ANNE ARUNDEL COUNTY
MARYLAND

Anne Arundel County
Retirement and Pension System

Comprehensive Annual Financial Report

Pension Trust Funds of Anne Arundel County, Maryland

For the Year Ended December 31, 2018

Anne Arundel County
Retirement and Pension System

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For the Year Ended December 31, 2018

Prepared by:
The Anne Arundel County Office of Finance
44 Calvert Street
Annapolis MD 21401

Anne Arundel County Retirement and Pension System
Comprehensive Annual Financial Report
For the Year Ended December 31, 2018

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Introductory Section

ANNE ARUNDEL COUNTY
MARYLAND

Dear Board of Trustees and Members of the
Anne Arundel County Retirement and Pension System:

I am pleased to present to you the Anne Arundel County Retirement and Pension System (the "System") Comprehensive Annual Financial Report for the year ended December 31, 2018. This financial report is a historical perspective of benefits, services, and fiscal activities of the System. The purpose of this report is to provide you, the retirement System participants and other interested parties, with sufficient information to evaluate the performance of the System during the plan year.

Plan History

County employees participate in four single-employer defined benefit pension plans (the "Plans"). The County Plans were established under authority created by County Charter and legislation. In December 1996, the County passed legislation creating the Anne Arundel County Retirement and Pension System, a corporation that is an agency in the executive branch of County government, effective February 1, 1997. At that date, all net assets of pension trust funds were transferred to the System. In 2004, the Board of Trustees of the System (the "Board") adopted a formal statement of funding objectives, policy, and strategy. The Statement of Investment Policy and Objectives was designed to clearly communicate the directives of the Trustees of the System to all interested parties. This investment policy applies to the funds of the System on an aggregate basis. The Policy Statement sets forth how each fund manager shall be governed and details specific investment guidelines relating to each of the fund managers.

Major Initiatives

In 2016, the Board did an extensive review of the System's custody agreement, fees, and securities lending arrangements. A new fee schedule was negotiated with the existing custodian and the securities lending program was transferred from the custodian to a new provider.

An Experience and Assumption Study was conducted by the actuary in 2012 to review the experience of the Plans during 2007 to 2011. In 2018, an Experience and Assumption Study was conducted by the actuary. The report recommended changes in assumptions due to their study of the demographic and economic experience of the Anne Arundel County Retirement Plans for the 2012 through 2016 plan years and their expectations for future experience. A gradual change in the discount rate (investment return) from 7.50% to 7.25% over the next five years was voted on and adopted by the Board. The Board will make this change gradually by lowering the discount rate five basis points each year. The rate for 2019 will be 7.45%.

Each year, the Board reviews the investment asset allocation and prospective returns for the various classes to attempt to construct a portfolio that will produce the desired rate of return. The resulting rebalancing of the portfolio generally requires moving funds among managers and can result in the elimination of a current manager or the hiring of a new investment manager. In 2017, the System changed an investment manager in the International Small Cap Equity strategy in order to improve performance, and committed an additional $28.0 million to Private Markets. In 2018, as a result of rebalancing decisions, profits were rebalanced from equities to the real estate portfolio and fixed income portfolios. In 2018, the System voted to invest $30.0 million in the $13.5 billion Warburg Pincus Global Growth Fund.

The Pension System Investment Policy was updated in 2018 to formally codify asset allocation changes approved by the Board during the February meeting.

A new 401(a) Employee Retirement Savings Plan ("Savings Plan") was created by Bill No. 95-17. Effective July 1, 2018, any employee hired in any position eligible to participate in the Employees' Retirement System shall have the election to choose the Employee Retirement Savings Plan. The employee contribution rate for the Savings Plan is 4.0% and there is an 8.0% employer contribution rate. An employee vests in the new plan in five years.

The Employee Pension Portal online system went live in the fall of 2018. The portal allows employees to view their annual pension statement, calculate retirement estimates and use other retirement tools electronically, including the Deferred Retirement Option Program (DROP) calculation for employees eligible for the DROP.

Funding Status

The fiduciary net position as a percentage of the total pension liability decreased for the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan and the Detention Officers' and Deputy

Sheriffs' Retirement Plan. The Employees Retirement Plan decreased from 77.2% in 2017 to 68.8% in 2018. The Police Service Retirement Plan decreased from 79.4% in 2017 to 71.5% in 2018. The Fire Service Retirement Plan decreased from 88.0% in 2017 to 78.2% in 2018. The Detention Officers' and Deputy Sheriffs' Retirement Plan decreased from 75.0% in 2017 to 67.2% in 2018.

Investment Performance

The average negative investment returns for the Employees' Retirement Plan, the Police Service Retirement Plan, and the Fire Service Retirement Plan on a market value basis for the year ended December 31, 2018 were 4.7%, and for the Detention Officers' and Deputy Sheriffs' Retirement Plan, 4.8%. On an actuarial basis, the average investment returns for the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan, and the Detention Officers' and Deputy Sheriffs' Retirement Plan were 4.7%, 4.6%, 4.6%, and 4.7%, respectively. The actuarial value of assets is calculated by spreading the market-value investment gains or losses in excess of (or below) the assumed rate of return over a five-year period. The asset-smoothing method was changed with the 2011 valuation.

System Organization and Management

The Board of Trustees is responsible for reviewing the investment program, approving policies, objectives, and guidelines and reviewing the financial performance of the System in relation to expectations. The Board also appoints the investment committee to make specific recommendations as to asset allocation and investment strategies. The investment committee works with an investment consultant, currently New England Pension Consultants (NEPC), to establish strategies and conduct searches for appropriate investment managers. The Board has final approval for all manager selections and policy changes.

The Board also selects the custodial bank, currently State Street Bank & Trust, that has custody of and is the bank of record for the Plans' investments, the actuary for the Plans, Bolton Partners, Inc., and the independent auditors, CliftonLarsonAllen, LLP. The Secretary of the Board of Trustees is responsible for daily administrative decisions and the Anne Arundel County Office of Personnel and the Office of Finance carry out these administrative actions, including transmittal of contributions and funding the payment of benefits and other administrative expenses. Additional details regarding investment professionals who provide services to the System are included in the Investment Section later in this report.

Financial Management

The financial statements and supplemental information and schedules included in this report are the responsibility of System management and have been prepared in accordance with accounting principles generally accepted in the United States of America for governmental accounting and reporting as pronounced and adopted by the Governmental Accounting Standards Board. I advise you to read the Management Discussion and Analysis, Basic Financial Statements, and Notes to the Basic Financial Statements to gain a better understanding of the results of the System during 2018.

Independent Audit

The System is audited annually. CliftonLarsonAllen, LLP, an independent firm of Certified Public Accountants, conducted the audit for the year ended December 31, 2018. Refer to Independent Auditors' Report for the audit opinion.

Internal Accounting Control

Management is responsible for maintaining a system of adequate internal controls designed to provide reasonable assurance that transactions are executed in accordance with management's general or specific authorization, and are recorded as needed to maintain accountability for assets and to permit preparation of the combining financial statements. We believe the internal controls in effect during the year ended December 31, 2018 adequately safeguard the assets and provide reasonable assurance regarding the proper recording of financial transactions.

Acknowledgments

Staff in Anne Arundel County's Office of Finance prepared this Comprehensive Annual Financial Report of the Retirement and Pension System. The report is intended to provide complete and reliable information as a basis for making management decisions, determining compliance with legal provisions, and to provide a means of determining responsible stewardship for the assets contributed by the members and their employers. This report is being sent to the Board of Trustees and other interested parties.

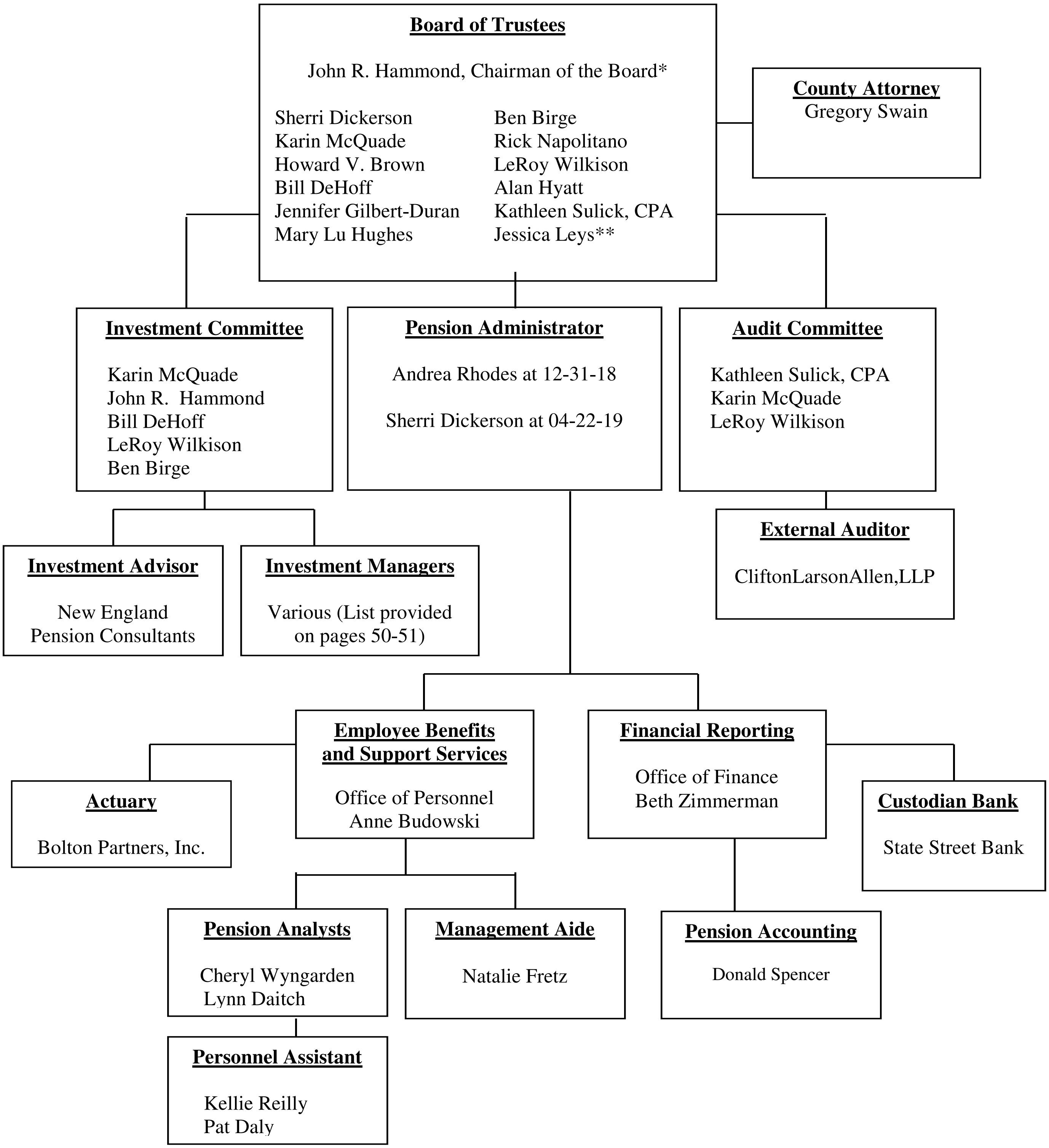
Respectfully,

Karin McQuade

Karin McQuade
Controller

Anne Arundel County Retirement and Pension System

Organizational Chart



*As of December 31, 2018

**Acting Budget Officer as of January 1, 2019

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Financial Section

CliftonLarsonAllen LLP
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INDEPENDENT AUDITORS' REPORT

Board of Trustees
Anne Arundel County Retirement and Pension System
Annapolis, Maryland

Report on the Financial Statements

We have audited the accompanying financial statements of Anne Arundel County Retirement and Pension System (the System), a pension trust fund of Anne Arundel County, Maryland, which comprise the combining statement of fiduciary net position as of December 31, 2018 and the related combining statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2018, and the respective changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Report on Summarized Comparative Information

We have previously audited the System's 2017 financial statements, and we expressed an unmodified audit opinion on those audited financial statements in our report dated June 14, 2018. In our opinion, the summarized comparative information presented herein as of and for the year ended December 31, 2017 is consistent, in all material respects, with the audited financial statements from which it has been derived.

A member of Nexia International

Board of Trustees
Anne Arundel County Retirement and Pension System

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, the schedules of changes in net pension liability and related ratios by plan, investment returns, and employer contributions by plan, and notes to required supplementary information, as listed in the table of contents, be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the System's financial statements. The supplementary schedules, including the schedules of administrative expenses, investment expenses, and payments to consultants and the introductory, investment, actuarial and statistical sections, as listed in the table of contents, are presented for purposes of additional analysis and are not a required part of the financial statements.

The supplementary schedules, as listed in the table of contents, are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the financial statements. Such information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supplementary schedules, including the schedules of administrative expenses, investment expenses, and payments to consultants, as listed in the table of contents, are fairly stated, in all material respects, in relation to the financial statements as a whole.

The information in the introductory, investment, actuarial and statistical sections, as listed in the table of contents, have not been subjected to the auditing procedures applied in the audit of the financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated June 14, 2019 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

CliftonLarsonAllen LLP

CliftonLarsonAllen LLP

Baltimore, Maryland
June 14, 2019

CliftonLarsonAllen LLP
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INDEPENDENT AUDITORS' REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT OF FINANCIAL STATEMENTS PERFORMED IN ACCORDANCE WITH *GOVERNMENT AUDITING STANDARDS*

The Board of Trustees
Anne Arundel County Retirement and Pension System
Annapolis, Maryland

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of Anne Arundel County Retirement and Pension System (the System), a pension trust fund of Anne Arundel County, Maryland, which comprise the combining statement of fiduciary net position as of December 31, 2018 and the related combining statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, and have issued our report thereon dated June 14, 2019.

Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered the System's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we do not express an opinion on the effectiveness of the System's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the System's financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

The Board of Trustees
Anne Arundel County Retirement and Pension System

Compliance and Other Matters

As part of obtaining reasonable assurance about whether the System's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the result of that testing, and not to provide an opinion on the effectiveness of the System's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

CliftonLarsonAllen LLP

CliftonLarsonAllen LLP

Baltimore, Maryland
June 14, 2019

Introduction

To introduce readers of the financial report of the Anne Arundel County Retirement and Pension System (System), the Office of Finance is pleased to provide this discussion and analysis of financial activities for the year ended December 31, 2018. Please read it in conjunction with the rest of the report, which consists of the basic financial statements, including the notes thereto, required supplementary information (RSI), and supplementary schedules. Combined amounts from the year ended December 31, 2017 have been provided herein to enhance comparability.

The System has the fiduciary responsibility to administer four single-employer defined benefit pension plans for certain Anne Arundel County (County) employees: the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan and the Detention Officers' and Deputy Sheriffs' Retirement Plan (the "Plans").

Financial Highlights

The System's total fiduciary net position decreased $131.3 million in calendar year 2018, bringing net position to $1.8 billion. Contributions increased 4.9% to $85.8 million versus $81.8 million in 2017. Of this total, employer contributions of $72.0 million were 5.4% higher than as of 2017 at $68.3 million. Participant contributions increased by $0.4 million to $13.9 million, a 2.5% increase. The 2018 time weighted total rate of return of -4.7% compares to a gain of 16.0% for 2017.

The System paid $126.2 million in benefits in 2018, compared with $122.6 million paid in 2017, an increase of 3.0%. The 2018 Cost of Living Adjustment (COLA) for beneficiaries ranged from 1.4% for retirees since 1997 and 2.1% to 2.4% for substantially all retired prior to 1997. The number of benefit recipients increased to 3,623, a 3.3% increase over the prior year.

Employees' Retirement Plan – In 2018, net position decreased $49.7 million or 7.4% to $620.2 million driven primarily by investment loss of $31.4 million compared with $94.8 million in 2017. Benefit payments of $50.6 million outpaced contributions of $32.6 million by $17.9 million and various administrative expenses were $533.9 thousand.

Police Service Retirement Plan – In 2018, net position decreased $37.0 million or 6.7% to $516.3 million. The Plan's benefit payments of $35.9 million were $10.6 million greater than contributions of $25.3 million. Investment losses of $26.0 million in 2018 compare to gains of $78.1 million in 2017. Administrative expenses were $470.0 thousand.

Fire Service Retirement Plan – In 2018, net position decreased by $38.1 million or 6.9% to $509.7 million. Investment losses in 2018 were $25.3 million compared with a gain of $77.9 million in 2017. Contributions of $19.2 million were 60.9% of the benefit payments of $31.6 million. Various administrative expenses were $453.0 thousand.

Detention Officers' and Deputy Sheriffs' Retirement Plan. – In 2018, net position decreased by $6.5 million or 4.6% to $134.8 million. Contributions were $8.6 million compared with benefit payments of $8.2 million. Investment losses of $6.9 million in 2018 compare to gains of $19.6 million in 2017.

Overview of the Basic Financial Statements

In this financial report, the basic financial statements consist of the Combining Statement of Fiduciary Net Position and the Combining Statement of Changes in Fiduciary Net Position with accompanying Notes. The financial statements present information in separate columns for each of the four single-employer defined benefit pension plans as of and for the year ended December 31, 2018 with combined comparative information as of and for the year ended December 31, 2017. The Combined Statement of Fiduciary Net Position presents the financial position of the Plans. The financial position is comprised of assets, which primarily consist of investments less liabilities, including accounts payable, investment commitments payable, and the obligation for collateral related to the securities lending program. The obligation from the securities lending program is offset by collateral held. The difference between assets and liabilities is net position, which represents the amount of resources available to pay future benefits to retirees and their beneficiaries.

Investments net of cash consist of domestic and foreign debt obligations, domestic and foreign equities, real estate, insurance company contracts, absolute return funds, and private markets. The System has a securities lending program to enhance its investment return. The assets and liabilities arising from the program are closely matched, netting to no additional material Plan liability. In accordance with generally accepted accounting principles, the liability for future benefit payments is not reported in these financial statements. Refer to Note 4 for the Schedule of Net Pension Liability of the System by Plan which presents an estimate of the liabilities.

The Combining Statement of Changes in Fiduciary Net Position presents the additions to and deductions from the four Plans' net positions during the year. Each Plan receives contributions from participants and the County, as well as income or losses from investments and related activity. The primary deductions are the payment of benefits, which are the Plans' primary objectives. Deductions also include refunds to members who leave the Plans as well as administrative expenses. Administrative expenses are allocated monthly to each Plan based on its relative percentage of the total investments.

Notes to the Basic Financial Statements

The Notes to the Basic Financial Statements are an integral part of the statements. These notes provide background and more detail about the information in the financial statements. Among other matters, the notes describe the System's purpose and its membership; the significant accounting policies used to prepare the basic financial statements; the nature of the four Plans, including the membership and benefit provisions and contribution requirements; the System's investment authority and policies; how investments and related documentation are safeguarded; and selected details about various investment activity and balances.

Required Supplementary Information (RSI)

The RSI section provides actuarially determined information about the Plans. The section displays changes for each Plan's Net Pension Liability (NPL) and related ratios, contributions related to payrolls by Plan, and money-weighted investment returns for the System.

Summary and Analysis of Financial Information

The following Condensed Statements of Fiduciary Net Position and Changes in Fiduciary Net Position present financial information, with dollar amounts in millions, for the System comparing 2018 and 2017.

Condensed Combining Statement of Fiduciary Net Position
As of December 31, 2018 and 2017

(in millions)			Change in	
Assets	**2018**	**2017**	**Dollars**	**Percentage**
Cash and short-term investments	$ 59.6	$ 67.2	$ (7.6)	(11.3) %
Securities lending collateral	54.0	54.1	(0.1)	(0.2)
Receivables	11.0	9.0	2.0	22.3
Investments at fair value and deposits	1,726.1	1,849.1	(123.0)	(6.7)
Total assets	1,850.7	1,979.4	(128.7)	(6.5)
Liabilities				
Investment settlements and accounts payable	15.7	13.0	2.7	20.8
Securities lending obligations	54.0	54.1	(0.1)	(0.2)
Total liabilities	69.7	67.1	2.6	3.9
Net position restricted for pension benefits	$ 1,781.0	$ 1,912.3	$ (131.3)	(6.9) %

Condensed Combining Statement of Changes in Fiduciary Net Position
For Years Ended December 31, 2018 and 2017

			Change in	
(in millions)	**2018**	**2017**	**Dollars**	**Percentage**
Additions				
Employer contributions	$ 72.0	$ 68.3	$ 3.7	5.5 %
Participant contributions	14.0	13.5	0.5	3.7
Investment income / gains /(losses)	(89.5)	270.7	(360.2)	(133.1)
Total additions	(3.5)	352.5	(356.0)	(101.0)
Deductions				
Benefit payments and refunds	126.2	122.6	3.6	2.9
Administrative expenses	1.6	1.5	0.1	6.7
Total deductions	127.8	124.1	3.7	3.0
Net increase/(decrease)	(131.3)	228.4	(359.7)	(157.5)
Net position restricted for pension benefits				
Beginning of year	1,912.3	1,683.9	228.4	13.6
End of year	$ 1,781.0	$ 1,912.3	$ (131.3)	(6.9) %

Comparative investment time weighted returns are displayed by investment type in the following table. The table also shows each category's relative percent of the System's investment portfolio.

Investment Type	Percent of Investments		Annual Investment Return	
	2018	2017	2018	2017
Cash and temporary investments	3.3%	3.5%	2.0%	1.0%
Domestic equity	20.4	23.8	(7.2)	20.7
International equity pools	23.4	26.0	16.1	29.3
Domestic and international fixed income	19.9	18.4	(5.3)	6.0
Global asset allocation pools	13.6	12.5	(0.2)	8.4
Opportunistic	0.4	0.6	2.6	3.9
Private markets	7.4	6.1	16.1	15.2
Real estate investment pools	6.8	5.0	8.8	8.0
Stable value pooled investments	1.2	1.2	4.0	3.7
Absolute Return fixed income	3.6	2.9	(0.5)	4.9
Total percent of investments	100.0%	100.0%		
Total annual performance			-4.7%	16.0%

The System's funding objective is to meet long-term benefit obligations through contributions and investment income. The funding ratio, which is the actuarial value of assets divided by the actuarial accrued liability, is an estimate of how well the System is meeting that objective. A higher funded ratio indicates that the Plan is better funded. As of December 31, 2018 and 2017 the funded ratios for the System were 77.7% and 80.1%, respectively. Additionally, System fiduciary net position as a percentage of the total pension liability as of December 31, 2018 was 71.9%.

The System paid $126.2 million in retirement benefits and refunds to 3,623 participants and beneficiaries during 2018, compared to $122.6 million in 2017 to 3,506 participants and beneficiaries. This reflects an average of $34.8 thousand per person in 2018, compared to an average of $35.0 thousand in 2017.

The System received $14.0 million in contributions from 3,931 active participants during 2018. In 2017, $13.5 million was received from 4,023 active participants. The employer contributions were $72.0 million in 2018, compared to $68.3 million in 2017. Employer contributions for the calendar year are based on the appropriate June fiscal year's actuarial recommended contribution, which is divided by 12 and provided to the respective Plans on a monthly basis. The County contributed 100.0% of the 2018 Actuarially Determined Contribution (ADC) for all Plans and has contributed the ADC recommended by the actuary for the past 10 years, with true-up adjustments from 2010 to 2011 and 2014 to 2015. Administrative costs for 2018 were approximately $1.6 million for 8,003 participants or an average cost of $200 per person compared to $1.5 million for 2017 administrative costs for 7,935 participants at $189 per person.

Overall Analysis of Financial Position

The System reduced its long-term investment return assumption from 7.5% to 7.25% in 2018 which, as a more conservative approach, puts pressure on reducing the Net Pension Liability (NPL). The Board of Trustees believes the System is structured to support continued asset growth and stable funding for the future.

Requests for information

The System's Comprehensive Annual Financial Report is available at Anne Arundel County's web page http://www.aacounty.org/boards-and-commissions/retirement-and-pension-system-board-of-trustees/pension-trust-fund-reports/. If you have questions concerning this report or need additional financial information, please contact the Office of Personnel, 2660 Riva Road, Annapolis, Maryland, 21401

Anne Arundel County Retirement and Pension System
Combining Statement of Fiduciary Net Position
December 31, 2018 (with December 31, 2017 Combined Comparative Totals)

	Employees' Retirement Plan	*Police Service Retirement Plan*	*Fire Service Retirement Plan*	*Detention Officers' and Deputy Sheriffs' Retirement Plan*	*2018 Combined Total*	*2017 Combined Total*
ASSETS						
Investments:						
Cash and temporary investments	$ 20,666,702	$ 17,210,853	17,209,020	$ 4,490,036	$ 59,576,611	$ 67,291,489
U. S. Government obligations	5,936,332	4,941,914	4,882,599	1,289,267	17,050,112	21,228,981
Corporate obligations	40,124,549	33,403,127	33,002,209	8,714,341	115,244,226	115,680,153
Fixed income mutual funds	52,711,393	43,881,499	43,354,815	11,447,980	151,395,687	142,551,781
International fixed income mutual funds	24,252,853	20,190,162	19,947,831	5,267,290	69,658,136	73,539,157
Global asset pools	84,472,663	70,322,312	69,478,276	18,345,964	242,619,215	239,068,825
Domestic equity	126,967,858	105,698,969	104,430,327	27,575,167	364,672,321	456,905,578
International equity pools	145,729,329	121,317,631	119,861,528	31,649,826	418,558,314	498,330,852
Private markets	48,443,593	40,328,615	39,844,574	10,521,089	139,137,871	128,847,114
Real estate investment pools	42,415,853	35,310,605	34,886,793	9,211,971	121,825,222	95,810,314
Absolute return fixed income	22,288,591	18,554,941	18,332,237	4,840,687	64,016,456	54,392,074
Aetna insurance pooled fixed income	7,638,405	6,358,866	6,282,544	1,658,926	21,938,741	22,612,156
Total investments	621,648,121	517,519,494	511,512,753	135,012,544	1,785,692,912	1,916,258,474
Collateral from securities lending transactions	18,807,910	15,657,323	15,469,398	4,084,745	54,019,376	54,066,224
Receivables:						
Employer contributions	2,330,044	1,876,085	1,367,166	617,960	6,191,255	5,800,768
Participant contributions	394,195	267,340	273,060	101,568	1,036,163	1,014,925
Accrued interest and dividends	680,344	566,383	559,587	147,763	1,954,077	1,857,419
Investment sales proceeds	618,277	514,707	508,529	134,279	1,775,792	296,818
Total receivables	4,022,860	3,224,515	2,708,342	1,001,570	10,957,287	8,969,930
Deposits on hand	5,666	89,242	41,047	-	135,955	128,492
Total assets	644,484,557	536,490,574	529,731,540	140,098,859	1,850,805,530	1,979,423,120
LIABILITIES						
Accounts payable	854,302	711,195	702,658	185,539	2,453,694	1,981,739
Investment commitments payable	4,649,563	3,870,696	3,824,238	1,009,803	13,354,300	11,122,278
Obligation for collateral received under securities lending transactions	18,807,910	15,657,323	15,469,398	4,084,745	54,019,376	54,066,224
Total liabilities	24,311,775	20,239,214	19,996,294	5,280,087	69,827,370	67,170,241
Net position held in trust for pension benefits	**$ 620,172,782**	**$ 516,251,360**	**509,735,246**	**$ 134,818,772**	**$ 1,780,978,160**	**$ 1,912,252,880**

Accompanying notes to the basic financial statements are an integral part of this statement.

Anne Arundel County Retirement and Pension System
Combining Statement of Changes in Fiduciary Net Position
For the Year Ended December 31, 2018 (with December 31, 2017 Combined Comparative Totals)

	Employees' Retirement Plan	*Police Service Retirement Plan*	*Fire Service Retirement Plan*	*Detention Officers' and Dep. Sheriffs' Retirement Plan*	*2018 Combined Total*	*2017 Combined Comparative Total*
ADDITIONS						
Contributions						
Employer	$ 27,032,514	$ 21,933,942	$ 15,703,506	$ 7,282,176	$ 71,952,138	$ 68,249,610
Participants	5,611,993	3,371,789	3,523,812	1,351,994	13,859,588	13,516,451
Total contributions	32,644,507	25,305,731	19,227,318	8,634,170	85,811,726	81,766,061
Investment income						
Net appreciation/(depreciation) in market value of investments	(44,400,980)	(36,932,377)	(36,520,542)	(9,643,353)	(127,497,252)	234,740,805
Interest income	7,259,387	6,171,915	6,478,186	1,527,912	21,437,400	22,982,861
Dividend income	9,886,638	8,212,442	8,118,224	2,131,027	28,348,331	24,758,884
Income/ loss from investment activities	(27,254,955)	(22,548,020)	(21,924,132)	(5,984,414)	(77,711,521)	282,482,550
Less investment expense	4,097,266	3,456,485	3,407,162	873,180	11,834,093	12,014,941
Net income/gain/(loss) from investing activities	(31,352,221)	(26,004,505)	(25,331,294)	(6,857,594)	(89,545,614)	270,467,609
Securities lending activities						
Securities lending income	501,983	416,736	412,012	107,992	1,438,723	891,648
Securities lending expenses						
Borrower rebates	343,824	285,436	282,200	73,967	985,427	503,828
Management fees	63,264	52,520	51,925	13,610	181,319	155,128
Total securities lending expenses	407,088	337,956	334,125	87,577	1,166,746	658,956
Net income from securities lending	94,895	78,780	77,887	20,415	271,977	232,692
Total investment income/(loss)	(31,257,326)	(25,925,725)	(25,253,407)	(6,837,179)	(89,273,637)	270,700,301
Total additions	1,387,181	(619,994)	(6,026,089)	1,796,991	(3,461,911)	352,466,362
DEDUCTIONS						
Benefit payments	50,574,448	35,929,917	31,571,336	8,164,410	126,240,111	122,602,452
Administrative expenses	533,927	470,041	452,952	115,778	1,572,698	1,508,247
Total deductions	51,108,375	36,399,958	32,024,288	8,280,188	127,812,809	124,110,699
Increase/(decrease) in fiduciary net position	(49,721,194)	(37,019,952)	(38,050,377)	(6,483,197)	(131,274,720)	228,355,663
Net position, January 1	669,893,976	553,271,312	547,785,623	141,301,969	1,912,252,880	1,683,897,217
Net position, December 31	**$ 620,172,782**	**$ 516,251,360**	**$ 509,735,246**	**$ 134,818,772**	**$ 1,780,978,160**	**$ 1,912,252,880**

Accompanying notes to the basic financial statements are an integral part of this statement.

