



**Cavanaugh Macdonald**  
CONSULTING, LLC

*The experience and dedication you deserve*

**GASB Statement No. 67 Report**

**For the**

**Judges' Retirement System**

**Prepared as of**

**June 30, 2016**





# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

October 12, 2016

Public Employees' Retirement Board  
100 North Park, Suite 200  
Helena, MT 59620-0139

Members of the Board:

Presented in this report is information to assist the Judges Retirement System of the State of Montana (JRS) in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 67. The information is presented for the period ending June 30, 2016.

The annual actuarial valuation was used as a basis for much of the information presented in this report was performed as of June 30, 2015. The valuation was performed by a prior actuary, which based upon data, furnished by the PERS staff, concerning active, inactive and retired members along with pertinent financial information.

To the best of our knowledge, this report is complete and accurate. The necessary calculations were performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems.

The calculations were prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, and, in our opinion, meet the requirements of GASB 67.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the calculations were completed in compliance with the laws governing the System. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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Board of Trustees

October 12, 2016

Page 2

Future actuarial results may differ significantly from the current results 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Edward Macdonald', written in a cursive style.

Edward A. Macdonald, ASA, FCA, MAAA  
President

A handwritten signature in blue ink, appearing to read 'Todd B. Green', written in a cursive style.

Todd B. Green, ASA, FCA, MAAA  
Principal and Consulting Actuary

EAM/TBG:jan



## **TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Item</u></b>	<b><u>Page No.</u></b>
	Board Summary	1
I	Introduction	3
II	Financial Statement Notes	5
III	Required Supplementary Information	9
<b><u>Schedule</u></b>		
A	Required Supplementary Information Tables	11
B	Plan Provisions	14
C	Actuarial Assumptions and Methods	17
D	Glossary of Terms	23



## **REPORT OF THE ANNUAL GASB STATEMENT NO. 67**

### **REQUIRED INFORMATION FOR JUDGES' RETIREMENT SYSTEM OF THE STATE OF MONTANA**

**PREPARED AS OF JUNE 30, 2016**

#### **BOARD SUMMARY**

This report provides information required by the Judges Retirement System (JRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans." The information provided herein was prepared for the purpose of assisting JRS to comply with the financial reporting and disclosure requirements of GASB No. 67 and is not applicable for purposes of funding the System. A calculation of the System's liability for purposes other than GASB No. 67 may produce significantly different results.

The Total Pension Liability (TPL), Fiduciary Net Position (FNP), Net Pension Liability (NPL) and certain sensitivity information shown in this report are based on an actuarial valuation performed as of June 30, 2015, by the System's prior actuary. The total pension liability as of the end of the plan year, June 30, 2016, was determined using standard roll forward procedures, which are detailed in Section II of this report.

The System's FNP is projected to cover all future benefit payments of current plan members. Therefore, the discount rate used to measure the TPL is the long-term expected rate of return on pension plan investments of 7.75%.

As of June 30, 2016, the TPL is \$53,953,458 and the FNP is \$87,805,718. The NPL, which is determined by subtracting the FNP from the TPL, is equal to (\$33,852,260). Also included in this report is a sensitivity analysis of the NPL, which shows results using both a 1% increase in the discount rate and 1% decrease in the discount rate. A higher discount rate reduces the NPL while a lower discount increases the NPL.

Schedule A shows three tables of required supplementary information. The first table details the changes in the NPL for the year ending June 30, 2016, with a comparison to the prior two years. The second table shows the ratio of the FNP to the TPL and a ratio of the NPL to the covered-employee payroll for the same three-year period. The final Schedule A table shows a history of the schedule of employer contributions.

The table on the following page highlights some of the information required by GASB No. 67 as of June 30, 2016.



