Charter Township of Ypsilanti Police and Firefighter's Retirement System

December 31, 2019

Actuarial Valuation Report

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At the request of the plan sponsor, this report summarizes the Charter Township of Ypsilanti Police and Firefighter's Retirement System as of December 31, 2019. The purpose of this report is to communicate the following results of the valuation:

• Funded Status;
• and Determine Recommended Contribution;

This report has been prepared in accordance with the applicable Federal and State laws. Consequently, it may not be appropriate for other purposes. Please contact Nyhart prior to disclosing this report to any other party or relying on its content for any purpose other than that explained above. Failure to do so may result in misrepresentation or misinterpretation of this report.

The results in this report were prepared using information provided to us by other parties. The census and asset information has been provided to us by the employer. We have reviewed the provided data for reasonableness when compared to prior information provided, but have not audited the data. Where relevant data may be missing, we have made assumptions we believe to be reasonable. We are not aware of any significant issues with and have relied on the data provided. Any errors in the data provided may result in a different result than those provided in this report. A summary of the data used in the valuation is included in this report.

The actuarial assumptions and methods were chosen by the Board. In our opinion, all actuarial assumptions and methods are individually reasonable and in combination represent our best estimate of anticipated experience of the plan. 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 or 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 (such as the end of an amortization period); and
• changes in plan provisions or applicable law.

We did not perform an analysis of the potential range of future measurements due to the limited scope of our engagement. This report has been prepared in accordance with generally accepted actuarial principles and practice.

Neither Nyhart nor any of its employees have any relationship with the plan or its sponsor which could impair or appear to impair the objectivity of this report. To the extent that this report or any attachment concerns tax matters, it is not intended to be used and cannot be used by a taxpayer for the purpose of avoiding penalties that may be imposed by law.

Actuarial Certification

The undersigned are compliant with the continuing education requirements of the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States and are available for any questions.

Nyhart

Nick H. Meggos, EA, FCA	Scott Gavin, FSA, EA, MAAA

May 8, 2020
Date

Executive Summary

The actuarial report provides the plan sponsor with several ways to measure the funded status of the pension plan. The following detail is included in the report:

- Recommended Contribution
- Asset Performance
- Plan Demographics

This report is filled with actuarial terminology. However, the ultimate objective of the valuation is to provide a rational method of funding the plan. It is necessary to fund the benefit promised by the employer in a manner that is logical and employer friendly, yet safeguards the participants' interest. The actuarially derived contribution, however, is not the true cost of the pension plan. The true cost is illustrated by the following formula:

Ultimate Pension Cost = Benefits Paid - Investment Income + Plan Expenses

While the plan's liability and normal cost determine the current contribution recommendations, the true cost is controlled only by the "defined" benefit and investment income generated by the underlying assets. The actuarial process only controls the timing of costs.

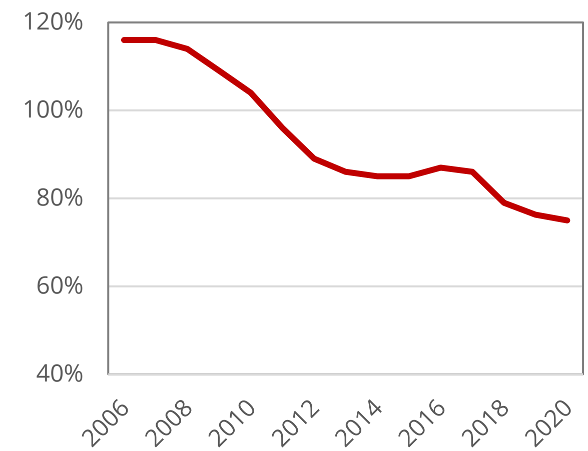
We suggest that a plan sponsor treat the actuarial report as you would treat a scorecard. It is simply a measure of progress toward the ultimate goal of paying all pension benefits when participants retire.

Summary Results

The actuarial valuation's primary purpose is to produce a scorecard measure displaying the funding progress of the plan toward the ultimate goal of paying benefits at retirement. The accrued liability is based on an entry age level percentage of pay.

