

Milliman Client Report



**Minnesota Legislative Commission
on Pensions and Retirement**

**Replication of the Actuarial Valuation of the
Duluth Teachers' Retirement Fund Association
as of July 1, 2012**

Prepared by:

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January 24, 2013

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January 24, 2013

Minnesota Legislative Commission
on Pensions and Retirement
State Office Building, Room 55
100 Rev. Dr. Martin Luther King Jr. Boulevard
St. Paul, Minnesota 55155

Attention: Mr. Lawrence A. Martin, Executive Director

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a review and replication of the July 1, 2012 actuarial valuation of the Duluth Teachers' Retirement Fund Association (DTRFA). An overview of our major findings is included in the Executive Summary section of the report. More detailed commentary and information is provided in the sections that follow.

We pursued this analysis and review with a constructive mindset. We looked to identify any possible suggestions that might improve understanding of or confidence in the actuarial services being provided. Naturally, some of the comments may be viewed as personal preference or nit-picky in nature. While we are not trying to impose our own preferences or biases on the Fund or the retained actuary, neither did we hesitate to make such comments if we believed that some change, however minor, would improve the actuarial functions.

This report has been prepared for use by the Minnesota Legislative Commission on Pensions and Retirement (LCPR) in their oversight role with regard to the Fund. It has been prepared using Milliman valuation systems in a manner that would be used by Milliman to prepare a full actuarial valuation of the Fund. We recognize that there are hundreds of thousands of complex calculations performed by the actuarial valuation system. For this reason, even the smallest differences between valuation systems can produce noticeable differences in the valuation results between two different actuaries.

In preparing this report, we have relied without audit on the employee data, plan provisions, value of the plan assets and other plan financial information as provided by various involved entities including your office, DTRFA, The Segal Group, Inc., and others. We have reviewed this data for reasonableness and for consistency with previously supplied information. If any of this information as summarized in this report is inaccurate or incomplete, the results shown could be materially affected and this report may need to be revised.

On the basis of the foregoing we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

Any distribution of the enclosed report must be in its entirety including this cover letter, unless prior written consent is obtained from Milliman, Inc. This report has been prepared in accordance with the terms and provisions of the Consulting Services Agreement effective September 26, 2011.

January 24, 2013
Page Two

We, William V. Hogan, FSA, and Timothy J. Herman, FSA, are actuaries for Milliman, Inc. We are members of the American Academy of Actuaries and Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We look forward to making a personal presentation of our findings in briefings to the Minnesota Legislative Commission on Pensions and Retirement and to relevant staff members.

Respectfully submitted,

Milliman, Inc.



William V. Hogan, FSA, EA, MAAA
Principal and Consulting Actuary



Timothy J. Herman, FSA, EA, MAAA
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WVH/TJH/kf

Table of Contents

Opinion Letter

Table of Contents

Executive Summary _____	1
Principal Valuation Results _____	4
Plan Assets _____	6
▪ Statement of Plan Net Assets for Year Ended June 30, 2012	
▪ Reconciliation of Plan Assets	
▪ Actuarial Asset Value	
Development of Costs _____	9
▪ Actuarial Valuation Balance Sheet	
▪ Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate	
▪ Changes in Unfunded Actuarial Accrued Liability	
▪ Determination of Contribution Sufficiency/(Deficiency)	
Actuarial Basis _____	16
▪ Actuarial Cost Method	
▪ Summary of Actuarial Assumptions	
▪ Summary of Plan Provisions	
Member Data _____	29

Executive Summary

Purpose and Scope of the Actuarial Replication Audit

In accordance with Minnesota Statutes, Section 356.214, Subdivision 4, the LCPR has engaged Milliman, Inc. to perform a replication of the July 1, 2012 actuarial valuation of the Fund administered by DTRFA.

In performing the replication of the actuarial valuation, we follow several well defined steps. These steps involve a review and cleansing of the data used in the actuarial valuation, an assessment of the plan provisions to be valued, an analysis of the actuarial assumptions to be applied, a review of the reported value of plan assets as of the valuation date, and preparation of the actuarial calculations using appropriate computer programming and summarizing the results. All of the above steps are to be applied in accordance with the requirements of Minnesota statutes and the Actuarial Standards For Actuarial Work adopted by the LCPR.

In conducting our work, we initially prepared the above steps independently from the work of the Fund Actuary. After completing that work, we conducted a review of some individual benefit trace information in order to identify any key differences in programming or technique. We then prepared a summary of the key valuation results, showing a comparative of our results to those of the Fund Actuary.

It is important to recognize that the actuarial valuation process, while very sophisticated in its calculation methodology, is still an estimate of the financial value of benefits payable on contingent events, most of which occur many years into the future. As such, a considerable amount of uncertainty and variability surrounds those estimates. As actuaries we recognize this fact and are comfortable that small differences (in percentages) in the results do not change the overall financial results portrayed in the valuation. Furthermore, the actuarial software used by different firms has implicit differences that create differences in the valuation numbers. For this reason, we believe the comparison of valuation results should be evaluated in terms of percentage differences. To provide some context to our comments, in a replication audit, where the differences that are identified can also be quantified, we generally expect to be within 1%-2% on the calculation of the present value of future benefits and within 4%-5% on the calculation of the actuarial accrued liability and normal cost. The wider range on the latter items is because there tends to be more variability in how different actuarial software programs allocate the total liability (present value of future benefits) to past and future years of service.

Statement of Findings

In general, we found the actuarial calculations by the Fund Actuary to be reasonably consistent with our own separate calculations to within a reasonable degree of tolerance. Where we saw differences, we attempted to identify the reasons. Overall, we are satisfied that the July 1, 2012 actuarial valuation results for the Fund as prepared by the Fund Actuary present a fair and reasonable representation of the present value of future benefits. We note some differences in the actuarial liabilities and contribution requirements for the Fund due to a different application of the Entry Age Normal Cost Method (see discussion below). It is our intent to comment further in our overall report to be prepared in January 2013.

Executive Summary

(continued)

The following commentary provides our main conclusions on the various areas of our review:

- **Plan Provisions:** We started with the summary of plan provisions for the Fund that Milliman reviewed last year. After reviewing the actuarial report prepared by the Fund Actuary, we believe that their summary of plan provisions is consistent with our understanding of the current plan provisions.
- **Membership Data:** Our raw data counts match up to within a few lives with the counts as summarized by DTRFA. After applying our own cleansing methods, our valuation data count was modestly different from the count as reported by the Fund Actuary. Our active data count was higher by 3 lives and our inactive data count was 9 lives higher.

Given the total counts involved, our conclusion is that the Fund Actuary is reasonably reflecting the data received from DTRFA to within a reasonable degree of tolerance with our own determinations.