**REPORT OF THE ANNUAL GASB STATEMENT NO. 67**

**REQUIRED INFORMATION FOR  
JUDGES' RETIREMENT SYSTEM  
OF THE STATE OF MONTANA**

**PREPARED AS OF JUNE 30, 2016**

**BOARD SUMMARY**

	<b>2016</b>
<b>Valuation Date (VD):</b>	June 30, 2015
<b>Prior Measurement Date:</b>	June 30, 2015
<b>Measurement Date (MD):</b>	June 30, 2016
<b>Membership Data:</b>	
Retirees and Beneficiaries	67
Inactive Members	2
Active Employees	<u>55</u>
Total	124
<b>Discount Rate:</b>	
Long-Term Expected Rate of Return	7.75%
Municipal Bond Index Rate at Prior Measurement Date	3.82%
Municipal Bond Index Rate at Measurement Date	3.01%
Fiscal Year in which Fiduciary Net Position is Projected to be Depleted	n/a
Discount Rate at Prior Measurement Date	7.75%
Discount Rate at Measurement Date	7.75%
<b>Net Pension Liability:</b>	
Total Pension Liability (TPL)	\$53,953,458
Fiduciary Net Position (FNP)	<u>87,805,718</u>
Net Pension Liability (NPL = TPL – FNP)	(\$33,852,260)
FNP as a percentage of TPL	162.74%



## Section I - Introduction

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**REPORT OF THE ANNUAL GASB STATEMENT NO. 67  
REQUIRED INFORMATION FOR THE  
JUDGES RETIREMENT SYSTEM  
OF THE STATE OF MONTANA  
PREPARED AS OF JUNE 30, 2016**

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), “*Financial Reporting For Pension Plans*”, in June 2012. GASB 67’s effective date is for plan years beginning after June 15, 2013. This report, prepared as of June 30, 2016. Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of the Judges Retirement System of the State of Montana as of June 30, 2015. The results of that valuation were detailed in a report dated September 29, 2015.

GASB 67 basically divorces accounting and funding, creating disclosure and reporting requirements that may or may not be consistent with the basis used for funding the System.

A major change in GASB 67 is the requirement to determine the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial funding method. If, as is the case here, the valuation date at which the TPL is determined is before the Measurement Date, the TPL must be rolled forward to the Measurement Date. The Net Pension Liability (NPL) is then set equal to the TPL minus the System’s Fiduciary Net Position (FNP) (the market values of assets) as of the Measurement Date. The benefit provisions recognized in the calculation of the TPL are summarized in Schedule B.

Among the assumptions needed for the liability calculation is a Discount Rate. To determine the Discount Rate, the FNP must be projected into the future for as long as there are anticipated benefits payable under the plan’s provision applicable to the membership and beneficiaries of the System on the Measurement Date. If the FNP is projected to not be depleted at any point in the future, the long term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the Discount Rate.



## **Section I - Introduction**

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If, however, the FNP is projected to be depleted, the Discount Rate is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. The rate used, if necessary, for this purpose is the Bond Buyer General Obligation 20-year Municipal Bond Index published monthly by the Board of Governors of the Federal Reserve System.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information (RSI).



## Section II – Financial Statement Notes

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The material presented herein will follow the order presented in GASB 67. Paragraph numbers are provided for ease of reference.

**Paragraphs 30(a) (1)-(3):** The information required is to be supplied by the Plan.

**Paragraph 30(a) (4):** The data required regarding the membership of the Judges’ Retirement System were furnished by the System’s staff. The following table summarizes the membership of the system as of June 30, 2015, the Valuation Date.

### Membership

	Number
Retired Members Or Their Beneficiaries Currently Receiving Benefits	67
Inactive Members Entitled To But Not Yet Receiving Benefits	2
Active Members	55
Total	124

**Paragraphs 30(a)(5)-(6) and Paragraphs 30(b)-(f):** The information required is to be supplied by the Plan.



## Section II – Financial Statement Notes

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**Paragraphs 31(a) (1)-(4):** The information is provided in the following table. As stated above, the NPL is equal to the TPL minus the FNP. That result as of June 30, 2016 is presented in the table below.

