefit at the time of retirement;

- each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were amortized by level percent-of-payroll contributions over a period of 29 years. This UAAL payment reflects payments expected to be made between the valuation date and the date contributions determined by this report are scheduled to begin. The UAAL contribution rate is adjusted to reflect that annual total payroll growth has been less than the assumption of 3.25% in the last several years.

The funding value of assets used for funding purposes is derived as follows: prior year valuation assets are increased by contribution and expected investment income and reduced by refunds, benefit payments and expenses. To this amount is added 20% of the difference between expected and actual investment income for each of the previous five years, starting with the June 30, 2012 valuation. Prior to June 30, 2012, 25% of the difference between expected and actual investment income for each of the previous four years was added.

Actuarial Assumptions Used for the Valuation

The actuary calculates the contribution requirements and benefit values of the Fund by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost methods described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

- long-term rates of investment return to be generated by the assets of the Fund
- patterns of pay increases to members
- rates of mortality among members, retirees and beneficiaries
- rates of withdrawal of active members (without entitlement to a retirement benefit)
- rates of disability among members
- the age patterns of actual retirement
- rate of increase in the cost of retiree health insurance

In making a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - - a period of time which can be as long as a century.

Actual experience of the Fund will not coincide exactly with assumed experience, regardless of the accuracy of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations). The assumptions are established by the Board after consulting with the actuary. New assumptions were adopted for the June 30, 2016 valuation pursuant to the Experience Study dated April 8, 2016, which contains the rationale for these assumptions. All assumptions are based on future expectations, not market measures.

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

	Salary Increase Assumptions for Individual Members		
Years of Service	**Merit & Seniority**	**Base (Economic)**	**Increase Next Year**
1 to 3	5.00%	3.25%	8.25%
4	2.50%	3.25%	5.75%
5	1.50%	3.25%	4.75%
6	0.50%	3.25%	3.75%
7	0.30%	3.25%	3.55%
8	0.20%	3.25%	3.45%
9 & Up	0.00%	3.25%	3.25%

If the number of active members remains constant, then the total active member payroll will increase 3.25% annually, the base portion of the individual salary increase assumptions. This increasing payroll was recognized in amortizing Unfunded Actuarial accrued Liabilities.

The assumed nominal rate of investment return net of investment expenses was 7.50% a year compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time. ***The assumed real return*** for funding purposes is the rate of return in excess of wage inflation: 4.25%.

The mortality table for healthy retirees was the RP-2014 Blue Collar Healthy Annuitant mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale released by the Society of Actuaries.

	Post-Retirement Healthy Life expectancy determined by age in given future year					
	Year 2017		Year 2027		Year 2037	
Age	Male	Female	Male	Female	Male	Female
50	34.02	37.04	35.06	38.01	36.07	38.96
55	29.20	32.11	30.19	33.04	31.16	33.97
60	24.63	27.36	25.55	28.25	26.47	29.13
65	20.29	22.78	21.14	23.62	21.99	24.45
70	16.23	18.43	17.01	19.21	17.78	19.98
75	12.54	14.42	13.24	15.13	13.93	15.83
80	9.34	10.88	9.94	11.49	10.53	12.10

For mortality of disabled retirees the RP-2014 Disabled Annuitant mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale was used.

For pre-retirement mortality the RP-2014 Blue Collar Employees mortality tables with fully-generational projected mortality improvement based on the MP-2015 2-dimensional improvement scale was used. 50% of the pre-retirement deaths are assumed to be duty related and 50% are assumed to non-duty related.

The MP-2015 projection scale was applied to the aforementioned RP-2014 tables adjusted to the base year of 2006 as recommended by the Society of Actuaries.

Additional margin for future mortality improvements are included in the projection scale.

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Years of Service	% Retiring During the Next Year
20	10.0 %
21	5.0
22	5.0
23	5.0
24	15.0
25	20.0
26	10.0
27	10.0
28	25.0
29	50.0
30	50.0
31	50.0
32	50.0
33	50.0
34	50.0
35 & Up	100.0

A member is eligible for retirement after completing 20 or more years of service.

Active members in the DROP are assumed to follow the retirement rates above. However, they are assumed to retire at a rate of 100% in the fifth year following DROP.