1 Summary of Significant Accounting Policies

The Anne Arundel County Retirement and Pension System (System) administers four defined benefit pension plans – the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan, and the Detention Officers' and Deputy Sheriffs' Retirement Plan (Plans). Although the assets of the Plans are commingled for investment purposes, each Plan's assets may be used only for the payment of benefits to the members of that Plan, in accordance with its terms. The System was established as an Agency in the Executive branch of Anne Arundel County, Maryland (County) and has the powers and privileges of a corporation to the extent permitted by law. The System is reported as Pension Trust Funds in the County's Comprehensive Annual Financial Report (CAFR). The Board of Trustees is comprised of representatives from the Executive branch of the County, participating employee groups, and two representatives from outside County government.

A *Basis of Presentation* – The accounts of the System are organized on the basis of separate pension trust funds for each Plan, each of which is considered a separate accounting entity. The operations of each fund are accounted for with a separate set of self-balancing accounts that comprise its assets, liabilities, net position, additions, and deductions.

B *Basis of Accounting* – The basic financial statements were prepared using the accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. The County's contribution to each Plan is recognized when due and the County has made a formal commitment to provide the contribution. Benefits and refunds are recognized when due and payable in accordance with the terms of each Plan.

The accounting and reporting policies conform to accounting principles generally accepted in the United States of America as applicable to government organizations. The preparation of financial statements in conformity with these principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

C *Investments* – Investments are reported at fair value. Short-term investments are reported at cost, which approximates fair value. Securities traded on a national or international exchange are valued at the last reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments, and are discounted at prevailing interest rates for similar instruments reflected at fair value. The fair value of real estate investments is based on periodic independent appraisals. Investments that do not have an established market, such as private markets, are reported at estimated fair values. The fair value of private markets are based on management's valuation of estimates and assumptions from information and representations provided by the respective general partners, in the absence of readily ascertainable market values. There are no investments with parties or in entities related to the County. Fixed income securities are valued based on yields currently available on comparable securities of issuers with similar credit ratings.

D *Administrative Expenses* – The administrative expenses of the System are charged to the respective Plans on the basis of its percentage ownership in the System's net position. Expenses are paid either by the County or from a separate cash account held by the custodian. Because of the commingled nature of funds, payments may be from either investment earnings or contributions. The total administrative expenses incurred during the year ended December 31, 2018 were $1,572,698 of which approximately $579,260 was initially paid through the County's Accounts Payable department and subsequently reimbursed to the County by the System. The System is administered by employees within the County's Office of Personnel and the Office of Finance. Some administrative costs are allocated to the Pension System and paid by the Custodian. Certain administrative costs are paid by the County's General Fund and reimbursed by the System to the County.

E *Income Taxes* – The System qualifies under Section 401(a) of the Internal Revenue Code (IRC) and is exempt from income taxation as allowed by Section 501(a) of the IRC.

F *Comparative Financial Information* – The financial statements include prior-year combined comparative information for the System, but not at the individual Plan level, which is required by generally accepted accounting principles. Accordingly, these financial statements should be read in conjunction with the System's audited financial report from 2017, from which the combined prior-year amounts were derived.

G *New GASB Pronouncements* – For the year ended December 31, 2018, there were no new GASB pronouncements to be implemented.

2 General Description of the System

A *Covered Membership* – Membership in each plan consisted of the following as of December 31, 2018, based on the January 1, 2019 actuarial valuation:

	Employees' Plan	Police Plan	Fire Plan	Detention Plan	Total
Retirees and beneficiaries receiving payments	1,974	739	626	284	3,623
Terminated plan members entitled to but not yet receiving payments	303	-	-	4	307
Deferred Retirement Option Program (DROP)	-	61	60	21	142
Active plan members	2,191	638	780	322	3,931
	4,468	1,438	1,466	631	8,003

B *Plan Description, Contribution Information and Vesting* – The following description of the System provides only general information. Participants should refer to the most recent Summary Plan Description booklets for a more complete description of the respective Plan's provisions.

Employees' Retirement Plan

Plan Description – The Employees' Retirement Plan is a single-employer defined benefit pension plan that covers all full-time general employees of the County who are not included in any other pension plan, as well as employees of Anne Arundel Economic Development Corporation. The Plan provides retirement, disability, and death benefits to Plan members and their beneficiaries pursuant to two separate benefit structures, Tier I and Tier II. Cost-of-living adjustments (COLAs) are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Employees who elect to be in Tier I are required to contribute 4.0% of their annual covered salary. Tier II employees are not required nor permitted to make contributions. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2018 of $27,032,514, as determined by the Plan's consulting actuary.

Cliff Vesting – Participants hired on or before June 30, 2015 will be fully vested after their fifth year of service. Termination prior to the fifth year will result in the return of all employee contributions, if applicable, plus 4.25% interest per annum with no additional benefits available. Participants hired on or after July 1, 2015 will be fully vested after their tenth year of service. Termination prior to the tenth year will result in the return of all employee contributions, if applicable, plus 4.25 % interest per annum with no additional benefits available.

Police Service Retirement Plan

Plan Description – The Police Service Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Police Officer, Police Sergeant, Police Lieutenant, Police Captain, Police Major, Deputy Police Chief, and (by election) the Chief of Police. The Plan provides retirement, disability, and death benefits to Plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 7.25% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2018 of $21,933,942, as determined by the Plan's consulting actuary.

Normal Retirement – Participants hired on or after February 25, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of their fifth year of service, or their completion of 20 years of service. Participants hired before February 25, 2002 will be fully vested on the earlier of their attainment of age 50 or completion of 20 years of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 3.0% interest per annum with no additional benefits available.

Fire Service Retirement Plan

Plan Description – The Fire Service Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Fire Fighter II, Fire Fighter III, Fire Fighter Cardiac Rescue Technician, Fire Fighter/Emergency Medical Technician-Paramedic, Fire Lieutenant, Fire Captain, Fire Battalion Chief, Fire Division Chief, Fire Deputy Chief, and (by election) the Fire Administrator. The Plan provides retirement, disability, and death benefits to plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 7.25% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2018 of $15,703,506, as determined by the Plan's consulting actuary.

Normal Retirement – Participants who retire on or after July 1, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of their fifth year of service, or their completion of 20 years of service. Participants who retired prior to July 1, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of 5 years of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 3.% interest per annum with no additional benefits available.

Detention Officers' and Deputy Sheriffs' Retirement Plan

Plan Description – The Detention Officers' and Deputy Sheriffs' Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Detention Officer I, Detention Officer II, Detention Officer III, Correctional Program Specialist I, Correctional Program Specialist II, Criminal Justice Program Supervisor, Security Administrator, Correctional Facility Administrator, Assistant Correctional Facility Administrator, Deputy Sheriff I, Deputy Sheriff II, Deputy Sheriff III, Deputy Sheriff IV, and (by election) the Superintendent of Detention Facilities. The plan provides retirement, disability, and death benefits to Plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 6.75% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2018 of $7,282,176, as determined by the Plan's consulting actuary.

Cliff Vesting – Participants will be fully vested on the attainment of age 50 and completion of their fifth year of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 4.25% interest per annum, with no additional benefits available.

C Legislative Changes for the Past Five Years

Bill No. 02-14 amends provisions related to the calculation of death benefits, locating persons entitled to benefits, and other general provisions to comply with IRS plan qualification rules.

Bill No. 56-16 added interest in the 6th year of DROP for Police and DO/DS plans and added the exception to the benefit reduction for retired police officers who participated in the DROP program reemployed into a position in the Sheriff's or State's Attorney's Office requiring certification as a police officer.

Bill No. 86-16 modifies provisions of the County Code relating to the Employees' Retirement Plan ("the Plan") so that new employees will have the option to make an irrevocable election to participate in either Tier One or Tier Two of the Plan within the first 30 days of hire. The bill will eliminate current Code language allowing employees who elect Tier Two to transfer to Tier One within five years of hire.

Bill No. 78-17 eliminates the reduction in benefit for DROP retirees participating in the Police Service Retirement Plan and the Detention Officers' and Deputy Sheriffs' Retirement Plan, and DROP retirees from the Fire Service Plan who retired from non-represented positions, if they are reemployed in any capacity that meets the exceptions set forth in § 5-1-203(c)(1). The bill also adds an exception under § 5-1-203(c) for any retirees (including DROP participants) who are reemployed into a grant-funded contractual position under §802(a)(17) of the Charter.

There will be no reduction in retirement benefits for police officers, detention officers, deputy sheriffs, or fire deputy and division chiefs retiring in the DROP, so long as they retired as a classified employee and are reemployed in an exempt 1500-hour contractual position, a grant-funded contractual position, or in a position with the Sheriff or State's Attorney's offices that requires certification as a police officer. The bill also allows any retiree formerly employed in the classified service to work in a grant-funded contractual position without a reduction in benefits.

If the affected DROP retirees are reemployed in a position in the classified service, however, they will have a reduction in retirement benefits during the reemployment as required under § 5-1-203(b). This is the same for other County retirees who were previously employed in the classified service. DROP retirees in the Fire Service Retirement Plan who retire from a represented position will continue to have the retirement benefit reduction required by § 5-1-515 upon reemployment.

Bill No. 95-17 created the new 401(a) Employee Retirement Savings Plan. Effective July 1, 2018, any employee hired in any position eligible to participate in the Employees' Retirement System shall have the election to choose the Employee Retirement Savings Plan. Employee contribution for the Savings Plan is 4% and there is an 8% employer contribution. An employee vests in the new plan in 5 years.

Bill No. 66-18 modifies the interest earned on accounts for certain employees who participated in the Deferred Retirement Option Program (DROP). Participants of the Fire Service Retirement Plan, except for those in the classification of Battalion Chief, are eligible for interest in the 6th year of DROP after July 1, 2018. Participants in the DROP from the Police Service Retirement Plan and Detention Officers' and Deputy Sheriffs' Retirement Plan are already eligible for interest in the 6th year.

3 Deferred Retirement Option Program (DROP)

The Police Service, Fire Service and Detention Officers' and Deputy Sheriffs' Retirement Plans offer DROP plans. These programs permit a Plan member to be credited for benefit payments into an individual account within the Plan while continuing to provide services to the employer and to be paid a salary. All Plans allow accumulation of pension after 20 years of County service. DROP period must be between 3 and 5 years. Members may remain in DROP for a sixth year, but no interest shall be credited to the DROP account in the sixth year. The lump sum values held by the System pursuant to the DROP programs are $8,201,499 for the Police Service Plan, $6,080,005 for the Fire Service Plan and $1,746,373 for the Detention Officers' and Deputy Sheriffs' Retirement Plan.

4 Net Pension Liability of the System by Plan

The components of the net pension liability and assumptions for each Plan at December 31, 2018 based on the actuarial valuations are displayed below. The valuation date is January 1, 2018 which is then rolled forward to the measurement date of December 31, 2018.

	Employees' Retirement Plan	Police Service Retirement Plan	Fire Service Retirement Plan	Detention Officers' and Deputy Sheriffs' Retirement Plan
Total pension liability	$ 901,747,616	$ 722,742,281	$ 652,013,902	$ 200,706,206
Plan fiduciary net position	(620,586,567)	(516,505,185)	(509,828,407)	(134,908,267)
Plan net pension liability	$ 281,161,049	$ 206,237,096	$ 142,185,495	$ 65,797,939
Plan fiduciary net position as a percentage of the total pension liability	68.82%	71.46%	78.19%	67.22%

Note to schedule: Source is actuarial data based on preliminary financials. The differences between this schedule and the final combining statement of changes in fiduciary net position page 14 are considered immaterial.

Actuarial assumptions The total pension liability was determined by an actuarial valuation as of December 31, 2018 using the following summarized actuarial assumptions, applied to all periods included in the measurement. Full descriptions of the actuarial assumptions are available in the January 1, 2018 valuation reports. The most recent Experience and Assumption Study was conducted in 2018 for the period 2007 to 2011.

Inflation	3.00%	3.00%	3.00%	3.00%
Salary increases	Rates vary by participant age for each Plan.			
Investment rate of return	7.50%, net of pension plan investment expense, including inflation for each Plan.			
Mortality Scale	RP-2000 Blue Collar Mortality tables with generational project by Scale AA for each Plan.			
Set forward for post-disability mortality.	9 years	5 years	5 years	5 years

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the Actuarial Statement Section included in this Comprehensive Annual Financial Report.

Discount Rate – The discount rate used to measure the total pension liability was 7.50% as of December 31, 2018. The projection of cash flows used to determine the discount rate assumed plan contributions will be made in amounts consistent with statutory provisions and recognizing the System's current funding policy and cost-sharing mechanism between employers and members. For this purpose, all contributions that are intended to fund benefits for all plan members and their beneficiaries are included, except that projected contributions that are intended to fund the service costs for future plan members and their beneficiaries are not included.

Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of December 31, 2018.

Sensitivity of the net pension liability to changes in the discount rate – The following schedule presents the net pension liability, calculated using the discount rate of 7.5%, as well as what the Plan's net pension liability would be if it were calculated using a discount rate that is 1.0 percentage point lower (6.5%) or 1.0 percentage point higher (8.5%) than the current rate.

	Employees' Retirement Plan	Police Service Retirement Plan	Fire Service Retirement Plan	Detention Officers' and Deputy Sheriffs' Retirement Plan
1% Decrease to 6.5%	$ 380,337,986	$ 298,591,578	$ 227,638,543	$ 89,656,810
Current Discount Rate 7.5%	$ 281,161,049	$ 206,237,096	$ 142,185,495	$ 65,797,939
1% Increase to 8.5%	$ 197,207,217	$ 130,633,481	$ 72,203,235	$ 45,941,767

Long Term Expected Returns – For investment purposes, the four Plans which comprise the System are managed on a co-mingled basis and the long-term expected rates of investment return are the same for each Plan. The long-term (30-year) expected rate of return on pension System investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by using an optimizer program that relies on the arithmetic return inputs, the standard deviation forecast (risk) for each asset class, and the correlations among them. The result is a 30-year nominal, geometric, net-of-fee return forecast for the pension assets. The 30-year real rate of return is calculated by netting the inflation assumption out of the nominal forecast. The nominal and real rates of return forecasts for each major asset class included in the pension System's target asset allocation of December 31, 2018 (see the discussion of the System's investment policy) are summarized in the following table:

30-Year Return Assumptions by Asset Class
As of December 31, 2018

	30-Year Geometric Forecast	
Asset Class	(Nominal Returns)	(Real Returns)
Cash	2.75%	0.00%
U.S. Treasuries	3.25%	0.50%
IG Corp Credit	4.75%	2.00%
Mortgage Backed Securities	3.25%	0.50%
Bank Loans	5.50%	2.75%
* Core Fixed Income	3.75%	1.00%
High-Yield Bonds	5.50%	2.75%
Absolute Return Fixed Income	4.39%	1.64%
Emerging Market Debt (External)	5.00%	2.25%
Emerging Market Debt (Local Currency)	6.50%	3.75%
Large Cap Equity	7.50%	4.75%
Small/Mid Cap Equity	7.75%	5.00%
International Equities (Unhedged)	7.75%	5.00%
Emerging Int'l Equities	9.25%	6.50%
Private Equity	9.50%	6.75%
Private Debt	7.50%	4.75%
Real Estate	6.50%	3.75%
Hedge Funds	6.34%	3.59%
Hedge Funds (Macro)	6.25%	3.50%
** Risk Parity	6.72%	3.97%

Note: NEPC's 30-year geometric CPI inflation assumption is 2.75%.
** Core Bonds assumption based on market weighted blend of components of Aggregate Index (Treasuries, IG Corp Credit, and MBS).*
*** Risk Parity Allocation Modeled as 3% Global Macro Hedge Funds and the balance Bridgewater All Weather (using NEPC manager specific assumptions for Bridgewater).*

5 Risks and Uncertainties

The System may invest in various types of investment securities. Investment securities are exposed to various risks, such as interest rate, market, and credit risk. Due to the level of risk associated with certain investment securities, it is possible that changes in the values of investment securities may occur in the near-term and that such changes could materially affect the amounts reported in the Statement of Fiduciary Net Position.

6 Investments

A General Investment Policy – The System operates under the "Prudent Person" rule used herein, meaning that in investing, the governing authorities of the systems, funds and plans, shall exercise the judgment and care under the circumstances then prevailing, that an institutional investor of ordinary prudence, discretion, and intelligence exercises in the management of investments entrusted to it, not in regard to speculation, but in regard to the permanent disposition of funds, considering probable safety of capital as well as probable income. Investments are made in full accordance with any and all applicable Maryland statutes, as well as any other applicable legislation or regulation, state, federal or otherwise. The roles and responsibilities of the Board of Trustees, the Investment Committee, the Investment Consultant, the Investment Managers and the Custodian are clearly defined. The Board has established a diversified portfolio to meet the System's return requirements. The table below summarizes the target asset allocation.

Asset Class	Market Target (%)	Minimum Exposure (%)	Maximum Exposure (%)
Domestic Equity	21	12	31
International Equity	17	7	27
Emerging Market Equity	7	0	12
Domestic Fixed Income	21	5	40
Emerging Market Debt	4	0	10
Private Markets	10	0	18
Real Estate	6	0	11
Global Asset Allocation (GAA)	12	7	17
Cash	2	0	10

B *Investments Authorized* – The System is authorized to invest in U.S. Government securities, insurance company general accounts, commercial paper, money market mutual funds, corporate bonds, common and international stocks, limited partnerships, absolute return funds, private equity, mortgage participation notes and real estate. State statutes do not prohibit the System from participating in securities lending transactions. (See Note 7 to the basic financial statements for additional information concerning the System's security lending transactions.)

C *Custodial Credit Risk, Deposits* – Custodial credit risk for deposits is the risk that the System will not be able to recover its deposits, in the event of the failure of a depository financial institution or will not be able to recover collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either a counterparty or the counterparty's trust department or agent but not in the System's name. As of December 31, 2018, there were no investments that met this criteria.

D *Concentration Risk* – Concentration risk is the risk of loss to the System attributed to the magnitude of the System's investment in a single issuer. As of December 31, 2018, there was no exposure to a single issuer greater than 5.0% of the plan net position, excluding investment pools. The System's Investment Policy Statement sets maximum concentration limits by asset type and style.

E. *Rate of Return* – For the year ended December 31, 2018, the annual money-weighted rate of return on pension system investments, net of System expenses, was -4.9%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

F *Interest Rate Risk* – Interest rate risk is the risk that changes in interest rates will adversely affect the value of an investment. The fair value of fixed income (debt) securities is affected by increases and declines in interest rates. These investments may also have embedded call features allowing the issuer to redeem part or all of the issue prior to maturity at a pre-set price. In addition, debt issues may have interest rates that vary according to a pre-determined external index (such as the London Inter-Bank Offered Rate) or a pre-determined step-up in the interest rate at a pre-determined date(s). The Investment Policy Statement (IPS) sets limits on floating rates for mortgage backed securities and establishes limits on the average duration of some investment types.

The following table uses the *Segmented Time Distribution* method to display the System's debt holdings by maturity term and investment type. Some issues within the categories agencies/instrumentalities, corporate bonds, collateralized mortgage obligations, and other asset-backed securities have variable rate features. The total fair value of these securities was $8,898,002 as of December 31, 2018.

		Investment Maturities (in Years)			
Investment Type	**Fair Value**	**Less than 1 year**	**1 to 5**	**6 to 10**	**over 10**
Money market pools	$ 59,576,611	$ 59,576,611	$ -	$ -	$ -
U.S. Treasuries	17,050,111	4,403,694	3,024,392	1,253,346	8,368,679
Agency/Instrumentalities	22,677,092	-	-	109,718	22,567,374
Corporate Bonds	65,885,132	477,097	24,097,855	31,535,848	9,774,332
Bank Loans	4,116,256	-	1,235,264	2,880,992	-
Bond Mutual Funds	221,053,823	221,053,823	-	-	-
Collateralized Mrtg Obligations	7,030,743	-	487,049	761,769	5,781,925
Other Asset-Backed Securities	1,867,259	-	399,984	32,111	1,435,164
Foreign and Yankee Bonds	13,667,924	120,712	4,855,712	5,793,160	2,898,340
Totals	$ 412,924,951	$ 285,631,937	$ 34,100,256	$ 42,366,944	$ 50,825,814

The segmented time distribution table includes issues with call features and assumes that these issues will be held to maturity. The total fair market value of callable securities totals $72,472,503 with call dates ranging from January 15, 2019, for continuously callable issues, to February 8, 2056. Stated call prices are generally at par. The callable holdings include issues with floating interest rates which have a market value of $5,658,287.

G *Credit Risk* – Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to the System. Debt securities are rated by Nationally Recognized Statistical Rating Organizations to provide purchasers with an opinion of the capability and willingness of a borrower to re-pay its debt. The following table displays the System's debt holdings and quality ratings from Standard & Poor's. The Investment Policy Statement provides guidelines to all fixed income managers related to allowable quality ratings.

		Standard & Poor's Credit Ratings				
	Total Fair Value	**AAA - A**	**BBB - B**	**CCC - C**	**D**	**NR**
Agency/Instrumentalities	$ 22,677,092	$ -	$ 192,000	$ -	$ -	$ 22,485,092
Collateralized Mort.Obligations	7,030,742	1,465,763	113,405	961,462	357,106	4,133,006
Other Asset-backed Obligations	1,867,259	365,735	102,012	270,997	-	1,128,515
Corporate Bonds	65,884,954	7,379,567	57,689,958	303,646	-	511,783
Yankee & Foreign Gov.Issued	13,667,924	2,990,516	10,495,084	-	-	182,324
Bank Loans	4,116,256	-	-	-	-	4,116,256
Guaranteed Invest Contracts	21,938,741	-	-	-	-	21,938,741
Mutual Funds	221,053,823	-	-	-	-	221,053,823
Short Term Investment Pools	59,576,611	-	-	-	-	59,576,611
Total Credit Risk of Debt Securities	$ 417,813,402	$ 12,201,581	$ 68,592,459	$ 1,536,105	$ 357,106	$ 335,126,151
US Gov't & Agencies	17,050,111					
Total Debt Securities	$ 434,863,513					

H *Foreign Currency Risk* – The investment policy recognizes the value of global diversification. A maximum of 66.0% in international/global exposure is allowed. The System retains six managers for global and international equity and fixed income exposure. These managers may also purchase or sell currency on a spot basis and may enter into forward exchange contracts on currency provided that the use of such contracts is designed to dampen portfolio volatility or to facilitate the settlement of securities transactions.

There is potential risk with exposure to foreign currency relating to potential unfavorable fluctuation of exchange rates compared with the U.S. Dollar. The System's direct exposure to foreign currency was zero as of December 31, 2018. The fair market value of international/global equities and fixed income assets that were managed in pooled funds totaled $730,835,665 as of December 31, 2018.

I *Fair Value Measurement* – The System categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). Level 1 inputs are quoted prices in active markets for identical assets, Level 2 inputs are significant other observable inputs, and Level 3 inputs are significant unobservable inputs. As of December 31, 2018 all short-term investments were in money market mutual funds which are not subject to the fair value measurement requirements.

Level 1	Unadjusted quoted prices in active markets for identical instruments.
Level 2	Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuation in which all significant inputs are observable.
Level 3	Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

The following table shows the fair value leveling of the System's investment portfolio at December 31, 2018.

Pension System Assets at Fair Value December 31, 2018

Assets at Fair Value December 31, 2018 Investment Type	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Fixed Income Investments				
U.S. Government obligations	$ 17,050,111	$ -	$ 17,050,111	$ -
Agency/Instrumentalities	22,677,092	-	22,677,092	-
Collateralized Mort. obligations	7,030,742	-	6,723,260	307,482
Other asset-backed obligations	1,867,259	-	1,467,275	399,984
Corporate bonds	83,669,133	-	83,662,874	6,259
Fixed income mutual funds	77,474,880	669,488	76,805,392	-
International fixed income mutual funds	69,658,136	-	-	69,658,136
Absolute return fixed income	64,016,456	-	-	64,016,456
Total fixed income investments	343,443,809	669,488	208,386,004	134,388,317
Equity Investments				
Domestic equity	364,672,321	312,378,120	52,294,201	-
International equity pools	309,637,246	309,637,246	-	-
Total equity investments	674,309,567	622,015,366	52,294,201	-
Total investments by fair value level	$ 1,017,753,376	$ 622,684,854	$ 260,680,205	$ 134,388,317

Pension System Net Asset Value Decmber 31, 2018

Investment Types at net asset value	Net Asset Value	Unfunded Commitments as of 12/31/18	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Commingled funds-debt	$ 73,920,807	$ -	Twice monthly	15 days
Commingled funds-equities	108,921,067	-	Monthly	5 Business days
Real estate (REIT) fund	121,825,222	-	Quarterly	90 days
Global asset pools	242,619,315	-	Monthly	5 Business days
Private markets buyouts	60,557,593	52,123,772	Not eligible	Not eligible
Private markets mezzanine	7,144,202	2,091,304	Not eligible	Not eligible
Private markets secondaries	15,448,110	8,563,813	Not eligible	Not eligible
Private markets distressed	27,221,760	12,025,000	Not eligible	Not eligible
Private markets fund of funds	6,625,261	1,701,820	Not eligible	Not eligible
Private markets energy	22,140,847	2,152,898	Not eligible	Not eligible
Total at net asset value	686,424,184	$ 78,658,607		
Investments measured at amortized cost				
Money market pools	59,576,611			
Aetna insurance pooled fixed income	21,938,741			
Total Investments	$ 1,785,692,912			

Securities classified in Level 1 are valued using quoted prices in active markets for those securities. Securities classified in Level 2 and Level 3 are valued using methodologies such as various bid evaluations, market averages and other matrix pricing techniques as well as values derived from associated traded securities or last trade data. In instances where inputs used to measure fair value fall into different levels, the fair value is categorized based on the lowest level input that is significant to the valuation.

Investments valued at the net asset value per share (or its equivalent) have been classified separately in the table above and include investments considered to be Alternative Investments as defined by the American Institute of

Certified Public Accountants. The definition includes investments for which a readily determinable fair value does not exist (that is, investments not listed on national exchanges or over-the-counter markets, or for which quoted market prices are not available from sources such as financial publications, the exchanges, or NASDAQ). These types of investments can be held within any of the asset classes used by the System based on underlying portfolio holdings and analysis of risk and return relations. These investments can be structured in different ways, including limited partnerships, limited liability companies, common trusts, and mutual funds. Some are closed-ended with a specific life and capital commitments while others are open-ended with opportunity for ad hoc contributions or withdrawals and termination with proper notice.

Commingled/Mutual Funds: These types of funds are open-ended funds and may be utilized for a variety of asset classes, including equity, fixed income, and Real Estate Investment Trusts (REITS). They are funds made up of underlying securities that have readily available fair values (publicly traded stocks or bonds). The System owns units of these funds rather than the individual securities. Contributions or withdrawals from the funds can be made as needed, generally with daily or monthly liquidity, with a notice period of one to thirty days. Because they are liquid funds, there are no unfunded commitments for these types of investments.

Private Markets: Private Market investments are typically private interests in corporations across different areas of the capital structure and in different stages of the corporations' development via limited partnership vehicles. Private Market investments are illiquid and long term in nature (10-12 years), typically held until maturity. These portfolios generally have a "J-Curve Effect" whereby there are low to negative returns in the initial years due to the payment of investment management fees and initial funding of investments made by the General Partner during a period when investments are typically carried at cost and returns have not been realized. To diversify the program, investments are made across business cycles, vintage years, and different strategies. The Systems' Investment Policy Statement has a dedicated asset class for Private Markets. There is no option to request redemptions from the Private Market funds.

7 Securities Lending

The Board of Trustees authorizes the System to lend securities held by the custodian, State Street Bank and Trust Company, to broker-dealers and other entities with a simultaneous agreement to return the collateral for the same securities in the future. The System's Lending Agent is Deutsche Bank AG (DB). Deutsche Bank AG lends securities for collateral in the form of cash or other securities of 102 percent for domestic securities and 105 percent for international. Cash collateral received by the System with respect to these transactions is invested in a separate, un-pooled account basis at the direction of the Board of Trustees in fully collateralized Repurchase Agreements.

At year end, the System had no credit risk exposure to borrowers because the amount of collateral held by the System was greater than the value of securities on loan. The market value of collateral held as of December 31, 2018 was $58,930,753, of which $54,019,375 was cash and $4,911,378 were U.S. Treasury securities. The market value of securities on loan for the System as of December 31, 2018 was $57,454,155.

The System did not impose any restrictions during the year on the amount of the loans that the agent made on its behalf. Moreover, there were no losses during the year resulting from a default of the borrowers or custodian.

All security loans can be terminated on demand by either the System or the borrower. Cash collateral received was invested in Repurchase Agreements, which as of December 31, 2018 had a weighted average final maturity of 24.5 days. The interest rate risk is zero days as assets and liabilities can be rate changed on a daily basis.