	December 31, 2018	December 31, 2019
Funded Status Measures		
Accrued Liability	$36,633,362	$37,705,326
Actuarial Value of Assets	$27,953,456	$28,271,231
Unfunded Actuarial Accrued Liability (UAAL)	$8,679,906	$9,434,095
Funded Percentage (AVA)	76.31%	74.98%
Funded Percentage (MVA)	70.41%	76.61%
Cost Measures		
Recommended Contribution for Next Fiscal Year	$1,067,076	$1,074,669
Recommended Contribution (as a percentage of payroll)	56.10%	63.55%
Asset Performance		
Market Value of Assets (MVA)	$25,793,581	$28,885,817
Actuarial Value of Assets (AVA)	$27,953,456	$28,271,231
Actuarial Value/Market Value	108.37%	97.87%
Market Value Rate of Return	(2.93%)	16.64%
Actuarial Value Rate of Return	3.46%	5.20%
Participant Information		
Active Participants	24	21
Terminated Vested Participants	0	0
Retirees and Beneficiaries	61	60
DROP Participants	3	6
Total	88	87
Expected Payroll Current Fiscal Year	$1,846,796	$1,641,864
Expected Payroll Next Fiscal Year	$1,902,200	$1,691,120

History of Funded Ratio



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Changes since Prior Valuation and Key Notes

The healthy mortality table used to measure funding liability has been updated from RP-2006 Total Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-18 to PubS-2010 Mortality with generational improvements projected beginning in 2010 based on the SOA Scale MP-19. This change resulted in an increase in the liabilities and normal cost.

The disabled mortality table used to measure funding liability has been updated from RP-2006 Disabled Retiree Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-18 to PubS-2010 Mortality with generational improvements projected beginning in 2010 based on the SOA Scale MP-19. This change resulted in an increase in the liabilities and normal cost.

Valuations prior to December 31, 2018 (and therefore any information in this report prior to December 31, 2018) were performed by a different actuary.

Historical Valuation Summary

	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019
Funding					
Accrued Liability	$31,803,061	$32,684,010	$36,152,816	$36,633,362	$37,705,326
Actuarial Value of Assets	$27,526,195	$28,170,351	$28,429,784	$27,953,456	$28,271,231
Unfunded Actuarial Accrued Liability	$4,276,866	$4,513,659	$7,723,032	$8,679,906	$9,434,095
Funded Percentage	86.55%	86.19%	78.64%	76.31%	74.98%
Normal Cost (NC)			$439,577	$491,476	$410,952
Actual Contribution	$763,874	$786,578	$998,711	June 2020	June 2021
Recommended Contribution	$763,874	$786,578	$998,711	$1,067,076	$1,074,669
Interest Rate	7.25%	7.25%	6.50%	6.50%	6.50%
Rate of Return					
Actuarial Value of Assets	5.97%	7.08%	7.13%	3.46%	5.20%
Market Value of Assets	2.99%	5.81%	9.36%	(2.93%)	16.64%
Demographic Information					
Active Participants	24	25	23	24	21
Terminated Vested Participants	0	0	0	0	0
Retired Participants	53	58	45	46	45
Beneficiaries	*0	*0	14	15	15
Disabled Participants	0	0	0	0	0
DROP Participants	3	1	4	3	6
Total Participants	80	84	86	88	87
Covered Payroll (prior year)	$1,709,517	$1,758,735	$1,605,017	$ 1,793,006	$1,594,043
Average Covered Pay	$71,230	$70,349	$69,783	$74,709	$75,907

* The number of beneficiaries for years 2016 or earlier are included in the retired count.

Identification of Risks

The results presented in this report are shown as single point values. However, these values are derived using assumptions about future markets and demographic behavior. If actual experience deviates from our assumptions, the actual results for the plan will consequently deviate from those presented in this report. Therefore, it is critical to understand the risks facing this pension plan. The following table shows the risks we believe are most relevant to the Charter Township of Ypsilanti Police and Firefighter's Retirement System. The risks are generally ordered with those we believe to have the most significance at the top. Also shown are possible methods by which a more detailed assessment of the risk can be performed.