- **Actuarial Assumptions and Methods:** In general, we believe that the assumptions and methods employed by the Fund Actuary are reasonable and consistent with statutes and the Standards for Actuarial Work. We note there appears to be a difference in the application of the entry age normal actuarial cost method between the Milliman results and the results prepared by the Fund Actuary. The Milliman results employ a method which bases the normal cost rate on the benefits to be earned by current members based on each member's benefit structure. In determining the normal cost rate, we assumed the current plan design has been in effect since date of hire. This approach will result in a normal cost rate that is level over a member's career. Subject to changes in the demographic composition of the active member group, the normal cost rate for the fund as a whole will decrease over time as new members with lower benefits replace current members with higher benefits.

We believe the Fund Actuary's results are based on the normal cost rate using the benefit structure for new hires. Under this application of the entry age normal actuarial cost method, the part of the current members' future accruals that will no longer be funded via normal cost rate are essentially capitalized as the actuarial accrued liability and funded via amortization of the unfunded actuarial accrued liability. This approach will result in a normal cost rate that is level over time, subject to changes in the demographic composition of the active member group.

In practice, we have seen both applications of the entry age normal actuarial cost method used for governmental employer pension plans. However, there is a concern about consistency between the results produced by different Fund Actuaries. Based on the prior replication valuations we have prepared, we believe that all of the other Fund Actuaries use the method we have employed. If we were to prepare the Milliman results under the DTRFA Fund Actuary's approach, our results match much more closely than the results shown in this report.

We note there appears to be a substantial difference between the Fund Actuary's results and our results for active Member benefits for deferred retirement and refund of contributions. This apparent difference is due to the approaches used in the valuation system when an active Member is assumed to leave the System by withdrawal. In the actuarial assumptions, Members who withdraw from the System after becoming eligible for a deferred benefit are assumed to take the larger of their return of contributions, or their deferred annuity benefit. In the Fund Actuary's results, the benefits are included in the deferred retirement component if the member is projected to be vested at the time of withdrawal. Otherwise, the benefits are included in the refund of contributions component. In the Milliman results, the deferred retirement component includes the value of annuity benefits for

Executive Summary

(continued)

vested Members who withdraw from the System. The refund of contributions component includes both the refund of contributions for members who are not vested at the date of assumed withdrawal plus the value of the return of contributions for Members who are assumed to elect a refund of contributions in lieu of future annuity benefits. Because the Fund Actuary's present value of future benefits for the withdrawal decrement (sum of deferred retirement component plus refund of contributions component) is within 3.6% of the Milliman results and the total amount of this category is relatively low compared to the total plan, we believe this difference is not material to the overall valuation.

We further note there is a substantial difference between the Fund Actuary's results and our results for terminated members. For deferred retirements with future augmentation, we believe this difference is due to different application of the actuarial standards for terminations that are expected following the member's vesting date. According to the actuarial standards, the proper technique is to assume that the member selects the benefit with the greater value. Thus, for each year after the member's vesting date, the actuarial present value of Projected Benefits is based on the larger of the member's contributions accumulated with interest or the present value of the member's vested deferred benefit (augmented, if appropriate). In our valuation, we determine the greater value as of the former member's assumed retirement date, and then discounting the greater value from the member's assumed retirement date to the valuation date. In the Fund Actuary's valuation, it is our understanding that the greater value is determined by comparing the present value of the deferred benefit as of the valuation date to the member's contributions accumulated with interest at the valuation date. Because the interest on accumulated contributions is 4% and the interest discount factor is 8% for the first 5 years and 8.5% thereafter, the Fund Actuary's method produces a higher present value.

- **Actuarial Value of Assets:** We believe that the Fund Actuary has fairly and correctly presented the actuarial value of assets.
- **Valuation System Results:** Based upon our own valuation system results, we were able to match the Fund Actuary valuation results within 0.6% on the present value of future benefits and within 1.1% on the actuarial liabilities. We are about 1.11 percentage points higher on the Normal Cost rate due primarily to the different applications of the Entry Age Normal Method as discussed above. Except for the Normal Cost rate, these values track very well to the Fund Actuary calculations in total. However, we note some differences in how those totals are split by decrement and group.
- **Valuation Report:** We believe the actuarial valuation report prepared by the Fund Actuary provides all of the information required by the Standards for Actuarial Work. Overall, the work by the Fund Actuary is comprehensive and thorough. We note that the Actuarial Standards call for identification of the Actuarial Gain or Loss related to mortality. The report provides this information for current benefit recipients.
- **COLA:** As part of legislation enacted in 2010, the annual Cost of Living Adjustment (COLA) applied to the pensions of retired Members was changed to 0.0% if the Accrued Liability Funded Ratio is less than 80%. However, if the Fund achieves at least 80%, but less than 90% funded ratio on the actuarial value of assets to actuarial liability, the COLA will increase to 1.0%. The valuation by the Fund Actuary assumes that the lower 0.0% COLA will remain in place for all years. As stated in the Fund Actuary's report, this assumption is based on the projections that indicate a steadily declining funding level in the future given the current statutory contribution schedule. We believe this assumption is reasonable.

Principal Valuation Results

This section provides a summary of the key measurements from the July 1, 2012 Actuarial Valuation. As the numbers show, we were able to reasonably match the primary data totals with those shown by the Fund Actuary in almost all cases.

Principal Valuation Results

	Actuarial Valuation as of	
	July 1, 2012 (Fund Actuary)	July 1, 2012 (Milliman)
<u>Contributions</u> (% of Payroll)		
Normal Cost Rate	6.49%	7.60%
UAAL Amortization Payment	15.36%	15.04%
Expenses	1.16%	1.16%
Total Required Contributions (Chapter 356)	23.01%	23.80%
Statutory Contributions (Chapter 354A)	14.52%	14.53%
Contribution (Deficiency)/Sufficiency	(8.49)%	(9.27)%
<u>Unfunded Actuarial Accrued Liability</u> (dollars in thousands)		
Based upon AVA	\$119,411	\$115,950
Based upon MVA	131,691	128,230
<u>Funding Ratios</u> (dollars in thousands)		
Accrued Benefit Funding Ratio		
Current Assets (AVA)	\$ 206,833	\$ 206,833
Current Benefit Obligations	301,336	312,734
Funding Ratio	68.64%	66.14%
Accrued Liability Funding Ratio		
Current Assets (AVA)	\$ 206,833	\$ 206,833
Current Assets (MVA)	194,553	194,553
Actuarial Accrued Liability	326,244	322,783
Funding Ratio (AVA)	63.40%	64.08%
Funding Ratio (MVA)	59.63%	60.27%
Projected Benefit Funding Ratio		
Current and Expected Future Assets	\$ 281,961	\$ 276,336
Current and Expected Future Benefit Obligations	350,008	347,800
Funding Ratio	80.56%	79.45%
<u>Participant Data</u>		
Active Members		
Number	919	922
Projected Annual Earnings (000s)	\$ 50,973	\$ 50,578
Average Projected Annual Earnings	55,466	54,857
Average Age	47.8	48.0
Average Service	13.2	13.1
Service Retirements	1,254	1,265
Survivors	19	12
Disability Retirements	113	114
Deferred Retirements	284	282
Terminated Other Non-vested	766	772
TOTAL	3,355	3,367

Plan Assets

Statement of Plan Net Assets for Year Ended June 30, 2012

(dollars in thousands)

We received asset information from DTRFA which provided assets by class as of June 30, 2012. We have reviewed these assets and summarized them below. Our summary exactly matches the summary provided by the Fund actuary in their Actuarial Valuation Report.

