NORTH DAKOTA HIGHWAY PATROLMEN'S RETIREMENT SYSTEM

Actuarial Valuation Report as of July 1, 2011

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SEGAL

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December 13, 2011

Board Members
North Dakota Public Employees Retirement System
Bismarck, North Dakota

Members of the Board:

It is a pleasure to submit this report that presents the results of our actuarial valuation of the North Dakota Highway Patrolmen's Retirement System as of July 1, 2011.

The census information on which our calculations are based and the financial information were provided by the Retirement Office staff. That assistance is gratefully acknowledged. The actuarial calculations were completed under the supervision of Mark Hamwee, FSA, MAAA, Enrolled Actuary.

This actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to meeting with you to review this report and to answering any questions you may have.

Sincerely,

Brad Ramirez, FSA, MAAA, FCA, EA
Consulting Actuary

Mark Hamwee, FSA, MAAA, EA
Vice President & Associate Actuary

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INTRODUCTION

This report summarizes the results of our actuarial valuation as of July 1, 2011. The employer contribution requirements presented on page 20 of the report are based on:

1. The present provisions of the North Dakota Highway Patrolmen's Retirement System;

2. The characteristics of covered active members, inactive non-retired members, pensioners and beneficiaries as of July 1, 2011;

3. The assets of the System as of June 30, 2011; and

4. Actuarial assumptions regarding investment earnings, salary increases, and rates of retirement, disability, death, etc.

The purpose of the actuarial valuation is to determine the contribution sufficient to meet the long-term obligations to the members covered by the North Dakota Highway Patrolmen's Retirement System in accordance with its benefit provisions.

If each of the actuarial assumptions is exactly fulfilled, the true actuarial cost of the System will equal the cost projected by the actuarial calculations. However, this result is never achieved because of the length of time over which projections are made and because of the great number of variables that can affect the emerging costs. The cost, expressed as a percentage of payroll, will increase if the System experiences net actuarial losses and will decrease if the System experiences net actuarial gains.

HIGHLIGHTS

- The present rate of contributions is not sufficient to meet the actuarially determined requirement for 2011-2012, based upon the actuarial assumptions and financing objectives approved by the Board. If unchanged, this difference will further increase the actuarial contribution requirement in future valuations.

- The employer actuarial contribution requirement for 2011-2012 is $2,170,739, or 27.13% of payroll. The statutory rate was 16.70% of payroll as of the valuation date, but is scheduled to increase to 17.70% of payroll after January 1, 2012 and to 18.70% of payroll after January 1, 2013. Scheduled increases in the member contribution rate of 1% of payroll on each of those dates will also act to decrease the employer actuarial contribution requirement. Even if all scheduled statutory contribution rate increases were in effect on the valuation date, the employer contribution requirement would be 25.63% of payroll, or 6.93% more than the ultimate statutory rate of 18.70% of payroll. Last year, prior to the enactment of any statutory contribution rate increases, the actuarially determined rate of 22.54% was greater than the statutory rate of payroll by 5.84% of payroll.

- The increase in the contribution rate deficit this year was primarily due to an investment loss and changes in actuarial assumptions as outlined below.

- The return on the market value of assets for 2010-2011 was 21.16%, and was 13.29% for the previous year.

- The return on the actuarial value of assets for 2010-2011 was 3.33% compared to the investment return assumption of 8.00%. As a result, the System experienced an investment loss of $2.3 million.

- The ratio of the actuarial value of assets to the market value of assets was 93.9%. Last year, this ratio was 110.0%.

- A comparison of this year's funded ratio to the prior year is as follows:

	July 1, 2011	July 1, 2010
Actuarial Value of Assets	$49,479,855	$49,325,610
Actuarial Accrued Liability	67,144,926	61,782,124
Funded Ratio	73.7%	79.8%

- The unrecognized appreciation represents about 6.1% of the market value of assets. A property of the asset smoothing method used by PERS is that the actuarial value of assets will tend to lag behind the market value of assets. This unrecognized appreciation will be recognized over the next five years. The potential impact may be illustrated as follows:

  - If the unrecognized appreciation were recognized immediately in the actuarial value of assets, the funded percentage would increase from 73.7% to 78.5%.

- If the unrecognized appreciation were recognized immediately in the actuarial value of assets, the actuarial contribution requirement would decrease from 27.13% of payroll to 24.31% of payroll.