8 Financial Instruments With Off-Balance Sheet Risk

Mortgage-Backed Securities – A mortgage-backed security depends on the underlying pool of mortgage loans to provide the cash flow to make principal and interest payments on the security. A decline in interest rates can result in prepayments, which reduce the fair value of the security. If homeowners pay on mortgages longer than anticipated, the cash flows are greater and the return on investment would be higher than anticipated. A collateralized mortgage obligation (CMO) is a mortgage-backed security that is comprised of classes or tranches of bonds. Each class is structured to achieve a specific level of cash flow based on the prepayment assumptions assigned to the underlying mortgage pool.

The System invests in mortgage-backed securities to enhance fixed income returns. Mortgage-backed securities are subject to credit risk, the risk that the borrowers will be unable to meet their obligations. These securities are also subject to prepayment risk, which is the risk that a payment will be made in excess of the regularly scheduled principal payment. Prepayment risk is comprised of two risks: call risk, (the risk that prepayments will occur when interest rates have declined), and extension risk, (the risk that prepayments will not be made when interest rates have increased.) As of December 31, 2018, the fair value of government mortgage-backed securities was $17,050,112, asset-backed securities was $1,867,259, and CMO's was $7,030,743. These are included in the corporate obligations total on the Statement of Fiduciary Net Position.

9 Exposure to Derivatives

Derivative instruments are securities that derive value from another asset and are in the form of a contract between two or more parties. Common derivatives are futures contracts, forwards contracts, options, and swaps. The System has no direct exposure to derivative securities. There are, however, mutual funds, commingled funds, and other investment vehicles in which the System has a percentage ownership that have exposure to futures, currency forward contracts, commodity forward contracts, and total return swap contracts. These funds enter into derivative contracts as part of their investment strategies to mitigate risk and volatility.

A derivative policy statement is included in the Investment Policy Statement (IPS). Prohibited instruments include options, commodities, uncovered options or futures, uncovered short positions, short selling, and use of financial leverage. The derivative exposure as of December 31, 2018 within the mutual funds, commingled funds, and other investment vehicles is comprised of allowable instruments based on the IPS.

10 Contingencies

Certain legal proceedings are pending against the System arising from its normal activities that, based on the facts presently available and the advice of legal counsel, management believes will not have a material adverse effect on the System's financial condition upon settlement.

11 Commitments

The System has committed to fund various private market investments totaling $290.2 million at December 31, 2018, of which approximately $78.6 remains unfunded. Additional details regarding the unfunded balances are in Note 6. The expected funding dates for these commitments extend through 2022.

12 Subsequent Events

The system evaluated subsequent events through June 14, 2019, the date the financial statements were available to be issued. Events or transactions occurring after December 31, 2018, but prior to June 14, 2019 that provided additional evidence about conditions that existed at December 31, 2018, have been recognized in the financial statements for the year ended December 31, 2018. Events or transactions that provided evidence about conditions that did not exist at December 31, 2018, but arose before the financial statements were available to be issued have not been recognized in the financial statements for the year ended December 31, 2018.

In 2018, an Experience and Assumption Study was conducted by the Actuary. The report recommended changes in assumptions due to their study of the demographic and economic experience of the Anne Arundel County Retirement Plans for the 2012 through 2016 plan years and their expectations for future experience. A gradual change in the discount rate (investment return) from 7.50% to 7.25% over the next 5 years was voted on and adopted by the Board. The Board will make this change gradually by lowering the discount rate 5 basis points each year. The rate for 2019 will be 7.45 percent.

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Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in the Net Pension Liability and Related Ratios – Employees' Retirement Plan
For Years ended December 31

	2018	2017	2016	2015	2014
Total pension liability (Dollar amounts in thousands)					
Service cost	$ 16,687	$ 15,497	$ 15,144	$ 15,115	$ 14,159
Interest	63,246	60,502	59,292	58,329	53,353
Changes of benefit terms	-	-	-	-	-
Differences between expected and actual experience	3,826	9,562	(12,599)	(17,971)	16,408
Changes of assumptions	-	-	-	-	22,567
Benefit payments, including refunds of member contributions	(50,575)	(47,380)	(44,024)	(41,253)	(39,012)
Net change in total pension liability	33,184	38,181	17,813	14,221	67,475
Total pension liability - beginning	868,564	830,383	812,570	798,349	730,874
Total pension liability - ending (a)	$ 901,748	$ 868,564	$ 830,383	$ 812,570	$ 798,349
Plan fiduciary net position					
Contributions - employer	27,033	25,654	25,810	25,630	24,451
Contributions - member	5,612	5,472	5,182	4,847	4,662
Net investment income	(31,166)	94,908	41,345	(8,374)	28,451
Benefit payments, including refunds of member contributions	(50,575)	(47,380)	(44,024)	(41,253)	(39,012)
Administrative expense	(543)	(526)	(497)	(504)	(519)
Net change in plan fiduciary net position	(49,640)	78,127	27,816	(19,654)	18,034
Plan fiduciary net position - beginning	670,226	592,099	564,283	583,936	565,902
Plan fiduciary net position - ending (b)	$ 620,587	$ 670,226	$ 592,099	$ 564,283	$ 583,936
County's net pension liability - ending (a)-(b)	$ 281,161	$ 198,337	$ 238,284	$ 248,287	$ 214,413
Plan fiduciary net position as a percentage of the total pension liability	68.8%	77.2%	71.3%	69.4%	73.1%
Covered payroll	$ 134,892	$ 138,239	$ 130,313	$ 127,827	$ 127,091
County's net pension liability as a percentage of covered payroll	208.4%	143.5%	182.9%	194.2%	168.7%
Expected average remaining service years of all participants	5	5	5	5	5

Notes to Schedule:

1 Source is actuarial data based on preliminary financials. The differences between this schedule and the final combining statement of changes in fiduciary net position on page 14 are considered immaterial.

2 This schedule is presented to illustrate the requirement to show information for 10 years. However, until 10-year trend is compiled, pension plans should present information for those years for which data is available.

3 There are no benefit changes reflected in the current schedule.

4 For FY 2019, the expected rate of investment return was reduced from 7.5% to 7.25% and other assumptions were changed to reflect results of the 2018 experience study.

Schedule of Changes in the Net Pension Liability and Related Ratios-Police Retirement Plan
For Years Ended December 31

	2018	2017	2016	2015	2014
Total pension liability (Dollar amounts in thousands)					
Service cost	$ 12,826	$ 12,689	$ 12,057	$ 12,258	$ 10,951
Interest	50,963	48,563	47,032	45,473	41,480
Changes of benefit terms	-	-	-	-	-
Differences between expected and actual experience	(2,591)	6,202	(4,527)	(4,693)	12,801
Changes of assumptions	-	-	-	-	18,331
Benefit payments, including refunds of member contributions	(35,938)	(34,950)	(33,357)	(31,134)	(29,507)
Net change in total pension liability	25,261	32,504	21,205	21,903	54,055
Total pension liability - beginning	697,482	664,978	643,773	621,870	567,815
Total pension liability - ending (a)	$ 722,742	$ 697,482	$ 664,978	$ 643,773	$ 621,870
Plan fiduciary net position					
Contributions - employer	21,934	20,931	20,411	19,560	18,870
Contributions - member	3,372	3,250	3,158	3,104	2,950
Net investment income	(25,860)	78,155	33,500	(7,869)	21,813
Benefit payments, including refunds of member contributions	(35,938)	(34,950)	(33,357)	(31,134)	(29,507)
Administrative expense	(464)	(445)	(417)	(423)	(418)
Net change in plan fiduciary net position	(36,956)	66,941	23,295	(16,762)	13,707
Plan fiduciary net position - beginning	553,461	486,520	463,225	479,988	466,281
Plan fiduciary net position - ending (b)	$ 516,505	$ 553,461	$ 486,520	$ 463,225	$ 479,988
County's net pension liability - ending (a)-(b)	$ 206,237	$ 144,020	$ 178,458	$ 180,547	$ 141,882
Plan fiduciary net position as a percentage of the total pension liability	71.5%	79.4%	73.2%	72.0%	77.2%
Covered payroll	$ 48,322	$ 45,989	$ 44,894	$ 43,879	$ 42,960
County's net pension liability as a percentage of covered payroll	426.8%	313.2%	397.5%	411.5%	330.3%
Expected average remaining service years of all participants	4	4	4	4	4

Notes to Schedule:

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4 For FY 19, the expected rate of investment return was reduced from 7.5% to 7.25% and other assumptions were changed to reflect results of the 2018 experience study.

Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in the Net Pension Liability and Related Ratios-Fire Retirement Plan
For Years Ended December 31

	2018	2017	2016	2015	2014
Total pension liability (Dollar amounts in thousands)					
Service cost	$ 11,785	$ 11,556	$ 11,102	$ 10,339	$ 9,184
Interest	45,537	43,670	42,294	41,924	38,949
Changes of benefit terms	-	-	-	-	-
Differences between expected and actual experience	3,521	2,210	(1,552)	(14,630)	3,679
Changes of assumptions	-	-	-	-	18,028
Benefit payments, including refunds of member contributions	(31,973)	(33,129)	(33,868)	(31,520)	(28,823)
Net change in total pension liability	28,869	24,309	17,976	6,112	41,016
Total pension liability - beginning	623,144	598,836	580,860	574,748	533,731
Total pension liability - ending (a)	$ 652,014	$ 623,144	$ 598,836	$ 580,860	$ 574,748
Plan fiduciary net position					
Contributions - employer	15,704	14,664	14,591	15,122	15,899
Contributions - member	3,524	3,441	3,257	3,050	2,778
Net investment income	(25,208)	77,992	33,899	(7,744)	22,688
Benefit payments, including refunds of member contributions	(31,973)	(33,129)	(33,868)	(31,520)	(28,823)
Administrative expense	(430)	(448)	(428)	(436)	(423)
Net change in plan fiduciary net position	(38,382)	62,520	17,451	(21,528)	12,119
Plan fiduciary net position - beginning	548,211	485,690	468,239	489,767	477,648
Plan fiduciary net position - ending (b)	$ 509,828	548,211	485,690	468,239	489,767
County's net pension liability - ending (a)-(b)	$ 142,185	$ 74,933	$ 113,146	$ 112,621	$ 84,981
Plan fiduciary net position as a percentage of the total pension liability	78.2%	88.0%	81.1%	80.6%	85.2%
Covered payroll	$ 48,728	$ 46,954	$ 46,228	$ 43,838	$ 40,476
County's net pension liability as a percentage of covered payroll	291.8%	159.6%	244.8%	256.9%	210.0%
Expected average remaining service years of all participants	6	6	6	5	5

Notes to Schedule:

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3 There are no benefit changes reflected in the current schedule.

4 For FY 2019, the expected rate of investment return was reduced from 7.5% to 7.25% and other assumptions were changed to reflect results of the 2018 experience study.

Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in Net Pension Liability and Related Ratios-Detention Officers and Deputy Sheriffs' Plan
For Years Ended December 31

	2018	2017	2016	2015	2014
Total pension liability (Dollar amounts in thousands)					
Service cost	$ 4,533	$ 4,658	$ 4,461	$ 4,634	$ 4,602
Interest	13,836	12,912	12,281	11,401	10,301
Changes of benefit terms	-	-	-	4,635	-
Differences between expected and actual experience	1,938	2,244	(1,678)	(2,558)	2,322
Changes of assumptions	-	-	-	-	3,494
Benefit payments, including refunds of member contributions	(8,162)	(6,821)	(6,485)	(6,279)	(5,819)
Net change in total pension liability	12,145	12,993	8,579	11,833	14,900
Total pension liability - beginning	188,562	175,569	166,990	155,156	140,256
Total pension liability - ending (a)	$ 200,706	188,562	175,569	166,990	155,156
Plan fiduciary net position					
Contributions - employer	7,282	7,000	6,689	6,371	6,111
Contributions - member	1,352	1,354	1,316	1,317	1,298
Net investment income	(6,825)	19,607	8,159	(1,919)	4,944
Benefit payments, including refunds of member contributions	(8,162)	(6,821)	(6,485)	(6,279)	(5,819)
Administrative expense	(108)	(109)	(100)	(98)	(96)
Net change in plan fiduciary net position	(6,461)	21,030	9,579	(608)	6,438
Plan fiduciary net position - beginning	141,369	120,339	110,760	111,368	104,930
Plan fiduciary net position - ending (b)	$ 134,908	141,369	120,339	110,760	111,368
County's net pension liability - ending (a)-(b)	$ 65,798	47,193	55,230	56,230	43,788
Plan fiduciary net position as a percentage of the total pension liability	67.2%	75.0%	68.5%	66.3%	71.8%
Covered payroll	$ 19,573	$ 19,790	$ 19,801	$ 19,386	$ 19,776
County's net pension liability as a percentage of covered payroll	336.2%	238.5%	278.9%	290.1%	221.4%
Expected average remaining service years of all participants	3	3	3	4	4

Notes to Schedule:

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2 This schedule is presented to illustrate the requirement to show information for 10 years. However, until 10-year trend is compiled, pension plans should present for those years for which data is available.

3 There are no benefit changes reflected in the schedule for the current year.

4 For FY 2019, the expected rate of investment return was reduced from 7.5% to 7.25% and other assumptions were changed to reflect results of the 2018 experience study.

Schedule of Investment Returns

Year Ended	Annual Money-weighted Rate of Return Net of Investment Expenses
2014	4.5%
2015	(1.8%)
2016	6.2%
2017	15.7%
2018	(4.9%)

Note: Money-weighted results for the required 10-year timeframe will be added as available.
The 2016 money-weighted return was revised due to a software error, which has been corrected.
Source: New England Pension Consultants, LLC

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Employees' Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Actuarially determined contribution	$ 27,033	$ 25,654	$ 25,810	$ 25,655	$ 24,426	$ 22,362	$ 19,824	$ 18,186	$ 17,284	$ 15,246
Contributions in relation to the actuarially determined contribution	27,033	25,654	25,810	25,630	24,451	22,362	19,824	18,186	17,284	15,246
Contribution deficiency (excess)	$ -	$ -	$ -	$ 25	$ (25)	$ -	$ -	$ -	$ -	$ -
Covered payroll	$ 134,892	$ 138,239	$ 130,313	$ 127,827	$ 127,091	$ 115,809	$ 116,025	$ 120,416	$ 133,498	$ 126,031
Contributions as a percentage of covered payroll	20.04%	18.56%	19.81%	20.05%	19.24%	19.31%	17.09%	15.10%	12.95%	12.10%

Notes to Schedule

Valuation Date: Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	Periods range from 15 to 24 years. Starting with new bases in 2018, assumption changes and gains and losses are amortized over 20 years and Plan changes are amortized over the average future service of the active population at the time of the change.
Asset valuation method	5-year smoothed market.
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A nine-year set forward is used for post-disability mortality.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Police Service Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Actuarially determined contribution	$ 21,934	$ 20,931	$ 20,411	$ 19,560	$ 18,870	$ 17,746	$ 15,530	$ 14,153	$ 13,696	$ 12,428
Contributions in relation to the actuarially determined contribution	21,934	20,931	20,411	19,560	18,870	17,746	15,530	13,793	14,056	12,428
Contribution deficiency (excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 360	$ (360)	$ -
Covered payroll Excluding members in DROP	$ 48,322	$ 45,989	$ 44,894	$ 43,879	$ 42,960	$ 41,714	$ 40,522	$ 41,335	$ 42,449	$ 42,499
Contributions as a percentage of covered payroll	45.39%	45.51%	45.46%	44.58%	43.92%	42.54%	38.32%	33.37%	33.11%	29.24%

Notes to Schedule

Valuation Date: Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	Periods range from 15 to 24 years. Starting with new bases in 2018, assumption changes and gains and losses are amortized over 20 years and Plan changes are amortized over the average future service of the active population at the time of the change.
Asset valuation method	5-year smoothed market.
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater then 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2018	***2017***	***2016***	***2015***	***2014***	***2013***	***2012***	***2011***	***2010***	***2009***
Actuarially determined contribution	$ 15,704	$ 14,664	$ 14,591	$ 15,122	$ 15,899	$ 16,152	$ 15,238	$ 14,395	$ 14,213	$ 12,701
Contributions in relation to the actuarially determined contribution	15,704	14,664	14,591	15,122	15,899	16,152	15,238	13,960	14,649	12,701
Contribution deficiency (excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 435	$ (435)	$ -
Covered payroll Excluding members in DROP	$ 48,728	$ 46,954	$ 46,228	$ 43,838	$ 40,476	$ 44,951	$ 43,362	$ 45,673	$ 47,841	$ 49,064
Contributions as a percentage of covered payroll	32.23%	31.23%	31.56%	34.50%	39.28%	35.93%	35.14%	30.57%	30.62%	25.89%

Notes to Schedule

Valuation Date: Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit.
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	Periods range from 15 to 24 years. Starting with new bases in 2014, assumption changes and gains and losses are amortized over 20 years and Plan changes are amortized over the average future service of the active population at the time of the change.
Asset valuation method	5-year smoothed market.
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater then 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Actuarially determined contribution	$ 7,282	$ 7,000	$ 6,689	$ 6,371	$ 6,111	$ 5,600	$ 5,141	$ 4,994	$ 4,789	$ 4,349
Contributions in relation to the actuarially determined contribution	7,282	7,000	6,689	6,371	6,111	5,600	5,141	4,876	4,907	4,349
Contribution deficiency (excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 118	$ (118)	$ -
Covered payroll Excluding members in DROP	$ 19,573	$ 19,790	$ 19,801	$ 19,386	$ 19,776	$ 18,133	$ 17,897	$ 18,761	$ 19,310	$ 20,204
Contributions as a percentage of covered payroll	37.20%	35.37%	33.78%	32.86%	30.90%	30.88%	28.73%	25.99%	25.41%	21.53%

Notes to Schedule

Valuation Date: Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit.
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	Periods range from 4 to 34 years. Starting with new basis in 2014, assumption changes and gains/losses are amortized over 20 years and Plan changes are amortized over the average future service of the active populatio at time of the change.
Asset valuation method	5-year smoothed market.
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement Age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater then 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

1 Changes in Actuarial Methods and Assumptions

There were no method or assumption changes since the prior valuation. There were no Plan amendments that affect benefits since the prior valuation for any of the four Plans.

2 Significant Legislative Changes 2014 to 2018

Legislative changes are listed in the General Description of the System in the Notes to the Basic Financial Statements.

Schedule of Administrative Expenses

Professional Services			*Miscellaneous: County paid*	
Actuarial	$	172,307	Supplies	9,683
Benefit payment processing		76,092	Postage	19,915
Insurance service fees		35,785	Printing	7,824
Audit		40,697	Medical evaluations	11,286
Investment consulting fees		498,528	Training & memberships	1,918
Legal counsel		6,500	Indirect costs paid to County	585,800
Misc. Fees/Other Consultants		49,365	Legal notices	234
		879,274		636,660
Travel and Entertainment			*Miscellaneous: System paid*	
Travel & meals		5,202	Prudential administration	3,960
		5,202	Tax withholding expenses	47,602
				51,562
			Total Administrative Costs	**$ 1,572,698**

Schedule of Investment Expenses

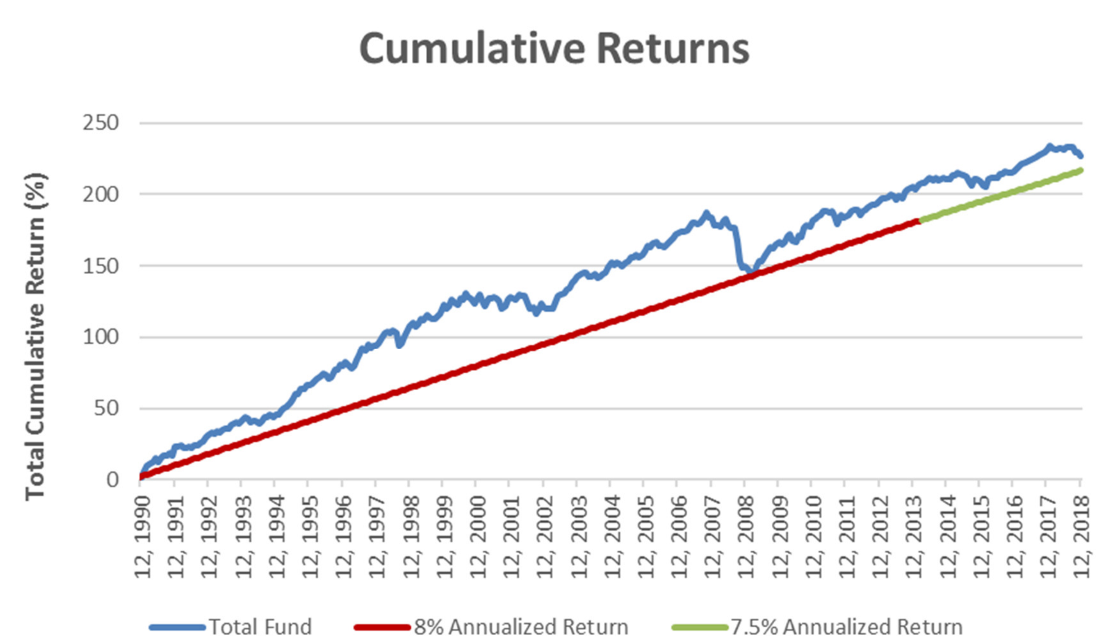
Management Fees			*Management Fees (continued)*	
Aetna/ING Investment Mgmt	$	412,643	Loomis Sayles Sr. Loan Fnd	369,450
Apollo		52,869	Newstone Partners Combined	440,461
Bridgewater		4,028,857	Penn Capital	330,484
Causeway		815,621	Private Advisors	273,974
Chartwell Investment Partners		423,254	Quellos Private Capital	235,120
Clarion Lion Real Estate		958,720	Siguler Guff Combined	
Crescent Mezzanine (TCW)		92,475	Southeastern Asset Mgmt, Inc.	455,772
Dupont Capital Management		30,548	State Street Global Advisors	38,401
EIG Energy		343,292	VOYA-ING	715,241
Entrust Special Opportunities		144,126	Wedge Capital Management	527,574
HRJ Special Opportunities		11,530	Western Asset Management	221,083
Lexington		121,367	Westwood Management Company	420,491
				11,463,353
			Custodial Fees	
			State Street Bank & Trust	370,740
			Total Investment Expense	**$ 11,834,093**

Schedule of Payments to Consultants

Company		*Fee*	*Nature of Service*
Aetna	$	35,785	Insurance Services
ADP		76,092	Benefit Payment Processing
Bolton Partners, Inc.		172,307	Actuarial Services
CliftonLarsonAllen		40,697	Audit Services
New England Pension Consultants		498,528	Investment Consulting Services
Other		55,865	Legal Services & Miscellaneous
	$	**879,274**	

Investment Section

The following is a review of investment activity of the System with discussion and comparisons to general investment market trends. NEPC, LLC (NEPC), the Investment Advisor, prepared this review using information provided by State Street Bank, the Custodian Bank. The following table illustrates the System's cumulative, net-of-fee, returns in relation to its actuarially assumed rate of return:



*Return Target is 8% from inception through February 2014 and 7.5% thereafter.

Fiscal year 2018 was the twentieth consecutive year the System's investment portfolio has been overseen by the Board of Trustees. NEPC continued to serve as the System's pension and investment consultant. In 2018, the System did not add any new investment managers, but made $55 million in private equity commitments, with $25 million to Lexington Capital Partners Fund IX and $30 million to Warburg Pincus Global Growth Fund.

MARKET COMMENTARY:

GLOBAL EQUITY MARKETS

First Quarter 2018

Volatility dulled returns in the first quarter amid heightening concerns around trade tensions between the United States and China. Developed market stocks outside of North America declined 1.5%, according to the MSCI EAFE Index, while emerging market equities eked out gains of 1.4%. The currency-hedged MSCI EAFE Index lost 4.3% during the quarter as most currencies strengthened against the dollar. US stocks fell 3.7% in February, snapping their 15-month winning streak; they ended the quarter in the red, losing a modest 0.8%. Information technology dominated sector performance, posting strong returns globally.

Second Quarter 2018

Global equities eked out a modest 0.5% in the second quarter, according to the MSCI ACWI Index. Growth stocks outperformed value while large-cap equities bested small caps in non-US markets. Bolstered by rising oil prices, energy was the strongest performing sector with gains of 10.3%. Financials and telecom sectors lagged with losses of 5.6% and 4.1%, respectively. Excluding the US, developed market equities were in the red at 1.2%, according to the MSCI EAFE Index, as a stronger US dollar erased gains in local equity markets. The S&P 500 returned 3.4%, buoyed by a robust employment report with joblessness hitting an 18-yearold low in May. Value beat growth in small-cap stocks while growth outperformed value in the large caps; small-cap stocks bested large caps. Emerging markets took a hit with stocks posting their worst quarter since 2015 with losses of nearly 8% in the second quarter, according to the MSCI EM Index. Within sectors, financials, real estate and industrials were the worst performers. Emerging market currencies sold off as the US dollar strengthened and the 10-year Treasury yield breached 3% for the first time in almost five years. Of note, MSCI said it would add 236 China A-share stocks to its emerging markets index, in addition to including Argentina and Saudi Arabia.

Third Quarter 2018

Global markets rose in the third quarter, led primarily by the US and, more specifically, growth stocks. The S&P 500 gained 7.7% in the three months ended September 30 while healthcare led sector performance. Japanese equities were also a strong performer, driven by continued reforms and the reelection of its prime minister. Meanwhile, stocks didn't fare as well in the UK as concerns mounted around Brexit; emerging markets were hurt by a currency crisis in Turkey and tensions related to US-China trade relations.

Fourth Quarter 2018

Stocks across the board took a severe beating in the fourth quarter with the MSCI ACWI Index down 12.8%; energy, the worst performing sector, lost 20.2%. The MSCI EAFE Index was in the red at 12.5%. In the US, stocks recorded their worst quarter in more than seven years with the S&P 500 bleeding 13.5% as investors fretted over the trade dispute between the United States and China, and the pace of interest rate increases. Domestic equities also posted their worst December since the 1930's as large-cap equities outperformed small caps and value bested growth. Emerging market stocks, which underwent a correction earlier in the year, outperformed developed markets with the MSCI EM Index falling 7.47% for the quarter. Brazil was the best performing country, buoyed by President-elect Jair Bolsonaro's pick for chief economic advisor and his pledge to sell state-owned companies. Asia lagged, pulled down by declines in China, Korea and Taiwan. Healthcare and information technology were among the worst performing sectors, losing 15.4% and 15.1%, respectively.

2018 Summary of Results – Global Equity

For comparison, the following table illustrates equity index returns across geographies, economic regions, and styles for the year and trailing time periods:

Global Equity Market Returns as of 12/31/2018				
Global Equity	**Quarter**	**1 Year**	**3 Yrs**	**5 Yrs**
MSCI ACWI	-12.8%	-9.4%	6.6%	4.3%
US Equity	**Quarter**	**1 Year**	**3 Yrs**	**5 Yrs**
S&P 500	-13.5%	-4.4%	9.3%	8.5%
Russell 1000 Growth	-15.9%	-1.5%	11.1%	10.4%
Russell 1000 Value	-11.7%	-8.3%	7.0%	5.9%
Russell 2000	-20.2%	-11.0%	7.4%	4.4%
Russell 2000 Growth	-21.7%	-9.3%	7.2%	5.1%
Russell 2000 Value	-18.7%	-12.9%	7.4%	3.6%
International Equity	**Quarter**	**1 Year**	**3 Yrs**	**5 Yrs**
MSCI EAFE	-12.5	-13.8%	2.9%	0.5%
MSCI EAFE Hedged USD	12.2%	-11.0%	2.6%	3.8%
MSCI EAFE Small Cap	-16.0%	-17.9%	3.7%	3.1%
MSCI Europe	-12.7%	-14.9%	2.1%	-0.6%
MSCI Japan	-14.2%	-12.9%	3.4%	3.1%
MSCI Emerging Markets	-7.5%	-14.6%	9.3%	1.6%
MSCI Emerging Markets Small Cap	-7.2%	-18.6%	3.7%	1.0%

GLOBAL FIXED INCOME MARKETS

First Quarter 2018

Credit was mostly subdued in the first quarter with the Bloomberg Barclays Aggregate down 1.5% and the Bloomberg Barclays High Yield Index losing 0.9%; breaking from the pack, the S&P LSTA Leveraged Loan Index was up 1.4%. US long credit was down 3.8%, while long Treasuries fell 3.3% with yields on the 10-year note at 2.74%. Outside the US, emerging markets continued to rally with local debt leading the way. The JPM GBI-EM Index returned 4.4% in the first quarter, bolstered by emerging market currencies which were up 2.5%. Hard-currency sovereign debt didn't fare as well, falling 2.0% as spreads widened.

Second Quarter 2018

The Bloomberg Barclays Aggregate Index was down 0.2% as corporate spreads remained relatively flat in the second quarter. The Bloomberg Barclays High Yield Index gained 1%, while the S&P LSTA Leveraged Loan Index was up 0.7% with loans leading high-yield performance so far this year. The US Long Credit Index fell 2.7% and the US Long Treasury gained 0.3% with the 10-year now yielding 2.86%. Outside the US, emerging markets debt had a rough quarter in dollar-denominated and local currencies, losing 3.5% and 10.4%, respectively, amid drawdowns of local currencies stoked by concerns around US tariffs and election results in Turkey and Mexico.

Third Quarter 2018

US credit was affected by higher interest rates and the ongoing trade war. The rate hike in September pushed the Fed Funds rate to its peak since October 2008. The Bloomberg Barclays High Yield Index finished the quarter up 2.4% and the S&P LSTA Leveraged Loan Index gained 1.3%; loans remained in the lead for the year with gains of 4% compared to 2.6% for high yield. The US Long Credit Index was up 1.3%, and the US Long Treasury lost 2.9% with yield on the 10-year Treasury increasing 20 basis points to close at 3.06%. In emerging markets, US dollar-denominated debt was up 1.5%, according to the JPM EMBI Index, while local currency debt lost 1.8%, according to the JPM GBI-EM Index.