	Market Value	
	Fund Actuary	Milliman
Assets in Trust		
Cash, Equivalents, Short-term Securities	\$ 16,102	\$ 16,102
Investments		
Fixed Income	34,085	34,085
Equity and Other	149,655	149,655
Real Estate and Mortgages	0	0
Invested Securities Lending Collateral	4,911	4,911
Other Assets	<u>270</u>	<u>270</u>
Total Assets in Trust	205,023	205,023
Assets Receivable	2,114	2,114
Liabilities		
Invested Securities Lending Collateral	\$ (6,249)	\$ (6,249)
Stock and Bond Purchases, and Accounts Payable	<u>(6,335)</u>	<u>(6,335)</u>
Total Liabilities	(12,584)	(12,584)
Net Assets Held in Trust for Pension Benefits		
Member Reserves	\$ 32,976	\$ 32,976
Other Reserves	<u>161,577</u>	<u>161,577</u>
Total Assets Available for Benefits	194,553	194,553
Net Assets at Market Value	<u>194,553</u>	<u>194,553</u>

Plan Assets

Reconciliation of Plan Assets (dollars in thousands)

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by DTRFA for the Plan's Fiscal year July 1, 2011 to June 30, 2012.

We received this information directly from DTRFA and summarized it below. Our summary matches the summary provided by the Fund actuary.

	Market Value	
	Fund Actuary	Milliman
A. Assets Available at Beginning of Year (BOY)	\$ 213,368	\$ 213,368
B. Additions		
1. Member Contributions	\$ 2,888	\$ 2,888
2. Employer Contributions	2,879	2,879
3. Direct State Aid (including redirected "amortization State aid" payments)	554	554
4. Investment Income	2,547	2,547
5. Investment Expenses	(1,273)	(1,273)
6. Other	112	112
7. Net Appreciation/(Depreciation)	<u>(990)</u>	<u>(990)</u>
8. Total Additions	6,717	6,717
C. Operating Expenses		
1. Service Retirements	\$ 22,845	\$ 22,845
2. Disability Benefits	156	156
3. Survivor Benefits	1,805	1,805
4. Refunds	97	97
5. Administrative Expenses	<u>629</u>	<u>629</u>
6. Total Operating Expenses	25,532	25,532
D. Other Changes in Reserves	<u>0</u>	<u>0</u>
E. Assets Available at End of Year (EOY)	194,553	194,553
F. Determination of Current Year Unrecognized Asset Return		
1. Service Retirements		
(a) Assets Available at BOY: (A)	\$ 213,368	\$ 213,368
(b) Assets Available at EOY: (E)	194,553	194,553
(c) Average Balance [(a) + (b) - Net Investment Income]/2 [Net Investment Income: (B.4) + (B.5) + (B.6) + (B.7)]	203,762	203,762
2. Expected Return: 8.50% x (F.1.(c))	17,319	17,319
3. Actual Return: (B.4) + (B.5) + (B.6) + (B.7)	<u>396</u>	<u>396</u>
4. Current Year Unrecognized Asset Return: (F.3) - (F.2)	(16,923)	(16,923)

Plan Assets

Actuarial Asset Value (dollars in thousands)

Based upon the assets reported to us by DTRFA and prior year actuarial valuation information regarding unrecognized asset returns, we have constructed the Actuarial Value of Assets for the July 1, 2012 Actuarial Valuation. Our calculation matches the Fund actuary.

1. Calculation of Unrecognized Return

	<u>Original Amount</u>	<u>% Not Recognized</u>	<u>June 30, 2012</u>
a. Year Ended June 30, 2012	\$ (16,923)	80%	\$ (13,538)
b. Year Ended June 30, 2011	23,939	60	14,363
c. Year Ended June 30, 2010	15,619	40	6,248
d. Year Ended June 30, 2009	<u>(96,765)</u>	20	<u>(19,353)</u>
e. Year Ended June 30, 2008	(57,603)		
f. Total Unrecognized Return			(12,280)

2. Market Value of Assets Available for Benefits	\$194,553
3. Less: Unrecognized Return	(12,280)
4. Actuarial Value of Assets (Current Assets) : (2) – (3)	<u>206,833</u>
5. Actuarial Value as a Percent of Market Value	<u>106.3%</u>

Development of Costs

Actuarial Valuation Balance Sheet (dollars in thousands)

The actuarial balance sheet is based on the fundamental equation that at any given time the present value of benefits to be paid in the future must be equal to the assets on hand plus the present value of future contributions to be received. The total rate of contribution is determined as the amount which will make the total present and potential assets balance with the total present value of future benefits. The members' rate of contribution is fixed at the current schedule. The employer's rate of contribution is the balance required to cover the total rate of contribution.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. It is this reserve system which permits the establishment of a level rate of contribution each year.

	June 30, 2012 (Fund Actuary)	June 30, 2012 (Milliman)
A. Actuarial Value of Assets	\$ 206,833	\$ 206,833
B. Expected Future Assets		
1. Present Value of Expected Future Statutory Supplemental Contributions	51,363	44,485
2. Present Value of Future Normal Cost Contributions	23,765	25,018
3. Total Expected Future Assets (1. + 2.)	75,128	69,503
C. Total Current and Expected Future Assets	\$ 281,961	\$ 276,336
D. Current Benefit Obligations		
1. Benefit Recipients	217,991	220,619
2. Deferred Retirement with Augmentation	8,826	7,253
3. Former Members without Vested Rights	1,367	1,406
4. Active Members	<u>73,152</u>	<u>83,456</u>
5. Total Current Benefit Obligations	301,336	312,734
E. Expected Future Benefit Obligations	48,672	35,066
F. Total Current and Expected Future Benefit Obligations	350,008	347,800
G. Unfunded Current Benefit Obligations (D.5. – A.)	94,503	105,901
H. Unfunded Current and Future Benefit Obligations (F. – C.)	68,047	71,464

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (dollars in thousands)

In the tables that follow the Commentary in this section, we provide the calculations which ultimately determine the required supplemental contribution rate. From these tables, a critical calculation is the Actuarial Present Value of Projected Benefits. This calculation reflects the actuary's estimate of the total present value cost of all benefits yet to be paid by the Fund to the current members (active and inactive). In replication audits, we typically strive to be within 2% of the actuary's calculation. If that level cannot be achieved, then it is important to identify the differences in more detail. In general, our calculations are within the 2% threshold with the exception of Deferred Members and Former Members Without Vested Rights who are outside the range due to the return of contributions issue described earlier in the report. It is our intent to review this component further in an effort to identify any other differences we may have compared to the Fund Actuary. The table below shows, as a percentage, the ratio of the numbers calculated by Milliman to the numbers reported by the Fund Actuary.