	Fiscal Year Ending
	June 30, 2016
Total Pension Liability	\$53,953,458
Fiduciary Net Position	<u>87,805,718</u>
Net Pension Liability	(\$33,852,260)
Ratio of Fiduciary Net Position to Total Pension Liability	162.74%

**Paragraph 31(b):** This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The actuarial assumptions utilized in developing the TPL are outlined in Schedule C. The total pension liability was determined by an actuarial valuation as of June 30, 2015, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00 percent
Salary increases	4.00 percent, including inflation
Investment rate of return	7.75 percent, net of pension plan investment expense, including inflation
Mortality	Healthy Mortality: RP-2000 Combined Employee and Annuitant Mortality Table projected to 2015 using Scale AA Disabled Mortality: RP-2000 Combined Employee and Annuitant Mortality Table



## Section II – Financial Statement Notes

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### Paragraph 31.b.(1)

- (a) **Discount rate:** The discount rate used to measure the total pension liability was 7.75%
- (b) **Projected cash flows:** The projection of cash flows used to determine the discount rate assumed the System would continue to receive contributions provided for in statute in the future.
- (c) **Long term rate of return:** The long-term expected rate of return on pension plan investments was determined using a combination of analysis which includes log-normal distribution analysis 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 weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. In addition, a Peer System Comparison analysis is also conducted of similar retirement systems which compares the assumed rate of return to the median assumed rate of return of other retirement systems which are similar in terms of asset size.
- (d) **Municipal bond rate:** the discount rate determination does not use a municipal bond rate
- (e) **Periods of projected benefit payments:** projected future benefit payments for all current plan members were projected through 2117
- (f) **Assumed Asset Allocation:** The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Broad US Equity	36.0%	4.55%
Broad Intl Equity	18.0%	6.35%
Private Equity	12.0%	7.75%
Intermediate Bonds	23.4%	1.00%
High Yield Bonds	2.6%	4.00%
Core Real Estate	4.0%	4.00%
Non-Core Real Estate	4.0%	4.00%



## Section II – Financial Statement Notes

(g) **Sensitivity analysis:** this paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of 7.75 percent, as well as what the System’s net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate:

	1% Decrease 6.75%	Current Discount Rate 7.75%	1% Increase 8.75%
System’s net pension liability	(\$29,752,954)	(\$33,852,260)	(\$39,015,302)

**Paragraph 31(c):** June 30, 2015 is the actuarial valuation date upon which the TPL is based. An expected TPL is determined as of June 30, 2016 using standard roll forward techniques. The roll forward calculation adds the annual normal cost (also called the service cost), subtracts the actual benefit payments and refunds for the plan year and then applies the expected investment rate of return for the year. The table below summarizes the calculation.

TPL Roll Forward	(1) TPL Reported for Fiscal Year End 2015	(2) Development of TPL for Fiscal Year End 2016
(a) Interest Rate	7.75%	7.75%
(b) Valuation Date for Measurement	June 30, 2014	June 30, 2015
(c) TPL as of June 30, 2015	53,145,689	51,900,833
(d) Entry Age Normal Cost for the period July 1, 2015 - June 30, 2016	1,465,155	1,465,155
(e) Actual Benefit Payments and Refunds for the period July 1, 2015 - June 30, 2016	3,416,023	3,416,023
(f) TPL as of June 30, 2016 = [(c + d) * 1.0775] - [e * 1.03875]	55,294,791	53,953,458
(g) Experience Actuarial (Gain) / Loss: = (2f) - (1f)		(1,341,333)



### Section III – Required Supplementary Information

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There are several tables of Required Supplementary Information (RSI) that need to be included in the System’s financial statements:

**Paragraphs 32(a)-(c):** The required tables are provided in Schedule A.

**Paragraph 32(d):** The money-weighted rates of return required are to be supplied by the Plan.

**Paragraph 34:** In addition the following should be noted regarding the RSI:

*Changes of benefit terms:* The following changes to the plan provisions were made as identified:

2015:

An inactive vested judge’s beneficiary is eligible for a survivor benefit or death benefit if the judge dies prior to retiring.