- The actuarial valuation report as of July 1, 2011 is based on financial data as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected.

- Based on the Actuarial Experience Study completed in early 2010, the Board approved several changes to the actuarial assumptions. This resulted in an increase in the actuarially determined contribution rate of 2.44% of payroll. See Exhibits II and III of the Actuarial Valuation Certificate for a complete summary of assumptions and changes in assumptions.

- The only changes in the plan provisions were the increases in the statutory contribution rate as shown below. See Exhibit IV of the Actuarial Valuation Certificate for a complete summary of plan provisions.

  Member contributions as a percent of monthly salary:

Current:	10.30%
Effective January 2012:	11.30%
Effective January 2013:	12.30%

  Member contributions earn interest at an annual rate of 7.50% compounded monthly.

  State contributions as a percent of monthly salary for each participating member:

Current:	16.70%
Effective January 2012:	17.70%
Effective January 2013:	18.70%

MEMBER CHARACTERISTICS

Last year, as of July 1, 2010, there were 139 covered active members, four terminated members eligible for a deferred vested benefit, and one terminated member eligible for a refund of his accumulated contributions. During the year, five members terminated employment and one member retired. There were no new members in fiscal year 2010-2011. Therefore, there were 133 active Highway Patrolmen covered under the provisions of the System as of July 1, 2011. The significant age, service, salary and accumulated contribution information for these members is summarized below along with comparative figures from the preceding actuarial valuation.

	As of July 1, 2011	As of July 1, 2010
Data for active members:		
Eligible for immediate retirement benefits	12	9
Vested (not eligible for immediate retirement)	53	54
Non-vested	68	76
Total*	133	139
Average age	37.7	36.9
Average years of service (excluding service before transfer)	11.3	10.4
Average annual salary	$60,168	$55,666
Average accumulated contributions	87,026	75,370

* Excludes 10 members with split service in the Highway Patrolmen's System and the Main System, and currently in the Main System.

For the 133 members continuing in active service from last year, average salaries increased by 7.63%. The average service increased by 0.9 years since last year. Distributions of active employees by age, service (excluding service before transfer), and salary are presented in Tables 1 and 2.

Ten members from the Highway Patrol continue to be active in PERS; 23 members from PERS are active members in the Highway Patrol. Liabilities for these members are carried in both systems based on their service in that system.

Five terminated members are eligible for a deferred vested benefit and four terminated members are due refunds.

TABLE 1

Census of Members in Active Service on July 1, 2011
by Nearest Age and Years of Employment

		Years of Employment					
Nearest Age	Total	Under 5	5 - 9	10 - 14	15 - 19	20 - 24	25 & Over
Total	133	40	32	18	16	19	8
20 – 24	3	3	-	-	-	-	-
25 – 29	26	20	6	-	-	-	-
30 - 34	25	7	13	5	-	-	-
35 - 39	26	5	10	7	4	-	-
40 - 44	24	4	2	5	8	5	-
45 - 49	19	1	1	1	3	10	3
50 - 54	10	-	-	-	1	4	5
55 & over	-	-	-	-	-	-	-

TABLE 2

Census of Members in Active Service on July 1, 2011
by Nearest Age and Actual Salary

		Actual Salary							
Nearest Age	Total	Under $30,000	$30,000-$34,999	$35,000-$39,999	$40,000-$44,999	$45,000-$49,999	$50,000-$54,999	$55,000-$59,999	$60,000 & Over
Total	133	-	-	1	2	38	20	37	35
20 - 24	3	-	-	-	-	3	-	-	-
25 - 29	26	-	-	-	1	19	5	1	-
30 - 34	25	-	-	-	-	7	9	5	4
35 - 39	26	-	-	1	1	3	5	9	7
40 - 44	24	-	-	-	-	5	-	9	10
45 - 49	19	-	-	-	-	1	1	8	9
50 - 54	10	-	-	-	-	-	-	5	5
55 & over	-	-	-	-	-	-	-	-	-

BENEFIT EXPERIENCE

There were 87 pensioners (including four disabled pensioners) and 26 surviving spouses receiving benefits as of July 1, 2010. During the year ended June 30, 2011, 1 member was awarded a retirement pension and there was one additional alternate payee resulting from a qualified domestic relations order (counted as a beneficiary). Therefore, there were 88 pensioners (including four disabled pensioners) and 27 surviving spouses receiving benefits as of July 1, 2011. Key statistics on pensioners and beneficiaries are shown below.