Type of Risk	Method to Assess Risk
Investment Return	Scenario Testing; Asset Liability Study
Interest Rates	Scenario Testing; Stochastic Modeling
Participant Longevity	Projections and Contribution Strategy
Early Retirement	Scenario Testing; Review population and retirement rates
Salary Growth	Review salary history and future budgets; scenario testing

Plan Maturity Measures - December 31, 2019

Each pension plan has a distinct life-cycle. New plans promise future benefits to active employees and then accumulate assets to pre-fund those benefits. As the plan matures, benefits are paid and the pre-funded assets begin to decumulate until ultimately, the plan pays out all benefits. A plan's maturity has a dramatic influence on how risks should be viewed. The following maturity measures illustrate where the Charter Township of Ypsilanti Police and Firefighter's Retirement System falls in its life-cycle.

Duration of Liabilities: 10.8%

Duration is the most common measure of plan maturity. It is defined as the sensitivity of the liabilities to a change in the interest rate assumption. The metric also approximates the weighted average length of time, in years, until benefits are expected to be paid. A plan with high duration is, by definition, more sensitive to changes in interest rates. A plan with low duration is more susceptible to risk if asset performance deviates from expectations as there would be less time to make up for market losses in adverse market environments while more favorable environments could result in trapped surplus from gains. Conversely, high duration plans can often take on more risk when investing, and low duration plans are less sensitive to interest rate fluctuations.

Demographic Distribution - Ratio of Actively Accruing Participants to All Participants: 24.1%

A plan with a high ratio is more sensitive to fluctuations in salary (if a salary-based plan) and statutory changes. A plan with a low ratio is at higher risk from demographic experience. Such a plan should pay close attention to valuation assumptions as there will be less opportunity to realize future offsetting gains or losses when current experience deviates from assumptions. Plans with a low ratio also have limited opportunities to make alterations to plan design to affect future funded status.

Asset Leverage - Ratio of Payroll for Plan Participants to Market Value of Assets: 5.7%

Younger plans typically have a large payroll base from which to draw in order to fund the plan while mature plans often have a large pool of assets dedicated to providing benefits to a population primarily consisting of members no longer on payroll. Plans with low asset leverage will find it more difficult to address underfunding, as the contributions needed to make up the deficit will represent a higher percentage of payroll than for a plan with high asset leverage.

Benefit Payment Percentage - Ratio of Annual Benefit Payments to Market Value of Assets: 7.6%

As a plan enters its decumulation phase, a larger percentage of the pre-funded assets are paid out each year to retirees. A high percentage is not cause for alarm as long as the plan is nearly fully funded. However, such a plan is more sensitive to negative asset performance, especially if cash contributions are not an option to make up for losses.

Assets and Liabilities

The basic building blocks of the actuarial report are contained in this section. These include:

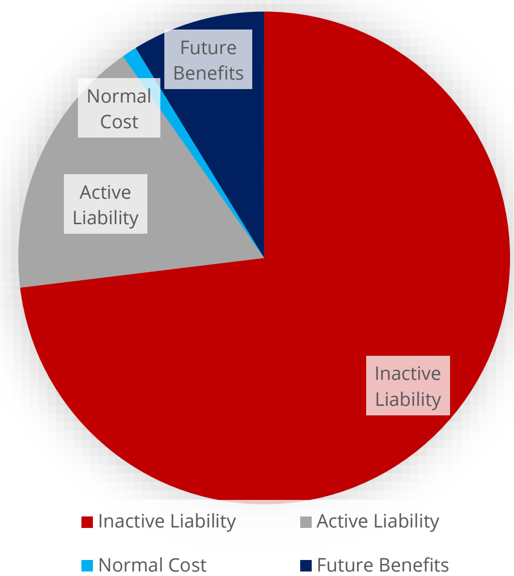
- Actuarial Accrued Liabilities
- Asset Information
- Summary of Contributions

Present Value of Future Benefits

The Present Value of Future Benefits represents the future benefits payable to the existing participants.

	December 31, 2019
Present Value of Future Benefits	
Active participants	
Retirement	$10,471,988
Disability	430,203
Death	151,737
Termination	167,139
Refund of contributions	26,753
Total active	$11,247,820
Inactive participants	
Retired participants	$28,816,620
Beneficiaries	1,709,148
Disabled participants	0
Terminated vested participants	0
Total inactive	$30,525,768
Total	$41,773,588
Present value of future payrolls	$16,303,896