*Changes of assumption:* None.

*Method and assumptions used in calculations of actuarially determined contributions.* The actuarially determined contribution rates are determined on an annual basis. The following actuarial methods and assumptions were used to determine contribution rates reported in that schedule:

Valuation date	June 30, 2015
Timing	Actuarially determined contributions are determined on the valuation date payable in the fiscal year beginning immediately following the valuation date
Actuarial cost method	Entry age Normal
Amortization method	Level percentage of payroll, open
Remaining amortization period	0 years
Asset valuation method	4-year smoothed market
Wage Inflation	4.00 percent
Salary increase	4.00 percent
Inflation	3.00 percent
Investment rate of return	7.75 percent, net of pension plan investment expense, including inflation



### **Section III – Required Supplementary Information**

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Mortality

Healthy Mortality:

RP-2000 Combined Employee and Annuitant  
Mortality Table projected to 2015 using Scale AA

Disabled Mortality:

RP-2000 Combined Employee and Annuitant  
Mortality Table



## Schedule A – Required Supplementary Tables

### SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY GASB 67 Paragraph 32(a)

	2016	2015	2014
<b>Total pension liability</b>			
Service Cost	1,578,705	1,652,926	1,593,854
Interest	3,986,420	3,933,947	3,824,389
Benefit changes	0	0	0
Difference between expected and actual experience	(1,341,333)	(1,032,091)	0
Changes of assumptions	0	0	0
Benefit payments	(3,416,023)	(3,040,988)	(3,022,512)
Refunds of contributions	0	0	0
<b>Net change in total pension liability</b>	<b>807,769</b>	<b>1,513,794</b>	<b>2,395,731</b>
<b>Total pension liability - beginning</b>	<b>53,145,689</b>	<b>51,631,895</b>	<b>49,236,164</b>
<b>Total pension liability - ending (a)</b>	<b>53,953,458</b>	<b>53,145,689</b>	<b>51,631,895</b>
<b>Plan net position</b>			
Contributions - employer	1,807,493	1,683,990	1,651,483
Contributions - member	729,180	534,091	481,461
Net investment income	1,778,748	3,842,387	12,420,597
Benefit payments	(3,416,023)	(3,040,988)	(3,022,512)
Administrative expense	(197,445)	(135,815)	(100,567)
Refunds of contributions	0	0	0
Other	(2,742)	0	0
<b>Net change in plan net position</b>	<b>699,211</b>	<b>2,883,665</b>	<b>11,430,462</b>
<b>Plan net position - beginning</b>	<b>87,106,507</b>	<b>84,222,842</b>	<b>72,792,380</b>
<b>Plan net position - ending (b)</b>	<b>87,805,718</b>	<b>87,106,507</b>	<b>84,222,842</b>
<b>Net pension liability - ending (a) - (b)</b>	<b>(33,852,260)</b>	<b>(33,960,818)</b>	<b>(32,590,947)</b>



## Schedule A – Required Supplementary Tables

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### SCHEDULE OF THE NET PENSION LIABILITY GASB 67 Paragraph 32(b)

	2016	2015	2014
Total pension liability	53,953,458	53,145,689	51,631,895
Plan net position	<u>87,805,718</u>	<u>87,106,507</u>	<u>84,222,842</u>
Net pension liability	(33,852,260)	(33,960,818)	(32,590,947)
Ratio of plan net position to total pension liability	162.74%	163.90%	163.12%
Covered-employee payroll	6,920,367	6,524,569	6,354,763
Net pension liability as a percentage of covered- employee payroll	-489.17%	-520.51%	-512.86%



## Schedule A – Required Supplementary Tables

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### SCHEDULE OF EMPLOYER CONTRIBUTIONS GASB 67 Paragraph 32(c)

	2016	2015	2014
Actuarially determined employer contribution	0	0	0
Actual employer contributions	1,807,493	1,683,990	1,651,483
Non-Employer Contributions	0	0	0
Annual contribution deficiency/(excess)	(1,807,493)	(1,683,990)	(1,651,483)
Covered-employee payroll	6,920,367	6,524,569	6,354,763
Actual contributions as a percentage of covered-employee payroll	26.11%	25.81%	25.98%