	Actuarial Present Value of Projected Benefits
Active Members	97.29%
Deferred Members	82.18
Former Members without Vested Rights	102.85
Benefit Recipients	<u>101.21</u>
Total	99.37%

The tables that follow the Actuarial Present Value of Projected Benefits are designed to determine how much of the Actuarial Present Value of Projected Benefits is to be funded by the future "normal cost" contributions (Actuarial Present Value of Future Normal Cost) versus how much belongs to past contributions (Actuarial Accrued Liability). This allocation does not change the total costs determined in the Actuarial Present Value of Projected Benefits. It simply allocates cost to past versus future based upon the Entry Age Normal Actuarial Cost Method. In replication audits, we typically look to be within 5% of the actuary's calculations for active member Actuarial Accrued Liability. The larger range recognizes that different valuation systems have different ways of rounding service and ages. In addition, the Entry Age Method requires projection of theoretical past amounts which can be handled somewhat differently between actuarial valuation systems. The reader should note that the ratios shown below reflect different application of the Entry Age Normal Actuarial Cost Method as discussed earlier in this report. The table below shows, as a percentage, the ratio of the numbers calculated by Milliman to the numbers reported by the Fund Actuary.

	Actuarial Accrued Liability
Active Members	95.35%
Deferred Members	82.18
Former Members without Vested Rights	102.85
Benefit Recipients	<u>101.29</u>
Total	98.94%

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (dollars in thousands)

Once the Actuarial Accrued Liability is determined, it is compared to the Actuarial Value of Assets to determine the unfunded liability. The difference between these numbers is then amortized to the statutory amortization date of June 30, 2039 based upon the present value of future payrolls. Because this calculation is based upon the difference of two relatively close numbers, any change in one of the numbers can have a large impact when viewed as a percentage.

For example, if the Actuarial Accrued Liability is \$1,000 and the Actuarial Value of Assets is \$900, then unfunded liability is \$100. If the Actuarial Accrued Liability is reduced by \$25, the unfunded liability becomes \$75. In this example, the reduction in the Actuarial Accrued Liability of 2.5% generates a reduction of 25% in both the unfunded liability and the supplemental contribution rate.

Based upon the above, it should be expected that small deviations in the amount of Actuarial Accrued Liability will have a larger impact on the supplemental contribution rate. It is not evidenced here where our calculation of the Actuarial Accrued Liability is 1.1% less than the Fund Actuary but our supplemental contribution percentage rate is 2.1% less than the Fund Actuary.

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (dollars in thousands)

	Actuarial Present Value of Projected Benefits	
	Fund Actuary	Milliman
1. Active Members		
A. Retirement Annuities	\$ 114,122	\$ 111,209
B. Disability Benefits	1,524	1,385
C. Survivor's Benefits	2,103	1,705
D. Deferred Retirements	4,075	1,449
E. Refunds	<u>0</u>	<u>2,774</u>
F. Total	121,824	118,522
2. Deferred Retirements with Future Augmentation	8,826	7,253
3. Former Members without Vested Rights	1,367	1,406
4. Benefit Recipients	<u>217,991</u>	<u>220,619</u>
5. Total	350,008	347,800

	Actuarial Present Value of Future Normal Costs	
	Fund Actuary	Milliman
1. Active Members		
A. Retirement Annuities	\$ 18,796	\$ 19,918
B. Disability Benefits	488	433
C. Survivor's Benefits	521	455
D. Deferred Retirements	3,960	782
E. Refunds	<u>0</u>	<u>3,429</u>
F. Total	23,765	25,018
2. Deferred Retirements with Future Augmentation	0	0
3. Former Members without Vested Rights	0	0
4. Benefit Recipients	<u>0</u>	<u>0</u>
5. Total	23,765	25,018

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (dollars in thousands)

	Actuarial Accrued Liability	
	Fund Actuary	Milliman
A. Determination of Actuarial Accrued Liability (AAL)		
1. Active Members		
A. Retirement Annuities	\$ 95,326	\$ 91,291
B. Disability Benefits	1,037	952
C. Survivor's Benefits	1,582	1,250
D. Deferred Retirements	115	667
E. Refunds	<u>0</u>	<u>(655)</u>
F. Total	98,060	93,505
2. Deferred Retirements with Future Augmentation	8,826	7,253
3. Former Members without Vested Rights	1,367	1,406
4. Benefit Recipients	<u>217,991</u>	<u>220,619</u>
5. Total	326,244	322,783
B. Determination of Unfunded Actuarial Accrued Liability (UAAL)		
1. Actuarial Accrued Liability	\$ 326,244	\$ 322,783
2. Current Assets (AVA)	206,833	206,833
3. Unfunded Actuarial Accrued Liability (AVA)	119,411	115,950
4. Current Assets (MVA)	194,553	194,553
5. Unfunded Actuarial Accrued Liability (MVA)	131,691	128,230
C. Determination of Supplemental Contribution Rate*		
1. Present value of future payrolls through the amortization date of June 30, 2039	777,468	770,976
2. Supplemental Contribution Rate (AVA) (B.3. / C.1.)	15.36%	15.04%
3. Supplemental Contribution Rate (MVA) (B.5. / C.1.)	16.94%	16.63%

*The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing for an initial period of time.

Development of Costs

Determination of Contribution Sufficiency/(Deficiency) (dollars in thousands)

In this section, we compare the statutory contributions provided under Chapter 354A of Minnesota statutes (354A contributions) to the required contributions under Chapter 356 of Minnesota statutes (356 contributions). The difference between these amounts results in a reported contribution sufficiency or deficiency.

With respect to the 354A contributions, the percentage is set by statute and we agree with the percentages reported by the Fund Actuary. The dollar amount is determined by applying the statutory percentage to the member compensation provided in the data file and projected (and annualized where necessary) with expected pay increases for the upcoming year. While reasonably close, our projection methodology was slightly different from the Fund Actuary resulting in a small dollar difference.

With respect to the 356 contributions, the total is equal to the sum of the Normal Cost (Entry Age Normal method) plus the supplemental contribution calculated earlier in this report plus an allowance for expected administrative expenses. Typically, in a replication audit, it is desirable to be within 5% of the actuary's Normal Cost. In this case, our Normal Cost percentage is 17.1% higher than the Fund Actuary. The reader should note that this large difference is due primarily to the different application of the Entry Age Normal Actuarial Cost Method discussed earlier in this report. We further note that our components of Normal Cost are somewhat different from the Fund Actuary. This is not an uncommon result as the treatment of where to categorize certain costs on an "entry age" basis between actuarial valuation systems quite often results in these differences.