Breakdown of Present Value of Future Benefits



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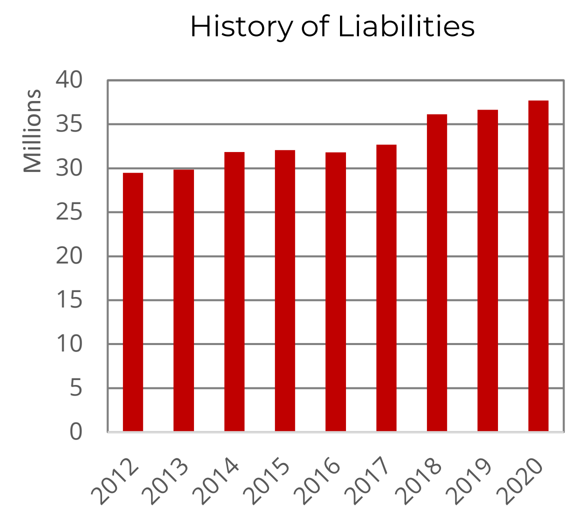
Actuarial Accrued Liability

The Actuarial Accrued Liability measures the present value of benefits earned as of the valuation date, using a specified set of actuarial assumptions.

	December 31, 2019
Funding Liabilities – Entry Age Normal as Percent of Pay	
Active participants	
Retirement	$6,913,518
Disability	184,015
Death	42,436
Termination	63,153
Refund of contributions	(23,564)
Total Active	$7,179,558
Inactive participants	
Retired participants	$28,816,620
Beneficiaries	1,709,148
Disabled participants	0
Terminated vested participants	0
Total Inactive	$30,525,768
Total	$37,705,326
Normal Cost	$410,952
Interest Rate	6.50%



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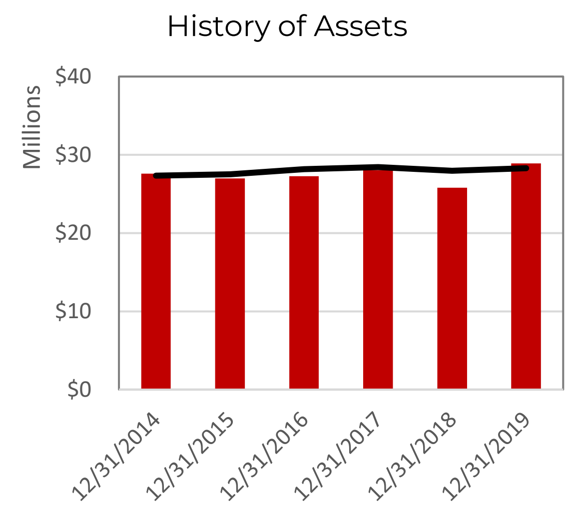
Asset Information

The amount of assets backing the pension promise is the most significant driver of volatility and future costs within a pension plan. The investment performance of the assets directly offsets the ultimate cost.

	December 31, 2019
Market Value Reconciliation	
Market value of assets, beginning of prior year	$25,793,581
Contributions	
Employer contributions	998,711
Employee contributions	97,837
Total	$1,096,548
Investment income	$4,200,535
Administrative Expenses	$(17,448)
Benefit payments	$(2,187,399)
Market value of assets, beginning of current year	$28,885,817
Return on Market Value	16.64%
Market value of assets available for pension benefits	$28,885,817
Actuarial Value of Assets	
Value at beginning of current year	$28,271,231
Assets Reserves	
Reserves for	
Employees' contributions	$933,014
Employer contributions	(2,572,965)
Retired benefit payments	30,525,768
Total reserves at market	$28,885,817
Funding value adjustment	$(614,586)
Actuarial value of assets	$28,271,231



Monitoring the pension plan's investment performance is crucial to eliminating surprises.

Asset Information (continued)

Plan Assets are used to develop funded percentages and contribution requirements.

	December 31, 2019
1. Expected Investment Income	
(a) Market value of assets, beginning of prior year	$25,793,581
(b) Employee Contributions	97,837
(c) Employer Contributions	998,711
(d) Refund of Member Contributions	0
(e) Benefit payments	2,187,399
(f) Administrative Expenses	17,448
(g) Expected Investment Income – end of year [6.5% x (a) + 6.5% x (1/2) x {(b)+(c)-(d)-(e)-(f)}]	$1,640,563
2. Market value of Investment Income, beginning of current year	$4,200,535
3. Gain/Loss on market value (2)-(1g)	$2,559,972
4. Phased-In Recognition of Investment Income	
(a) Current Year Phase in of gain/(loss) (2,559,972 x .8)	$2,047,978
(b) First Prior Year ((2,576,124) x .6)	(1,545,674)
(c) Second Prior Year (489,964 x .4)	195,986
(d) Third Prior Year ((418,519) x .2)	(83,704)
(e) Total	$614,586
5. Expected market value of assets, beginning of current year [(1a)+(1b)+(1c)-(1d)-(1e)-(1f)+(1g))]	$26,325,845
6. Final market value of assets [(1a)+(1b)+(1c)-(1d)-(1e)-(1f)+(2))]	$28,885,817
7. Final actuarial value of assets 6-(4e)	$28,271,231