Fourth Quarter 2018

In the US, high-yield spreads— particularly in the lower-rated CCC-segment—widened significantly in the fourth quarter. The burgeoning BBB-rated segment is a concern for investment-grade and high-yield debt investors. Double the size of the high-yield market, the growth in the BBB-segment has been driven largely by issuance, an increase in mergers and acquisitions, and credit downgrades from A to BBB. Widespread downgrades among BBBs could lead to an oversupply in high-yield securities and pressure prices. Outside the US, emerging markets were in the red for 2018 with local debt, the worst performing, down 6.2% for the year. However, local currency debt proved to be one of the few bright spots for the quarter, posting a gain of 2.1%

2018 Summary of Results — Global Fixed Income

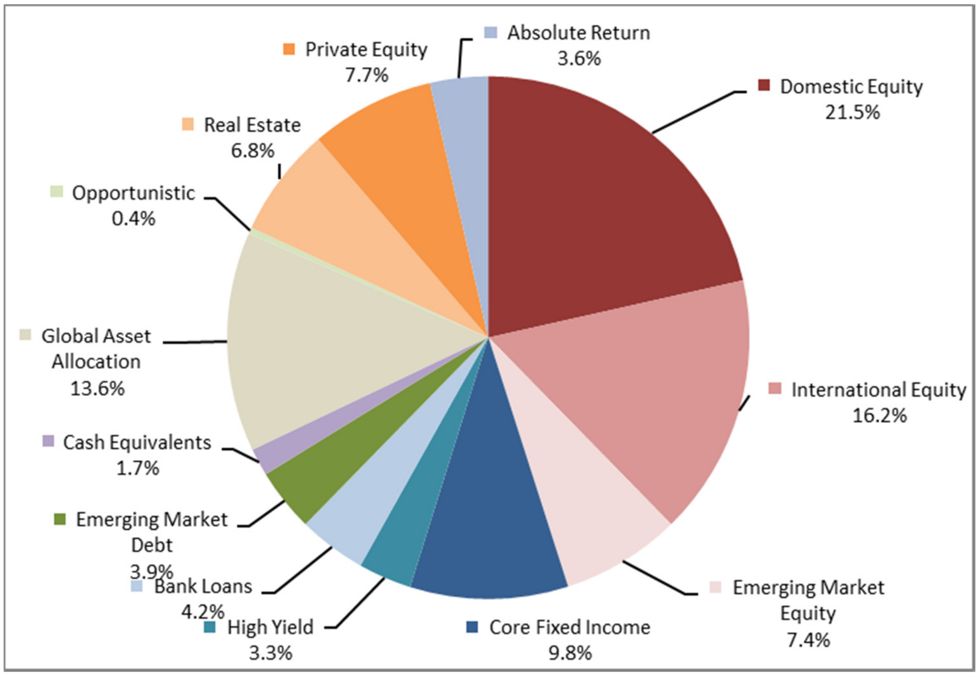
For comparison, the following table illustrates fixed income index returns and yields across regions, countries, and styles for the year and trailing time periods:

Global Fixed Income Market Returns as of 12/31/2018				
Global Fixed Income	**Quarter**	**1 Year**	**3 Yrs**	**5 Yrs**
BC Global Aggregate	1.2%	-1.2%	2.7%	1.1%
BC Global Aggregate (USD Hedged)	1.7%	1.8%	2.9%	3.4%
JPM EMBI Plus	-0.7%	-5.4%	4.0%	4.0%
JPM GBI-EM Global Diversified	2.1%	-6.2%	5.9%	-1.0%
Domestic Fixed Income	**Quarter**	**1 Year**	**3 Yrs**	**5 Yrs**
BC Aggregate Bond	1.6%	0.0%	2.1%	2.5%
BC Municipal Bond	1.7%	1.3%	2.3%	3.8%
BC TIPS	-0.4%	-1.3%	2.1%	1.7%
BC US Treasury	2.6%	0.9%	1.4%	2.0%
BC US Long Treasury	4.2%	-1.8%	2.6%	5.9%
BC MBS	2.1%	1.0%	1.7%	2.5%
BC US Credit	0.0%	-2.1%	3.2%	3.2%
BC US Long Credit	-1.6%	-6.8%	4.9%	5.1%
BC High Yield	-4.5%	-2.1%	7.2%	3.8%
BC Muni High Yield	0.3%	4.8%	5.8%	6.5%
S&P LSTA Lev. Loan	-3.5%	0.4%	4.8%	3.1%
BC T-Bills	0.6%	1.9%	1.0%	0.6%

GROWTH OF ASSETS AND ASSET ALLOCATION:

As of December 31, 2018, the System's net assets stood at $1.78 billion, down approximately $131.3 million for the year. For the fiscal year, the System experienced $57.74 million in net cash outflows and $68.06 million in investment losses. At December 31, 2018, the System's assets were in compliance with Policy and were allocated as follows:

ASSET ALLOCATION
(As of December 31, 2018)



INVESTMENT PERFORMANCE:

For fiscal year ending December 31, 2018, the System's assets earned -4.7%, net of fees, below its actuarially assumed rate of 7.5%. This also brought the System's return since inception (September 1990) to 7.4%, net of fees. These returns were calculated using a time-weighted approach (i.e., compound interest).

The following table summarizes investment holdings as of December 31, 2018, displaying fair market value and percent of the total value compared with the prior year data:

	2018		2017	
	Fair Value	Percentage of Total Fair Value	Fair Value	Percentage of Total Fair Value
Cash and temporary investments	$ 59,576,611	3.3 %	$ 67,291,489	3.5 %
Domestic and international fixed income	353,348,161	19.9	353,000,073	18.4
Domestic equity	364,672,321	20.4	456,905,578	23.8
Global fixed asset allocation pools	242,619,215	13.6	239,036,825	12.5
Opportunistic	7,162,936	0.4	11,378,373	0.6
International equity pools	418,558,314	23.4	498,330,852	26.0
Private Markets	131,974,935	7.4	117,468,741	6.1
Real estate investment pools	121,825,222	6.8	95,810,314	5.0
Absolute return fixed income	64,016,456	3.6	54,392,074	2.9
Stable Value Aetna insurance pools	21,938,741	1.2	22,612,156	1.2
	$ 1,785,692,912	100.0 %	$ 1,916,226,475	100.0 %

The following table summarizes the System's net-of-fee returns by asset category and compares them to relevant benchmarks:

Anne Arundel County Pension

Portfolio Holdings & Returns -- Fiscal Year Ending 2018

		Trailing Period Returns [1]		
	FY Ending Value	**Last Year**	**Last 3 Years**	**Last 5 Years**
Total Equity Composite	**45.0%**	**-11.9%**	**5.9%**	**3.5%**
Domestic Equity Composite		-7.2%	7.5%	6.4%
S&P 500 Index		*-4.4%*	*9.3%*	*8.5%*
Russell 2000 Index		*-11.0%*	*7.4%*	*4.4%*
Int'l Equity Composite		-17.7%	1.3%	-0.4%
MSCI EAFE Index		*-13.8%*	*2.9%*	*0.5%*
Emerging Markets Equity Composite		-11.9%	12.2%	1.9%
MSCI Emerging Markets Free Index		*-14.6%*	*9.2%*	*1.6%*
Total Fixed Income Composite	**24.8%**	**-1.2%**	**3.9%**	**2.6%**
Core Fixed Composite		0.2%	3.0%	3.2%
BBgBarc US Aggregate Bond Index		*0.0%*	*2.1%*	*2.5%*
Absolute Return Fixed Income Composite [2]		-0.5%	2.6%	n/a
3-Month LIBOR + 3% Index		*5.4%*	*4.5%*	*4.0%*
High Yield Bond Composite		-1.6%	5.1%	3.0%
BoA ML US BB-B Bond Index		*-2.0%*	*5.7%*	*4.0%*
Bank Loan Composite [3]		-0.3%	n/a	n/a
S&P/LSTA Leveraged BB Loan Index		*-0.4%*	*3.4%*	*2.8%*
Emerging Market Debt Composite		-5.3%	6.0%	0.6%
EMD Blended Index [4]		*-4.6%*	*5.6%*	*2.0%*
Real Estate Composite	**6.8%**	**8.8%**	**8.3%**	**10.3%**
NCREIF Property Index		*6.7%*	*7.2%*	*9.3%*
Global Asset Allocation Composite	**13.6%**	**-0.2%**	**5.6%**	**3.9%**
91-Day T-Bills + 6% Index		*8.0%*	*7.1%*	*6.7%*
Opportunistic Composite	**0.4%**	**2.6%**	**6.1%**	**4.6%**
BBgBarc High Yield Index		*-2.1%*	*7.2%*	*3.8%*
Private Equity Composite [5]	**7.7%**	**13.8%**	**11.6%**	**9.8%**
7.5% Return Index		*7.5%*	*7.5%*	*7.5%*
Cash Equivalents Composite	**1.7%**	2.0%	1.1%	0.7%
91-Day T-Bills Index		1.9%	1.1%	0.6%
AAC TOTAL FUND	**100.0%**	**-4.7%**	**6.0%**	**4.1%**

Notes:

[1] Returns are time-weighted, net of fees, except for Private Equity.

[2] Inception date of August 2014.

[3] Inception date of July 2016.

[4] 50% JPM EMBI Global Div' + 25% JPM EMBI Global + 25% JPM Corporate EMBI Index.

[5] Returns are money-weighted (IRRs).

The following table lists alphabetically lists all of the System's investment managers with their asset values, as of December 2018, describing each by service type:

Firm	Investment Service	Ending Market Value (December 31, 2018)
Aetna General	Annuity	$21,938,741
BlackRock Fixed Income	Absolute Return Fixed Income	$64,016,456
Bridgewater Associates All Weather	Global Asset Allocation	$176,415,679
Bridgewater Associates Pure Alpha	Global Asset Allocation	$66,203,538
Causeway Capital Management	International Equity	$108,921,067
Chartwell Investment Partners	Small Cap Growth Equity	$39,166,667
Clarion Partners	Core Real Estate	$121,825,222
Dimensional Fund Advisors	Emerging Markets Equity	$131,144,100
Entrust Capital	High Yield Fixed Income	$7,162,936
Lazard Asset Management	International Equity	$102,402,217
Loomis Sayles & Company	Senior Bank Loans	$73,920,807
PENN Capital Management	High Yield Fixed Income	$58,413,618
PIMCO	Emerging Markets Fixed Income	$69,658,136
Private Equity Composite	-	$136,317,892
Segall, Bryant & Hamill	International Small Cap Equity	$57,933,296
Southeastern Asset Management	Large Cap Value Equity	$52,294,201
State Street Global Advisors	Large Cap Core Equity	$117,809,903
Voya Financial (Equity)	Large Cap Growth Equity	$76,805,391
Voya Financial (Fixed Income)	Core Fixed Income	$76,933,153
Wedge Capital Management	Small Cap Value Equity	$46,425,396
Western Asset Management	Core Fixed Income	$76,523,091
Westwood	Large Cap Value Equity	$69,048,874

Sum of Market Values does not equal total plan assets due to the exclusion of liquidating managers and cash.

Investment Objectives

The Trustees of the Anne Arundel County Retirement System (System) seek to maintain the annual rate of pension contributions based on accepted actuarial practices, at a stable or declining percent of payroll. The Trustees also seek to maintain the funded ratio (market value of assets/actuarial value of benefits earned to date as measured by the Accrual Benefit Obligation) at a target level of 115% and in no event less than 100% in any given year. The System must remain capable of paying all benefits earned by employees. This principle is paramount and will not be compromised. Prudence is thus a mandatory factor in all decisions relating to the System. The disposition of the System's assets shall be made solely in the interest of the participants and their beneficiaries of the pension plan for exclusive purposes of providing benefits to such participants and their beneficiaries. Investments shall be made in a cost efficient manner, and reflect current industry best practices. The System return requirements are articulated in three separate ways:

- Nominal Returns – The actuarially required rate of return for the Fund is 7.5% annually, net of all fees and operating expenses. In order to achieve a buffer and have a somewhat higher likelihood of achieving the Fund's objective, the Board desires a net total return in excess of this 7.5% target.
- Real Returns – The Board is aware the preservation of purchasing power is driven by inflation. As the Consumer Price Index (CPI) is the most commonly accepted measure of inflation, The Board has defined its real rate of return target as the nominal return less CPI. With an actuarially assumed return rate of 7.5% (long-term) and an actuarially assumed CPI rate of 3.00% (long-term), the long-term, real return target is set at 4.50%.
- Relative Returns – Total return shall rank in the top half of the appropriate public fund universe. Risk-adjusted returns should also rank in the top half of the same universe. Returns for investment managers shall exceed their respective benchmarks, as well as rank in the top half of the appropriate universe of managers adhering to the same investment strategy.

The Board further recognizes that the return targets described herein may not be achieved in any single year. Instead, a longer-term horizon of 5-7 years shall be used in measuring the long-term success of the Fund. While the Board expects that returns will vary over time, the Fund shall have a risk tolerance consistent with that of other funds created for similar purposes, and the assets of the Fund shall be invested accordingly.

General Investment Policy

The System operates under the "Prudent Person" rule used herein, meaning that in investing, the governing authorities of the systems, funds and plans, shall exercise the judgment and care under the circumstances then prevailing, that an institutional investor of ordinary prudence, discretion, and intelligence exercises in the management of investments entrusted to it, not in regard to speculation, but in regard to the permanent disposition of funds, considering probable safety of capital as well as probable income.

Investments are made in full accordance with any and all applicable Maryland statutes, as well as any other applicable legislation or regulation, state, federal or otherwise. The roles and responsibilities of the Board of Trustees, the Investment Committee, the Investment Consultant, the Investment Managers and the Custodian are clearly defined. The Board has established a diversified portfolio to meet the System's return requirements. The table below summarizes the target asset allocation

Asset Class	Market Target (%)	Minimum Exposure (%)	Maximum Exposure (%)
Domestic Equity	21	12	31
International Equity	17	7	27
Emerging Market Equity	7	0	12
Domestic Fixed Income	21	5	40
Emerging Market Debt	4	0	10
Private Markets	10	0	18
Real Estate	6	0	11
Global Asset Allocation (GAA)	12	7	17
Cash	2	0	10

The Investment Committee reviews the asset allocation on a quarterly basis to determine if the asset allocation is consistent with the exposure ranges described herein. When necessary, the Investment Committee makes recommendations to the Board of Trustees to rebalance the asset allocation. At least annually the Investment Committee conducts a total portfolio review in concert with the pension consultant's investment outlook, and makes appropriate rebalancing recommendations to the Board of Trustees. The System shall strive to maintain a neutral bias with respect to Style Allocation (Growth versus Value) in its equity investments. The Board of Trustees shall use appropriate judgment and care, taking into account market conditions and transaction costs, when rebalancing portfolios.

For each separate account, investment managers must comply with the quality and diversification requirements stated in the investment policy. Investment managers have detailed reporting requirements and must certify policy compliance on a quarterly basis. Permissible derivative uses are hedging, creation of permitted market exposures, and management of country and asset allocation exposure.

Proxy Voting

The Board of Trustees delegates proxy voting responsibility to its investment managers. Investment managers are required to report to the Board on an annual basis, summarizing proxy voting over the previous fiscal year. The report must detail any changes that have occurred in the manager's proxy voting policies, and note any instances where proxies were not voted in accordance with the best interest of the System's beneficiaries.

Investment Manager Fees

The following table presents investment managers' fees paid by asset class.

Asset Class	Assets Managed (Includes Cash)	Fees Paid
Domestic equity	$ 382,678,336	$ 2,580,733
International equity	418,558,313	815,621
Domestic fixed income	208,857,517	921,017
Global assets	242,619,315	4,028,857
Other *	163,287,473	-
Private markets **	139,281,054	1,745,762
Real estate	120,574,868	958,720
Stable value insurance account	98,744,133	412,643
Total Investment Managers' Fees		11,463,353
Other Investment Service Fees:		
Custodial fees		370,740
Total Investment Expenses		$ 11,834,093

* Fees net to fund assets. Not available as discrete amounts.
** Fees reported for a portion, but not all of private market accounts.

Brokerage Commissions

Broker's commissions on investment transactions, excluding mutual funds, for the year ended December 31, 2018 totaled $226,258. Brokerage firms receiving more than $6,000 in fees are listed below.

Brokerage Firms	Fees Paid
Liquidnet, Inc.	$ 35,441
J.P. Morgan Securities	32,028
Instinet U.K. Ltd	22,807
Goldman Sachs & Co.	11,568
Barclays Capital LE	8,750
BTIG, LLC	8,123
UBS Securities, LLC	$ 6,879
Credit Suisse Securities (USA)	6,664
Deutsche Bank Securities, Inc.	6,235
Merrill Lynch Pierce Fenner & Smith	6,069
RBC Dominion Securities, Inc.	6,020
	$ 150,584

The Investment Policy Statement requires that each manager shall provide an annual commission report to the Investment Committee and Investment Consultant within forty-five (45) days of the end of each calendar year. The report shall cover all trades executed during the prior year and should include a discussion of the firm's policy for selecting brokers, reviewing brokers, and negotiating brokerage commissions. This should include identification of any situations where the investment manager has a financial interest in brokers used to execute trades in the portfolio as well as a list of all broker-dealers used by the firm. Actual commission expenses are to be compared to the prior year. If the firm has a system for monitoring total transaction costs (commissions plus market impact), a copy of this analysis should be provided. If no such system is being used, the commission report should include a complete explanation of how the firm monitors selected brokers for best execution.

Manager Name	Asset Class	Long-term Benchmark	Style Benchmark	Peer Group Universe	Guideline Exemptions
Aetna General	Domestic Fixed Income	Ryan Labs 5 Yr GIC	Ryan Labs 5 Yr GIC	All US Fixed Income Managers	None
Apollo Investment Fund VIII, L.P. Apollo Investment Fund IX, L.P.	Private Equity	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
BlackRock	Absolute Return Fixed Income	3 Month Libor +3%	3 Month Libor + 3%	Absolute Return Fixed Income Managers	None
Bridgewater Associates, Inc.	Global Asset Allocation	91 Day T-Bills + 6%	91 Day T-Bills + 6%	Absolute Return Managers (low volatility HFOF managers)	None
Bridgewater Associates, Inc.	Hedge Fund	91 Day T-Bills + 6%	91 Day T-Bills + 6%	Absolute Return (Global Macro Managers)	None
Causeway Capital Management LLC	International Equity	MSCI EAFE	MSCI EAFE	International Developed Equity	None
Chartwell Investment Partners	U.S. Small Cap Growth Equity	Russell 2000 Index	Russell 2000 Growth	U.S. Small Cap Growth Equity	None
Clarion Partners	Real Estate	NCREIF Property Index	NCREIF Property Index	Real Estate Managers	None
Dimensional Fund Advisors, LP	Emerging Markets Equity	MSCI Emerging Markets Free Index	MSCI Emerging Markets Index (net div)	Emerging Markets Equity	None
DuPont Capital Management	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
EIG XV EIG XVI	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Entrust	Opportunistic	HFRI ED: Distressed/Restructuring Index	HFRI ED: Distressed/Restructuring Index	Absolute Return Managers	None
HRJ Capital (Capital Dynamics)	Private Equity Distressed Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Lazard Asset Management LLC	International Equity	MSCI EAFE-ND	MSCI EAFE	International Developed Equity	None
Lexington Partners VI-B Lexington Partners VII Lexington Partners VIII Lexington Partners IX	Private Equity Secondaries	7.5% Constant Return	7.5% Constant Return	Private Equity Managers	None
Loomis Sayles & Company, L.P.	Bank Loans	S&P LSTA US BB Ratings Loan Index	S&P LSTA US BB Ratings Loan Index	Bank Loan Managers	None
Newstone Capital Partners I Newstone Capital Partners II	Private Equity Distressed Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None

Manager Name	Asset Class	Long-term Benchmark	Style Benchmark	Peer Group Universe	Guideline Exemptions
Penn Capital	US High Yield Fixed Income	BofA ML US High Yield BB-B Rated Index	BofA ML US High Yield BB-B Rated Index	High Yield Bond	None
PIMCO	Emerging Market Debt	50% JPM EMBI Global Div./25% JPM EMBI Global/25% JPM	50% JPM EMBI Global Div./25% JPM EMBI Global/25% JPM	Emerging Market Debt	None
Private Advisors Small Company Buyout Fund V Private Advisors Small Company Buyout Fund VI Private Advisors Coinvestment Fund LP	Private Equity Small Buyout Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Quellos Private Capital II, LP Quellos Private Capital III, LP	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Segall, Bryant & Hamill	International Small Cap Equity	MSCI EAFE Small Cap Index	MSCI EAFE Small Cap Index	International Small Cap Equity	None
Siguler Guff DOF III Siguler Guff DOF IV Siguler Guff DOF V	Private Equity Distressed Debt	7.5% Constant Return	7.5% Constant Return	Private Equity Managers	None
Southeastern Asset Management	U.S. Large Cap Value Equity	Russell 1000 Index	Russell 1000 Value Index	U.S. Large Cap Value Equity	Note A
State Street Global Advisors	Domestic Equity	S&P 500 Index	S&P 500 Index	US Large Cap Core Equity	None
TCW/Crescent Mezzanine Partners, LP IV TCW/Crescent Mezzanine Partners, LP V Crescent Mezzanine Partners, LP VI	Private Equity Mezzanine Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
VOYA Financial	Core Fixed Income	Barclays Capital Aggregate Bond Index	Barclays Capital Aggregate Bond Index	Core Fixed Income	Note B
VOYA Financial	U.S. Large Cap Growth Equity`	Russell 1000 Index	Russell 1000 Growth Index	U.S. Large Cap Growth Equity	None
Warburg Pincus Private Equity XII, LP Warburg Pincus Global Growth	Private Equity Growth Equity	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
WEDGE Capital Management	US Small Cap Value Equity	Russell 2000 Index	Russell 2000 Value Index	US Small Cap Value	None
Western Asset Management	Core Plus Fixed Income	Barclays Capital Aggregate Bond Index	Barclays Capital Aggregate Bond Index	Core Fixed Income	Note C
Westwood Management Corp.	U.S. Large Cap Value Equity	Russell 1000 Index	Russell 1000 Value Index	U.S. Large Cap Value Equity	None

Note A:
1. May hold up to 10% of their portfolio in any one security.
2. May hold up to 30% of the portfolio in American Depository Receipts (ADRs), which are stocks or convertibles of foreign companies that are publicly traded in the US.
3. Is exempt from being required to hold at least 25 stocks in their portfolio.
4. For securities held in the Anne Arundel County Pension and Retirement System portfolio, Southeastern may own up to 20% of the outstanding market capitalization of a given company across all of their portfolios. If Southeastern owns more than this 20% limit for any security within the Anne Arundel County Pension and Retirement System portfolio, the Investment Committee Chairman and Investment Consultant of the Anne Arundel County Pension and Retirement System must be notified immediately for approval to continue holding the security, which may or may not be granted, depending on prevailing conditions.
5. May hold up to 20% of the portfolio in cash and equivalents if market conditions warrant, but Board must be notified if cash goes above 20%.

Note B:
1. May hold up to 5% of the portfolio, at market value, in Senior Bank Loan Debt securities.

Note C:
1. Exempt from receiving at least two competitive offers on the same or similar securities prior to purchasing new issue mortgage back securities.
2. Permitted to invest in the securities referenced in Section A of the Anne Arundel County Retirement and Pension System Investment Policy Statement. In addition, Western Asset may hold investments in High Yield Fixed Income, Emerging Market Debt, Emerging Market Debt Local Currency, and/or Bank Loans.

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Largest Stock Holdings (By Fair Value)

Rank	Shares	Company	Fair Value
1	88,199	MICROSOFT CORP COMMON STOCK	$ 8,958,372
2	5,293	AMAZON.COM INC COMMON STOCK	7,949,927
3	5,699	ALPHABET INC CL A COMMON STOCK	5,955,227
4	31,183	APPLE INC COMMON STOCK	4,918,806
5	323,715	CENTURYLINK INC COMMON STOCK	4,904,282
6	16,454	UNITEDHEALTH GROUP INC COMMON STOCK	4,099,020
7	481,494	GENERAL ELECTRIC CO COMMON STOCK	3,644,910
8	316,989	MATTEL INC COMMON STOCK	3,166,720
9	19,432	FEDEX CORP COMMON STOCK	3,134,965
10	6,990	FAIRFAX FINANCIAL HLDGS LTD COMMON STOCK	3,076,159

Note: This list does not include investments in stock investment pools
A complete list of portfolio holding is available upon request.

Largest Bond Holdings (By Fair Value)

Rank	Par	Description	Fair Value
1	1,230,000	BAUSCH HEALTH COS INC COMPANY GUAR 144A 05/23 5.875	1,137,750
2	750,000	BOMBARDIER INC SR UNSECURED 144A 12/21 8.75	772,500
3	760,000	ALTICE FRANCE SA SR SECURED 144A 05/24 6.25	708,700
4	660,000	ALLY FINANCIAL INC SUBORDINATED 11/25 5.75	656,700
5	670,000	CENTURYLINK INC SR UNSECURED 04/24 7.5	646,550
6	605,000	MEREDITH CORP COMPANY GUAR 144A 02/26 6.875	591,388
7	600,000	HCA INC COMPANY GUAR 02/25 5.375	585,000
8	545,000	KINETIC CONCEPT/KCI USA SECURED 144A 11/21 12.5	583,150
9	625,000	CSC HOLDINGS LLC SR UNSECURED 06/24 5.25	572,656
10	545,000	SELECT MEDICAL CORP COMPANY GUAR 06/21 6.375	543,638

Note: A complete list of portfolio holdings is available upon request.

Actuarial Section

Dear Members of the Board of Trustees

We prepared annual actuarial valuations as of January 1, 2019 for the Anne Arundel County Retirement and Pension System. The system consists of the following plans, each of which is valued separately:

- Employees' Retirement Plan
- Police Service Retirement Plan
- Fire Service Retirement Plan
- Detention Officers' and Deputy Sheriffs' Retirement Plan

The contributions determined in these valuations are for the Fiscal year ending June 30, 2020. The valuations are based on employee and financial data, which were provided by the County Office of Personnel and County Office of Finance, respectively. We have performed limited tests for consistency and reasonableness and have not found any material problems with the data.

The following GASB68 information is provided as of the December 31, 2018 measurement date for FYE2019. This will require that the actual County contributions for the second half of FY19 (i.e. contributions made after the measurement date) to be treated as a deferred outflow (when the amount is known), but this will not affect the Total Pension Expense recognized for FY19. The methods, assumptions, and participant data as of December 31, 2018 used for these calculations are summarized in the relevant sections of this report. The GASB68 information was prepared using the Entry Age Normal actuarial cost method with Normal Cost ending at DROP entry date.

Methodology, Reliance and Certification

This report is prepared for the County. The report contains the actuarial information to be included with the County's financial statements for the year end June 30, 2019 (the County's fiscal year end date) as required by GASB68. This information has been prepared for use in the financial statements of the County. This information is not intended for, nor should it be used for, any additional purposes.

All costs, liabilities and other factors under the Plans were determined in accordance with generally accepted actuarial principles and procedures. The funding method used in the actuarial valuations is the projected unit credit cost method. The objective of this funding method is to produce level contributions as a percentage of payroll as long as the average age of the population does not change. The funding objective of the System is to meet long-term benefit promises through contributions and investment income. The funding ratio, which is the actuarial value of assets divided by the actuarial accrued liability, is an estimate of how well the System is meeting the objective. On the GASB reporting basis, the ratio for all four plans increased from the prior year.

The included calculations assume that the members and the County will continue to make all required actuarially determined contributions. Based on that assumption, the plan's fiduciary net position is expected to be available to make all future benefit payments of current plan members.

These calculations and comparisons with assets are applicable for the valuation date only. The future is uncertain, and the plan may become better funded or more poorly funded in the future. This valuation does not provide any guarantee that the plan will be able to provide the promised benefits in the future.

Methodology, Reliance and Certification (cont.)

This is a deterministic valuation in that it is based on a single set of assumptions. This set of assumptions is one possible basis for our calculations. Other assumptions may be equally valid. The future is uncertain and the plan's actual experience will differ from those assumptions; these differences may be significant or material because these results are very sensitive to the assumptions made and, in some cases, to the interaction between the assumptions. We may consider that some factors are not material to the valuation of the plan and may not provide a specific assumption for those factors. We may have used other assumptions in the past. We will likely consider changes in assumptions at a future date.

The County is responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in this report. The County is solely responsible for communicating to Bolton Partners, Inc. any changes required thereto.

The County could reasonably ask how the valuation would change if we used a different assumption set or if plan experience exhibited variations from our assumptions. This report does not contain such an analysis. This type of analysis would be a separate assignment.

The cost of this plan is determined by the benefits promised by the plan, the plan's participant population, the investment experience of the plan and many other factors. An actuarial valuation is a budgeting tool for the County or in this case a measure of accounting expense. It does not affect the cost of the plan. As the experience of the plan evolves, it is normal for the level of contributions and expense to the plan to change. If a contribution is not made for a particular year, either by deliberate choice or because of an error in a calculation, that contribution can be made in later years. We will not be responsible for contributions that are made at a future time rather than an earlier time. The plan sponsor is responsible for funding the cost of the plan.

We make every effort to ensure that our calculations are accurately performed. These calculations are complex. Despite our best efforts, we may make a mistake. We reserve the right to correct any potential errors by amending the results of this report or by including the corrections in a future valuation report.

Because modeling all aspects of a situation is not possible or practical, we may use summary information, estimates, or simplifications of calculations to facilitate the modeling of future events in an efficient and cost-effective manner. We may also exclude factors or data that are immaterial in our judgment. Use of such simplifying techniques does not, in our judgment, affect the reasonableness of valuation results for the plan.

This report is based on plan provisions, census data, and asset data submitted by the County. We have relied on this information for purposes of preparing this report, but have not performed an audit. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information. The plan sponsor is solely responsible for the validity and completeness of this information.