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating Within the Next Year
ALL	0	8.00%
	1	5.00%
	2	3.00%
	3	2.00%
	4	2.00%
20	5 & Over	1.00%
25		1.00%
30		0.90%
35		0.65%
40		0.50%
45		0.35%
50		0.25%
55		0.20%
60		0.20%
65		0.20%
70		0.20%

Rates of disability were as follows:

Sample Ages	% of Active Members Becoming Disabled Within the Next Year	
	Men	Women
20	0.11%	0.05%
25	0.14%	0.08%
30	0.15%	0.11%
35	0.22%	0.20%
40	0.32%	0.29%
45	0.49%	0.43%
50	0.79%	0.68%
55	1.38%	1.15%
60	2.30%	1.66%

In addition, 25% of the disabilities are assumed to be non-duty related and 75% are assumed to be duty related; of the 75% assumed to be duty disability, half were assumed to be covered under their own occupation provisions.

Expense Load. Normal cost for pensions was loaded by 2.0% of active payroll to cover administrative expenses.

Miscellaneous and Technical Assumptions
June 30, 2017

Marriage Assumption:	100% are assumed to be married for purposes of death-in-service benefits and 84% are assumed to be married for deaths after retirement. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	Beginning of the valuation year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from experience, without adjustment for multiple decrement table effects.
Decrement Operation:	Only withdrawal operates the first 5 years of service. Only mortality operates during retirement eligibility.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent-of-payroll shown in this report, and the actual payroll payable at the time contributions are made.
Normal Form of Benefit:	A 60% automatic joint and survivor payment is the assumed normal form of benefit for married people.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Annualized Salary Adjustment:	During the 2017 Fiscal Year, there were 27 pay periods. Reported pays were adjusted by 26/27 to account the additional pay period.

SECTION D

OPERATION OF THE RETIREMENT SYSTEM

Basic Financial Objective and Operation of the Retirement System

Benefit Promises Made Which Must Be Paid For. A retirement program is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an "IOU" which reads: "The Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The Constitution of the State of Michigan is directed to the question:

> "Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."

This Retirement System meets this constitutional requirement by having the following ***Financial Objective: To establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level*** from year-to-year and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

> ***Normal Cost*** (the value of benefits likely to be paid which is assigned to service being rendered in the current year)
> . . . plus . . .
> ***Interest on the Unfunded Actuarial Accrued Liability*** (the difference between the actuarial accrued liability and current System assets).

If contributions to the retirement program are less than the preceding amount, the difference, *plus investment earnings not realized thereon*, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