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Reserve Allocation

In financing the Actuarial Accrued Liabilities, the Valuation Assets were distributed as follows:

Reserves for	Active and Deferred Vested Members	Retired Members	Contingency Reserve	Total
Employees' Contributions	$933,014			$933,014
Employer Contributions	(3,187,551)			(3,187,551)
Retired Benefit Payments		$30,525,768		30,525,768
Total	$(2,254,537)	$30,525,768	None	$28,271,231

The Unfunded Actuarial Accrued Liabilities were distributed as follows:

Reserves for	Active and Deferred Vested Members	Retired Members	Total
Computed Actuarial Accrued Liabilities	$7,179,558	$30,525,768	$37,705,326
Applied Assets	(2,254,537)	30,525,768	28,271,231
Unfunded Actuarial Accrued Liabilities	$9,434,095	$0	$9,434,095

Funding Results

The basic building blocks of the actuarial report are contained in this section. These include:

- Reconciliation of Gain/Loss
- Recommended Contribution

Reconciliation of Gain/Loss

	December 31, 2019
Liability (Gain)/Loss	
1. Actuarial liability, beginning of prior year	$36,633,362
2. Normal cost for prior year	491,476
3. Benefit payments	(2,187,399)
4. Expected Interest	2,342,024
5. Change in Assumptions (Mortality Update)	365,397
6. Change in Plan Provisions	0
7. Expected actuarial liability, beginning of current year	37,644,860
8. Actual actuarial liability	37,705,326
9. Liability (Gain)/Loss, (8) – (7)	$60,466
Asset Gain/(Loss)	
10. Actuarial value of assets, beginning of prior year	$27,953,456
11. Contributions	1,096,548
12. Benefit payments	(2,187,399)
13. Expected Investment return	1,781,522
14. Expected actuarial value of assets, beginning of current year	$28,644,127
15. Actual actuarial value of assets, beginning of current year	28,271,231
16. Asset (Gain)/Loss, (14) – (15)	$372,896
Total (Gain)/ Loss, (9) + (16)	$433,362

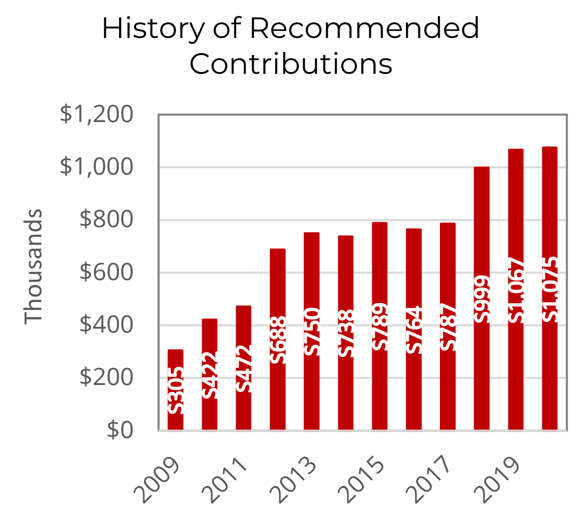
Reconciliation of Unfunded Actuarial Accrued Liability (UAAL)

		December 31, 2019
1.	UAAL beginning of prior year	$8,679,906
2.	Normal Cost for prior year	491,476
3.	Administrative Expenses	$17,448
4.	Employer Contributions	(998,711)
5.	Non-Employer Contributions	(97,837)
6.	Interest	543,054
7.	Expected UAAL, beginning of current year	$8,635,336
8.	Changes due to:	
	(a) Amendments	0
	(b) Assumptions	0
	(1) Mortality Update	365,397
	(c) Funding Methods	0
	(d) (Gain)/Loss	433,362
	(e) Total	$798,759
9.	UAAL beginning of current year	$9,434,095

Development of Recommended Contribution

The recommended contribution is the annual amount necessary to fund the plan according to funding policies and/or applicable laws.