	July 1, 2011	July 1, 2010
Number of pensioners and beneficiaries	115	113
Annualized benefits in force	$3,560,532	$3,502,382
Average monthly benefit	$2,580	$2,583
Average age	67.2	66.4

Tables 3 and 4 summarize the census data for pensioners and beneficiaries. In the year ended June 30, 2011, benefit payments totaled $3,568,301, including refund payments of $37,156. In the year ended June 30, 2010, benefit payments were $3,402,152.

TABLE 3

Pensions in Force on July 1, 2011
by Type of Recipient and Monthly Amount

Monthly Amount	Total	Pensioner	Beneficiary	Disabled
Total	115	84	27	4
Under $499	10	1	9	-
500– 999	7	1	6	-
1,000– 1,499	12	2	9	1
1,500 – 1,999	3	2	1	-
2,000 – 2,499	20	17	1	2
2,500 – 2,999	19	17	1	1
3,000 – 3,499	18	18	-	-
3,500 – 3,999	9	9	-	-
4,000 – 4,499	9	9	-	-
4,500 – 4,999	4	4	-	-
5,000 & Over	4	4	-	-

TABLE 4

Pensions in Force on July 1, 2011
by Type of Recipient and Nearest Age

Nearest Age	Total	Pensioner	Beneficiary	Disabled
Total	115	84	27	4
Under 55	14	7	3	4
55 - 59	21	21	-	-
60 - 64	21	17	4	-
65 - 69	14	12	2	-
70 - 74	13	7	6	-
75 - 79	13	11	2	-
80 - 84	14	7	7	-
85 - 89	3	1	2	-
90 & over	2	1	1	-

ASSETS

Market Value of Assets

The combined market value of net assets of the North Dakota Public Employees Retirement System (PERS) and the Highway Patrolmen's Retirement System (HPRS) was $1,810,762,019 as of June 30, 2011, compared to $1,519,023,138 last year. This year's combined market value represents an increase of 19.21% over the market value one year earlier.

The market value of net assets attributable to the Highway Patrolmen's Retirement System as of July 1, 2011 was $52,705,421 compared to $44,838,156 as of July 1, 2010. The rate of return on a market value basis for the HPRS Fund was 21.16% for the year ended June 30, 2011.

Actuarial Value of Assets

The actuarial value of assets are determined as follows:

> Market appreciation and depreciation are spread over five years beginning with the year of occurrence. Interest and dividends are recognized immediately. This procedure results in recognition of all changes in market value over a five-year period. A characteristic of this asset valuation method is that, over time, it is more likely than not to produce an actuarial value of assets that is less than the market value of assets.

The above procedure is applied to the combined assets of PERS and HPRS Retirement Income Funds to determine the combined actuarial value of assets. The combined actuarial value was $1,699,943,566 as of June 30, 2011. The determination of the combined actuarial asset value is shown in Table 5. This table shows that there is approximately $111 million of appreciation that will be recognized in future years.

Table 6 summarizes the combined investment results over the previous ten-year period. Over this period, the earnings of $712,541,900 on an actuarial value basis represented an average annual return of 5.15%. For the 2010-2011 year, the actuarial rate of return on the combined assets was 3.31%.

The total actuarial value of assets is allocated to PERS and HPRS in proportion to the reported market value of assets. This allocation is illustrated in Table 7 and results in an actuarial value of assets for HPRS as of July 1, 2011 of $49,479,855. Last year's actuarial value of assets was $49,325,610. On an actuarial basis, the rate of return on the HPRS Fund was 3.33% for the year ended June 30, 2011.

Chart 1 on page 12 is a graph showing the historical asset values for the HPRS Fund on both an actuarial and market value basis. A summary of income and disbursements for 2011 and 2010 on an actuarial value basis is given in Table 8, and a summary statement of assets is shown in Table 9 for HPRS. The progress of the HPRS Fund for the last ten years is provided in Table 10. It shows that the actuarial value of assets has increased slightly following two years of decreases. Contributions and benefit payments have increased consistently over the period.