The County is solely responsible for selecting the plan's investment policies, asset allocations and individual investments. Bolton Partners, Inc.'s actuaries have not provided any investment advice to the County.

The information in this report was prepared for the internal use of the County, the plan and their auditors in connection with our actuarial valuations of the pension plan as required by GASB68. This report may not be used for any other purpose; Bolton Partners, Inc. is not responsible for the consequences of any unauthorized use or the reliance on this information by any other party.

The calculation of actuarial liabilities for valuation purposes is based on a current estimate of future benefit payments. The calculation includes a computation of the "present value" of those estimated future benefit payments using an assumed discount rate; the higher the discount rate assumption, the lower the estimated liability will be. For purposes of estimating the liabilities (future and accrued) in this report, you selected an assumption based on the expected long-term rate of return on plan investments. Using a lower discount rate assumption, such as a rate based on long-term bond yields, could substantially increase the estimated present value of future and accrued liabilities.

Methodology, Reliance and Certification (cont.)

This report provides certain financial calculations for use by the auditor. These values have been computed in accordance with our understanding of generally accepted actuarial principles and practices and fairly reflect the actuarial position of the Plan. The various actuarial assumptions and methods which have been used are, in our opinion, appropriate for the purposes of this report.

The report is conditioned on the assumption of an ongoing plan and is not meant to present the actuarial position of the Plan in the case of Plan termination. 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 or additional cost or contribution requirements based on the plan's funded status), and changes in plan provisions or applicable law.

The actuarial assumptions and methods used for these valuations meet the parameters set forth in the Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Defined Benefit Pension Plans.

We have included the following supporting schedules: Actuarial Basis, Schedule of Member Valuation Data, Summary of Plan Provisions, Summary of Major Legislative changes, a Solvency Test, and Analysis of Financial Experience. We meet the qualification standards of the American Academy of Actuaries to render the actuarial opinions contained in the reports and are currently compliant with the Continuing Professional Development Requirement of the Society of Actuaries.

Thomas B. Lowman, FSA, EA, MAAA	May 17, 2019 Date
Ann M Sturner Ann M. Sturner, FSA, EA	May 17, 2019 Date
Michael Spadaro Michael Spadaro, ASA	May 17, 2019 Date

Order of Attachments by Plan

Attachment A..Employee's Retirement Plan

Attachment B..Police Service Retirement Plan

Attachment C..Fire Service Retirement Plan

Attachment D...Detention Officers' and Deputy Sheriffs' Retirement Plan

Attachment A

Employees' Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six-month lag between the valuation and the fiscal year. The 2019 valuation determines the County contributions due for the fiscal year ending June 30, 2020. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2019 to June 30, 2019) have not been treated as assets in the current valuation.

C. Valuation Procedures

Tier One active participants who terminate prior to age 40 are assumed to elect to receive a refund of employee contributions with interest. Employees who terminate at or after age 40 are assumed to receive their vested benefit at normal retirement date.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining pension expense and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Employees' Plan provisions.

Economic

Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the original benefit each year from retirement. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of the current benefit each year from retirement.

Other

Mortality	Healthy: RP-2000 Blue Collar Mortality Table for males and females projected generationally using scale AA. Pre-Termination mortality uses 60% of these rates. Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward nine years and then projected generationally using scale AA. 100% of pre-retirement deaths are assumed to be non-duty-related. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.

Disability	See Table of Sample Rates. 10% of disablement is assumed to be duty-related.
Administrative Expenses	The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.
Retirement Rates	

Age	Service 20	30	31
50	6%	40%	40%
55	9%	30%	5%
60	15%	15%	15%
65	40%	40%	40%
68	100%	100%	100%

Percentage Married	Males – 70%; Females – 70%
Age Difference	Males are assumed to be four years older than their spouses.
Military Service	Active liabilities (which depend on credited service) are loaded by 1.0% to account for future crediting of military service.
Disability Leave	Active liabilities (which depend on credited service) are loaded by 1.5% to account for future crediting of disability service.

The Tier 1 service cap of 60% is valued as 62% to account for Disability and Military service credit not being limited by the 30-year cap on service.

	Table of Sample Base Mortality Rates (2000)				Projection Scale	
	Healthy Mortality		Disabled Mortality		(Healthy and Disabled)	
Age	Males	Females	Males	Females	Males	Females
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.10	0.05	1.00	1.40
30	0.07	0.03	0.13	0.08	0.50	1.00
35	0.11	0.05	0.17	0.13	0.50	1.10
40	0.14	0.09	0.23	0.18	0.80	1.50
45	0.18	0.14	0.36	0.26	1.30	1.60
50	0.24	0.20	0.73	0.43	1.80	1.70
55	0.42	0.28	1.38	0.91	1.90	0.80
60	0.83	0.49	2.39	1.64	1.60	0.50
65	1.55	1.04	3.91	2.82	1.40	0.50

	Table of Sample Decrement Rates		
	Percentage		
		Withdrawal	
Attained Age	Disablement	Males	Females
20	0.020%	12.47%	21.57%
25	0.020	9.97	18.12
30	0.020	6.78	13.34
35	0.030	4.37	9.05
40	0.061	3.48	7.48
45	0.100	2.40	5.95
50	0.162	0.63	1.56
55	0.266	0.43	1.07
60	0.397	0.00	0.00
64	0.541	0.00	0.00

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.5%
25	6.0
30	5.5
35	5.0
40	4.5
45	4.0
50	3.5
55	3.5

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	2,225	107,290,189	48,220	3.7%
January 1, 2007	2,338	116,709,102	49,917	3.5%
January 1, 2008	2,284	117,222,681	51,323	2.8%
January 1, 2009	2,312	124,803,488	53,981	5.2%
January 1, 2010	2,278	126,030,706	55,325	2.5%
January 1, 2011	2,239	123,498,129	55,158	(0.3%)
January 1, 2012	2,209	120,415,534	54,511	(1.2%)
January 1, 2013	2,152	116,024,717	53,915	(1.1%)
January 1, 2014	2,125	115,809,426	54,499	1.1%
January 1, 2015	2,207	127,090,869	57,585	5.7%
January 1, 2016	2,186	127,827,040	58,475	1.5%
January 1, 2017	2,187	130,312,665	59,585	1.9%
January 1, 2018	2,278	138,239,224	60,684	1.8%
January 1, 2019	2,191	134,891,500	61,566	1.5%

Members With Deferred Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	217	37	(22)	232
1/1/06 to 12/31/06	232	20	(12)	240
1/1/07 to 12/31/07	240	42	(22)	260
1/1/08 to 12/31/08	260	37	(40)	257
1/1/09 to 12/31/09	257	25	(25)	257
1/1/10 to 12/31/10	257	24	(24)	257
1/1/11 to 12/31/11	257	22	(19)	260
1/1/12 to 12/31/12	260	41	(28)	273
1/1/13 to 12/31/13	273	34	(36)	271
1/1/14 to 12/31/14	271	27	(29)	269
1/1/15 to 12/31/15	269	30	(23)	276
1/1/16 to 12/31/16	276	18	(16)	278
1/1/17 to 12/31/17	278	24	(25)	277
1/1/18 to 12/31/18	277	43	(17)	303

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	911	93	(22)	982
1/1/06 to 12/31/06	982	109	(22)	1,069
1/1/07 to 12/31/07	1,069	102	(28)	1,143
1/1/08 to 12/31/08	1,143	82	(31)	1,194
1/1/09 to 12/31/09	1,194	93	(17)	1,270
1/1/10 to 12/31/10	1,270	82	(27)	1,325
1/1/11 to 12/31/11	1,325	107	(39)	1,393
1/1/12 to 12/31/12	1,393	110	(35)	1,468
1/1/13 to 12/31/13	1,468	130	(54)	1,544
1/1/14 to 12/31/14	1,544	113	(34)	1,623
1/1/15 to 12/31/15	1,623	123	(36)	1,710
1/1/16 to 12/31/16	1,710	139	(42)	1,807
1/1/17 to 12/31/17	1,807	131	(44)	1,894
1/1/18 to 12/31/18	1,894	141	(61)	1,974

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year			
Year Ending	Number	Annual Allowance[1]	Number	Annual Allowance	Number	Annual Allowance	% Increase in Average Annual Allowance	Average Annual Allowance
12/31/2006	109	$3,576,394	22	$400,214	1,069	$21,649,834	7.65%	$20,252
12/31/2007	102	$2,170,425	28	$306,253	1,143	$23,514,006	1.58%	$20,572
12/31/2008	82	$2,955,585	31	$523,131	1,194	$25,946,460	5.63%	$21,731
12/31/2009	93	$1,846,297	17	$157,628	1,270	$27,635,129	0.13%	$21,760
12/31/2010	82	$2,841,455	27	$403,314	1,325	$30,073,270	4.31%	$22,697
12/31/2011	107	$3,147,404	39	$744,281	1,393	$32,476,393	2.72%	$23,314
12/31/2012	110	$3,351,810	35	$557,851	1,468	$35,270,352	3.05%	$24,026
12/31/2013	130	$3,331,597	54	$1,034,187	1,544	$37,567,762	1.27%	$24,331
12/31/2014	113	$2,915,234	34	$720,676	1,623	$39,762,320	0.69%	$24,499
12/31/2015	123	$3,092,029	36	$775,758	1,710	$42,078,591	0.44%	$24,607
12/31/2016	139	$3,935,345	42	$693,441	1,807	$45,320,495	1.93%	$25,081
12/31/2017	131	$4,473,521	44	$831,055	1,894	$48,962,961	3.07%	$25,852
12/31/2018	141	$5,147,623	61	$1,133,546	1,974	$52,977,038	3.81%	$26,837

[1] Includes COLA's

Tier One Members

Compensation — For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.

Final Earnings — The average of the highest 3 years of all basic pays.

Eligibility Requirements — Full-time general employees of the County will be eligible to participate in the pension plan upon hire.

Employee Contributions — 4% of compensation.

Retirement Date

Normal Retirement — The first of the month coincident with or next following the participant's 60th birthday or, if earlier, when the participant has 30 years of service.

Early Retirement — Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service, provided the participant is at least age 50.

Postponed Retirement — A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.

Retirement Benefits

Normal Retirement — 2.0% of final earnings for each year of service (maximum 60% plus 2% times unused disability credit and pre-employment military service credit).

Early Retirement — Same as normal retirement, but reduced actuarially for early commencement.

Years Early	Reduction Factor
1	2%
2	5%
3	9%
4	14%
5	20%
6	28%
7	36%
8	44%
9	52%
10	60%

Postponed Retirement — Same as normal retirement, but based on continued accrual past normal retirement date.

Disability

Eligibility — Totally and permanently disabled (except as the result of actions specified in the County code). To receive duty-related disability benefits, there is no service requirement. Five years of service are required to receive non-duty benefits.

Duty-Related — The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.

Non-Duty — The greater of the accrued benefit or 25% of final earnings, payable immediately, unreduced.

Normal form of Payment	Monthly life annuity with modified cash refund.
Termination of Employment	
Less than 5 years of service	Return of employee contributions with 4.25% interest.
5+ years of service	For employees hired before July 1, 2015, at the discretion of the employee, either a return of contributions with interest or the accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date. For employees hired on or after July 1, 2015 and County Council, appointed exempt employees, and County Executives hired on or after December 1, 2014, return of employee contributions with interest.
10+ years of service	For employees hired on or after July 1, 2015 and County Council members whose first term begins on or after December 1, 2014, at the discretion of the employee, either a return of contributions with interest or the accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date.
Death Benefits	
Married and eligible for early retirement	The greatest of: • $10 per month • 50% of the final earnings • The accrued benefit, reduced actuarially for early commencement and the joint and 100% survivor form.
Unmarried or not eligible for early retirement	Return of employee contributions with 4.25% interest plus a lump sum of 50% of final earnings.
Cost of Living Increase (simple, for benefits accrued as of 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior year benefit plus base benefit multiplied by increase in current March CPI from March CPI for prior year. • Benefit increased by 3% of initial benefit.
Cost of Living Increase (compound, for benefits accrued after 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.

<u>Tier Two Members</u>

Compensation	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.
Final Earnings	The average of the highest 3 years of all basic pays.
Eligibility Requirements	Full-time general employees of the County will be eligible to participate in the pension plan upon hire. Members can elect to join Tier One.
Employee Contributions	No employee contributions required or allowed.

Retirement Date	
Normal Retirement	The first of the month coincident with or next following the participant's 60th birthday or, if earlier, when the participant has 30 years of service.
Early Retirement	Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service, provided the participant is at least age 50.
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.
Retirement Benefits	
Normal Retirement	1.0% of final earnings for each year of service.
Early Retirement	The normal retirement benefit is reduced for early commencement, using the same reduction factors as Tier 1.
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.
Normal form of Payment	Monthly life annuity.
Disability	
Eligibility	Totally and permanently disabled (except as the result of actions specified in the County code). To receive duty-related disability benefits, there is no service requirement. Five years of service are required to receive non-duty benefits.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-duty	The greater of the accrued benefit or 25% of final earnings, payable immediately, unreduced.
Termination of Employment	
Less than 5 years of service	No benefit is payable.
5+ years of service	For employees hired before July 1, 2015, the accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date. For employees hired on or after July 1, 2015 and County Council, appointed exempt employees, and County Executives hired on or after December 1, 2014, no benefit is payable.
10+ years of service	For employees hired on or after July 1, 2015 and County Council members whose first term begins on or after December 1, 2014, the accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date.

Death benefits

Married and eligible for early retirement	The greatest of: • \$10 per month • 50% of the final earnings • The accrued benefit reduced actuarially for early commencement and the joint and 100% survivor form.
Unmarried or not eligible for early retirement	A lump sum of 50% of final earnings.
Cost of Living Increase (compound)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.

County Council Bill No. 34-92	Effective 6/1/92 through 8/31/92
	Participants age 50 or older with at least 20 years of service could elect to retire with an additional pension equal to 1/12 of 2% for each year of credited service. The additional amount could be taken as a pension increase, a lump sum, or as a temporary supplement to age 62. Appropriate actuarial adjustments apply.
State House Bill No. 687	Effective 7/1/90
	County employees were given the opportunity to apply for credit under the County's plan for previous service with the State of Maryland (or a political subdivision of the State).
County Council Bill No. 90-93	Effective 12/22/93
	Plan participants are required to pay the full actuarial value of service purchases. Purchases can only be made at retirement. To be eligible, an employee must have 60 months of County service. Existing plan participants must be notified of their right to purchase service under existing law.
County Council Bill No. 82-94	Effective 10/31/94
	Transfers assets from general employees plan to A&E plan for participants who have transferred between these two plans.
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase will only apply to benefits accrued as of 1/31/97. The cost of living increase for future benefits is a compound increase equal to 60% of the annual change in the CPI, not to exceed 2.5%. Employees hired, or rehired, on or after 12/4/96 will be Tier Two employees and will have different benefits than current employees.
County Council Bill No. 41-99	Effective 6/15/99
	Employees paid under the deputy sheriff employees pay schedule become Tier Two members of the Detention Center Plan effective as of January 1, 1999. Service credited under the Employees' Plan will count as credited service in the Detention Center Plan and no future benefit will be paid from the Employees' Plan. Assets are transferred from the Employees' Plan to the Detention Center Plan in an amount equal to the projected unit credit accrued liability in the Employees' Plan.
Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be paid over the 60% cap. Normal retirement was changed to the earlier of 30 years of service or age 60.
County Council Bill No. 74-09	Effective 12/11/2009.
	For non-represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 3% for determining the final average basic pay.
County Council Bill No. 6-10	Effective 4/18/2010.
	Provides for a disability benefit for those participants who are totally and permanently disabled as a result of qualified military service.
County Council Bill No. 98-12	Effective 5/13/2013
	Changed the definition of "final average basic pay" from highest 3 out of the last 5 years basic pays to highest 3 of all basic pays.
County Council Bill No. 97-13	Effective 4/14/2014
	Members of the Employees' Plan and Category II members of the Detention and Deputy Sheriffs' Plan hired on or after July 1, 2015 will be subject to 10 year vesting and 10 year normal retirement provisions. The 10 year requirement also affects the ability to purchase service or get credit for pre-plan military service. The 10 year requirement extends to County Council members hired on or after December 1, 2014.

County Council Bill No.95-17	Effective 3/23/2018
	Created the Employee Retirement Savings Plan and allowed certain non-vested members of the Employees' Plan a one-time opportunity to transfer the present value of their Employees' Plan accrued benefit to it.

Solvency Test

2001 to 2019

Actuarial Valuation Date	Active Member Contribution (1)	Retirees and Beneficiaries Inactive and Pay-Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets (1)	(2)	(3)
1/1/2001	41,406,031	111,719,124	186,186,863	302,805,427	100%	100%	80.4%
1/1/2002	44,309,682	121,204,179	192,282,764	321,443,897	100%	100%	81.1%
1/1/2003	45,678,833	150,497,365	176,296,171	335,539,414	100%	100%	79.1%
1/1/2004	47,751,449	163,182,780	156,607,123	367,756,502	100%	100%	100.1%
1/1/2005	49,689,830	197,181,410	158,300,584	395,501,876	100%	100%	93.9%
1/1/2006	50,870,066	224,477,149	163,885,111	422,234,496	100%	100%	89.6%
1/1/2007	52,535,798	257,120,315	172,315,517	456,656,849	100%	100%	85.3%
1/1/2008	52,839,596	289,584,191	183,917,695	492,788,674	100%	100%	81.8%
1/1/2009	54,817,303	315,594,769	197,782,908	488,275,803	100%	100%	59.6%
1/1/2010	58,025,700	333,890,452	206,924,979	519,556,093	100%	100%	61.7%
1/1/2011	60,121,679	360,630,667	206,517,241	522,165,145	100%	100%	49.1%
1/1/2012	62,225,800	383,559,354	207,867,904	516,070,401	100%	100%	33.8%
1/1/2013	63,403,319	423,101,739	207,075,617	508,232,321	100%	100%	10.5%
1/1/2014	63,002,887	460,323,316	212,402,830	545,812,384	100%	100%	10.6%
1/1/2015	65,660,434	486,377,944	229,067,582	582,795,438	100%	100%	13.4%
1/1/2016	66,159,912	490,715,140	228,431,557	604,433,282	100%	100%	20.8%
1/1/2017	65,446,178	523,475,213	224,074,001	627,147,522	100%	100%	17.1%
1/1/2018	66,260,425	558,360,980	226,842,467	653,155,048	100%	100%	12.6%
1/1/2019	64,509,950	610,456,195	238,768,689	665,037,621	100%	98%	0.0%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from $198,308,824 to $248,697,213. The funded status decreased from 76.7% to 72.8%.

Reasons for Change in Contribution Rates

The employer contribution rate increased from 20.2% for the fiscal year ending June 30, 2019 to 23.2% for the fiscal year ending June 30, 2020. The increase of 3.0% is due to the following reasons:

Investment Performance	1.0%
Pay Increases	0.0%
New Entrants/Change in Normal Cost	-0.1%
COLA	-0.2%
Change in Expenses	0.0%
Assumption and Method Changes	0.5%
Demographics and Other Changes	1.8%
Total	**3.0%**

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2018, were as follows:

Total pension liability	$ 901,747,616
Plan fiduciary net position	(620,586,567)
County's net pension liability	$ 281,161,049
Plan fiduciary net position as a percentage of the total pension liability	68.82%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2017 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A nine-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2018 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	1% Decrease 6.50%	*Current Discount Rate* 7.50%	*1% Increase* 8.50%
County's net pension liability	$ 380,337,986	$ 281,161,049	$ 197,207,217

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 12/31/17	$ 868,563,618	$ 670,226,434	$ 198,337,184
Changes for the year:			
Service cost	16,687,330		16,687,330
Interest	63,245,698		63,245,698
Changes of benefit terms	-		-
Differences between expected and actual experience	3,826,240		3,826,240
Changes of assumptions	-		-
Contributions - employer		27,032,514	(27,032,514)
Contributions - member		5,611,992	(5,611,992)
Net investment income		(31,166,016)	31,166,016
Benefit payments, including refunds of member contributions	(50,575,270)	(50,575,270)	-
Administrative expense		(543,087)	543,087
Other		-	-
Net Changes	33,183,998	(49,639,867)	82,823,865
Balances at 12/31/18	$ 901,747,616	$ 620,586,567	$ 281,161,049

Changes in the County's Net Pension Liability and Related Ratios
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total pension liability										
Service cost	$ 16,687	$ 15,497	$ 15,144	$ 15,115	$ 14,159					
Interest	$ 63,246	$ 60,502	$ 59,292	$ 58,329	$ 53,353					
Changes of benefit terms	-	-	-	-	-					
Differences between expected and actual experience	3,826	9,562	(12,599)	(17,971)	16,408					
Changes of assumptions	-	-	-	-	22,567		Information for FY2013 and earlier is not available			
Benefit payments, including refunds of member contributions	(50,575)	(47,380)	(44,024)	(41,253)	(39,012)					
Net change in total pension liability	33,184	38,181	17,813	14,221	67,475					
Total pension liability - beginning	868,564	830,383	812,570	798,349	730,874					
Total pension liability - ending (a)	$ 901,748	$ 868,564	$ 830,383	$ 812,570	$ 798,349					
Plan fiduciary net position										
Contributions - employer	$ 27,033	$ 25,654	$ 25,810	$ 25,630	$ 24,451					
Contributions - member	5,612	5,472	5,182	4,847	4,662					
Net investment income	(31,166)	94,908	41,345	(8,374)	28,451					
Benefit payments, including refunds of member contributions	(50,575)	(47,380)	(44,024)	(41,253)	(39,012)					
Administrative expense	(543)	(526)	(497)	(504)	(519)					
Other	-	-	-	-	-					
Net change in plan fiduciary net position	$ (49,640)	$ 78,127	$ 27,816	$ (19,654)	$ 18,034					
Plan fiduciary net position - beginning	670,226	592,099	564,283	583,936	565,902					
Plan fiduciary net position - ending (b)	$ 620,587	$ 670,226	$ 592,099	$ 564,283	$ 583,936					
County's net pension liability - ending (a)-(b)	$ 281,161	$ 198,337	$ 238,284	$ 248,287	$ 214,413					
Plan fiduciary net position as a percentage of the total pension liability	68.82%	77.16%	71.30%	69.44%	73.14%					
Covered payroll	$ 134,892	$ 138,239	$ 130,313	$ 127,827	$ 127,091					
County's net pension liability as a percentage of covered payroll	208.43%	143.47%	182.86%	194.24%	168.71%					
Expected average remaining service years of all participants	5	5	5	5	5					

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Schedule of County Contributions

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	$ 27,033	$ 25,654	$ 25,810	$ 25,655	$ 24,426					
Contributions in relation to the actuarially determined contribution	27,033	25,654	25,810	25,630	24,451		Information for FY2013 and earlier is not available			
Contribution deficiency (excess)	$ -	$ -	$ -	$ 25	$ (25)					
Covered payroll	$ 134,892	$ 138,239	$ 130,313	$ 127,827	$ 127,091					
Contributions as a percentage of covered payroll	20.04%	18.56%	19.81%	20.05%	19.24%					

Notes to Schedule

Valuation date:
Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 15 to 24 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A nine-year set forward is used for post-disability mortality.

Attachment B

Police Service Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from the final prior year's audit.

There is a six-month lag between the valuation and the fiscal year. The 2019 valuation determines the County contributions due for the fiscal year ending June 30, 2020. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2019 to June 30, 2019) have not been treated as assets in the current valuation.

C. Valuation Procedures

Generally, the plan provides a 100% survivor benefit to the spouse at the time of the retiree's death. This allows for post retirement marriages. We have valued the forms of payment originally coded in the data or based this on marital status at time of retirement (generally a 100% survivor benefit but not always). 80% of employees and 70% of current retired and disabled members are assumed married. Males are assumed to be four years older than their spouses.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining pension expense and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Police Service Retirement Plan provisions.

Economic

Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the current benefit each year from retirement effective January 1, 2014. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of the current benefit each year from retirement effective January 1, 2014.

Other

Mortality	Healthy: RP-2000 Blue Collar Mortality Table for males and females projected generationally using scale AA. Pre-Termination mortality uses 60% of these rates. Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward five years and then projected generationally using scale AA. 100% of pre-retirement deaths are assumed to be non-duty-related. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.
Disability	See Table of Sample Rates. 75% of disablement is assumed to be duty-related.

Administrative Expenses — The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Prudential Benefits — Our calculations reflect that some benefits have already been purchased.

Retirement Rates[1] — Sample Rates:

For GASB68 accounting

	Service		
Age	20	22	23+
40	26.40%	10.00%	100.00%
45	18.34%	10.00%	100.00%
50	36.66%	50.00%	100.00%
55	50.00%	50.00%	100.00%

DROP load — To reflect the cost of the more valuable benefits provided from the deferred retirement option program the following loads were applied:

Sample Load Rates

	Service			
Age	23	27	30	35
44	0.4%	1.4%	2.3%	12.0%
50	2.0%	3.7%	4.5%	14.6%
55	2.7%	4.6%	5.4%	15.6%
60	3.2%	5.3%	6.1%	16.4%

Percentage Married — 80% of employees and 70% of current retirees and disableds are assumed married.

Age Difference — Males are assumed to be four years older than their spouses.

Military Service — Active liabilities (which depend on credited service) are loaded by 3.25% to account for future crediting of military service.

Disability Leave — Active liabilities (which depend on credited service) are loaded by 1.75% to account for future crediting of disability service.

Table of Sample Base Mortality Rates (2000)

	Healthy Mortality		Disabled Mortality		Projection Scale (Healthy and Disabled)	
Age	Males	Females	Males	Females	Males	Females
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

[1] 100% at age 58.

	Table of Sample Decrement Rates	
	Percentage	
Attained Age	Disability	**Withdrawal**
20	0.3060%	5.31%
25	0.3060	4.25
30	0.3060	3.19
35	0.4526	2.13
40	0.9340	1.28
45	1.5619	0.64
50	2.2983	0.00
55	0.0000	0.00
60	0.0000	0.00
64	0.0000	0.00

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.0%
25	6.0
30	5.5
35	5.0
40	4.5
45	4.0
50	4.0

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	642[1]	36,694,307	57,156	7.56%
January 1, 2007	640[2]	37,805,038	59,070	3.35%
January 1, 2008	658[3]	41,011,336	62,327	5.51%
January 1, 2009	627[4]	41,508,547	66,202	6.22%
January 1, 2010	632[5]	42,499,380	67,246	1.58%
January 1, 2011	620[6]	42,449,204	68,466	1.81%
January 1, 2012	636[7]	41,334,580	64,991	(5.08%)
January 1, 2013	640[8]	40,521,944	63,316	(2.58%)
January 1, 2014	666[9]	41,714,302	62,634	(1.08%)
January 1, 2015	693[10]	48,261,635	69,642	11.19%
January 1, 2016	684[11]	48,116,765	70,346	1.01%
January 1, 2017	699[12]	50,560,385	72,332	2.82%
January 1, 2018	688[13]	51,758,654	75,231	4.01%
January 1, 2019	699[14]	55,101,812	78,829	4.78%

[1] Includes 58 participants in DROP.
[2] Includes 51 participants in DROP.
[3] Includes 47 participants in DROP.
[4] Includes 34 participants in DROP.
[5] Includes 45 participants in DROP.
[6] Includes 57 participants in DROP.
[7] Includes 60 participants in DROP.
[8] Includes 60 participants in DROP.
[9] Includes 58 participants in DROP.
[10] Includes 55 participants in DROP.
[11] Includes 43 participants in DROP.
[12] Includes 55 participants in DROP.
[13] Includes 54 participants in DROP.
[14] Includes 61 participants in DROP.

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/04 to 12/31/04	411	18	(2)	427
1/1/05 to 12/31/05	427	29	(4)	452
1/1/06 to 12/31/06	452	38	(12)	478
1/1/07 to 12/31/07	478	40	(7)	511
1/1/08 to 12/31/08	511	50	(8)	553
1/1/09 to 12/31/09	553	30	(12)	571
1/1/10 to 12/31/10	571	26	(14)	583
1/1/11 to 12/31/11	583	31	(14)	600
1/1/12 to 12/31/12	600	40	(11)	629
1/1/13 to 12/31/13	629	22	(12)	639
1/1/14 to 12/31/14	639	29	(13)	655
1/1/15 to 12/31/15	655	46	(12)	689
1/1/16 to 12/31/16	689	37	(15)	711
1/1/17 to 12/31/17	711	33	(14)	730
1/1/18 to 12/31/18	730	31	(22)	739

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year			
Year Ending	Number	Annual Allowance[15]	Number	Annual Allowance	Number	Annual Allowance	% Increase in Average Annual Allowance	Average Annual Allowance
12/31/2008	50	$2,367,778	8	$359,448	553	$20,719,636	2.32%	$37,468
12/31/2009	30	$1,788,475	12	$391,958	571	$22,116,153	3.37%	$38,732
12/31/2010	26	$1,037,257	14	$550,831	583	$22,602,579	0.10%	$38,769
12/31/2011	31	$1,825,986	14	$551,286	600	$23,877,279	2.65%	$39,795
12/31/2012	40	$2,627,863	11	$542,409	629	$25,962,733	3.72%	$41,276
12/31/2013	22	$1,353,267	12	$401,425	639	$26,914,575	2.04%	$42,120
12/31/2014	29	$1,788,688	13	$669,885	655	$28,033,378	1.61%	$42,799
12/31/2015	46	$1,714,607	12	$416,626	689	$29,331,359	(0.53%)	$42,571
12/31/2016	37	$1,638,640	15	$529,572	711	$30,440,427	0.57%	$42,814
12/31/2017	33	$2,373,201	14	$590,897	730	$32,279,545	3.28%	$44,219
12/31/2018	31	$2,019,609	22	$798,878	739	$33,500,276	2.52%	$45,332

[15] Includes COLA's

Compensation	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.
Final Earnings	The average of the highest 3 years of all basic pays.
Eligibility Requirements	Full-time employees occupying the classes of work listed below and making contributions to the plan will be eligible to participate in the pension plan upon hire: • Police Officer • Police Sergeant • Police Lieutenant • Police Captain • Police Major • Deputy Police Chief • Chief of Police, by election
Employee Contributions	7.25% of compensation for all participants.
Retirement Date	
Normal Retirement	The first of the month coincident with or next following the participant's 50^{th} birthday with 5 years of service or the completion of 20 years of service. For those hired prior to February 25, 2002, the five years of service is not required.
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.
Retirement Benefits	
Normal Retirement	2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit).
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.
Normal Form of Payment	For single participants, monthly life annuity with payments guaranteed for 5 years. For married participants, unreduced 100% joint and survivor annuity with payments guaranteed for 5 years.
Disability	
Eligibility	Totally and permanently disabled (except as the result of activities specified in the County code) regardless of length of service.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.
Termination of Employment	
Less than 20 years of service	Return of employee contributions with 3.00% interest.