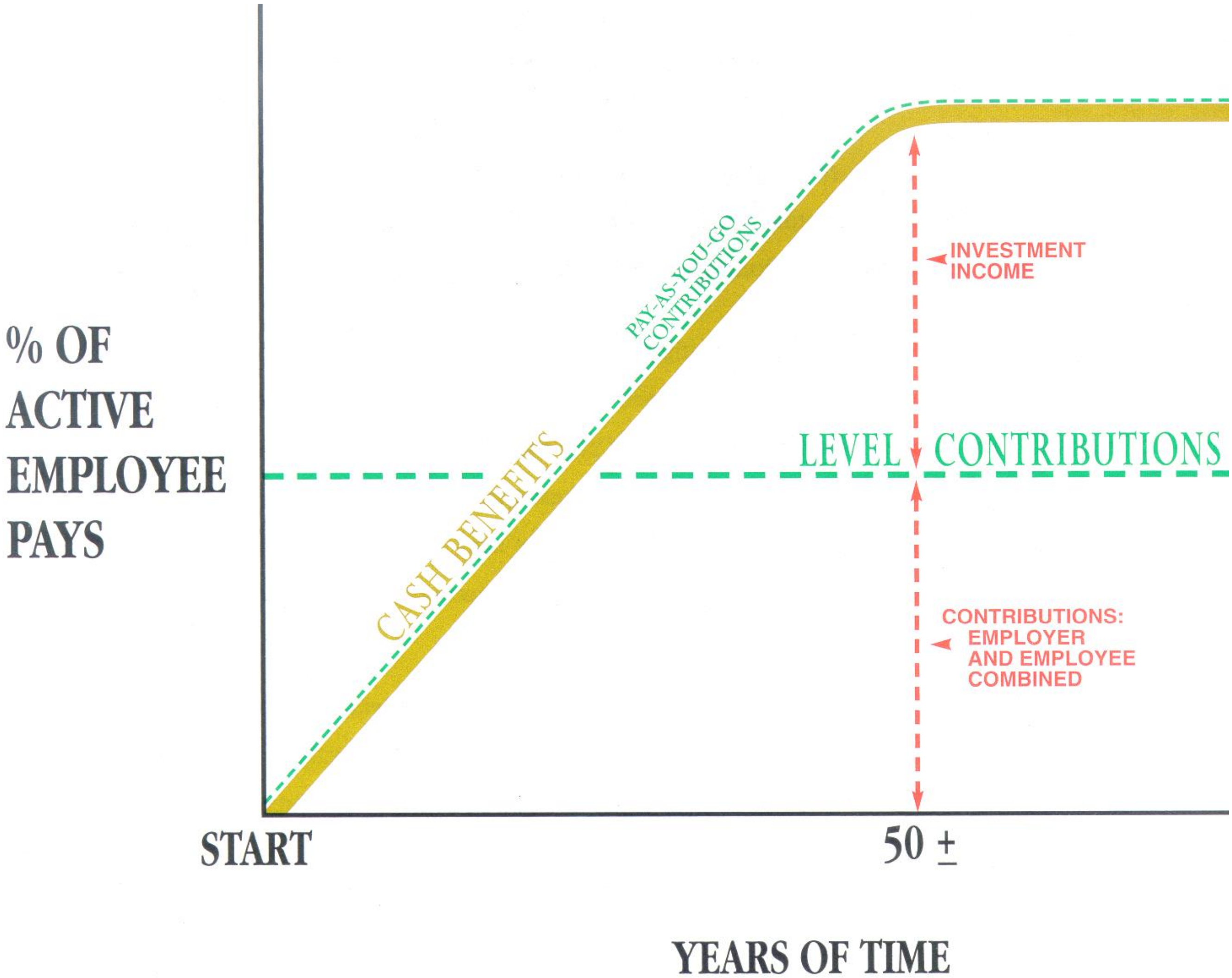
B = C + I - E

> **Benefit** payments to any group of members and their beneficiaries cannot exceed the sum of:
>
> > **Contributions** received over time on behalf of the group
> > . . . plus . . .
> > **Investment** earnings on contributions received and not required for immediate payment of benefits
> > . . . minus . . .
> > **Expenses** incurred in operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. They are lured by artificially low present contributions, but the inevitable consequence is a relentlessly increasing contribution rate to a level greatly in excess of the level percent-of-payroll rate. ***This method of financing is prohibited in Michigan by the State constitution***.

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Invested assets are a by-product of level percent-of-payroll contributions, not the objective. Investment income becomes a major contributor to the retirement program, and the amount is directly related to the amount of past contributions and investment performance.

Computed Contribution Rate Needed to Finance Benefits. From a given schedule of benefits and from the data furnished, the actuary calculates the contribution rate ***by means of an actuarial valuation*** - the technique of assigning monetary values to the risks assumed in operating a retirement program.