A picture of the financial development of the HPRS Fund over the last ten years is provided in Chart 2 on page 17. It shows that benefit payments and expenses currently exceed and continue to grow at a faster pace than contributions. However, during the past ten years overall, the investment income has offset this deficit and served to increase the assets of the System.

Investment results on an actuarial value basis are used to determine whether investment experience is meeting the System's actuarially assumed return. They do not, however, necessarily indicate the relative success of the System's investment program. Comparisons of performance with other funds, investment institutions, and market indices are generally based on rates of return that reflect market changes in full.

Investment Return

The investment returns for the last ten years for the combined PERS and HPRS fund are as follows:

Year Ending June 30	Market Value	Actuarial Value
2002	(6.94%)	3.91%
2003	5.19	2.18
2004	16.65	3.16
2005	14.17	4.36
2006	12.04	7.79
2007	19.63	15.84
2008	(5.21)	8.51
2009	(24.05)	1.72
2010	13.25	1.48
2011	21.09	3.31

The above values demonstrate the fact that the volatility of market value returns is reduced by using an actuarial value of assets. Chart 3 on page 18 illustrates this smoothing effect. By using an actuarial value that reduces the year-to-year fluctuations in investment return, year-to-year fluctuations in contribution requirements are minimized.

Rates of investment return on the market value basis include all capital appreciation and depreciation. The returns on the actuarial value reflect only a portion of the capital appreciation and depreciation based on the adopted asset valuation method.

TABLE 5

Determination of Actuarial Value of Assets (for PERS and HPRS) as of June 30, 2011 and 2010

		June 30, 2011		June 30, 2010	
Year Ending	Total Appreciation (Depreciation)	Percent Deferred	Amount Deferred	Percent Deferred	Amount Deferred
June 30, 2007	$285,031,438	0%	$0	20%	$57,006,288
June 30, 2008	(133,303,450)	20%	(26,660,690)	40%	(53,321,380)
June 30, 2009	(463,523,678)	40%	(185,409,471)	60%	(278,114,207)
June 30, 2010	153,004,660	60%	91,802,796	80%	122,403,728
June 30, 2011	288,857,273	80%	231,085,818	N/A	0
Total Deferred as of Valuation Date			$110,818,453		($152,025,571)
(a) Total Appreciation (Depreciation) for last five Plan Years			130,066,243		(6,687,465)
(b) Write-Up/(Down) Amount for the year - equals 20% of (a)			26,013,248		(1,337,493)

	June 30, 2011	June 30, 2010
Market Value of Assets	$1,810,762,019	$1,519,023,138
Less: Deferred Appreciation (Depreciation)	110,818,453	(152,025,571)
Actuarial value of assets	$1,699,943,566	$1,671,048,709
Actuarial Value as a Percent of Market Value	93.9%	110.0%

Chart 1
Value of Assets (HPRS)