## Schedule B – Plan Provisions

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Service Credit	<ul style="list-style-type: none"><li>• Service credit is used to determine the amount of a member’s retirement benefit</li><li>• One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service.</li></ul>
Membership Service	<ul style="list-style-type: none"><li>• Membership service is used to determine eligibility for vesting, retirement or other benefits.</li><li>• One month of membership service is earned for any month member contributions are made, regardless of the number hours worked.</li><li>• Members may purchase service that counts toward membership service.</li></ul>
Contributions	<ul style="list-style-type: none"><li>• Member contributions are made through an “employer pick-up” arrangement which result in deferral of taxes on the contributions.</li></ul>
Compensation	<ul style="list-style-type: none"><li>• Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems.</li><li>• Bonuses paid on or after July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses.</li></ul>
Withdrawal of employee contributions	<ul style="list-style-type: none"><li>• A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit.</li><li>• The member receives the accumulated member contributions which consists of member contributions and regular interest.</li><li>• Upon receipt of a refund of accumulated contributions a member’s vested right to a monthly benefit is forfeited.</li></ul>
Member contributions interest credited (regular interest)	<ul style="list-style-type: none"><li>• Interest is credited to member accounts at the rates determined by the Board.</li><li>• The current interest rate credited to member accounts is 0.25%.</li></ul>
Vesting eligibility and benefit	<ul style="list-style-type: none"><li>• 5 years of membership service.</li><li>• Accrued normal retirement benefit, payable when eligible for retirement.</li><li>• In lieu of a pension, a member may receive a refund of accumulated contributions.</li><li>• Upon receipt of a refund of contributions, a member’s vested right to a monthly benefit is forfeited.</li></ul>
Type of Plan	<ul style="list-style-type: none"><li>• Single-employer cost sharing</li></ul>
Membership eligibility	<ul style="list-style-type: none"><li>• Judges of district courts</li><li>• Justices of supreme court</li><li>• Chief water judge</li><li>• Associate water judge (effective July1,2011)</li></ul>



## Schedule B – Plan Provisions

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Member contributions	<ul style="list-style-type: none"><li>• 7% of member's compensation.</li></ul>
Employer contributions	<ul style="list-style-type: none"><li>• 25.81% of each member's compensation</li></ul>
Compensation period used in benefit calculation	<ul style="list-style-type: none"><li>• Current salary or HAC = Highest Average Compensation</li><li>• <b>Hired prior to July 1, 1997, and did not elect GABA</b>, benefits are calculated using current salary of the office from which the member retired.</li><li>• <b>Hired on or after July 1, 1997, or hired prior to July 1, 1997 and elected GABA</b>, benefits are calculated using HAC, the average of the highest 36 consecutive months (or shorter period of total services) of compensation paid to the member.</li><li>• <b>Hired on or after July 1, 2013</b>: 110% annual cap on compensation considered as part of a member's HAC.</li></ul>
Service retirement eligibility and benefit	<ul style="list-style-type: none"><li>• <b>Age 60 with 5 years membership service</b></li><li>• <b>First 15 years of service credit:</b> 3<sup>1</sup>/<sub>3</sub>% per year of current salary or HAC, and</li><li>• <b>Over 15 years of service credit:</b> 1.785% per year of current salary or HAC</li></ul>
Disability eligibility and benefit	<p><b>Non-duty disability:</b></p> <ul style="list-style-type: none"><li>• 5 years membership service</li><li>• Regular disability benefit: Actuarial equivalent of the normal retirement benefit available at the time of disability.</li></ul> <p><b>Duty-related disability:</b></p> <ul style="list-style-type: none"><li>• Any amount of membership service</li><li>• Duty-related disability benefit: Greater of 50% of current salary or 50% of HAC.</li></ul>
Survivor's eligibility and benefit	<p><b>Duty-related death:</b></p> <ul style="list-style-type: none"><li>• Active or retired member</li><li>• Member's service retirement benefit on the date of the death.</li></ul> <p><b>Non-duty-related death:</b></p> <ul style="list-style-type: none"><li>• Vested member</li><li>• Refund of the member's accumulated contributions, or</li><li>• Actuarial equivalent of the member's service retirement benefit on date of death.</li><li>• A beneficiary may elect to receive the present value of the benefit as a single lump sum</li><li>• For a retired member without a contingent annuitant, a payment will be made to the member's designated beneficiary equal to the accumulated contributions reduced by any retirement benefits already paid.</li></ul>