Normal Cost	
1. Normal Cost	
(a) Total Normal Cost	$410,952
(b) Expected participant contributions discounted to December 31	(91,425)
(c) Expected Administrative Expenses discounted to December 31	16,473
(d) Net normal cost as of December 31, 2019	$336,000
As a percentage of expected 2020 payroll (w/o DROP)	20.46%
(e) Net normal cost as of July 1, 2021	$369,287
Amortization of Unrecognized Actuarial Accrued Liability (UAAL)	
1. Calculation of UAAL	
(a) Entry Age Normal Accrued Liability	$37,705,326
(b) Actuarial Value of Assets	28,271,231
(c) UAAL as of December 31, 2019	$9,434,095
2. Anticipated 7/1/2020 UAAL Contribution discounted to December 31	606,874
3. Remaining UAAL to Amortize	8,827,221
4. Amortization Period	18
5. UAAL Amortization as of December 31, 2019	$641,800
6. UAAL Amortization as of July 1, 2021	$705,382
2021 Contribution	
1. Net Normal Cost	$369,287
2. UAAL Amortization	705,382
3. Total Contribution Payable on July 1, 2021	$1,074,669
As a percentage of expected 2021 payroll (w/o DROP)	63.55%
As a percentage of expected 2021 payroll (with DROP)	48.05%



Michigan PA 202 Reporting Requirements

	December 31, 2019	
Funding Assumptions	**Plan Assumptions**	**State Treasury Uniform Assumptions**
Funded Ratio		
Interest Rate	6.50%	6.50%
Mortality	PubS-2010 Mortality with SOA Scale MP-19	No change
Accrued Liability	$37,705,326	$37,705,326
Market Value of Assets	$28,885,817	$28,885,817
Unfunded Accrued Liability, MVA Basis	$8,819,509	$8,819,509
Funded Percentage (MVA)	**76.61%**	**76.61%**
Underfunded Status	Not Underfunded	Not Underfunded
Actuarially Determined Contribution	$1,074,669	$1,074,669

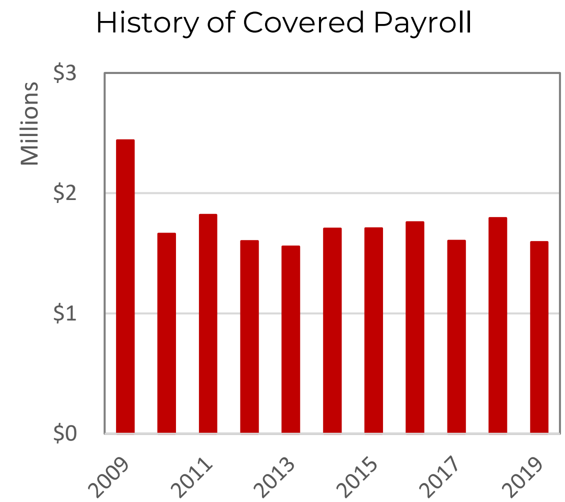
Data, Assumptions, and Plan Provisions

- Demographic Information
- Plan Provisions
- Assumptions and Methods

Demographic Information

The foundation of a reliable actuarial report is the participant information provided by the plan sponsor. Monitoring trends in demographic information is crucial for long-term pension planning.

	December 31, 2018	December 31, 2019
Participant Counts		
Active Participants	24	21
Retired Participants	46	45
Beneficiaries	15	15
Disabled Participants	0	0
Terminated Vested Participants	0	0
DROP Participants	3	6
Total Participants	88	87
Active Participant Demographics (Ongoing)		
Average Age	41.7	40.7
Average Service	11.5	10.7
Average Compensation	$74,709	$75,907
Total Covered Payroll (prior year)	$1,793,006	$1,594,043
Total Payroll (prior year)	$1,793,006	$1,594,043



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Demographic Information (continued)

	December 31, 2018	December 31, 2019
Retiree Statistics		
Average Age	68.6	69.3
Average Monthly Benefit	$3,604	$3,645
Beneficiary Statistics		
Average Age	74.1	75.1
Average Monthly Benefit	$1,120	$1,120
Disabled Participant Statistics		
Average Age	N/A	N/A
Average Monthly Benefit	N/A	N/A
Terminated Vested Participant Statistics		
Average Age	N/A	N/A
Average Monthly Benefit	N/A	N/A
DROP Participant Statistics		
Average Age	55.4	56.5
Average Monthly Benefit	$5,824	$5,718

Monitoring the average age of the population is important due to the relationship of actuarial cost to age. Generally speaking, an older population generates a higher actuarial cost.