As mentioned earlier, the supplemental contributions are highly leveraged to the value of the Actuarial Accrued Liability and on the projected payroll. In this case, our supplemental contribution percentage is lower by 2.1% but this is based upon an Actuarial Accrued Liability that is lower by 1.1% and a projected payroll that is 0.8% lower.

Similar to the 354A contributions, we arrive at the same expense allowance percentage but our dollar contribution is different due to payroll projection methodology.

As a result of the above, our calculation of the Contribution Sufficiency/Deficiency is a deficiency of (9.27)%. This compares to a deficiency reported by the Fund Actuary of (8.49)%. The difference of 0.78% is primarily the result of the supplemental contribution and Normal Cost difference.

Development of Costs

Determination of Contribution Sufficiency/(Deficiency) (dollars in thousands)

	Fund Actuary		Milliman	
	July 1, 2012		July 1, 2012	
	Percent of Payroll	Dollar Amount	Percent of Payroll	Dollar Amount
A. Statutory Contributions – Chapter 354A				
1. Employee Contributions	6.50%	\$ 3,313	6.50%	\$ 3,288
2. Employer Contributions	6.79	3,461	6.79	3,434
3. Supplemental Contributions				
a. 1993 Legislation	<u>1.23</u>	<u>626</u>	<u>1.24</u>	<u>626</u>
4. Total	14.52	7,400	14.53	7,348
B. Required Contributions – Chapter 356				
1. Normal Cost				
A. Retirement Benefits	5.26	2,679	6.23	3,151
B. Disability Benefits	0.13	65	0.12	61
C. Survivor Benefits	0.14	73	0.14	71
D. Deferred Retirement Benefits	0.96	487	0.20	101
E. Refunds	<u>0.00</u>	<u>0</u>	<u>0.91</u>	<u>460</u>
F. Total	6.49	3,304	7.60	3,844
2. Supplemental Contribution Amortization by June 30, 2039 of Unfunded Actuarial Accrued Liability	15.36	7,829	15.04	7,607
3. Allowance for Expenses	1.16	591	1.16	587
4. Total	23.01	11,724	23.80	12,038
C. Contribution Sufficiency/(Deficiency) (A.4. – B.4.)	(8.49)%	\$ (4,324)	(9.27)%	\$ (4,690)

Note: Projected annual payroll for fiscal year beginning on the valuation date:
\$50,973 for Fund actuary and \$50,578 for Milliman.

Actuarial Basis

Actuarial Cost Method

Liabilities and contributions in this report are computed using the Individual Entry Age Normal Cost Method. This method is prescribed by Minnesota Statutes.

The objective under this method is to fund each member's benefits under the Plan as payments which are level as a percentage of salary, starting at original participation date (or employment date), and continuing until the assumed date of retirement, termination, disability or death. For valuation purposes, entry age for each member is determined as the age at valuation minus years of service as of the valuation date.

At any given date, a liability is calculated equal to the contributions which would have been accumulated if this method of funding had always been used, the current plan provisions had always been in place, and all assumptions had been precisely accurate. The difference between this liability and the assets (if any) which are held in the fund is the unfunded liability. The unfunded liability is typically funded over a chosen period in accordance with the amortization schedule.

A detailed description of the calculation follows:

The normal cost for each active member under the assumed retirement age is determined by applying to earnings the level percentage of salary which, if contributed each year from date of entry into the Plan until the assumed retirement (termination, disability or death) date, is sufficient to provide the full value of the benefits expected to be payable.

- The present value of future normal costs is the total of the discounted values of all active members' normal cost, assuming these to be paid in each case from the valuation date until retirement (termination, disability or death) date.
- The present value of projected benefits is calculated as the value of all benefit payments expected to be paid to the Plan's current members, including active and retired members, beneficiaries, and terminated members with vested rights.
- The accrued liability is the excess of the present value of projected benefits over the present value of future normal costs.
- The unfunded liability is the excess of the accrued liability over the assets of the fund, and represents that part of the accrued liability which has not been funded by accumulated past contributions.

Change in Actuarial Cost Method

None

Actuarial Basis

Asset Valuation Method

The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;

The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;

The investment gain or (loss) so determined is recognized over five years at 20% per year;

The asset value is, the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

Actuarial Basis

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. All assumptions are prescribed by Statutes, the LCPR, or the Board of Trustees.

Mortality Rates									
<i>Healthy (Pre and Post Retirement)</i>	Male: RP 2000 annuitant male mortality table set back 3 years with no projected mortality improvement from 2000 to 2012 and generational mortality improvement after 2012. Female: RP 2000 annuitant female mortality table set back 3 years with no projected mortality improvement from 2000 to 2012 and generational mortality improvement after 2012.								
<i>Disabled</i>	Male and Female tables apply:								
	<table><tr><th>Age</th><th>Table</th></tr><tr><td>54 and younger</td><td>Disabled Eligible for Social Security Disability – ERISA Sec. 4044 for 2006.</td></tr><tr><td>55 – 64</td><td>Graded from table for ages 54 and younger to table for ages 65 and older.</td></tr><tr><td>65 and older</td><td>RP 2000 annuitant mortality table set back 3 years with no projected mortality improvement from 2000 to 2012 and generational mortality improvement after 2012.</td></tr></table>	Age	Table	54 and younger	Disabled Eligible for Social Security Disability – ERISA Sec. 4044 for 2006.	55 – 64	Graded from table for ages 54 and younger to table for ages 65 and older.	65 and older	RP 2000 annuitant mortality table set back 3 years with no projected mortality improvement from 2000 to 2012 and generational mortality improvement after 2012.
Age	Table								
54 and younger	Disabled Eligible for Social Security Disability – ERISA Sec. 4044 for 2006.								
55 – 64	Graded from table for ages 54 and younger to table for ages 65 and older.								
65 and older	RP 2000 annuitant mortality table set back 3 years with no projected mortality improvement from 2000 to 2012 and generational mortality improvement after 2012.								
Retirement Rates	Rates are shown for selected ages in the rate table.								
Withdrawal Rates	Select and ultimate rates are based on recent plan experience. Ultimate rates after the third year are shown for sample ages on the page 21. Select rates are as follows: <table><tr><th>First Year</th><th>Second Year</th><th>Third Year</th></tr><tr><td>45%</td><td>20%</td><td>12%</td></tr></table>	First Year	Second Year	Third Year	45%	20%	12%		
First Year	Second Year	Third Year							
45%	20%	12%							
Retirement Age for Inactive Vested Members	Normal retirement age.								
Unknown Data for Members	Active members with missing information were assumed to have the following: Age: 45 Hire date: June 30, 2012								
Percent Married	80% of members are assumed to be married.								
Age of Spouse	Females three years younger than males.								
Net Investment Return	8.00% per annum for the time period after June 30, 2012 through June 30, 2017, and 8.50% per annum thereafter.								
Salary Increases	Reported salary for prior fiscal year, with new hires annualized, increased to current fiscal year and annually for each future year according to the ultimate rate table on the page 21. This table includes a 8-year select period. For service from hire through 7 completed years, a 7.75% salary increase is assumed.								