## Schedule B – Plan Provisions

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Retirement benefits -  
Form of payment                      The normal form of payment is a single life annuity with a refund of any remaining accumulated contributions (account balance) to a designated beneficiary. (Option 1)

Optional Benefits:

- Option 2, a life annuity and joint 100% survivor benefit,
- Option 3, a life annuity and joint 50 % survivor benefit, and
- Option 4, a life annuity with a period certain.

If a retiring member selects Option 2 or 3 and the contingent annuitant predeceases or is divorced from the member, the retiree may, within 18 months of the death or divorce, choose to revert to the higher Option 1 benefit available at retirement or the retiree may select a different contingent annuitant and/or a different option.

Post retirement  
benefit increases                      

- For retired members who have been retired for at least 12 months and who were either hired after June 30, 1997 or hired prior to July 1, 1997 and elected GABA, a GABA will be made each year equal to 3%.
- For retired members who were hired prior to July 1, 1997 and did not elect GABA, the current salary of an active member in the same position is used to recalculate the monthly benefit.

Changes since  
last valuation                      None



## **Schedule C – Actuarial Assumptions and Methods**

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The assumptions and methods utilized in the valuation were developed in the five-year experience study for the period ending 2009 dated June 15, 2010.

Tables C-2 through C-3 give rates of decrement for service retirement, disablement and mortality.

### **Actuarial Cost Method**

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

### **Records and Data**

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.

### **Replacement of Terminated Members**

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

### **Administrative and Investment Expenses**

The investment expenses of the System are assumed to be funded by investment earnings in excess of 7.75% per year.

Administrative expenses are assumed to equal 0.15% of payroll.

### **Valuation of Assets**

Market value of assets



## **Schedule C – Actuarial Assumptions and Methods**

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### **Investment Earnings**

The annual rate of investment earnings of the assets of the System is assumed to be 7.75% per year net of investment expenses, compounded annually.

### **Interest on Member Contributions**

Interest on member contributions is assumed to accrue at a rate of 3.50% per annum, compounded annually.

### **Future Salaries**

The rates of annual salary increase assumed for the purpose of the valuation are an assumed 4.0% annual rate of increase in the general wage level of the membership. There are not separate merit and seniority increases assumed.

### **Service Retirement**

Table C-2 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits.

### **Disablement**

The rates of disablement used in this valuation are illustrated in Table C-3.

### **Mortality**

The mortality rates used in this valuation are illustrated in Table C-4. A written description of each table used is included in Table C-1.

### **Other Terminations of Employment**

No terminations are assumed other than for retirement, death and disability.

### **Probability of Marriage & Dependent Children**

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children. Female spouses are three years younger than their male spouse.

### **Records with no Birth Date**

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.



## Schedule C – Actuarial Assumptions and Methods

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Table C-1

### Summary of Valuation Assumptions

I. Economic assumptions		
A. General wage increases		4.00%
B. Investment return		7.75%
C. Price Inflation Assumption		3.00%
D. Growth in membership		0.00%
E. Interest on member accounts		3.50%
II. Demographic assumptions		
A. Retirement		Table C-2
B. Disablement		Table C-3
C. Mortality among contributing members, service retired members, and beneficiaries. The tables include margins for mortality improvement which is expected to occur in the future.		Table C-4
For Males and Females: RP 2000 Combined Mortality Table projected to 2015 using Scale AA.		
D. Mortality among disabled members		Table C-4
For Males and Females: RP 2000 Combined Mortality Table.		