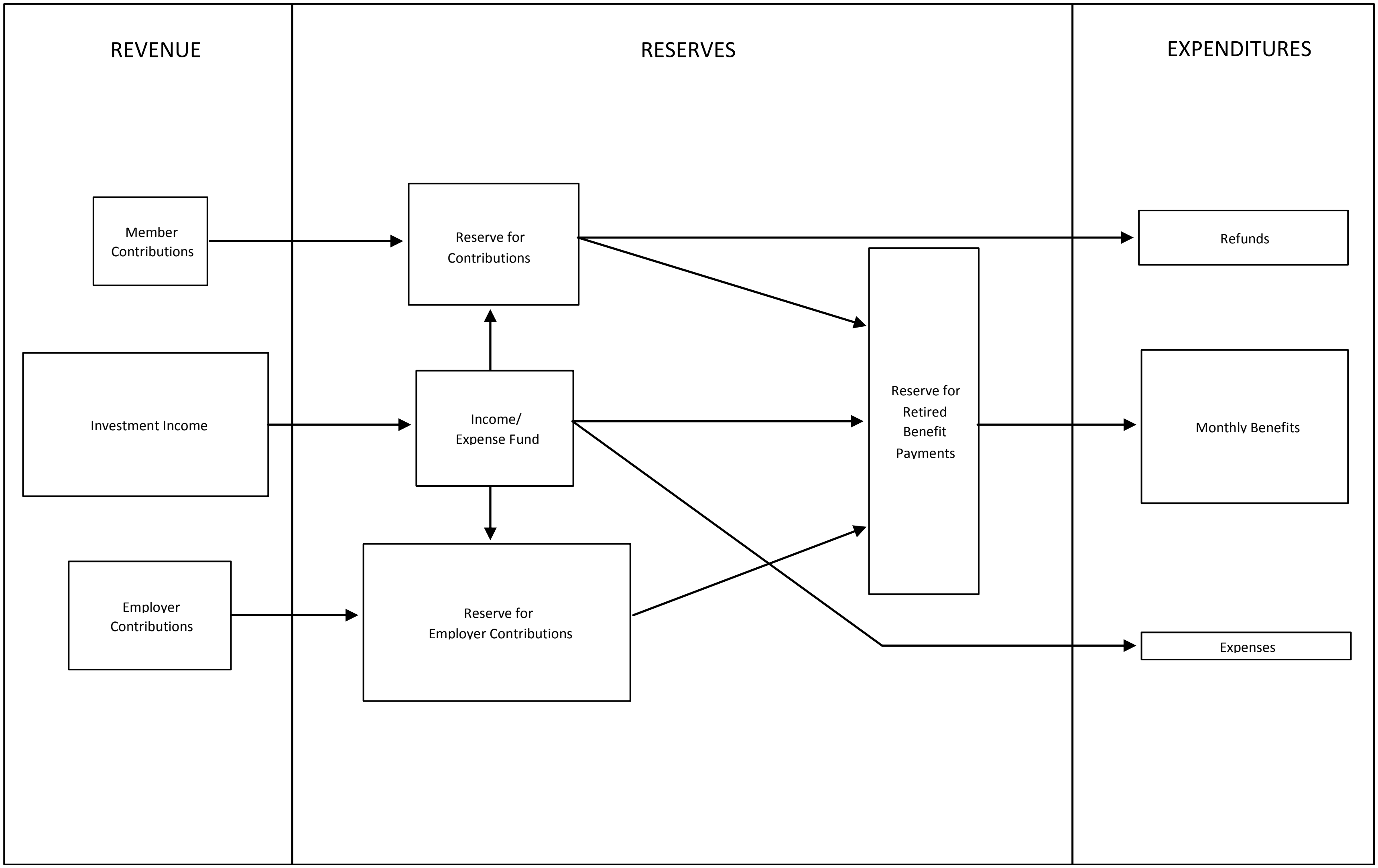


CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- Economic Risk Areas
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- Non-Economic Risk Areas
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

Flow of Money Through the Retirement System



Glossary

Actuarial Accrued Liability	The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."
Accrued Service	The service credited under the plan which was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.
Actuarial Present Value	The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
Amortization	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
Experience Gain (Loss)	A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.
DROP	Deferred Retirement Option Plan. This plan acts like an optional form of payment. It is selected by active members who wish to have their accrued retirement benefit frozen and paid into an account (monthly) that is available for cash withdrawal at the time of retirement.

Normal Cost	The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.
Plan Termination Liability	The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for the future service and salary. The termination liability will generally be less than the liabilities computed on a "going-concern" basis and is not normally determined in a routine actuarial valuation.
Reserve Account	An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.
Unfunded Actuarial Accrued Liability	The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."
Valuation Assets	The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.

APPENDIX 1

ACTUARIAL FUNDING POLICY

City of Southfield Fire and Police Retirement System
Actuarial Funding Policy

WHEREAS, the City of Southfield Fire and Police Retirement System ("Retirement System") is established and administered pursuant to the provisions of Public Act 345 of 1937, as amended (MCL 38.551 *et seq*.), applicable collective bargaining agreements, and applicable state and federal laws including, but not limited to Public Act 314 of 1965, as amended ("Act 314") [MCL 38.1132 *et seq*.], and

WHEREAS, the Board of Trustees of the Retirement System ("Board") is vested with the authority and fiduciary responsibility for the administration, management and operation of the Retirement System, and

WHEREAS, the Board, in consultation with its Actuary, has an obligation to establish the economic and demographic assumptions to be utilized in performing the required actuarial valuation of the Retirement System and in determining the required annual employer contribution to the Retirement System, and

WHEREAS, the Board is aware of upcoming changes to the accounting and reporting standards approved by the Governmental Accounting Standards Board (GASB) for public pension plans, and

WHEREAS, the Board wishes to establish a formal Actuarial Funding Policy addressing the funding objectives and actuarial assumptions to be utilized in determining the funding status of the Retirement System, therefore be it

RESOLVED, that the Board hereby adopts the following Actuarial Funding Policy:

I. GENERAL

A. Purpose

In light of upcoming changes to the GASB financial accounting and reporting standards for public pension plans, the Board of Trustees of the Retirement System desires to establish a formal Actuarial Funding Policy to ensure the systematic funding of future pension obligations of the Retirement System.