Changes in the ratio of active to retired participants can be a significant driver of costs in a volatile asset market.

Participant Reconciliation

	Active	Terminated Vested	Disabled	Retired	Beneficiaries	Totals
Prior Year	24	0	0	49	15	88
Active						
To Retired	(3)			3		
To Terminated Vested						
Terminated Vested						
To Retired						
Retired						
To Survivor						
To Death				(1)		(1)
Survivor						
To Death						
Additions						
Departures						
Current Year	21	0	0	51	15	87

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Active Participant Schedule

Active participant information grouped based on age and service.

Age Group	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25										
25 to 29	2									2
30 to 34	5	2								7
35 to 39		1								1
40 to 44		1		2						3
45 to 49				3	1					4
50 to 54			1		2					3
55 to 59										
60 to 64			1							1
65 to 69										
70 & up										
Total	7	4	2	5	3					21

Plan Status

Act 345 of the Public Acts of 1937 and most recently amended for Township of Ypsilanti 8/8/2018.

Eligibility for Participation

Any full time permanent firefighters and police officers employed by the Township. The Plan is open to new hires for Police and Fire.

Accrual of Benefits

A participant shall accumulate a benefit payable at normal retirement date based on credited service as of the date of determination and the accrual rate associated with their classification.

Benefits

Normal Retirement

Eligibility	25 or more years of service or age 60 regardless of service
Benefit	

Employees hired before 1/1/2014:

3.00% of Final Average Compensation times credited service (up to 25 years) plus 1% times Final Average Compensation times credited service in excess of 25 years.

Employees hired on or after 1/1/2014:

2.35% of Final Average Compensation times credited service (up to 25 years) plus 1% times Final Average Compensation times credited service in excess of 25 years.

Death after Retirement Survivor's Pension

Eligibility	Payable to surviving spouse of retired member receiving a single life annuity effective July 1, 1975 or later
Benefit	60% of the single life annuity the late retiree was receiving

Death before Retirement In Line of Duty

Eligibility	Expiration of workers' compensation to the survivors of a member who died in the line of duty
Benefit	Same amount paid by workers' compensation

Death before Retirement Not In Line of Duty

Eligibility	20 years of service
Benefit	Married participant: spouse will receive single life annuity actuarially reduced in accordance with Option I elected.

Termination Benefit

Eligibility	10 years of service
Benefit	Accrued retirement benefit payable at participant's normal retirement date. If the participant terminates prior to the service requirement, a refund of the accumulated contributions with interest will be issued.

Disability Benefit In Line of Duty

Eligibility	Immediately upon total and permanent disability
Benefit	50% of Final Average Compensation up to age 55, then Normal Retirement Benefit with service credited from date of disability to age 55

Disability Benefit Not In Line of Duty

Eligibility	5 years of service and deemed to be totally and permanently disabled
Benefit	1.5% times Final Average Compensation times credited service As of January 1, 2016 – At what would have been 25 years of service for the retiree, the pension will be recalculated based on the multiplier rate that was in effect at the time of medical retirement.

Deferred Retirement Option Plan (DROP)

Eligibility	Employees hired before 1/1/2014 may participate in the DROP once eligible for retirement.
Benefit	The participant's accrued benefit at the date of entering the DROP, accumulated with interest each year based on the Funded Ratio received within the most recent Annual Pension Valuation.

Funded Ratio	Interest Earned
95% and above	5.0%
85% - 94%	4.0%
75% - 84%	3.0%
74% and below	2.0%

The maximum period for participation in the DROP is 5 years.

Compensation

Compensation includes base rate of pay, overtime pay, longevity pay, holiday pay, sick leave payments, and unused vacation.