Death Benefits

Married	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
Unmarried	Return of employee contributions with 3.00% interest plus, if one or more years of service, a lump sum of 50% of final earnings.
Cost of Living Increase (for benefits accrued as of 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Base benefit multiplied by ratio of current 12 month average CPI to 12 month average CPI at retirement. • Prior year benefit increased by 4%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial amount.
Cost of Living Increase (for benefits accrued after 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Prior year benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial amount.
Deferred Retirement Option Program (DROP)	Allows accumulation of pension after 20 years of County service. DROP period must be between 3 and 5 years. Members may remain in DROP for a sixth year, but no interest shall be credited to the DROP account in the sixth year.

County Council Bill No. 34-92	Effective 6/1/92 through 8/31/92
	Participants age 50 or with at least 20 years of service could elect to retire with an additional pension equal to 1/12 of 2.5% of final earnings for the first 20 years of service, plus 1/12 of 2% of final earnings for each additional year of service. The additional amount could be taken as a pension increase, a lump sum, or as a temporary supplement to age 62. Appropriate actuarial adjustments apply.
County Council Bill No. 66-92	Effective 7/2/92
	The plan was amended to allow normal, unreduced retirement after 20 years of service.
	Employee contributions were increased to 6% from 5%.
	Participants under age 50 were not allowed to retire and receive retirement incentives (under Bill No, 34-92) in addition to unreduced retirement. They could either retire early with the incentives, or normally without the incentives.
State House Bill No. 687	Effective 7/1/90
	County employees were given the opportunity to apply for credit under the County's plan for previous service with the State of Maryland (or a political subdivision of the State).
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase will only apply to benefits accrued as of 1/31/97. The cost of living increase for future benefits is a compound increase equal to 60% of the annual change in the CPI, not to exceed 2.5%. Employees hired, or rehired, on or after 12/4/96 will be Tier Two employees and will have different benefits than current employees.
Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be paid over the 70% cap. Normal Retirement was changed to the earlier of 20 years of service or age 50 with 5 years of service. Elimination of Tier 2 benefits. Implemented a Deferred Retirement Option Program (DROP), a voluntary program that provides an alternative way to earn and receive retirement benefits.
County Council Bill No. 66-05	Effective 10/10/2005
	Reduced the contribution percentage for Category II participants from 6% to 5%.
County Council Bill No. 58-07	Effective 10/11/2007
	Reduced the contribution percentage for Category I participants from 6% to 5%.
County Council Bill 74-09	Effective 12/11/2009.
	For non-represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 3% for determining the average basic pay. Clarified the limits on those entering DROP. The effective annual interest rate for the DROP account changed from 8% to 4.25% for those entering DROP on or after July 1, 2009.
County Council Bill No. 6-10	Effective 4/18/2010
	Provides for a disability benefit for those participants who are totally and permanently disabled as a result of qualified military service.
County Council Bill 41-10	Effective 7/1/2010.
	Increased the contribution rate for Police Officers, Police Officer First Class, Police Corporals, and Police Sergeants to 7.25%.
County Council Bill No. 98-12	Effective 5/13/2013.
	Changed the definition of "final average basic pay" from highest 3 out of the last 5 years basic pays to highest 3 of all basic pays.

County Council Bill No. 30-12	Effective 2/1/2013
	All participant except for those in the Police Lieutenant classification shall contribute 7.25% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant in the plan.
County Council Bill No. 67-12	Effective 2/1/2013
	Participant in the Police Lieutenant classification shall contribute 7.25% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant in the plan.

Solvency Test

2001 to 2019

Actuarial Valuation Date	Active Member Contribution (1)[1]	Retirees and Beneficiaries Inactive and Pay-Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets (1)	(2)	(3)
1/1/2001	16,460,010	140,990,477	130,567,495	252,149,932	100%	100%	72.5%
1/1/2002	17,063,875	157,661,880	130,272,087	268,703,856	100%	100%	72.1%
1/1/2003	17,905,001	169,590,397	131,140,395	281,967,318	100%	100%	72.0%
1/1/2004	18,600,457	183,863,447	123,091,936	311,371,499	100%	100%	88.5%
1/1/2005	19,504,325	193,958,675	132,691,153	337,113,153	100%	100%	93.2%
1/1/2006	17,307,619	211,322,531	147,930,753	360,268,341	100%	100%	89.0%
1/1/2007	18,309,729	231,512,770	151,875,606	389,877,885	100%	100%	92.2%
1/1/2008	19,041,581	256,380,618	158,244,903	417,278,055	100%	100%	89.6%
1/1/2009	19,699,084	286,232,025	157,750,087	408,261,502	100%	100%	64.9%
1/1/2010	19,761,988	303,531,019	164,282,171	432,176,036	100%	100%	66.3%
1/1/2011	20,787,782	310,212,178	171,001,709	435,891,125	100%	100%	61.3%
1/1/2012	21,860,897	325,991,800	178,302,281	430,342,941	100%	100%	46.3%
1/1/2013	22,454,626	357,544,534	175,292,937	420,675,703	100%	100%	23.2%
1/1/2014	24,465,302	364,953,146	186,969,390	452,075,806	100%	100%	33.5%
1/1/2015	26,791,267	381,682,950	205,142,796	481,633,710	100%	100%	35.7%
1/1/2016	28,952,829	400,644,387	205,420,231	498,491,072	100%	100%	33.5%
1/1/2017	29,153,543	410,045,649	213,498,527	517,010,261	100%	100%	36.4%
1/1/2018	30,742,890	430,537,535	223,106,492	540,292,183	100%	100%	35.4%
1/1/2019	31,312,419	448,094,223	228,963,359	553,866,523	100%	100%	32.5%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from $144,094,734 to $154,503,478. The funded status decreased from 78.9% to 78.2%.

Reasons for Change in Contribution Rates

The employer contribution rate decreased from 43.5% for the fiscal year ending June 30, 2019 to 43.0% for the fiscal year ending June 30, 2020. The decrease of 0.5% is due to the following reasons:

Investment Performance	2.2%
Pay Increases	0.0%
New Entrants/Change in Normal Cost	0.3%
COLA	-0.4%
Change in Expenses	0.0%
Assumption and Method Changes	-1.4%
Demographics and Other Changes	-1.2%
Total	**-0.5%**

[1] Does not include contribution balances for any participants currently in DROP

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2018, were as follows:

Total pension liability	$ 722,742,281
Plan fiduciary net position	(516,505,185)
County's net pension liability	$ 206,237,096
Plan fiduciary net position as a percentage of the total pension liability	71.46%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2018 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2017 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	1% Decrease 6.50%	*Current Discount Rate* 7.50%	*1% Increase* 8.50%
County's net pension liability	$ 298,591,578	$ 206,237,096	$ 130,633,481

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 12/31/17	$ 697,481,578	$ 553,461,320	$ 144,020,258
Changes for the year:			
Service cost	12,825,772		12,825,772
Interest	50,963,454		50,963,454
Changes of benefit terms	-		-
Differences between expected and actual experience	(2,590,825)		(2,590,825)
Changes of assumptions	-		-
Contributions - employer		21,933,942	(21,933,942)
Contributions - member		3,371,789	(3,371,789)
Net investment income		(25,859,991)	25,859,991
Benefit payments, including refunds of member contributions	(35,937,699)	(35,937,699)	-
Administrative expense		(464,176)	464,176
Other		-	-
Net Changes	25,260,702	(36,956,135)	62,216,837
Balances at 12/31/18	$ 722,742,280	$ 516,505,185	$ 206,237,095

Changes in the County's Net Pension Liability and Related Ratios
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total pension liability										
Service cost	$ 12,826	$ 12,689	$ 12,057	$ 12,258	$ 10,951					
Interest	50,963	48,563	47,032	45,473	41,480					
Changes of benefit terms	-	-	-	-	-					
Differences between expected and actual experience	(2,591)	6,202	(4,527)	(4,693)	12,801					
Changes of assumptions	-	-	-	-	18,331		Information for FY2013 and earlier is not available			
Benefit payments, including refunds of member contributions	(35,938)	(34,950)	(33,357)	(31,134)	(29,507)					
Net change in total pension liability	25,261	32,504	21,205	21,903	54,055					
Total pension liability - beginning	697,482	664,978	643,773	621,870	567,815					
Total pension liability - ending (a)	$ 722,742	$ 697,482	$ 664,978	$ 643,773	$ 621,870					
Plan fiduciary net position										
Contributions - employer	$ 21,934	$ 20,931	$ 20,411	$ 19,560	$ 18,870					
Contributions - member	3,372	3,250	3,158	3,104	2,950					
Net investment income	(25,860)	78,155	33,500	(7,869)	21,813					
Benefit payments, including refunds of member contributions	(35,938)	(34,950)	(33,357)	(31,134)	(29,507)					
Administrative expense	(464)	(445)	(417)	(423)	(418)					
Other	-	-	-	-	-					
Net change in plan fiduciary net position	$ (36,956)	$ 66,941	$ 23,295	$ (16,762)	$ 13,707					
Plan fiduciary net position - beginning	553,461	486,520	463,225	479,988	466,281					
Plan fiduciary net position - ending (b)	$ 516,505	$ 553,461	$ 486,520	$ 463,225	$ 479,988					
County's net pension liability - ending (a)-(b)	$ 206,237	$ 144,020	$ 178,458	$ 180,547	$ 141,882					
Plan fiduciary net position as a percentage of the total pension liability	71.46%	79.35%	73.16%	71.95%	77.18%					
Covered payroll	$ 48,322	$ 45,989	$ 44,894	$ 43,879	$ 42,960					
County's net pension liability as a percentage of covered payroll	426.79%	313.16%	397.51%	411.47%	330.26%					
Expected average remaining service years of all participants	4	4	4	4	4					

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Covered Payroll: Does not include pay for members in DROP.

Schedule of County Contributions
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	$ 21,934	$ 20,931	$ 20,411	$ 19,560	$ 18,870					
Contributions in relation to the actuarially determined contribution	21,934	20,931	20,411	19,560	18,870		Information for FY2013 and earlier is not available			
Contribution deficiency (excess)	$ -	$ -	$ 0	$ -	$ -					
Covered payroll (excluding members in DROP)	$ 48,322	$ 45,989	$ 44,894	$ 43,879	$ 42,960					
Contributions as a percentage of covered payroll	45.39%	45.51%	45.46%	44.58%	43.92%					

Notes to Schedule

Valuation date:
Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 15 to 24 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

Attachment C

Fire Service Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six month lag between the valuation and the fiscal year. The 2019 valuation determines the County contribution due for the fiscal year ending June 30, 2020. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2019 to June 30, 2019) have not been treated as assets in the current valuation.

C. Valuation Procedures

Generally, the plan provides a 100% survivor benefit to the spouse at the time of the retiree's death. This allows for post retirement marriages. We have valued the forms of payment originally coded in the data or based this on marital status at time of retirement (generally a 100% survivor benefit but not always). 80% of employees and 70% of current retired and disabled members are assumed married. Males are assumed to be four years older than their spouses.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining pension expense and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Fire Plan provisions.

Economic	
Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the current benefit each year from retirement. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of current benefit each year from retirement.
Other	
Mortality	Healthy: RP-2000 Blue Collar Mortality Table for males and females projected generationally using scale AA. Pre-Termination mortality uses 60% of these rates. Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward five years and then projected generationally using scale AA. 100% of pre-retirement deaths are assumed to be non-duty-related. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.
Disability	See Table of Sample Rates. 75% of disablement is assumed to be duty-related.
Administrative Expenses	The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Prudential Benefits — Our calculations reflect that some benefits have already been purchased.

Retirement Rates — ***Sample Rates:***

For GASB68 accounting

Age	Service 20	22	24	25+
40	5.00%	5.00%	20.00%	100.00%
45	5.00%	5.00%	20.00%	100.00%
50	10.00%	10.00%	28.00%	100.00%
55	25.00%	25.00%	25.00%	100.00%
59	33.00%	33.00%	33.00%	100.00%
62	100.00%	100.00%	100.00%	100.00%

DROP load — To reflect the cost of the more valuable benefits provided from the deferred retirement option program the following loads were applied:

Sample Load Rates

Age	Service 23	27	30	35
44	0.45%	1.71%	2.70%	14.40%
50	2.43%	4.41%	5.40%	17.46%
55	3.24%	5.49%	6.48%	18.72%
60	3.87%	6.39%	7.29%	19.62%

Percentage Married — 80% of employees and 70% of current retirees and disableds are assumed married.

Age Difference — Males are assumed to be four years older than their spouses.

Military Service — Active liabilities (which depend on credited service) are loaded by 3.25% to account for future crediting of military service.

Disability Leave — Service credit for benefit formula purposes is increased by 1.75% to account for disability leave, which is converted, to service credit at retirement.

	Table of Sample Base Mortality Rates (2000)				Projection Scale	
	Healthy Mortality		Disabled Mortality		(Healthy and Disabled)	
Age	Males	Females	Males	Females	Males	Females
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

Attained Age	Table of Sample Decrement Rates	
	Percentage	
	Disability	Withdrawal
20	0.1836%	6.11%
25	0.1836	4.73
30	0.1836	2.87
35	0.2716	2.21
40	0.5604	1.69
45	0.9371	1.21
50	1.3790	0.00
55	0.0000	0.00
60	0.0000	0.00
65	0.0000	0.00

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.5%
25	6.0
30	5.5
35	5.0
40	4.5
45	4.0
50	4.0

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	722[1]	38,592,322	53,452	3.0%
January 1, 2007	811[2]	43,527,351	53,671	0.4%
January 1, 2008	770[3]	43,941,526	57,067	6.3%
January 1, 2009	845[4]	48,824,352	57,780	1.2%
January 1, 2010	820[5]	49,064,454	59,835	3.6%
January 1, 2011	792[6]	47,840,812	60,405	1.0%
January 1, 2012	752[7]	45,673,006	60,735	0.5%
January 1, 2013	713[8]	43,361,686	60,816	0.1%
January 1, 2014	754[9]	44,950,885	59,617	(2.0%)
January 1, 2015	780[10]	48,549,950	62,244	4.41%
January 1, 2016	832[11]	49,181,953	59,113	(5.03%)
January 1, 2017	837[12]	50,412,257	60,230	1.89%
January 1, 2018	835[13]	51,766,876	61,996	2.93%
January 1, 2019	840[14]	54,769,258	65,201	5.17%

[1] Includes 106 members in DROP.
[2] Includes 93 members in DROP.
[3] Includes 61 members in DROP.
[4] Includes 36 members in DROP.
[5] Includes 63 members in DROP.
[6] Includes 103 members in DROP.
[7] Includes 121 members in DROP.
[8] Includes 127 members in DROP.
[9] Includes 115 members in DROP.
[10] Includes 87 members in DROP.
[11] Includes 59 members in DROP.
[12] Includes 45 members in DROP.
[13] Includes 51 members in DROP.
[14] Includes 60 members in DROP.

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	270	26	(3)	293
1/1/06 to 12/31/06	293	48	(9)	332
1/1/07 to 12/31/07	332	42	(10)	364
1/1/08 to 12/31/08	364	45	(4)	405
1/1/09 to 12/31/09	405	13	(4)	414
1/1/10 to 12/31/10	414	18	(5)	427
1/1/11 to 12/31/11	427	15	(3)	439
1/1/12 to 12/31/12	439	24	(4)	459
1/1/13 to 12/31/13	459	27	(5)	481
1/1/14 to 12/31/14	481	45	(9)	517
1/1/15 to 12/31/15	517	38	(5)	550
1/1/16 to 12/31/16	550	49	(8)	591
1/1/17 to 12/31/17	591	31	(6)	616
1/1/18 to 12/31/18	616	25	(15)	626

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year			
Year Ending	Number	Annual Allowance[15]	Number	Annual Allowance	Number	Annual Allowance	% Increase in Average Annual Allowance	Average Annual Allowance
12/31/2007	42	$1,968,498	10	$178,384	364	$13,209,380	5.51%	$36,290
12/31/2008	45	$2,033,100	4	$116,736	405	$15,125,744	2.92%	$37,348
12/31/2009	13	$859,830	4	$124,348	414	$15,861,226	2.58%	$38,312
12/31/2010	18	$760,013	5	$215,742	427	$16,405,497	0.28%	$38,420
12/31/2011	15	$926,323	3	$95,933	439	$17,235,887	2.19%	$39,262
12/31/2012	24	$1,419,348	4	$53,068	459	$18,602,167	3.22%	$40,528
12/31/2013	27	$1,516,284	5	$182,136	481	$19,936,315	2.27%	$41,448
12/31/2014	45	$2,426,712	9	$307,354	517	$22,055,673	2.93%	$42,661
12/31/2015	38	$2,037,484	5	$208,634	550	$23,884,523	1.79%	$43,426
12/31/2016	49	$2,058,968	8	$179,838	591	$25,763,653	0.39%	$43,593
12/31/2017	31	$1,862,863	6	$217,350	616	$27,409,166	2.07%	$44,495
12/31/2018	25	$1,781,286	15	$499,156	626	$28,691,296	3.01%	$45,833

[15] Includes COLA's

Compensation	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.
Final Earnings	The average of the highest 3 years of all basic pays.
Eligibility Requirements	Full-time employees occupying the classes of work listed below and making contributions to the plan will be eligible to participate in the pension plan upon hire: • Fire Fighter II • Fire Fighter III • Fire Fighter/Cardiac Rescue Technician • Fire Fighter/Emergency Medical Technician Paramedic • Fire Lieutenant • Fire Captain • Fire Battalion Chief • Fire Division Chief • Deputy Fire Chief • Fire Chief, by election
Employee Contributions	7.25% of compensation for all participants.
Retirement Date	
Normal Retirement	The first of the month coincident with or next following the participant's 50th birthday and 5 years of service or the completion of 20 years of service.
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.
Retirement Benefits	
Normal Retirement	2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit.)
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.
Normal Form of Payment	For single participants, monthly life annuity with payments guaranteed for 5 years. For married participants, unreduced 100% joint and survivor annuity with payments guaranteed for 5 years.
Disability	
Eligibility	Totally and permanently disabled (except as the result of activities specified in the Country code) regardless of length of service.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.

Termination of Employment	Return of employee contributions with 3.00% interest.
Death Benefits	
Married	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
Unmarried	Return of employee contributions with 3.00% interest plus, if one or more years of service, a lump sum of 50% of final earnings.
Cost of Living Increase (for benefits accrued as of 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Base benefit multiplied by ratio of current 12 month average CPI to 12 month average CPI at retirement. • Prior year benefit increased by 4%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
Cost of Living Increase (for benefits accrued after 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Prior year benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
Deferred Retirement Option Program (DROP)	Allows accumulation of pension after 20 years of County service. DROP period must be between 3 and 5 years. Members may remain in DROP for a sixth year, but no interest shall be credited to the DROP account in the sixth year.

County Council Bill No. 48-89	Effective 9/13/89
	The previously combined Police and Fire plan was separated into distinct plans for each group.
	The reduction for retirement prior to age 50 was changed to 0.2% per month from 0.3% per month.
County Council Bill No. 34-92	Effective 6/1/92 through 8/31/92
	Participants age 50 or with at least 20 years of service could elect to retire with an additional pension equal to 1/12 of 2.5% of final earnings for the first 20 years of service, plus 1/12 of 2% of final earnings for each additional year of service. The additional amount could be taken as a pension increase, a lump sum, or as a temporary supplement to age 62. Appropriate actuarial adjustments apply.
State House Bill No. 687	Effective 7/1/90
	County employees were given the opportunity to apply for credit under the County's plan for previous service with the State of Maryland (or a political subdivision of the State).
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase will only apply to benefits accrued as of 1/31/97. The cost of living increase for future benefits is a compound increase equal to 60% of the annual change in the CPI, not to exceed 2.5%. Employees hired, or rehired, on or after 12/4/96 will be Tier Two employees and will have different benefits than current employees.
County Council Bill No. 80-00 Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be paid over the 70% cap. Normal Retirement was changed to the earlier of 20 years of service or age 50 with 5 years of service. Elimination of Tier 2 benefits. Implemented a Deferred Retirement Option Program (DROP), a voluntary program that provides an alternative way to earn and receive retirement benefits (retroactive to 1/1/2001).
County Council Bill 74-09	Effective 12/11/2009
	For non-represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 3% for determining the final average basic pay. For represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 5% for determining the final average basic pay.
County Council Bill 6-10	Effective 4/18/2010
	Provides for a disability benefit for those participants who are totally and permanently disabled as a result of qualified military service.
County Council Bill 41-10	Reduced the DROP interest rate from 8 % to 4.25%. Increased the contribution rate for all but Battalion Chief, Division Chief, Deputy Chief and Fire Chief to 7.25%.
County Council Bill No. 98-12	Effective 5/13/2013.
	Changed the definition of "final average basic pay" from highest 3 out of the last 5 years basic pays to highest 3 of all basic pays.
County Council Bill No. 30-12	Effective 2/1/2013
	All participant shall contribute 7.25% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant in the plan.
County Council Bill No. 66-18	Effective July 1, 2018
	Modifies the interest earned on accounts for certain employees who participated in the Deferred Retirement Option Program (DROP). Participants of the Fire Service Retirement Plan, except for those in the classification of Battalion Chief, are eligible for interest in the 6th year of DROP after July 1, 2018.

Solvency Test

2001 to 2019

Actuarial Valuation Date	Active Member Contribution (1)[1]	Retirees and Beneficiaries Inactive and Pay-Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets (1)	(2)	(3)
1/1/2001	18,423,733	80,220,043	165,988,380	225,133,219	100%	100%	76.2%
1/1/2002	17,271,015	89,282,049	174,533,657	241,162,428	100%	100%	77.1%
1/1/2003	17,874,473	100,771,355	177,832,409	256,190,269	100%	100%	77.3%
1/1/2004	18,501,046	114,331,831	169,067,357	286,763,188	100%	100%	91.0%
1/1/2005	19,654,724	126,074,578	181,130,954	313,478,279	100%	100%	92.6%
1/1/2006	20,610,737	139,896,281	195,279,378	340,274,675	100%	100%	92.1%
1/1/2007	16,552,044	163,245,791	203,896,433	368,413,752	100%	100%	92.5%
1/1/2008	18,136,682	199,472,219	196,206,186	395,884,441	100%	100%	90.9%
1/1/2009	20,084,128	222,938,946	193,497,784	390,551,359	100%	100%	76.2%
1/1/2010	19,643,430	231,194,224	204,438,155	418,191,046	100%	100%	81.9%
1/1/2011	18,426,718	231,165,590	214,897,299	425,830,155	100%	100%	82.0%
1/1/2012	18,980,755	241,688,369	225,426,623	426,196,539	100%	100%	73.4%
1/1/2013	20,011,772	259,809,098	230,649,782	426,659,036	100%	100%	63.7%
1/1/2014	21,692,514	278,481,205	241,904,214	462,235,880	100%	100%	67.0%
1/1/2015	24,732,788	311,351,876	231,670,080	490,533,983	100%	100%	66.7%
1/1/2016	27,679,531	335,464,387	211,631,903	503,389,792	100%	100%	66.3%
1/1/2017	29,579,980	358,058,086	202,630,706	516,044,681	100%	100%	63.4%
1/1/2018	30,315,919	376,991,732	202,482,078	534,987,849	100%	100%	63.1%
1/1/2019	31,349,277	389,664,773	218,448,234	546,237,670	100%	100%	57.3%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from $74,801,880 to $93,224,614. The funded status decreased from 87.7% to 85.4%.

Reasons for Change in Contribution Rates

The employer contribution rate increased from 31.7% for the fiscal year ending June 30, 2019 to 34.5% for the fiscal year ending June 30, 2020. The increase of 2.8% is due to the following reasons:

Investment Performance	2.1%
Pay Increases	0.2%
New Entrants/Change in Normal Cost	0.8%
COLA	-0.4%
Change in Expenses	0.0%
Assumption and Method Changes	0.3%
Demographics and Other Changes	-0.2%
Total	**2.8%**

[1] Does not include contribution balances for any participants currently in DROP

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2018, were as follows:

Total pension liability	$ 652,013,902
Plan fiduciary net position	(509,828,407)
County's net pension liability	$ 142,185,495
Plan fiduciary net position as a percentage of the total pension liability	78.19%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2018 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2018 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	1% Decrease 6.50%	*Current Discount Rate* 7.50%	*1% Increase* 8.50%
County's net pension liability	$ 227,638,543	$ 142,185,495	$ 72,203,235

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 12/31/17	$ 623,144,469	$ 548,210,777	$ 74,933,692
Changes for the year:			
Service cost	11,784,516		11,784,516
Interest	45,536,865		45,536,865
Changes of benefit terms	-		-
Differences between expected and actual experience	3,520,591		3,520,591
Changes of assumptions	-		-
Contributions - employer		15,703,506	(15,703,506)
Contributions - member		3,523,812	(3,523,812)
Net investment income		(25,207,573)	25,207,573
Benefit payments, including refunds of member contributions	(31,972,539)	(31,972,539)	-
Administrative expense		(429,576)	429,576
Other		-	-
Net Changes	28,869,433	(38,382,370)	67,251,803
Balances at 12/31/18	$ 652,013,902	$ 509,828,407	$ 142,185,495

Changes in the County's Net Pension Liability and Related Ratios
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total pension liability										
Service cost	$ 11,785	$ 11,556	$ 11,102	$ 10,339	$ 9,184					
Interest	45,537	43,670	42,294	41,924	38,949					
Changes of benefit terms	-	-	-	-	-					
Differences between expected and actual experience	3,521	2,210	(1,552)	(14,630)	3,679					
Changes of assumptions	-	-	-	-	18,028		Information for FY2013 and earlier is not available			
Benefit payments, including refunds of member contributions	(31,973)	(33,129)	(33,868)	(31,520)	(28,823)					
Net change in total pension liability	28,869	24,309	17,976	6,112	41,016					
Total pension liability - beginning	623,144	598,836	580,860	574,748	533,731					
Total pension liability - ending (a)	$ 652,014	$ 623,144	$ 598,836	$ 580,860	$ 574,748					
Plan fiduciary net position										
Contributions - employer	$ 15,704	$ 14,664	$ 14,591	$ 15,122	$ 15,899					
Contributions - member	3,524	3,441	3,257	3,050	2,778					
Net investment income	(25,208)	77,992	33,899	(7,744)	22,688					
Benefit payments, including refunds of member contributions	(31,973)	(33,129)	(33,868)	(31,520)	(28,823)					
Administrative expense	(430)	(448)	(428)	(436)	(423)					
Other	-	-	-	-	-					
Net change in plan fiduciary net position	$ (38,382)	$ 62,520	$ 17,451	$ (21,528)	$ 12,119					
Plan fiduciary net position - beginning	548,211	485,690	468,239	489,767	477,648					
Plan fiduciary net position - ending (b)	$ 509,828	$ 548,211	$ 485,690	$ 468,239	$ 489,767					
County's net pension liability - ending (a)-(b)	$ 142,185	$ 74,934	$ 113,145	$ 112,621	$ 84,981					
Plan fiduciary net position as a percentage of the total pension liability	78.19%	87.97%	81.11%	80.61%	85.21%					
Covered payroll	$ 48,728	$ 46,954	$ 46,228	$ 43,838	$ 40,476					
County's net pension liability as a percentage of covered payroll	291.79%	159.59%	244.76%	256.90%	209.95%					
Expected average remaining service years of all participants	6	6	6	5	5					

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Covered Payroll: Does not include pay for members in DROP.

Anne Arundel County Retirement and Pension System
Fire Service Retirement Plan – Actuarial Information
December 31, 2018

Schedule of County Contributions
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	$ 15,704	$ 14,664	$ 14,591	$ 15,122	$ 15,899					
Contributions in relation to the actuarially determined contribution	15,704	14,664	14,591	15,122	15,899		Information for FY2013 and earlier is not available			
Contribution deficiency (excess)	$ -	$ -	$ 0	$ 0	$ 0					
Covered payroll (excluding members in DROP)	$ 48,728	$ 46,954	$ 46,228	$ 43,838	$ 40,476					
Contributions as a percentage of covered payroll	32.23%	31.23%	31.56%	34.49%	39.28%					

Notes to Schedule

Valuation date:
Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 15 to 24 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

Attachment D

Detention Officers' and Deputy Sheriffs' Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six-month lag between the valuation and the fiscal year. The 2019 valuation determines the County contribution due for the fiscal year ending June 30, 2020. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2019 to June 30, 2019) have not been treated as assets in the current valuation.

C. Valuation Procedures

Active participants who terminate prior to age 40 are assumed to elect to receive a refund of employee contributions with interest. Employees who terminate at or after age 40 are assumed to receive their vested benefit at normal retirement date.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining pension expense and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Detention Officers and Deputy Sheriffs' Retirement Plan provisions.

Economic

Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the original benefit each year from retirement. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of the current benefit each year from retirement.