B. Policy Objectives

Maintain adequate levels of assets sufficient to fund all benefits expected to be paid to members and beneficiaries when due.

(1) Maintain adequate levels of assets sufficient to fund all benefits expected to be paid to members and beneficiaries when due.
(2) Maintain stability of employer contributions rates, consistent with other funding objectives.
(3) Support the public policy goals of accountability and transparency.
(4) Monitor material risks to assist in any risk management strategies the Board deems appropriate.

(5) Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring costs to future members and employers.
(6) Provide a reasonable margin for adverse experience to offset risk.
(7) Review the Plan's investment return assumption, potentially in conjunction with a periodic asset liability study and in consideration of the Board's risk profile.
(8) Continue the systematic reduction of the Plan's Unfunded Actuarial Accrued Liabilities (UAAL).

II. LEGAL

A. Annual Actuarial Valuation

Section 20h(4) of Act 314 [MCL 38.1140h(4)], requires the Retirement System to have an actuarial valuation performed annually as follows:

> Except as otherwise provided in this subsection, a system shall have an annual actuarial valuation with assets valued on a market-related basis. The actuarial present value of total projected benefits shall include all pension benefits to be provided by the system to members or beneficiaries pursuant to the terms of the system and any additional statutory or contractual agreements to provide pension benefits through the system that are in force at the actuarial valuation date, including, but not limited to, service credits purchased by members, deferred retirement option plans, early retirement programs, and postretirement adjustment programs. A system that has less than $20,000,000.00 is only required to have an actuarial valuation as required under this subsection done every other year.

B. Annual Employer Contribution

The Board is required, pursuant to Section 20m of Act 314 [MCL 38.1140m], to annually certify the annual required contribution to be made by the employer as follows:

> The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of any system shall confirm in the annual actuarial valuation required under section 20h and the summary annual report required under section 13 that each system under this act provides for the payment of the required employer contribution as provided in this section and shall confirm in the summary annual report that the system has received the required employer contribution for the year covered in the summary annual report. The required employer contribution is the actuarially determined contribution amount. An annual required employer contribution in a system under this act shall consist of a current service cost payment and a payment of at least the annual accrued amortized interest on any unfunded actuarial liability and the payment of the annual accrued amortized portion of the unfunded principal liability. For fiscal years that begin before January 1, 2006, the required employer contribution shall not be determined using an amortization period greater than 40 years. Except as otherwise provided in this section, for fiscal years that begin after December 31,

2005, the required employer contribution shall not be determined using an amortization period greater than 30 years. . . . In a plan year, any current service cost payment may be offset by a credit for amortization of accrued assets, if any, in excess of actuarial accrued liability. A required employer contribution for a system administered under this act shall allocate the actuarial present value of future plan benefits between the current service costs to be paid in the future and the actuarial accrued liability. The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of a system shall act upon the recommendation of an actuary and the board and the actuary shall take into account the standards of practice of the actuarial standards board of the American academy of actuaries in making the determination of the required employer contribution.

III. POLICY

A. Actuarial Cost Method

(1) The individual entry age actuarial cost method of valuation shall be utilized in determining actuarial accrued liability and normal cost with the following characteristics:

(a) the annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and
(b) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

(2) Differences in the past between assumed experience and actual experience (actuarial gains and losses) shall be factored into the actuarial accrued liability.

(3) The normal cost shall be determined on an individual basis for each active member.

B. Asset Smoothing Method

The investment gains or losses of each valuation period, resulting from the difference between actual investment return and assumed investment return, shall be recognized annually in level amounts over a period not to exceed five (5) years in calculating the funding value of assets.

C. Amortization Method

(1) A level percent of payroll amortization method shall be used to systematically pay off the unfunded actuarial accrued liabilities over a closed amortization period not to exceed 30 years.
(2) Unfunded liabilities associated with benefit changes or assumption changes shall be funded over a period determined by the Board in consultation with its actuary.
(3) Unfunded liabilities arising from benefit changes provided to retirees or in conjunction with early retirement incentive programs offered by the employer shall be separately funded over a period determined by the Board in consultation with its actuary.