Final Average Compensation (FAC)

Final Average Compensation shall be calculated on the three (3) years of highest annual Compensation received by an employee during the ten (10) years of service immediately preceding retirement.

Members shall have the option of having up to fourteen (14) unused vacation days paid out to them and applied and used toward the FAC.

Credited Service

For Vesting and Benefit Accrual
All years and completed months of continuous service with the Township of Ypsilanti.

Employee Contributions

6% of Compensation

Payment Forms

Normal Form
Single Participants: Single Life Annuity
Married Participants: Joint and 60% Survivor Annuity

Plan Provisions Not Included

We are not aware of any plan provisions not included in the valuation

Adjustments Made for Subsequent Events

We are not aware of any event following the measurement date and prior to the date of this report that would materially impact the results of this report.

Data, Assumptions, and Plan Provisions

Except where otherwise indicated, the following assumptions were selected by the plan sponsor with the concurrence of the actuary. Prescribed assumptions are based on the requirements of the relevant law, the Internal Revenue Code, and applicable regulation. The actuary was not able to evaluate the prescribed assumptions for reasonableness for the purpose of the measurement.

Valuation Date

December 31, 2019

Participant and Asset Information Collected as of

December 31, 2019

Cost Method

Individual Entry Age Cost Method – Level percent of pay

Amortization Method

18 year closed level percent of payroll (3.00%) amortization of Unfunded Actuarial Accrued Liability

Asset Valuation Method

Smoothed Value of Assets. Gains or losses on the Market Value of Assets are recognized over five years.

Interest Rates *(CO)*

6.50% net of investment expenses
The interest rate is the long-term rate of return on assets. This assumption is supported by the investment mix of the plan assets and long-term capital market return assumptions.

Annual Pay Increases *(FE)*

Pay increases follow the schedule below:
The annual pay increase reflects a general salary inflation assumption of 3.00% and a merit increase up to 3.50%. These assumptions are based on the latest experience study.

Age	Base Rate	Merit Rate
20	3.00%	3.50%
25	3.00%	3.50%
30	3.00%	3.10%
35	3.00%	1.60%
40	3.00%	0.70%
45	3.00%	0.70%
50	3.00%	0.70%
55	3.00%	0.60%
60	3.00%	0.50%

Mortality Rates *(FE)*

Healthy	PubS-2010 Mortality with generational improvements projected beginning in 2010 based on the SOA Scale MP-19
Disabled	PubS-2010 Mortality with generational improvements projected beginning in 2010 based on the SOA Scale MP-19

As the plan is not large enough to have credible experience, mortality assumptions are set to reflect general population trends.

Marital Status and Ages*(FE)*

90% of Participants assumed to be married with wives assumed to be the same age as their husbands.

Retirement Rates *(FE)*

Rates are based on years of service and date of hire.
100% of participants are assumed to retire at age 60 regardless of service.

Rates for participants hired before 1/1/2014.

Service	Rate
25-28 years	50%
29 years	60%
30+ years	100%

Rates for participants hired on or after 1/1/2014.

Service	Rate
25 years	60%
26-27 years	50%
28 years	70%
29 years	80%
30+ years	100%

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Disability Rates *(FE)*

Rates are based on age and are assumed to be 0% during a participant's first 5 years of service. Sample rates after the first 5 years of service are below.

Age	Males	Females
20	0.07%	0.03%
25	0.09%	0.05%
30	0.10%	0.07%
35	0.14%	0.13%
40	0.21%	0.19%
45	0.32%	0.28%
50	0.52%	0.45%
55	0.92%	0.76%
60	1.53%	1.10%

Withdrawal Rates *(FE)*

Rates are based on age and service. Sample rates are below.

Age	Service	Rate
ALL	0	10.0%
ALL	1	7.0%
ALL	2	5.0%
ALL	3	4.0%
ALL	4	3.5%
25	5+	3.5%
30	5+	2.9%
35	5+	1.5%
40	5+	0.6%
45+	5+	0.5%

Retirement rates, Disability rates, and Withdrawal rates are based on the most recent experience study from 2017.

Duty-Related Deaths and Disabilities *(FE)*

70% of pre-retirement deaths and disabilities are assumed to be duty-related

FE indicates an assumption representing an estimate of future experience
MD indicates an assumption representing observations of estimates inherent in market data
CO indicates an assumption representing a combination of an estimate of future experience and observations of market data