Other

Mortality	Healthy: RP-2000 Blue Collar Mortality Table for males and females projected generationally using scale AA. Pre-Termination mortality uses 60% of these rates. Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward five years and then projected generationally using scale AA. 100% of pre-retirement deaths are assumed to be non-duty-related. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.
Disability	See Table of Sample Rates. 75% of disablement is assumed to be duty-related.

Administrative Expenses — The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Retirement Rates

For GASB 68 accounting
(Category I)

Annual Rate

	Years of Service		
Age	Less than 20	20 or more but less than 23	23 or more
40-49	0%	12%	N/A
50	10%	30%	100%
51-54	5%	30%	100%
55-59	20%	30%	100%
60	100%	100%	100%

(Category II)

Annual Rate

	Years of Service			
Age	Less than 20	20	21-29	30 or more
<50	N/A	5%	2%	100%
50	10%	30%	30%	100%
51-59	10%	15%	15%	100%
60-64	10%	20%	20%	100%
>64	100%	100%	100%	100%

DROP load — To reflect the cost of the more valuable benefits provided from the deferred retirement option program the following loads were applied:

Sample Load Rates

	Service			
Age	23	27	30	35
44	0.40%	1.20%	2.10%	13.70%
50	2.70%	4.40%	5.30%	17.20%
55	4.10%	6.20%	7.10%	19.20%
60	5.90%	8.50%	9.40%	21.90%

Percentage Married	Males – 80%; Females – 80%
Age Difference	Males are assumed to be four years older than their spouses.
Military Service	Active liabilities (which depend on credited service) are loaded by 3.25% to account for future crediting of military service.
Disability Leave	Service credit for benefit formula purposes is increased by 1.75% to account for disability leave which is converted to service credit at retirement. In addition, it is assumed that participants with 30 or more years of service will have credit for 1 year of combined Disability Leave and Military Service.

	Table of Sample Base Mortality Rates (2000)				Projection Scale	
	Healthy Mortality		Disabled Mortality		(Healthy and Disabled)	
Age	Males	Females	Males	Females	Males	Females
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

Attained Age	Table of Sample Disability Rates Percentage
20	0.245%
25	0.245%
30	0.245%
35	0.362%
40	0.747%
45	1.250%
50	1.839%
55	0.000%
60	0.000%
64	0.000%

Attained Age	Table of Sample Withdrawal Rates			
	Less Than 10 Years of Service		10 or more Years of Service	
	Male Percentage	Female Percentage	Male Percentage	Female Percentage
20	12.38%	18.75%	8.67%	13.13%
25	8.98%	14.06%	6.29%	9.84%
30	6.81%	11.25%	4.77%	7.88%
35	4.95%	8.44%	3.47%	5.91%
40	3.41%	6.19%	2.39%	4.33%
45	1.86%	3.94%	1.30%	2.76%
50	0.00%	0.00%	0.00%	0.00%

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.00%
25	6.00
30	5.50
35	5.25
40	4.75
45	4.25
50	4.25

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2002	368	13,565,333	36,862	7.6%
January 1, 2003	371	14,690,339	39,597	7.4%
January 1, 2004	365	15,396,301	42,182	6.5%
January 1, 2005	347	15,355,590	44,252	4.9%
January 1, 2006	365	16,794,068	46,011	4.0%
January 1, 2007	359	17,367,873	48,378	5.1%
January 1, 2008	357	18,122,458	50,763	4.9%
January 1, 2009	373	19,785,653	53,045	4.5%
January 1, 2010	374	20,203,895	54,021	1.8%
January 1, 2011	354	19,310,216	54,549	1.0%
January 1, 2012	347	18,760,664	54,065	(0.9%)
January 1, 2013	338	17,896,574	52,948	(2.1%)
January 1, 2014	342	18,132,868	53,020	0.1%
January 1, 2015	345	19,775,644	57,321	8.1%
January 1, 2016	350[1]	19,974,632	57,070	(0.4%)
January 1, 2017	358[2]	21,000,562	58,661	2.79%
January 1, 2018	345[3]	21,268,895	61,649	5.09%
January 1, 2019	343[4]	21,444,603	62,521	1.41%

[1] Includes 8 members in DROP.
[2] Includes 15 members in DROP.
[3] Includes 18 members in DROP.
[4] Includes 21 members in DROP.

Members With Deferred Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/00 to 12/31/00	4	5	(1)	8
1/1/01 to 12/31/01	8	3	0	11
1/1/02 to 12/31/02	11	4	(9)	6
1/1/03 to 12/31/03	6	3	(1)	8
1/1/04 to 12/31/04	8	3	0	11
1/1/05 to 12/31/05	11	3	(1)	13
1/1/06 to 12/31/06	13	3	(1)	15
1/1/07 to 12/31/07	15	1	0	16
1/1/08 to 12/31/08	16	2	(2)	16
1/1/09 to 12/31/09	16	1	(2)	15
1/1/10 to 12/31/10	15	0	(3)	12
1/1/11 to 12/31/11	12	0	(3)	9
1/1/12 to 12/31/12	9	3	0	12
1/1/13 to 12/31/13	12	0	(3)	9
1/1/14 to 12/31/14	9	0	(1)	8
1/1/15 to 12/31/15	8	0	0	8
1/1/16 to 12/31/16	8	1	(2)	7
1/1/17 to 12/31/17	7	0	(1)	6
1/1/18 to 12/31/18	6	0	(2)	4

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/99 to 12/31/99	29	4	1	33
1/1/00 to 12/31/00	33	12	(2)	43
1/1/01 to 12/31/01	43	6	0	49
1/1/02 to 12/31/02	49	6	(1)	54
1/1/03 to 12/31/03	54	10	0	64
1/1/04 to 12/31/04	64	17	0	81
1/1/05 to 12/31/05	81	13	(2)	92
1/1/06 to 12/31/06	92	14	0	106
1/1/07 to 12/31/07	106	13	0	119
1/1/08 to 12/31/08	119	16	(2)	133
1/1/09 to 12/31/09	133	14	(1)	146
1/1/10 to 12/31/10	146	19	(1)	164
1/1/11 to 12/31/11	164	16	(1)	179
1/1/12 to 12/31/12	179	22	(4)	197
1/1/13 to 12/31/13	197	14	(3)	208
1/1/14 to 12/31/14	208	18	(3)	223
1/1/15 to 12/31/15	223	19	(3)	239
1/1/16 to 12/31/16	239	15	(4)	250
1/1/17 to 12/31/17	250	17	(1)	266
1/1/18 to 12/31/18	266	23	(5)	284

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year			
Year Ending	Number	Annual Allowance[5]	Number	Annual Allowance	Number	Annual Allowance	% Increase in Average Annual Allowance	Average Annual Allowance
12/31/2007	13	$426,794	0	$0	119	$2,789,664	5.17%	$23,443
12/31/2008	16	$441,233	2	$32,949	133	$3,197,948	2.57%	$24,045
12/31/2009	14	$358,390	1	$9,828	146	$3,546,510	1.02%	$24,291
12/31/2010	19	$502,095	1	$9,390	164	$4,039,215	1.39%	$24,629
12/31/2011	16	$458,651	1	$17,061	179	$4,480,805	1.64%	$25,032
12/31/2012	22	$701,667	4	$72,326	197	$5,110,146	3.63%	$25,940
12/31/2013	14	$378,114	3	$47,509	208	$5,440,751	0.84%	$26,157
12/31/2014	18	$416,562	3	$46,299	223	$5,811,014	(0.38%)	$26,058
12/31/2015	19	$487,445	3	$99,378	239	$6,199,081	(0.46%)	$25,938
12/31/2016	15	$332,225	4	$52,161	250	$6,479,145	(0.08%)	$25,917
12/31/2017	17	$707,232	1	$30,830	266	$7,155,547	3.80%	$26,901
12/31/2018	23	$874,647	5	$127,854	284	$7,902,340	3.43%	$27,825

[5] Includes COLA's

Compensation	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.
Final Earnings	The average of the highest 3 years of all basic pays.
Eligibility Requirements	Permanent employees who work at least 50% of the time specified for their position. They are either Category I or Category II
Category I	• Detention Officer • Detention Corporal • Detention Sergeant • Detention Lieutenant • Detention Captain • Deputy Sheriff I, II, III, and IV
Category II	• Correctional Program Specialist I and II • Criminal Justice Program Supervisor • Correctional Facility Administrator • Assistant Correctional Facility Administrator • Superintendent of Detention Facilities, by election
Employee Contributions	6.75% of compensation for all plan members.
Retirement Date	
Normal Retirement	Category I: The first of the month coincident with or next following the participant's 50^{th} birthday and five years of service or 20 years of service whichever comes first. Category II: The first of the month coincident with or next following the participant's 50^{th} birthday and 10 years of service or age 50 with five years of service for members hired before July 1, 2015.
Early Retirement	Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service for Category II.
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.
Retirement Benefits	
Normal Retirement	2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit)
Early Retirement	Same as normal retirement but reduced for early commencement.
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.
Normal Form of Payment	Monthly life annuity with payments guaranteed for 5 years.

Disability

Eligibility	Totally and permanently disabled (except as the result of activities specified in the County code) regardless of length of service.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.

Termination of Employment

Less than 5 years of service	Return of employee contributions with 4.25% interest.
5 years of service or more	For Category II employees hired before July 1, 2015 and all Category I employees, at the discretion of the employee, either a return of contributions with interest or the accrued normal retirement taking into account final earnings and service at date of termination, payable at normal retirement date. For Category II employees hired on or after July 1, 2015, return of employee contributions with interest.
10 years of service or more	For Category II employees hired on or after July 1, 2015, at the discretion of the employee, either a return of contributions with interest or the accrued normal retirement taking into account final earnings and service at date of termination, payable at normal retirement date.

Death Benefits

Married and eligible for retirement	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
Unmarried or not eligible for retirement	Return of employee contributions with 4.25% interest plus a lump sum equal to 50% of annual pay.

Cost of Living Increase (simple, for benefits accrued as of 1/31/97)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of:

- Prior year benefit plus base benefit multiplied by increase in current CPI from CPI for prior year.
- Benefit increased by 4% of original benefit.

Cost of Living Increase (compound, for benefits accrued after 1/31/97)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of:

- Prior year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year.
- Prior year Benefit increased by 2.5%.

Deferred Retirement Option Program (DROP)

Allows accumulation of pension after 20 years of County service. DROP period must be between 3 and 5 years. Members may remain in DROP for a sixth year, but no interest shall be credited to the DROP account in the sixth year

State House Bill No. 687	Effective 7/1/90
	County employees were given the opportunity to apply for credit under the County's plan for previous service with the State of Maryland (or a political subdivision of the State).
County Council Bill 90-93	Effective 12/22/93
	Plan participants are required to pay the full actuarial value for service purchases. Purchases can only be made at retirement, To be eligible, an employee must have 60 months of County service. Existing plan participants must be notified of their right to purchase service under existing law.
County Council Bill No. 94-93	Effective 11/19/93
	All current and future employees shall be 100% vested after 5 years of Credited service.
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase will only apply to benefits accrued as of 1/31/97. The cost of living increase for future benefits is a compound increase equal to 60% of the annual change in the CPI, not to exceed 2.5%. Employees hired, or rehired, on or after 12/4/96 will be Tier Two employees and will have different benefits than current employees.
County Council Bill No. 41-99	Effective 6/15/99
	Employees paid under the deputy sheriff employees pay schedule become members of the Detention Center Plan effective as of January 1, 1999. Service credited under the Employees' Plan will count as credited service in the Detention Center plan and no future benefit will be paid from the Employees' Plan. Assets are transferred from the Employees' Plan to the Detention Center Plan in an amount equal to the projected unit credit accrued liability in the Employees' Plan.
Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be credited over the 70% cap. Elimination of Tier Two benefits. Changed early retirement factors. Added a death benefit.
County Council Bill No. 32-04	Effective 7/1/2004
	Allows retirement after 20 years of service for "Category I" participants. Changes vesting for new hires from 5 years to 20 years. Provides for employees contributions to be made on a pre-tax ("pick up") basis.
County Council Bill No. 74-09	Effective 12/11/2009
	For non-represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 3% for determining the final average basic pay. For D3 and S2 members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 4% for determining the final average basic pay.
County Council Bill No. 78-09	Effective 11/16/2009
	For D1 and D2 members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 4% for determining the final average basic pay.
County Council Bill No. 6-10	Effective 4/18/2010
	Provides for a disability benefit for those participants who are totally and permanently disabled as a result of qualified military service.
County Council Bill 41-10	Effective 7/1/2010
	Increased the contribution rate for Detention Officers, Detention Corporals and Detention Sergeants to 6.75%. Added a "pop-up" option.
County Council Bill No. 98-12	Effective 5/13/2013.
	Changed the definition of "final average basic pay" from highest 3 out of the last 5 years basic pays to highest 3 of all basic pays.

County Council Bill No. 30-12	Effective 2/1/2013
	A participant in the classification of Detention Officer, Detention Corporal, or Detention Sergeant shall contribute 6.75% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant in the plan.
County Council Bill No. 50-15	Effective 7/23/2015
	Implemented a Deferred Retirement Option Program (DROP), a voluntary program that provides an alternative way to earn and receive retirement benefits
County Council Bill No. 97-13	Effective 4/14/2014
	Category II members of the Detention and Deputy Sheriffs' Plan hired on or after July 1, 2015 will be subject to 10 year vesting and 10 year normal retirement provisions. The 10 year requirement also affects the ability to purchase service or get credit for pre-plan military service.

Solvency Test

2001 to 2019

Actuarial Valuation Date	Active Member Contribution (1)[1]	Retirees and Beneficiaries Inactive and Pay-Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets (1)	(2)	(3)
1/1/2001	4,015,794	11,751,069	21,011,053	31,116,751	100%	100%	73.1%
1/1/2002	4,882,365	13,089,569	22,481,827	34,742,230	100%	100%	74.6%
1/1/2003	5,105,832	14,383,130	27,646,526	38,889,689	100%	100%	70.2%
1/1/2004	5,744,543	17,546,625	29,593,370	45,710,154	100%	100%	75.8%
1/1/2005	6,117,371	22,450,982	31,704,400	52,200,204	100%	100%	74.5%
1/1/2006	6,595,639	26,899,045	35,598,042	58,379,332	100%	100%	69.9%
1/1/2007	7,106,372	30,095,327	38,744,537	66,233,757	100%	100%	74.9%
1/1/2008	7,597,158	38,734,008	42,464,385	74,355,736	100%	100%	66.0%
1/1/2009	8,270,983	43,352,591	46,861,578	76,525,847	100%	100%	53.1%
1/1/2010	9,015,467	48,652,402	53,609,828	84,490,610	100%	100%	50.0%
1/1/2011	9,835,267	54,507,031	55,424,905	87,911,133	100%	100%	42.5%
1/1/2012	10,727,312	59,538,436	55,721,536	90,334,022	100%	100%	36.0%
1/1/2013	10,907,008	68,999,860	53,771,217	92,617,788	100%	100%	23.6%
1/1/2014	11,270,515	73,758,850	58,666,981	102,136,092	100%	100%	29.2%
1/1/2015	12,626,207	78,123,913	64,234,148	112,017,103	100%	100%	33.1%
1/1/2016	12,720,040	82,685,631	68,009,223	119,275,911	100%	100%	35.1%
1/1/2017	13,431,665	84,771,888	73,488,955	127,553,081	100%	100%	39.9%
1/1/2018	14,015,668	92,026,542	78,317,776	137,791,833	100%	100%	40.5%
1/1/2019	13,891,558	101,070,151	80,134,623	144,689,347	100%	100%	37.1%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from $46,568,153 to $50,406,985. The funded status decreased from 74.7% to 74.2%.

Reasons for Change in Contribution Rates

The employer contribution rate increased from 34.9% for the fiscal year ending June 30, 2019 to 36.3% for the fiscal year ending June 30, 2020. The increase of 1.4% is due to the following reasons:

Investment Performance	1.4%
Pay Increases	0.2%
New Entrants/Change in Normal Cost	0.9%
COLA	-0.2%
Change in Expenses	0.0%
Assumption and Method Changes	-1.6%
Demographics and Other Changes	0.7%
Total	**1.4%**

[1] Does not include contribution balances for any participants currently in DROP

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2018, were as follows:

Total pension liability	$ 200,706,206
Plan fiduciary net position	(134,908,267)
County's net pension liability	$ 65,797,939
Plan fiduciary net position as a percentage of the total pension liability	67.22%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2018 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2018 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	1% Decrease 6.50%	*Current Discount Rate* 7.50%	*1% Increase* 8.50%
County's net pension liability	$ 89,656,810	$ 65,797,939	$ 45,941,767

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 12/31/17	$ 188,561,621	$ 141,368,993	$ 47,192,628
Changes for the year:			
Service cost	4,532,722		4,532,722
Interest	13,836,051		13,836,051
Changes of benefit terms	-		-
Differences between expected and actual experience	1,937,718		1,937,718
Changes of assumptions	-		-
Contributions - employer		7,282,176	(7,282,176)
Contributions - member		1,351,994	(1,351,994)
Net investment income		(6,825,355)	6,825,355
Benefit payments, including refunds of member contributions	(8,161,906)	(8,161,906)	-
Administrative expense		(107,635)	107,635
Other		-	-
Net Changes	12,144,585	(6,460,726)	18,605,311
Balances at 12/31/18	$ 200,706,206	$ 134,908,267	$ 65,797,939

Changes in the County's Net Pension Liability and Related Ratios
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total pension liability										
Service cost	$ 4,533	$ 4,658	$ 4,461	$ 4,634	$ 4,602					
Interest	13,836	12,912	12,281	11,401	10,301					
Changes of benefit terms	-	-	-	4,635	-					
Differences between expected and actual experience	1,938	2,244	(1,678)	(2,558)	2,322					
Changes of assumptions	-	-	-	-	3,494		Information for FY2013 and earlier is not available			
Benefit payments, including refunds of member contributions	(8,162)	(6,821)	(6,485)	(6,279)	(5,819)					
Net change in total pension liability	12,145	12,993	8,579	11,834	14,900					
Total pension liability - beginning	188,562	175,569	166,990	155,156	140,256					
Total pension liability - ending (a)	$ 200,706	$ 188,562	$ 175,569	$ 166,990	$ 155,156					
Plan fiduciary net position										
Contributions - employer	$ 7,282	$ 7,000	$ 6,689	$ 6,371	$ 6,111					
Contributions - member	1,352	1,354	1,316	1,317	1,298					
Net investment income	(6,825)	19,607	8,159	(1,919)	4,944					
Benefit payments, including refunds of member contributions	(8,162)	(6,821)	(6,485)	(6,279)	(5,819)					
Administrative expense	(108)	(109)	(100)	(98)	(96)					
Other	-	-	-	-	-					
Net change in plan fiduciary net position	$ (6,461)	$ 21,030	$ 9,579	$ (608)	$ 6,438					
Plan fiduciary net position - beginning	141,369	120,339	110,760	111,368	104,930					
Plan fiduciary net position - ending (b)	$ 134,908	$ 141,369	$ 120,339	$ 110,760	$ 111,368					
County's net pension liability - ending (a)-(b)	$ 65,798	$ 47,193	$ 55,230	$ 56,230	$ 43,788					
Plan fiduciary net position as a percentage of the total pension liability	67.22%	74.97%	68.54%	66.33%	71.78%					
Covered payroll	$ 19,573	$ 19,790	$ 19,801	$ 19,386	$ 19,776					
County's net pension liability as a percentage of covered payroll	336.16%	238.47%	278.92%	290.05%	221.43%					
Expected average remaining service years of all participants	3	3	3	4	4					

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Covered Payroll: Does not include pay for members in DROP.

Schedule of County Contributions
Last 10 Fiscal Years
(Dollar amounts in thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	$ 7,282	$ 7,000	$ 6,689	$ 6,371	$ 6,111					
Contributions in relation to the actuarially determined contribution	7,282	7,000	6,689	6,371	6,111		Information for FY2013 and earlier is not available			
Contribution deficiency (excess)	$ -	$ -	$ -	$ -	$ -					
Covered payroll (excluding members in DROP)	$ 19,573	$ 19,790	$ 19,801	$ 19,386	$ 19,776					
Contributions as a percentage of covered payroll	37.20%	35.37%	33.78%	32.86%	30.90%					

Notes to Schedule

Valuation date:
Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 4 to 24 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

Statistical Section

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Employees' Retirement Plan

For the Last Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
ADDITIONS										
Contributions:										
Employer	$ 27,032,514	$ 25,654,218	$ 25,809,828	$ 25,629,927	$ 24,451,074	$ 22,361,658	$ 19,823,814	$ 18,186,402	$ 17,284,080	$ 15,246,252
Participant	5,611,993	5,471,911	5,181,705	4,846,856	4,662,147	4,452,981	4,416,529	4,562,145	4,556,815	5,085,885
Total contributions	32,644,507	31,126,129	30,991,533	30,476,783	29,113,221	26,814,639	24,240,343	22,748,547	21,840,895	20,332,137
Total investment income (loss)	(31,257,326)	94,922,075	40,737,517	(8,460,297)	28,221,576	52,230,456	63,100,607	9,825,346	61,439,541	62,603,110
Total additions	1,387,181	126,048,204	71,729,050	22,016,486	57,334,797	79,045,095	87,340,950	32,573,893	83,280,436	82,935,247
DEDUCTIONS										
Benefit payments and refunds	50,574,448	47,406,822	44,007,025	41,260,300	39,008,750	36,727,715	34,375,282	31,480,607	29,520,937	27,267,923
Administrative expenses	533,928	519,027	459,455	505,852	502,007	757,210	546,061	481,210	504,442	487,143
Total deductions	51,108,376	47,925,849	44,466,480	41,766,152	39,510,757	37,484,925	34,921,343	31,961,817	30,025,379	27,755,066
Net increases (decreases)	(49,721,194)	78,122,355	27,262,570	(19,749,666)	17,824,040	41,560,170	52,419,607	612,076	53,255,057	55,180,181
Net position, January 1	669,893,976	591,771,621	564,509,051	584,258,717	566,434,677	584,258,717	625,818,887	678,238,494	678,850,570	363,407,586
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	$ 620,172,782	$ 669,893,976	$ 591,771,621	$ 564,509,051	$ 584,258,717	$ 625,818,887	$ 678,238,494	$ 678,850,570	$ 732,105,627	$ 418,587,767

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Police Service Retirement Plan

For the Last Ten Years Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
ADDITIONS										
Contributions:										
Employer	$ 21,933,942	$ 20,931,078	$ 20,410,896	$ 19,559,952	$ 18,869,736	$ 17,745,906	$ 15,530,322	$ 13,793,256	$ 14,055,660	$ 12,428,136
Participant	3,371,789	3,250,062	3,158,451	3,104,338	2,949,789	2,679,723	2,553,740	2,637,833	2,297,386	2,024,825
Total contributions	25,305,731	24,181,140	23,569,347	22,664,290	21,819,525	20,425,629	18,084,062	16,431,089	16,353,046	14,452,961
Total investment income (loss)	(25,925,725)	78,166,498	33,000,617	(7,936,443)	22,133,732	41,763,446	50,828,258	6,731,539	49,685,037	50,713,568
Total additions	(619,994)	102,347,638	56,569,964	14,727,847	43,953,257	62,189,075	68,912,320	23,162,628	66,038,083	65,166,529
DEDUCTIONS										
Benefit payments and refunds	35,929,917	35,023,110	33,356,257	31,131,759	29,507,128	26,936,388	28,241,364	23,479,998	21,449,672	22,214,203
Administrative expenses	470,041	441,820	389,320	427,109	406,090	615,138	444,328	391,458	410,184	406,518
Total deductions	36,399,958	35,464,930	33,745,577	31,558,868	29,913,218	27,551,526	28,685,692	23,871,456	21,859,856	22,620,721
Net increases (decreases)	(37,019,952)	66,882,708	22,824,387	(16,831,021)	14,040,039	34,637,549	40,226,628	(708,828)	44,178,227	42,545,808
Net position, January 1	553,271,312	486,388,604	463,564,217	480,395,238	466,355,199	480,395,238	515,032,787	555,259,415	554,550,587	598,728,814
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	$ 516,251,360	$ 553,271,312	$ 486,388,604	$ 463,564,217	$ 480,395,238	$ 515,032,787	$ 555,259,415	$ 554,550,587	$ 598,728,814	$ 641,274,622

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
ADDITIONS										
Contributions:										
Employer	$ 15,703,506	$ 14,664,432	$ 14,591,340	$ 15,121,806	$ 15,898,956	$ 16,152,402	$ 15,238,104	$ 13,959,852	$ 14,648,580	$ 12,701,160
Participant	3,523,812	3,440,550	3,257,340	3,050,456	2,778,355	2,432,737	2,453,627	2,659,114	2,494,043	2,346,754
Total contributions	19,227,318	18,104,982	17,848,680	18,172,262	18,677,311	18,585,139	17,691,731	16,618,966	17,142,623	15,047,914
Total investment income (loss)	(25,253,407)	78,004,491	33,397,135	(7,794,949)	23,014,967	43,133,618	51,522,774	7,013,578	48,957,240	49,183,327
Total additions	(6,026,089)	96,109,473	51,245,815	10,377,313	41,692,278	61,718,757	69,214,505	23,632,544	66,099,863	64,231,241
DEDUCTIONS										
Benefit payments and refunds	31,571,336	33,353,794	33,888,976	31,492,994	28,842,723	21,870,063	19,520,674	18,091,220	17,432,953	17,785,497
Administrative expenses	452,952	439,507	401,289	438,008	409,916	633,476	444,256	388,157	398,463	379,081
Total deductions	32,024,288	33,793,301	34,290,265	31,931,002	29,252,639	22,503,539	19,964,930	18,479,377	17,831,416	18,164,578
Net increases (decreases)	(38,050,377)	62,316,172	16,955,550	(21,553,689)	12,439,639	39,215,218	49,249,575	5,153,167	48,268,447	46,066,663
Net position, January 1	547,785,623	485,469,451	468,513,901	490,067,590	477,627,951	490,067,590	529,282,808	578,532,383	583,685,550	631,953,997
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	$ 509,735,246	$ 547,785,623	$ 485,469,451	$ 468,513,901	$ 490,067,590	$ 529,282,808	$ 578,532,383	$ 583,685,550	$ 631,953,997	$ 678,020,660

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
ADDITIONS										
Contributions:										
Employer	$ 7,282,176	$ 6,999,882	$ 6,688,662	$ 6,370,758	$ 6,110,988	$ 5,600,178	$ 5,141,280	$ 4,876,332	$ 4,907,130	$ 4,348,914
Participant	1,351,994	1,353,928	1,315,988	1,317,143	1,297,641	1,195,439	1,120,848	1,175,133	1,084,820	1,029,277
Total contributions	8,634,170	8,353,810	8,004,650	7,687,901	7,408,629	6,795,617	6,262,128	6,051,465	5,991,950	5,378,191
Total investment income (loss)	(6,837,179)	19,607,237	8,037,893	(1,931,936)	5,017,294	9,305,671	10,887,141	1,330,029	9,901,091	9,672,565
Total additions	1,796,991	27,961,047	16,042,543	5,755,965	12,425,923	16,101,288	17,149,269	7,381,494	15,893,041	15,050,756
DEDUCTIONS										
Benefit payments and refunds	8,164,410	6,818,726	6,488,977	6,275,285	5,812,419	5,397,604	5,018,268	4,207,935	3,837,564	3,525,414
Administrative expenses	115,778	107,893	92,392	99,084	91,235	137,963	93,341	79,614	80,434	75,803
Total deductions	8,280,188	6,926,619	6,581,369	6,374,369	5,903,654	5,535,567	5,111,609	4,287,549	3,917,998	3,601,217
Net increases (decreases)	(6,483,197)	21,034,428	9,461,174	(618,404)	6,522,269	10,565,721	12,037,660	3,093,945	11,975,043	11,449,539
Net position, January 1	141,301,969	120,267,541	110,806,366	111,424,770	104,902,501	111,424,770	121,990,491	134,028,151	137,122,096	149,097,139
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	$ 134,818,772	$ 141,301,969	$ 120,267,540	$ 110,806,366	$ 111,424,770	$ 121,990,491	$ 134,028,151	$ 137,122,096	$ 149,097,139	$ 160,546,678

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Employees' Retirement Plan

For the Last Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Employer Data										
Contributions	$ 27,032,514	$ 25,654,218	$ 25,809,828	$ 25,629,927	$ 24,451,074	$ 22,361,658	$ 19,823,814	$ 18,186,402	17,284,080	$ 15,246,252
% of Covered Payroll	(20.0)	(18.6)	(19.8)	(20.1)	(19.2)	(19.3)	(17.1)	(15.1)	(14.0)	(12.1)
Participant Data										
Contributions	5,611,993	5,471,911	5,181,705	4,846,856	4,662,147	4,452,981	4,416,529	4,562,145	4,556,815	5,085,885
Total contributions	32,644,507	31,126,129	30,991,533	30,476,783	29,113,221	26,814,639	24,240,343	22,748,547	21,840,895	20,332,137
Total investment income (loss)	(31,257,326)	94,922,075	40,737,517	(8,460,297)	28,221,576	52,230,456	63,100,607	9,825,346	61,439,541	62,603,110
Total additions	$ 1,387,181	$ 126,048,204	$ 71,729,050	$ 22,016,486	$ 57,334,797	$ 79,045,095	$ 87,340,950	$ 32,573,893	83,280,436	$ 82,935,247

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Police Service Retirement Plan