D. Assumptions

The economic and demographic actuarial assumptions utilized to determine the contribution requirements and benefit values of the Retirement System shall be determined by the Board in consultation with its actuary.

E. Funding Target

(1) The targeted funded ratio of the Retirement System shall be 100%.
(2) The employer contribution rate shall at least be equal to the normal cost unless the funded ratio of the Retirement System exceeds 120%.
(3) A funding plan shall be developed by the Board in consultation with its actuary if the funded ratio of the Retirement System falls below 70%, which may include additional funding requirements.

F. Risk Management

(1) Assumption Changes

(a) The actuarial assumptions utilized to determine the annual contribution requirements and valuations shall be those last adopted by the Board based on the most recent experience study and upon the advice and recommendation of the Board's actuary. The Board's actuary shall conduct an experience study once every five years. The results of the experience study shall be the basis for the actuarial assumptions recommended to the Board.
(b) The actuarial assumptions may be revised during the five-year period between experience studies if significant plan design changes or other significant economic events occur, as advised by the actuary.

(2) Risk Measures. The following risk measures will be annually determined to provide quantifiable measurements of risk as it applies to the Retirement System.

(a) Funded ratio;
(b) Unfunded actuarial accrued liabilities – the years required to pay down the unfunded liabilities of the Retirement System based upon the current funding schedule;
(c) Total unfunded actuarial accrued liabilities as a percentage of total payroll;
(d) Total assets as a percentage of total payroll; and
(e) Total actuarial accrued liabilities as a percentage of total payroll.

(3) Risk Control

(a) The Board shall carefully monitor the risk measures identified above and shall consider steps to mitigate risk, particularly as the funded ratio increases.

IV. REVIEW AND AMENDMENT

A. Periodic Review

This Actuarial Funding Policy shall be reviewed no less frequently than once every five years in conjunction with the required experience study performed by the Board's actuary, and may be reviewed at any time at the Board's discretion.

B. Amendment

The Board, in consultation with its Actuary and Legal Counsel, may amend this Actuary Funding Policy at any time as deemed necessary to address changes in the makeup, benefit structure and/or funding status of the Retirement System.

APPENDIX 2

RISK MEASURERS

Risk Measures

Actuarial Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Unfunded AAL (UAAL) (2) - (1)	(4) Covered Payroll	(5) Funded Ratio (1) / (2)	(6) Assets / Payroll (1) / (4)	(7) Liability / Payroll (2) / (4)	(8) Unfunded / Payroll (3) / (4)
6/30/2008	$ 202,566,067	$195,460,165	($7,105,902)	$20,917,249	103.6 %	968.4	934.4 %	-34.0 %
6/30/2009	192,160,601	200,058,754	7,898,153	20,681,885	96.1	929.1	967.3	38.2
6/30/2010	182,973,491	206,368,685	23,395,194	19,677,191	88.7	929.9	1048.8	118.9
6/30/2011 [(a)]	173,231,198	211,803,567	38,572,369	18,960,852	81.8	913.6	1117.1	203.4
6/30/2012 [(a)]	174,215,687	211,803,567	37,587,880	18,960,852	82.3	918.8	1117.1	198.2
6/30/2013 [(a)]	181,342,197	220,687,538	39,345,341	18,819,454	82.2	963.6	1172.7	209.1
6/30/2014 [(a)]	192,685,680	225,157,311	32,471,631	18,452,501	85.6	1044.2	1220.2	176.0
6/30/2015	195,940,267	231,608,365	35,668,098	18,610,174	84.6	1052.9	1244.5	191.7
6/30/2016 [(a)]	195,645,031	248,037,025	52,391,994	18,741,427	78.9	1043.9	1323.5	279.6
6/30/2017	199,673,985	256,052,447	56,378,462	18,204,757	78.0	1096.8	1406.5	309.7

(a) Revised actuarial assumptions, methods, and/or benefit changes.

(5) The Funded Ratio is the most widely known measure of a retirement system's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(6) and (7) The ratios of assets and liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of pay. For systems that are closed to new hires, it is expected that these ratios will grow as payroll declines.

(8) The ratio of the unfunded liability to payroll gives an indication of the retirement system sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.