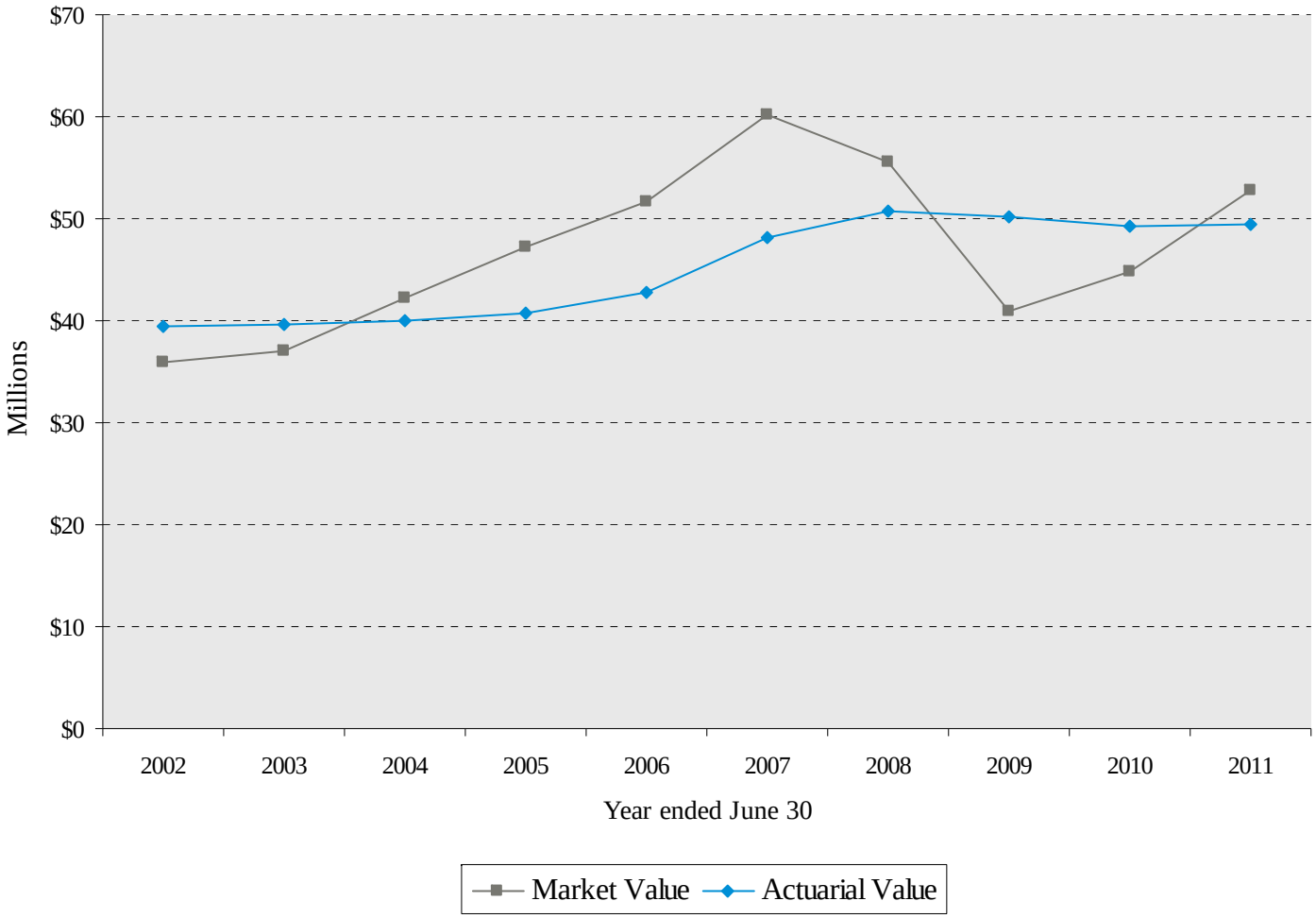


TABLE 6

Summary of Combined Investment Results for PERS and HPRS on Actuarial Value of Assets

Year Ended June 30	Net Interest and Dividend Income*		Other Income**		Total Net Investment Income	
	Amount	Yield	Amount	Yield	Amount	Yield
2002	$35,077,400	3.06%	$9,694,500	0.85%	$44,771,900	3.91%
2003	33,595,900	2.84	(7,793,200)	(0.66)	25,802,700	2.18
2004	30,464,800	2.54	7,398,200	0.62	37,863,000	3.16
2005	29,115,600	2.38	24,276,800	1.98	53,392,400	4.36
2006	24,410,600	1.93	73,910,900	5.86	98,321,500	7.79
2007	34,727,000	2.58	178,771,700	13.26	213,498,700	15.84
2008	32,819,700	2.13	98,332,000	6.38	131,151,700	8.51
2009	29,260,400	1.77	(964,400)	(0.05)	28,296,000	1.72
2010	25,938,200	1.57	(1,337,500)	(0.09)	24,600,700	1.48
2011	28,830,100	1.74	26,013,200	1.57	54,843,300	3.31
Total for Last Ten Years	$304,239,700		$408,302,200		$712,541,900	
Average Yield for last Ten Years					5.15%	

* Net of investment expenses.
** Includes write-up (down).

TABLE 7

Allocation of Combined (PERS and HPRS) Actuarial Value of Assets

	July 1, 2011		July 1, 2010	
	Market Value	Actuarial Value	Market Value	Actuarial Value
PERS Main System	$1,708,264,257	$1,603,718,656	$1,433,343,720	$1,576,794,397
PERS Judges	32,368,881	30,387,909	26,895,688	29,587,439
PERS National Guard	2,315,331	2,173,633	1,900,428	2,090,625
PERS Law Enforcement with prior Main service	14,590,482	13,697,546	11,737,147	12,911,814
PERS Law Enforcement without prior Main service	517,647	485,967	307,999	338,824
PERS Combined	$1,758,056,598	$1,650,463,711	$1,474,184,982	$1,621,723,099
Highway Patrol	52,705,421	49,479,855	44,838,156	49,325,610
Total	$1,810,762,019	$1,699,943,566	$1,519,023,138	$1,671,048,709

Note: Allocation of the actuarial value of assets is in proportion to the market value of assets.