For the Last Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Employer Data										
Contributions	$ 21,933,942	$ 20,931,078	$ 20,410,896	$ 19,559,952	$ 18,869,736	$ 17,745,906	$ 15,530,322	13,793,256	$ 14,055,660	$ 12,428,136
% of Covered Payroll	(39.8)	(40.4)	(40.4)	(40.7)	(39.1)	(42.5)	(38.3)	(33.4)	(33.1)	(29.2)
Participant Data										
Contributions	3,371,789	3,250,062	3,158,451	3,104,338	2,949,789	2,679,723	2,553,740	2,637,833	2,297,386	2,024,825
Total contributions	25,305,731	24,181,140	23,569,347	22,664,290	21,819,525	20,425,629	18,084,062	16,431,089	16,353,046	14,452,961
Total investment income (loss)	(25,925,725)	78,166,498	33,000,617	(7,936,443)	22,133,732	41,763,446	50,828,258	6,731,539	49,685,037	50,713,568
Total additions	$ (619,994)	$ 102,347,638	$ 56,569,964	$ 14,727,847	$ 43,953,257	$ 62,189,075	$ 68,912,320	23,162,628	$ 66,038,083	$ 65,166,529

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Employer Data										
Contributions	$ 15,703,506	$ 14,664,432	$ 14,591,340	$ 15,121,806	$ 15,898,956	$ 16,152,402	15,238,104	$ 13,959,852	$ 14,648,580	$ 12,701,160
% of Covered Payroll	(28.7)	(28.3)	(28.9)	(30.7)	(32.7)	(35.9)	(35.1)	(30.6)	(30.6)	(25.9)
Participant Data										
Contributions	3,523,812	3,440,550	3,257,340	3,050,456	2,778,355	2,432,737	2,453,627	2,659,114	2,494,043	2,346,754
Total contributions	19,227,318	18,104,982	17,848,680	18,172,262	18,677,311	18,585,139	17,691,731	16,618,966	17,142,623	15,047,914
Total investment income (loss)	(25,253,407)	78,004,491	33,397,135	(7,794,949)	23,014,967	43,133,618	51,522,774	7,013,478	48,957,240	49,183,327
Total additions	$ (6,026,089)	$ 96,109,473	$ 51,245,815	$ 10,377,313	$ 41,692,278	$ 61,718,757	69,214,505	$ 23,632,444	$ 66,099,863	$ 64,231,241

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Employer Data										
Contributions	$ 7,282,176	$ 6,999,882	$ 6,688,662	$ 6,370,758	$ 6,110,988	$ 5,600,178	$ 5,141,280	$ 4,876,332	$ 4,907,130	$ 4,348,914
% of Covered Payroll	(34.0)	(32.9)	(31.8)	(31.9)	(30.9)	(30.9)	(28.7)	(26.0)	(25.4)	(21.5)
Participant Data										
Contributions	1,351,994	1,353,928	1,315,988	1,317,143	1,297,641	1,195,439	1,120,848	1,175,133	1,084,820	1,027,277
Total contributions	8,634,170	8,353,810	8,004,650	7,687,901	7,408,629	6,795,617	6,262,128	6,051,465	5,991,950	5,376,191
Total investment income (loss)	(6,837,179)	19,607,237	8,037,893	(1,931,936)	5,017,294	9,305,671	10,887,141	1,330,029	9,901,091	9,672,565
Total additions	$ 1,796,991	$ 27,961,047	$ 16,042,543	$ 5,755,965	$ 12,425,923	$ 16,101,288	$ 17,149,269	$ 7,381,494	$ 15,893,041	$ 15,048,756

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Employees' Retirement Plan

For the Last TenYears Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Retirement benefits	$ 50,218,702	$ 46,845,091	$ 43,550,814	$ 40,941,647	$ 38,790,383	$ 36,318,903	$ 34,031,017	$ 31,102,824	$ 29,178,742	$ 26,707,107
Refunds	355,745	561,731	456,211	318,653	218,367	408,812	344,265	377,783	342,195	560,816
Administrative	533,928	519,027	459,455	505,852	502,007	757,210	546,061	481,210	504,442	487,143
Total expenses	$ 51,108,375	$ 47,925,849	$ 44,466,480	$ 41,766,152	$ 39,510,757	$ 37,484,925	$ 34,921,343	$ 31,961,817	$ 30,025,379	$ 27,755,066

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Police Service Retirement Plan

For the Last TenYears Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Retirement benefits	$ 32,231,240	$ 30,707,970	$ 29,719,138	$ 28,042,800	$ 26,857,368	$ 25,801,600	$ 24,178,421	$ 22,560,005	$ 20,973,246	$ 19,638,650
Refunds	154,429	210,180	354,899	113,762	47,790	4,271	245,111	184,099	10,476	540,887
DROP payments	3,544,248	4,104,960	3,282,220	2,975,197	2,601,970	1,130,517	3,817,832	735,894	465,950	2,034,666
Administrative	470,041	441,820	389,320	427,109	406,090	615,138	444,328	391,458	410,184	406,518
Total expenses	$ 36,399,958	$ 35,464,930	$ 33,745,577	$ 31,558,868	$ 29,913,218	$ 27,551,526	$ 28,685,692	$ 23,871,456	$ 21,859,856	$ 22,620,721

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Fire Service Retirement Plan

For the Last TenYears Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Retirement benefits	$ 29,960,925	$ 27,621,512	$ 25,293,551	$ 23,806,037	$ 20,143,295	$ 19,577,152	$ 17,701,069	$ 15,876,486	$ 15,560,775	$ 14,975,604
Refunds	320,586	440,518	157,533	199,254	20,220	119,655	199,210	457,144	114,588	847,725
DROP payments	1,289,825	5,291,764	8,437,892	7,487,703	8,679,208	2,173,256	1,620,395	1,757,590	1,757,590	1,962,168
Administrative	452,952	439,507	401,289	438,008	409,916	633,476	444,256	388,157	398,463	379,081
Total expenses	$ 32,024,288	$ 33,793,301	$ 34,290,265	$ 31,931,002	$ 29,252,639	$ 22,503,539	$ 19,964,930	$ 18,479,377	$ 17,831,416	$ 18,164,578

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last TenYears Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
Retirement benefits	$ 7,465,177	$ 6,780,248	$ 6,430,861	$ 6,129,460	$ 5,768,304	$ 5,364,396	$ 4,824,001	$ 4,190,561	$ 3,790,618	$ 3,435,870
Refunds	78,777	38,478	58,116	145,825	44,115	33,208	194,267	17,374	46,946	89,544
DROP payments	620,456	-	-	-	-	-	-	-	-	-
Administrative	115,778	107,893	92,392	99,084	91,235	137,963	93,341	79,613	80,434	75,803
Total expenses	$ 8,280,188	$ 6,926,619	$ 6,581,369	$ 6,374,369	$ 5,903,654	$ 5,535,567	$ 5,111,609	$ 4,287,548	$ 3,917,998	$ 3,601,217

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Employees' Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2018

Retirement Effective Dates		Years of Credited Service: 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30
Period 7/1/2008 to 6/30/2009	Average monthly benefit	$0	$753	$1,301	$1,521	$2,697	$2,602	$2,805
	Average final average salary	$0	$73,930	$33,899	$51,788	$76,461	$62,998	$59,919
	Number of retired members	0	12	7	14	10	22	17
Period 7/1/2009 to 6/30/2010	Average monthly benefit	$858	$446	$1,325	$1,488	$2,285	$2,787	$3,062
	Average final average salary	$33,675	$42,397	$60,468	$44,408	$65,207	$64,581	$64,768
	Number of retired members	1	8	10	9	15	15	27
Period 7/1/2010 to 6/30/2011	Average monthly benefit	$866	$820	$1,341	$1,535	$2,086	$2,490	$2,973
	Average final average salary	$48,000	$75,659	$73,933	$60,514	$63,166	$66,363	$64,628
	Number of retired members	1	5	5	8	11	13	20
Period 7/1/2011 to 6/30/2012	Average monthly benefit	$0	$576	$1,191	$1,735	$3,008	$3,302	$3,104
	Average final average salary	$0	$53,200	$57,406	$67,233	$83,960	$81,180	$68,741
	Number of retired members	0	10	13	10	14	19	23
Period 7/1/2012 to 6/30/2013	Average monthly benefit	$0	$751	$1,373	$1,493	$2,113	$3,021	$3,531
	Average final average salary	$0	$63,180	$61,423	$53,374	$54,783	$67,402	$73,827
	Number of retired members	0	17	18	9	20	13	24
Period 7/1/2013 to 6/30/2014	Average monthly benefit	$0	$762	$969	$1,896	$1,749	$2,664	$3,533
	Average final average salary	$0	$69,049	$52,434	$64,927	$51,423	$62,863	$77,560
	Number of retired members	0	22	22	7	13	19	22
Period 7/1/2014 to 6/30/2015	Average monthly benefit	$0	$589	$1,396	$2,044	$2,684	$3,247	$3,313
	Average final average salary	$0	$45,005	$51,336	$76,409	$79,510	$79,151	$73,566
	Number of retired members	0	23	12	12	8	22	22
Period 7/1/2015 to 6/30/2016	Average monthly benefit	$0	$585	$948	$1,707	$2,265	$3,113	$3,790
	Average final average salary	$0	$48,114	$44,409	$69,116	$63,456	$76,545	$82,715
	Number of retired members	0	14	9	10	11	28	24
Period 7/1/2016 to 6/30/2017	Average monthly benefit	$0	$783	$1,416	$1,799	$2,421	$3,295	$3,525
	Average final average salary	$0	$52,506	$72,550	$68,233	$70,410	$74,690	$78,814
	Number of retired members	0	13	20	18	14	17	30
Period 7/1/2017 to 6/30/2018	Average monthly benefit	$1,952	$741	$1,425	$1,639	$2,222	$3,649	$3,801
	Average final average salary	$36,067	$58,201	$66,465	$69,641	$81,177	$86,795	$81,469
	Number of retired members	1	9	18	18	14	18	35
Period 7/1/2018 to 12/31/2018	Average monthly benefit	$160	$628	$968	$1,867	$2,300	$3,113	$3,898
	Average final average salary	$40,040	$43,038	$56,620	$82,559	$69,826	$77,486	$84,301
	Number of retired members	1	6	11	8	9	11	23

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Police Service Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2018

					Years of Credited Service			
Retirement Effective Dates		**0 to 4**	**5 to 9**	**10 to 14**	**15 to 19**	**20 to 24**	**25 to 29**	**Over 30**
Period 7/1/2008	Average monthly benefit	$0	$2,085	$3,552	$3,341	$3,705	$0	$0
to 6/30/2009	Average final average salary	$0	$60,471	$68,090	$75,440	$80,116	$0	$0
	Number of retired members	0	2	3	3	5	0	0
Period 7/1/2009	Average monthly benefit	$0	$1,885	$3,118	$3,863	$4,374	$5,043	$4,902
to 6/30/2010	Average final average salary	$0	$46,628	$71,648	$94,631	$90,867	$94,651	$84,864
	Number of retired members	0	1	3	1	3	3	1
Period 7/1/2010	Average monthly benefit	$2,545	$3,912	$3,821	$3,895	$4,007	$0	$0
to 6/30/2011	Average final average salary	$47,962	$72,675	$70,711	$72,479	$87,711	$0	$0
	Number of retired members	1	3	3	1	5	0	0
Period 7/1/2011	Average monthly benefit	$0	$2,452	$0	$3,660	$4,100	$4,694	$0
to 6/30/2012	Average final average salary	$0	$77,361	$0	$79,411	$81,402	$87,293	$0
	Number of retired members	0	1	0	8	8	3	0
Period 7/1/2012	Average monthly benefit	$0	$0	$3,291	$3,535	$4,310	$4,960	$0
to 6/30/2013	Average final average salary	$0	$0	$58,658	$74,339	$86,975	$91,069	$0
	Number of retired members	0	0	1	2	8	3	0
Period 7/1/2013	Average monthly benefit	$0	$3,011	$3,429	$3,355	$3,927	$0	$0
to 6/30/2014	Average final average salary	$0	$55,286	$63,264	$82,074	$82,427	$0	$0
	Number of retired members	0	1	2	1	2	0	0
Period 7/1/2014	Average monthly benefit	$2,653	$2,617	$4,417	$3,622	$3,770	$4,781	$0
to 6/30/2015	Average final average salary	$51,685	$51,685	$83,747	$81,979	$91,405	$88,845	$0
	Number of retired members	1	2	1	5	4	1	0
Period 7/1/2015	Average monthly benefit	$2,680	$3,003	$3,860	$4,417	$4,418	$5,616	$0
to 6/30/2016	Average final average salary	$50,932	$58,489	$72,240	$83,747	$95,013	$102,581	$0
	Number of retired members	2	2	1	1	6	3	0
Period 7/1/2016	Average monthly benefit	$2,817	$3,519	$3,055	$3,962	$5,110	$5,069	$0
to 6/30/2017	Average final average salary	$51,685	$66,170	$74,113	$86,796	$107,768	$94,257	$0
	Number of retired members	1	3	3	4	3	1	0
Period 7/1/2017	Average monthly benefit	$0	$1,611	$2,359	$3,059	$3,980	$5,871	$0
to 6/30/2018	Average final average salary	$0	$81,323	$73,362	$80,916	$90,301	$105,397	$0
	Number of retired members	0	1	3	3	5	2	0
Period 7/1/2018	Average monthly benefit	$0	$648	$3,798	$0	$4,394	$5,063	$0
to 12/31/2018	Average final average salary	$0	$63,953	$74,139	$0	$99,636	$102,625	$0
	Number of retired members	0	1	1	0	2	1	0

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Fire Service Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2018

		Years of Credited Service						
Retirement Effective Dates		**0 to 4**	**5 to 9**	**10 to 14**	**15 to 19**	**20 to 24**	**25 to 29**	**Over 30**
Period 7/1/2008	Average monthly benefit	$2,394	$0	$0	$4,415	$3,380	$0	$0
to 6/30/2009	Average final average salary	$47,082	$0	$0	$83,123	$79,240	$0	$0
	Number of retired members	1	0	0	1	2	0	0
Period 7/1/2009	Average monthly benefit	$0	$2,810	$0	$4,291	$0	$0	$0
to 6/30/2010	Average final average salary	$0	$52,555	$0	$77,747	$0	$0	$0
	Number of retired members	0	1	0	2	0	0	0
Period 7/1/2010	Average monthly benefit	$0	$2,522	$0	$4,087	$4,153	$4,061	$0
to 6/30/2011	Average final average salary	$0	$46,971	$0	$81,781	$83,115	$77,005	$0
	Number of retired members	0	1	0	3	2	1	0
Period 7/1/2011	Average monthly benefit	$3,856	$1,489	$3,240	$0	$3,410	$4,338	$0
to 6/30/2012	Average final average salary	$70,096	$42,806	$58,567	$0	$77,007	$77,005	$0
	Number of retired members	1	1	2	0	1	1	0
Period 7/1/2012	Average monthly benefit	$0	$2,708	$2,203	$3,854	$3,651	$0	$4,492
to 6/30/2013	Average final average salary	$0	$48,963	$67,073	$82,747	$79,277	$0	$77,005
	Number of retired members	0	2	1	3	8	0	1
Period 7/1/2013	Average monthly benefit	$0	$2,747	$0	$3,351	$3,278	$4,088	$0
to 6/30/2014	Average final average salary	$0	$50,146	$0	$71,511	$77,656	$84,977	$0
	Number of retired members	0	2	0	2	1	1	0
Period 7/1/2014	Average monthly benefit	$0	$2,490	$3,257	$3,753	$4,764	$7,584	$0
to 6/30/2015	Average final average salary	$0	$46,132	$61,179	$69,802	$96,184	$160,740	$0
	Number of retired members	0	2	1	1	2	2	0
Period 7/1/2015	Average monthly benefit	$0	$0	$2,607	$3,753	$4,166	$3,905	$0
to 6/30/2016	Average final average salary	$0	$43,912	$57,129	$70,887	$90,016	$100,211	$0
	Number of retired members	0	1	5	2	5	2	0
Period 7/1/2016	Average monthly benefit	$0	$0	$2,805	$0	$3,942	$2,356	$0
to 6/30/2017	Average final average salary	$0	$0	$63,911	$0	$88,391	$86,220	$0
	Number of retired members	0	0	3	0	3	1	0
Period 7/1/2017	Average monthly benefit	$0	$0	$2,097	$0	$4,113	$4,883	$6,319
to 6/30/2018	Average final average salary	$0	$0	$60,667	$0	$87,260	$98,019	$100,474
	Number of retired members	0	0	3	0	2	3	1
Period 7/1/2018	Average monthly benefit	$0	$0	$0	$3,786	$0	$5,501	$0
to 12/31/2018	Average final average salary	$0	$0	$0	$69,120	$0	$109,527	$0
	Number of retired members	0	0	0	1	0	1	0

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Detention Officers' and Deputy Sheriffs' Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2018

		Years of Credited Service						
Retirement Effective Dates		**0 to 4**	**5 to 9**	**10 to 14**	**15 to 19**	**20 to 24**	**25 to 29**	**Over 30**
Period 7/1/2008	Average monthly benefit	$0	$782	$1,963	$2,997	$4,341	$3,434	$3,935
to 6/30/2009	Average final average salary	$0	$48,249	$67,568	$71,019	$94,610	$73,170	$70,905
	Number of retired members	0	3	3	4	2	1	2
Period 7/1/2009	Average monthly benefit	$0	$1,345	$1,910	$2,537	$0	$0	$0
to 6/30/2010	Average final average salary	$0	$48,257	$56,966	$64,507	$0	$0	$0
	Number of retired members	0	5	5	2	0	0	0
Period 7/1/2010	Average monthly benefit	$0	$1,216	$1,511	$1,933	$2,606	$0	$4,230
to 6/30/2011	Average final average salary	$0	$46,342	$51,707	$54,454	$64,099	$0	$80,876
	Number of retired members	0	7	3	1	7	0	1
Period 7/1/2011	Average monthly benefit	$0	$1,294	$1,922	$1,800	$3,098	$3,917	$4,623
to 6/30/2012	Average final average salary	$0	$44,652	$50,740	$55,734	$68,057	$73,954	$75,880
	Number of retired members	0	3	5	7	2	1	2
Period 7/1/2012	Average monthly benefit	$0	$577	$1,877	$2,113	$3,283	$0	$4,158
to 6/30/2013	Average final average salary	$0	$37,324	$50,974	$61,015	$74,501	$0	$85,146
	Number of retired members	0	3	5	2	8	0	1
Period 7/1/2013	Average monthly benefit	$0	$563	$1,353	$2,526	$2,683	$0	$0
to 6/30/2014	Average final average salary	$0	$47,394	$55,388	$69,155	$65,806	$0	$0
	Number of retired members	0	2	4	4	2	0	0
Period 7/1/2014	Average monthly benefit	$0	$736	$1,657	$2,012	$3,888	$4,448	$4,185
to 6/30/2015	Average final average salary	$0	$45,855	$55,828	$57,174	$89,482	$94,120	$72,918
	Number of retired members	0	5	2	7	2	1	1
Period 7/1/2015	Average monthly benefit	$0	$643	$1,266	$2,574	$3,098	$3,124	$0
to 6/30/2016	Average final average salary	$0	$43,049	$49,626	$68,661	$67,546	$69,804	$0
	Number of retired members	0	1	1	4	3	1	0
Period 7/1/2016	Average monthly benefit	$0	$831	$1,452	$2,116	$2,747	$0	$0
to 6/30/2017	Average final average salary	$0	$48,832	$57,652	$63,089	$64,943	$0	$0
	Number of retired members	$0	4	3	3	3	0	0
Period 7/1/2017	Average monthly benefit	$0	$732	$1,229	$2,309	$2,800	$3,519	$5,806
to 6/30/2018	Average final average salary	$0	$52,091	$57,759	$65,116	$68,500	$71,631	$105,609
	Number of retired members	0	1	2	1	10	2	1
Period 7/1/2018	Average monthly benefit	$0	$925	$1,356	$0	$3,088	$4,087	$0
to 12/31/2018	Average final average salary	$0	$50,055	$49,400	$0	$74,000	$82,041	$0
	Number of retired members	0	1	1	0	2	1	0

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Employees' Retirement Plan

For the Last Ten Years Ended December 31

Years of Credited Service	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
0 to 4	791	262	721	647	614	468	443	534	673	755
5 to 9	285	298	373	437	512	578	533	501	452	451
10 to 14	415	404	364	354	347	333	432	415	349	291
15 to 19	263	286	287	269	236	229	220	211	191	233
20 to 24	156	156	148	141	163	196	233	278	308	287
25 to 29	140	143	170	200	203	205	170	149	153	146
30 and over	141	127	124	138	132	116	121	121	113	115
Total members	2,191	1,676	2,187	2,186	2,207	2,125	2,152	2,209	2,239	2,278
Average years of service	11.8	11.4	12.0	12.4	12.4	12.8	13.1	12.8	12.3	12.0
Average age	48.4	48.5	48.8	48.9	48.6	49.0	48.6	48.2	47.8	47.4
Average salary	$ 61,566	$60,684	$59,585	$58,475	$57,585	$ 54,499	$ 53,915	$ 54,511	$ 55,158	$ 55,325

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Police Service Retirement Plan

For the Last Ten Years Ended December 31

Years of Credited Service	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
0 to 4	196	190	199	194	183	157	135	149	133	166
5 to 9	120	110	132	123	151	158	138	120	129	110
10 to 14	136	129	112	119	98	92	126	140	133	151
15 to 19	84	109	125	119	138	142	126	114	99	101
20 to 24	81	73	58	58	53	49	49	44	61	50
25 to 29	17	21	18	27	13	7	4	7	7	6
30 and over	4	2	-	1	2	3	2	2	1	3
Total members	638	634	644	641	638	608	580	576	563	587
Average years of service	10.8	11.0	10.6	10.9	10.57	10.7	10.7	10.9	11.1	10.6
Average age	37.2	37.3	37.0	37.4	37.18	37.4	37.4	37.4	37.7	37.0
Average salary	$ 75,741	$75,538	$69,711	$68,454	$67,336	$ 62,122	$ 62,102	$ 64,170	$ 66,276	$ 65,534

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

Years of Credited Service	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
0 to 4	273	311	288	239	142	71	98	133	244	323
5 to 9	64	79	104	194	258	320	240	239	183	133
10 to 14	282	216	206	157	118	63	85	76	95	82
15 to 19	61	80	70	85	76	84	77	105	75	100
20 to 24	58	51	75	52	60	71	60	58	74	93
25 to 29	37	40	39	38	36	29	24	18	16	20
30 and over	5	7	10	8	3	1	2	2	2	6
Total members	780	784	792	773	693	639	586	631	689	757
Average years of service	10.4	10.3	10.2	10.2	10.6	10.8	11.2	10.4	9.8	9.8
Average age	37.4	37.3	37.2	37.3	37.5	37.9	38.2	37.3	36.7	36.6
Average salary	$ 62,472	$ 59,891	$58,368	$56,711	$58,407	$ 54,752	$ 55,581	$ 55,924	$ 56,521	$ 57,714

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

Years of Credited Service	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
0 to 4	99	103	112	103	85	76	79	88	89	122
5 to 9	45	50	53	57	85	82	72	68	87	73
10 to 14	65	55	55	64	50	59	71	114	106	112
15 to 19	49	54	85	78	82	88	87	47	49	49
20 to 24	48	53	26	28	33	28	22	23	14	9
25 to 29	12	10	10	9	5	5	4	5	6	6
30 and over	4	2	2	3	5	4	3	2	3	3
Total members	322	327	343	342	345	342	338	347	354	374
Average years of service	11.1	11.4	11.0	11.1	11.4	11.3	11.0	10.8	10.4	6.9
Average age	44.3	44.0	43.8	44.1	44.72	45.0	44.3	44.5	44.5	43.9
Average salary	$ 60,787	$ 60,519	$57,730	$56,685	$57,321	$ 53,020	$ 52,949	$ 54,065	$ 54,549	$ 54,021

Anne Arundel County Retirement and Pension System

Summary of Current Active Members and DROP Members by Years of Service and Plan

For the Year Ended December 31, 2018

Active	*Employees' Retirement Plan*	*Police Service Retirement Plan*	*Fire Service Retirement Plan*	*Detention Officers' and Deputy Sheriffs' Retirement Plan*	*Total*
Years of Credited Service					
0-4	741	176	217	88	1,222
5-9	318	109	114	46	587
10-14	381	132	246	69	828
15-19	272	90	97	44	503
20-24	161	71	50	40	322
25-29	126	28	33	20	207
30+	163	12	10	9	194
Total Current Active Members	2,162	618	767	316	3,863
Drop					
0-4	N/A	-	-	-	-
5-9	N/A	-	-	-	-
10-14	N/A	-	-	-	-
15-19	N/A	-	-	-	-
20-24	N/A	16	10	7	33
25-29	N/A	20	20	6	46
30+	N/A	19	29	8	56
Total Current Active DROP Members		55	59	21	135

Anne Arundel County Retirement and Pension System

Schedule of Current Active DROP Members by Year of Entry

For the Last Five Years Years Ended December 31

	Police Service Retirement Plan	*Fire Service Retirement Plan*	*Detention & Sherrif Officers Retirement Plan*	*Total*
2014	5	4	-	9
2015	4	2	4	10
2016	16	9	4	29
2017	8	25	5	38
2018	22	19	8	49
	55	59	21	135

Notes:
1) The Employee's Retirement Plan does not provide a DROP.
2) The Police Service Retirement Plan DROP was initiated in 2002.
3) The Fire Service Retirement Plan DROP was initiated in 2001.
4) The Detention Officers' and Deputy Sheriffs' Retirement Plan was initated in 2015.
5) Actuarial data is based on preliminary employee information which therefore, does not agree with the final census data reflected above.

Anne Arundel County Retirement and Pension System

Schedule of Retirees and Beneficiaries by Attained Age and Type of Retirement

For the Year Ended December 31, 2018

Age Group	*Normal Retirement*	*Early Retirement*	*Service Connected Disability*	*Non-Service Connected Disability*	*Total*
19 & Under	-	-	-	-	-
20 - 24	-	-	-	-	-
25 - 29	-	-	-	-	-
30 - 34	1	-	10	1	12
35 - 39	2	-	7	5	14
40 - 44	7	-	24	2	33
45 - 49	31	-	44	7	82
50 - 54	180	16	63	10	269
55 - 59	268	32	55	12	367
60 - 64	566	56	57	11	690
65 - 69	638	42	48	9	737
70 - 74	582	24	25	5	636
75 - 79	326	1	15	5	347
80 - 84	205	-	1	2	208
85 & Up	152	-	2	1	155
Total Members	2,958	171	351	70	3,550

Anne Arundel County Retirement and Pension System

History of Operating Revenues and Expenses

For the Last Ten Years Ended December 31

	2018	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	*2009*
REVENUES										
Employer contributions	$ 71,952,138	$ 68,249,610	$ 67,500,726	$ 66,682,443	$ 65,330,754	$ 61,860,144	$ 55,733,520	$ 50,815,842	$ 50,895,450	$ 44,724,462
Participant contributions	13,859,588	13,516,451	12,913,484	12,318,793	11,687,932	10,760,880	10,544,744	11,034,225	10,433,064	10,486,741
Investment income	(89,273,637)	270,700,301	115,173,162	(26,123,625)	78,387,569	145,893,607	176,338,780	24,900,493	169,916,939	172,172,570
Total revenues	$ (3,461,911)	$ 352,466,362	$ 195,587,372	$ 52,877,611	$ 155,406,255	$ 218,514,631	$ 242,617,044	$ 86,750,560	$ 231,245,453	$ 227,383,773
EXPENSES										
Benefits and refunds	$ 126,240,111	$ 122,602,452	$ 117,741,235	$ 110,160,338	$ 103,171,020	$ 90,931,770	$ 87,155,588	$ 77,259,760	72,241,126	$ 70,793,037
Administrative expenses	1,572,698	1,508,247	1,342,456	1,470,053	1,409,248	1,604,203	1,527,986	1,340,439	1,393,523	1,348,545
Total expenses	$ 127,812,809	$ 124,110,699	$ 119,083,691	$ 111,630,391	$ 104,580,268	$ 92,535,973	$ 88,683,574	$ 78,600,199	$ 73,634,649	$ 72,141,582
COVERED PAYROLL										
Annual covered payroll	266,207,173	263,033,649	252,285,869	243,678,098	243,678,098	220,607,481	217,804,921	237,798,435	233,098,361	226,183,784
Total covered payroll	$ 266,207,173	$ 263,033,649	$ 252,285,869	$ 245,100,390	$ 243,678,098	$ 220,607,481	$ 217,804,921	$ 237,798,435	$ 233,098,361	$ 226,183,784
Employer contributions as a percent of covered payroll	27.03%	25.95%	26.76%	27.36%	26.81%	28.04%	25.59%	21.37%	21.83%	19.77%

Anne Arundel County Retirement and Pension System

History of Plan Investments and Liabilities

For the Ten Years Ended December 31

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total net assets fair market value	$ 1,780,978,160	$ 1,912,252,881	$ 1,684,262,514	$ 1,604,773,484	$ 1,668,780,810	$1,623,305,968	$1,498,074,369	$1,342,485,137	$1,337,927,398	$1,169,581,066
Actuarial accrued liability (AAL)	$ 2,456,663,451	$ 2,330,000,504	$ 2,227,654,391	$ 2,158,514,771	$ 2,117,461,985	$1,997,891,150	$1,893,021,509	$1,791,891,067	$1,713,528,066	$1,652,709,089
Actuarial value of assets (AVA)	$ 1,909,831,161	$ 1,866,226,913	1,787,755,545	$ 1,725,590,057	$ 1,666,980,234	$1,562,260,162	$1,448,184,848	$1,462,944,903	$1,471,797,558	$1,454,413,785
Unfunded actuarial liability (UAL)	$ 546,832,290	$ 463,773,591	$ $ 439,898,846	$ 432,924,714	$ 450,481,751	$435,630,988	$444,836,661	$328,946,164	$241,730,508	$198,295,304
Funded ratio (AVA/AAL)	77.74%	80.10%	80.25%	79.94%	78.73%	78.20%	76.50%	81.64%	85.89%	88.00%