Actuarial Basis

Summary of Actuarial Assumptions (continued)

Administrative Expenses	Prior year administrative expenses expressed as percentage of prior year projected payroll.
Allowance for Combined Service Annuity	10% load on liabilities for active and deferred vested participants.
Return of Contributions	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Special Consideration	<p>Members in the Old Plan are assumed to receive their retirement benefits from either the Old Plan or New Plan, based on whichever benefit is larger.</p> <p>Direct State aid payments include a portion attributed to redirected "amortization State aid" under 423A.02, Subdivision 3. For fiscal 2012, the amount is assumed to \$280,202.</p> <p>Married Members assumed to elect subsidized joint and survivor form of annuity as follows:</p> <p style="margin-left: 40px;">Males: 30% elect 50% J&S option 40% elect 100% J&S option</p> <p style="margin-left: 40px;">Females: 15% elect 50% J&S option 15% elect 100% J&S option</p>
Post-retirement Increases	<p>Effective July 1, 2010, the law provides for a post-retirement benefit adjustment of CPI-U (up to 5%) when the funding ratio using the actuarial value of assets equals or exceeds 90%. Until that 90% threshold is met, the post-retirement adjustment will operate under a transition schedule, which provides for an adjustment based on the funding ratio using the market value of assets (2% when greater than 90%, 1% when greater than 80%, otherwise 0%).</p> <p>This valuation assumes 0% per annum.</p>
Asset Valuation Method	Market Value, adjusted for amortization obligations receivable at the end of each fiscal year, less a percentage of the Unrecognized Asset Return determined at the close of each of the four preceding fiscal years. Unrecognized Asset Return is the difference between actual net return on Market Value of Assets and the asset return expected during the fiscal year (based on the assumed interest rate employed in the July 1 Actuarial Valuation of the fiscal year). Each year's Unrecognized Asset Return is being amortized over 5 years (20% per year) on a straight-line basis.
Actuarial Cost Method	Entry Age Normal Actuarial Cost Method. Entry Age is calculated as current age minus pension credits. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are expressed as a level percentage of payroll, with Normal Cost determined as if the current benefit provisions had always been in effect.

Actuarial Basis

Summary of Actuarial Assumptions (continued)

Payment on the Unfunded Actuarial Accrued Liability	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 3.50% per annum. The statutory amortization date is June 30, 2039. If the Actuarial Value of Assets exceeds the Actuarial Accrued Liability, the surplus amount shall be amortized over 30 years as a level percentage of payroll.
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Actuarial Basis

Summary of Actuarial Assumptions (continued)

Summary of Rates

Age	Mortality Rates (%)					
	Pre-Retirement*		Post-Retirement*		Post-Disability*	
	Male	Female	Male	Female	Male	Female
20	0.0301%	0.0184%	0.0301%	0.0184%	4.8300%	2.6300%
25	0.0366	0.0194	0.0366	0.0194	4.8300	2.6300
30	0.0382	0.0223	0.0382	0.0223	4.3600	2.5300
35	0.0562	0.0350	0.0562	0.0350	3.2000	2.2700
40	0.0904	0.0554	0.0904	0.0554	2.7100	2.1000
45	0.1215	0.0852	0.1215	0.0852	2.9700	2.1300
50	0.1734	0.1326	0.1734	0.1326	3.4000	2.3500
55	0.2667	0.2018	0.2667	0.2018	4.2000	2.7200
60	0.4693	0.3478	0.4693	0.3478	3.3737	1.9811
65	0.8757	0.6657	0.8757	0.6657	0.8757	0.6657
70	1.6075	1.2163	1.6075	1.2163	1.6075	1.2163

* Does not include generational improvement.

Age	Rate (%)		
	Ultimate Withdrawal	Disability	Salary Scale
20	3.50%	0.00%	6.00%
25	3.25	0.00	6.00
30	3.00	0.00	6.00
35	2.75	0.01	6.00
40	2.50	0.03	5.31
45	2.00	0.06	4.63
50	1.50	0.10	3.94
55	0.75	0.15	3.25
60	0.00	0.21	3.25
65	0.00	0.00	3.25
70	0.00	0.00	0.00

Actuarial Basis

Summary of Actuarial Assumptions (continued)

Summary of Retirement Rates

Rate %			
Old/Tier I			Tier II
Age	Members Not Eligible for Rule of 90	Members Eligible for Rule 90	
55	7.5	30.0	7.5
56	7.5	30.0	7.5
57	7.5	30.0	7.5
58	15.0	30.0	7.5
59	15.0	30.0	7.5
60	25.0	30.0	15.0
61	25.0	30.0	15.0
62	25.0	30.0	15.0
63	30.0	30.0	25.0
64	35.0	35.0	30.0
65	35.0	35.0	30.0
66	40.0	40.0	40.0
67	40.0	40.0	40.0
68	50.0	40.0	50.0
69	50.0	40.0	50.0
70 & Over	100.0	100.0	100.0

Actuarial Basis

Summary of Plan Provisions

This summary of provisions reflects our interpretation of applicable Statutes for purposes of preparing this valuation. This interpretation is not intended to create or rescind any benefit rights in conflict with any Minnesota Statutes.

Plan Year	July 1 through June 30
Eligibility (Old and New Plan)	Licensed full-time and part-time teachers who are employed by the Duluth Public Schools other than a charter school teacher, and eligible licensed staff at Lake Superior College, who have elected to retain their membership in the DTRFA. Also includes any employees of the Retirement Fund Association. Employees in the Old Plan are those first hired before July 1, 1981. Employees in the New Plan, Tier I are those first hired on or after July 1, 1981. Employees in the New Plan, Tier II are those first hired on or after July 1, 1989.
Credited Service (Old and New Plan)	Earned while employed in a covered position and employee contributions are deducted. May also include extended or mid-career leaves of absence, medical leave of absence, sabbatical leave, and military service. Credit for less than a full year is granted on a prorated basis.
Salary (Old Plan and New Plan)	Total Compensation. Excludes any lump-sum annual leave or sick leave payments and lump-sum payments at time of separation from employment.
Average Salary (Old Plan)	Average of the five highest years of annual salary.
Average Salary (New Plan)	Average of the five highest successive years of salary. Average Salary is based on all Credited Service if less than five years.
Retirement (Old Plan)	
<u>Normal Retirement</u>	
<i>Age Requirement</i>	Age 60, and
<i>Service Requirement</i>	10 years of Credited Service.
<i>Amount</i>	1.45% of Average Salary for each year of Credited Service.
<u>Early Retirement</u>	
<i>Age Requirement</i>	Age 55, and
<i>Service Requirement</i>	10 years of Credited Service, or
<i>Age/Service Requirement</i>	The sum of age and Credited Service equals 90, if earlier.
<i>Amount</i>	1.45% of Average Salary for each year of Credited Service with reduction of 0.25% for each month the member is under age 60. No reduction if the sum of age and years of Credited Service equals 90.