## Schedule C – Actuarial Assumptions and Methods

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**Table C-2**

**Retirement  
Annual Rates**

<u>Age</u>	<u>Rate</u>
60	15.0%
61	5.0
62	5.0
63	5.0
64	5.0
65	15.0
66	5.0
67	5.0
68	5.0
69	5.0
70 & Over	100.0

Vested terminations are assumed to retire at their earliest unreduced eligibility



## Schedule C – Actuarial Assumptions and Methods

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**Table C-3**

**Disablement  
Annual Rates**

<u>Age</u>	<u>All Members</u>
22	.00%
27	.00
32	.01
37	.04
42	.10
47	.13
52	.25
57	.36
62	.00

10% of disabilities are assumed to be duty-related and 90% are assumed to be non-duty related. All disabilities are assumed to be permanent without recovery.



## Schedule C – Actuarial Assumptions and Methods

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**Table C-4**  
**Mortality**  
**Annual Rates**

Age	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
	Men	Women	Men	Women
25	0.0323%	0.0168%	0.0376%	0.0207%
30	0.0412	0.0227	0.0444	0.0264
35	0.0717	0.0402	0.0773	0.0475
40	0.0957	0.0563	0.1079	0.0706
45	0.1239	0.0882	0.1508	0.1124
50	0.1628	0.1296	0.2138	0.1676
55	0.2718	0.2409	0.3624	0.2717
60	0.5297	0.4689	0.6747	0.5055
65	1.0309	0.9003	1.2737	0.9706
70	1.7702	1.5529	2.2206	1.6742
75	3.0622	2.4916	3.7834	2.8106
80	5.5360	4.1291	6.4368	4.5879
85	9.9680	7.0761	11.0757	7.7446
90	17.2706	12.5879	18.3408	13.1682
95	25.9578	18.8755	26.7491	19.4509



## **Schedule D – Glossary of Terms**

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### **Actuarial Present Value of Projected Benefit Payments**

Projected benefit payments discount to reflect the expected effects of the time value (present value) of money and the probabilities of payment.

### **Actuarial Valuation**

The determination, as of a point in time (the actuarial valuation date), of the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.

### **Actuarial Valuation Date**

The date as of which an actuarial valuation is performed.

### **Actuarially Determined Contribution**

A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

### **Cost-Sharing Multiple Employer Defined Benefit Pension Plan (Cost-Sharing Pension Plan)**

A multiple-employer defined benefit pension plan in which the pension obligation to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.

### **Covered Employee Payroll**

The payroll on which contributions to a pension plan are based.



## **Schedule D – Glossary of Terms**

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### **Discount Rate**

The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of Statement 67) to be greater than the benefit payments that are projected to be made in the period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.
2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

### **Entry Age Actuarial Cost Method**

A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of the actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the actuarial accrued liability.

### **Money-Weighted Rate of Return**

A method of calculating period-by-period returns on pension plan investments that adjust for the changing amounts actually invested. For purpose of Statement 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

### **Net Pension Liability**

The liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan. It is calculated by subtracting the plan's fiduciary net position from the plan's total pension liability.

### **Non-Employer Contributing Entity**

Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 67, plan members are not considered non-employer contributing entities.



## **Schedule D – Glossary of Terms**

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### **Plan Members**

Individuals that are covered under the terms of a pension plan. Plan Members generally included (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).

### **Projected Benefit Payments**

All benefits estimated to be payable through the pension plan to current active and inactive plan members as a result of their past service and their expected future service.

### **Real Rate of Return**

The rate of return on an investment after adjustment to eliminate inflation

### **Service Cost**

The portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

### **Single-Employer Defined Benefit Pension Plan (Single-Employer Pension Plan)**

A defined benefit pension plan that is used to provide pensions to employees of only one employer.

### **Total Pension Liability**

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service in conformity with the requirements of Statement 67.