Actuarial Basis

Summary of Plan Provisions (continued)

<i>Form of Payment</i>	Life annuity. Actuarially equivalent options are: <ul style="list-style-type: none">(a) 5, 10, 15 or 20-year Certain and Life, or(b) 50% or 100% Joint and Survivor with bounce back feature without additional reduction.(c) Other equivalent options approved by the Board.
<i>Benefit Increases</i>	<u>Annual Cost-of Living Adjustment (COLA):</u> Post-retirement benefit adjustments are based on the Plan's funding ratio as outlined in the assumptions section. Note: A member who is eligible for normal or early benefits under the Old Plan may instead receive a benefit under New Plan Tier I or New Plan Tier II if it is greater than the benefit from the Old Plan.

Retirement (New Plan Tier I)

Normal Retirement

<i>Age/Service Requirement</i>	Members first hired before July 1, 1989: <ul style="list-style-type: none">(a) Age 65, or(b) Age 62 and 30 years of Credited Service.
<i>Amount</i>	1.20% of Average Salary for each of the first ten years of Credited Service and 1.70% of Average Salary for each subsequent year.
<i>Early Retirement</i>	
<i>Age/Service Requirement</i>	<ul style="list-style-type: none">(a) Age 55 and three years (five years, if hired after June 30, 2010) of Credited Service, or(b) Any age with 30 years of Credited Service, or(c) The sum of age and Credited Service equals 90.
<i>Amount</i>	1.20% of Average Salary for the first ten years of Credited Service and 1.70% of Average Salary for each subsequent year with reduction of 0.25% for each month the member is under Normal Retirement Age. No reduction if the sum of age and years of Credited Service equals 90.
<i>Form of Payment</i>	Life annuity. Actuarially equivalent options are: <ul style="list-style-type: none">(a) 5, 10, 15 or 20-year Certain and Life, or(b) 50% or 100% Joint and Survivor with bounce back feature without additional reduction.(c) A larger life annuity before age 62 and reduced thereafter.

Actuarial Basis

Summary of Plan Provisions (continued)

Benefit Increases

Annual Cost-of Living Adjustment (COLA):

Post-retirement benefit adjustments are based on the Plan's funding ratio as outlined in the assumptions section.

Note: A member who is eligible for normal or early benefits under the New Plan Tier I may instead receive a benefit under New Plan Tier II if it is greater than the benefit from New Plan Tier I.

Retirement (New Plan Tier II)

Normal Retirement

Age/Service Requirement

Members first hired before June 30, 1989:

The greater of age 65 or the age eligible for full Social Security retirement benefits but not higher than age 66.

Amount

1.70% of Average Salary for each of Credited Service.

Early Retirement

Age/Service Requirement

Age 55 and three years (five years, if hired after June 30, 2010) of Credited Service.

Amount

1.70% of Average Salary for each year of Credited Service with augmentation to the age eligible for full Social Security retirement benefits at 3.00% per year and actuarial reduction for each month the member is under the Social Security Retirement Age.

Form of Payment

Life annuity. Actuarially equivalent options are:

- (a) 5, 10, 15 or 20-year Certain and Life, or
- (b) 50% or 100% Joint and Survivor with bounce back feature without additional reduction.
- (c) A larger life annuity before age 62 and reduced thereafter.

Benefit Increases

Annual Cost-of Living Adjustment (COLA):

Post-retirement benefit adjustments are based on the Plan's funding ratio as outlined in the assumptions section.

Disability (Old Plan)

Age/Service Requirement

Totally and permanently disabled as a teacher before the age of 60 with five years of Credited Service.

Amount

- (a) Normal Retirement benefit based on Credited Service and Average Salary at disability date without reduction for early commencement. Amount is reduced for Workers' Compensation.
- (b) Payment stops at age 60, or earlier if disability ceases or death occurs.

Form of Payment

Same as for Normal Retirement.

Benefit Increases

Same as for Normal Retirement.

Actuarial Basis

Summary of Plan Provisions (continued)

Disability (New Plan)

<i>Age/Service Requirement</i>	Totally and permanently disabled under Normal Retirement Age with three years (five years, if hired after June 30, 2010) of Credited Service. Also, at least two of the years of Credited Service must have been uninterrupted.
<i>Amount</i>	(a) Normal Retirement benefit based on Credited Service and Average Salary at disability without reduction commencement before retirement age. Benefit is reduced by Workers' Compensation. (b) Payment may begin 90 days after disability and stops at Normal Retirement Age, or earlier if disability ceases or death occurs. Benefits paid while partially employed may be reduced.
<i>Form of Payment</i>	Same as for Normal Retirement.
<i>Benefit Increases</i>	Same as for Normal Retirement.
<u>Retirement After Disability</u>	
<i>Age/Service Requirement</i>	Normal Retirement Age if still totally and permanently disabled.
<i>Amount</i>	Optional annuity continues, otherwise the larger of the disability benefit paid before Normal Retirement Age or the Normal Retirement benefit available at Normal Retirement Age, or an actuarial equivalent optional annuity.
<i>Benefit Increases</i>	Same as for retirement.

Withdrawal (Old Plan)

Refund of Member's

Contributions

<i>Age/Service Requirement</i>	Termination of Teaching Service.
<i>Amount</i>	Member's contributions with 4.00% interest compounded annually.

Deferred Annuity

<i>Age/Service Requirement</i>	Ten years of Credited Service.
<i>Amount</i>	<p>For members hired before July 1, 2006, the benefit computed under law in effect at termination and increased by the following annual percentage:</p> <p>(a) 3.00% until January 1 of the year following attainment of age 55, and</p> <p>(b) 5.00% thereafter until the annuity begins.</p> <p>For members hired after June 30, 2006, the benefit is computed under law in effect at termination and increased by 2.50% annually until the annuity begins.</p> <p>Effective July 1, 2012, the annual augmentation percentage is reduced to 2.00% from the age of termination to the age the annuity begins. The amount is payable as a Normal or Early Retirement.</p>

Actuarial Basis

Summary of Plan Provisions (continued)

Withdrawal (New Plan)

Refund of Member's

Contributions

Age/Service Requirement

Termination of Teaching Service.

Amount

Member's contributions accumulate with 4.00% interest compounded annually.

Deferred Annuity

Age/Service Requirement

Three years (five years, if hired after June 30, 2010) of Credited Service.

Amount

For members hired before July 1, 2006, the benefit is computed under law in effect at termination and increased by the following annual percentage:

- (a) 3.00% until January 1 of the year following attainment of age 55, and
- (b) 5.00% thereafter until the annuity begins.

For members hired after June 30, 2006, the benefit is computed under law in effect at termination and increased by 2.50% for all years.

Effective July 1, 2012, the annual augmentation percentage for all New Plan members is reduced to 2.00% from the age of termination to the age the annuity begins. The amount is payable as a Normal or Early Retirement.

Pre-Retirement Death Benefit (Old Plan)

Age/Service Requirement

None.

Amount

Refund of two times member's contributions accumulated with 4.00% interest compounded annually.

Post-Retirement Death Benefit (Old Plan)

Age/Service Requirement

None.

Amount

Refund the excess of member's contributions over total benefits paid, accumulated with 4.00% interest compounded annually.

Surviving Spouse Benefit (Old Plan)

Optional Annuity I

Age/Service Requirement

Death of active member with ten years of Credited Service:

Amount

In lieu of the Pre-Retirement Death Benefit Refund, an annuity to surviving spouse equivalent to 120% of the refund amount.

Optional Annuity II

Age/Service Requirement

Death of active member who is age 55 with ten years of Credited Service.

Amount

In lieu of the Pre-Retirement Death Benefit Refund or Surviving Spouse Optional Annuity I, spouse may elect survivor portion of the 100% joint and survivor annuity the member could have elected if terminated.

Actuarial Basis

Summary of Plan Provisions (continued)

Pre-Retirement Death Benefit (New Plan)

Surviving Spouse Optional Annuity

Age/Service Requirement

Member who dies before retirement benefits commence with three years (five years, if hired after June 30, 2010) of Credited Service.

Amount

Survivor's payment of the 100% joint and survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to Normal Retirement Age, the benefit is reduced at the early retirement reduction factors, with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.

Benefit Increases

Same as for Normal Retirement.

Refund of Member's Contributions

Age/Service Requirement

Member or former member dies before receiving any disability or retirement benefits, and survivor benefits are not payable.

Amount

Member's contributions with 4.00% interest compounded annually.

Contributions

Member

6.00% of salary. Effective July 1, 2012, 6.50% of salary.

Employer

6.29% of salary. Effective July 1, 2012, 6.79% of salary.

Direct State Aid

\$346,000 per year each October 1, beginning in 2008, plus a redirected "amortization State aid" payment, estimated at \$280,202 for fiscal 2013.

Changes in Plan Provisions

The following Plan changes are reflected in this valuation as described in the 2010 Omnibus Pension Bill:

- For purposes of determining the contribution sufficiency, contribution rates were increased from 6.00% to 6.50% and 6.29% to 6.79% for 2013 and thereafter for employees and employers, respectively.
-

Member Data

Duluth Teachers' Retirement Fund Association

Active Members as of June 30, 2012

<u>Age</u>	<u>Years of Service</u>								<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30+</u>	
<25	16	0	0	0	0	0	0	0	16
25-29	38	16	0	0	0	0	0	0	54
30-34	17	19	22	0	0	0	0	0	58
35-39	20	10	19	32	6	0	0	0	87
40-44	9	18	18	23	36	1	0	0	105
45-49	18	19	16	25	41	24	3	0	146
50-54	8	14	13	18	30	27	23	1	134
55-59	3	16	12	24	38	29	39	25	186
60-64	6	12	5	6	25	20	28	11	113
65+	7	5	2	1	2	3	0	3	23
ALL	142	129	107	129	178	104	93	40	922

Average Annual Earnings

<u>Age</u>	<u>Years of Service</u>								<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30+</u>	
<25	18786	0	0	0	0	0	0	0	18786
25-29	19210	33963	0	0	0	0	0	0	23581
30-34	20532	31854	51496	0	0	0	0	0	35986
35-39	16980	37646	56310	61598	66183	0	0	0	47749
40-44	18379	39741	62566	62487	71199	70078	0	0	57880
45-49	22596	27487	45669	59001	63985	67322	68311	0	51909
50-54	36807	30396	44545	58883	63968	64215	67925	65644	57013
55-59	22271	38974	49363	53295	66624	65792	71667	73655	62569
60-64	23150	28068	48242	60075	61498	68025	67175	79438	59558
65+	18959	37903	89112	101167	65990	69253	0	69121	49944
ALL	20593	33629	52809	59566	65752	66306	69281	74705	52741

Member Data

Duluth Teachers' Retirement Fund Association Service Retirements as of June 30, 2012

Age	Years Retired							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	10	27	0	0	1	0	0	38
60-64	25	127	74	0	0	0	0	226
65-69	6	49	132	99	5	1	1	293
70-74	1	8	35	110	76	0	0	230
75-79	1	3	1	36	117	44	0	202
80-84	0	1	0	2	39	66	46	154
85+	0	1	0	0	2	27	92	122
ALL	43	216	242	247	240	138	139	1265

Average Annual Benefit

Age	Years Retired							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	37093	20882	0	0	7477	0	0	24795
60-64	27830	21449	19421	0	0	0	0	21491
65-69	13083	18323	19645	17424	8712	23348	15052	18349
70-74	1614	12050	14371	19023	18709	0	0	17893
75-79	2080	13178	3044	16501	20340	16225	0	18477
80-84	0	5150	0	30869	18501	17435	16908	17642
85+	0	15038	0	0	31154	19513	13574	15188
ALL	26718	20101	18745	18110	19319	17499	14688	18650

Member Data

Duluth Teachers' Retirement Fund Association

Survivors as of June 30, 2012

Age	Years Since Death							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	3	0	0	0	3
50-54	0	1	1	0	0	0	0	2
55-59	0	4	0	0	0	0	0	4
60-64	0	1	2	1	1	0	1	6
65-69	0	0	1	3	1	1	0	6
70-74	1	0	0	7	8	3	2	21
75-79	0	0	0	0	9	10	4	23
80-84	0	0	0	1	3	9	12	25
85+	0	1	0	0	1	2	20	24
ALL	1	7	4	15	23	25	39	114

Average Annual Benefit

Age	Years Since Death							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	3291	0	0	0	3291
50-54	0	838	543	0	0	0	0	691
55-59	0	16118	0	0	0	0	0	16118
60-64	0	993	5385	18027	15743	0	5682	8536
65-69	0	0	1614	20609	23610	12294	0	16557
70-74	28332	0	0	16676	26949	29628	8658	22231
75-79	0	0	0	0	20035	19617	17091	19341
80-84	0	0	0	19007	19495	15950	16335	16682
85+	0	10379	0	0	2113	18534	13422	13250
ALL	28332	10954	3232	15031	21559	19119	14252	16430

Member Data

Duluth Teachers' Retirement Fund Association

Disability Retirements as of June 30, 2012

Age	Years Disabled							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	1	1	0	0	0	0	0	2
55-59	1	0	2	0	0	0	0	3
60-64	0	2	2	0	0	0	0	4
65-69	0	0	1	0	0	2	0	3
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	2	3	5	0	0	2	0	12

Average Annual Benefit

Age	Years Disabled							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	10486	5999	0	0	0	0	0	8243
55-59	6934	0	9498	0	0	0	0	8643
60-64	0	17028	19892	0	0	0	0	18460
65-69	0	0	12697	0	0	16394	0	15162
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	8710	13351	14296	0	0	16394	0	13478

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