TABLE 8

Summary Statement of Income and Disbursements for HPRS Fund
for the Years Ended June 30, 2011 and 2010
(Actuarial Value Basis)

	Year Ended June 30, 2011	Year Ended June 30, 2010
Contribution Income:		
Employer Contributions	$ 1,285,699	$ 1,196,562
Member Contributions	793,028	741,271
Service Credit Repurchases	46,844	0
Total Contribution Income	$ 2,125,571	$ 1,937,833
Less: Administrative Expenses	(22,734)	(18,154)
Net Contribution Income	$ 2,102,837	$ 1,919,679
Investment Income:		
Interest and Dividends	$ 1,049,129	$ 964,213
Less: Investment Expenses	(202,243)	(189,360)
Net Interest and Dividends	$ 846,886	$ 774,853
Write-up of Assets	772,823	(163,906)
Net Investment Income	$ 1,619,709	$ 610,947
Total Income Available for Benefit Payments and Reserves	$ 3,722,546	$ 2,530,626
Benefit Payments:		
Pension Benefits	$ (3,531,145)	$ (3,402,021)
Refunds	(37,156)	(131)
Total Benefit Payments	$ (3,568,301)	$ (3,402,152)
Addition to Reserve for Future Benefit Payments	$ 154,245	$ (871,526)
Actuarial Value of Assets, Start of Year	49,325,610	50,197,136
Actuarial Value of Assets, End of Year	$ 49,479,855	$ 49,325,610

TABLE 9

Summary Statement of Assets for HPRS Fund
(based on unaudited financial statements)
for the Years Ended June 30, 2011 and 2010

	Year Ended June 30, 2011		Year Ended June 30, 2010	
Cash		$0		$0
Receivables				
Contribution receivable	$173,431		$174,168	
Interest receivable	79,891		73,757	
Total receivables		253,322		247,925
Investments				
Domestic equities	$21,133,697		$16,264,408	
International equities	7,878,261		5,947,939	
International fixed income	2,555,551		2,553,189	
Domestic fixed income	15,325,042		15,194,703	
Real estate	2,969,758		2,175,128	
Alternative investments	1,840,724		1,872,282	
Invested cash	756,840		585,849	
Total investments		52,459,873		44,593,498
Securities lending collateral		0		278,611
Software (not in production)		1,485		27,820
Software (net of amortization)		28,685		0
Total assets		52,743,365		45,147,854
Liabilities				
Due to fiduciary funds	(37,944)		(31,087)	
Securities lending collateral	0		(278,611)	
Total liabilities		(37,944)		(309,698)
Net assets at market value		$52,705,421		$44,838,156
Net assets at actuarial value		$49,479,855		$49,325,610

TABLE 10

Progress of the HPRS Fund through June 30, 2011
(Actuarial Value Basis)

Year Ended June 30	Employer Contributions	Member Contributions	Administrative Expenses	Net Investment Income	Benefit Payments	Fund at End of Year
2001						$38,787,052
2002	$814,035	$501,850	$15,919	$1,467,287	$2,050,607	39,503,698
2003	833,074	513,812	16,469	792,875	2,063,483	39,563,507
2004	844,241	520,700	16,562	1,268,080	2,222,645	39,957,321
2005	867,803	535,233	16,058	1,799,734	2,447,165	40,696,868
2006	931,206	574,341	17,470	3,235,491	2,662,076	42,758,360
2007	960,487	592,398	19,410	6,854,855	2,978,776	48,167,914
2008	1,058,825	649,861	18,364	4,162,228	3,211,580	50,808,884
2009	1,122,720	692,320	19,141	786,522	3,194,169	50,197,136
2010	1,196,562	741,271	18,154	610,947	3,402,152	49,325,610
2011	1,285,699	839,872	22,734	1,619,709	3,568,301	49,479,855
Total for last ten years	$9,914,652	$6,161,658	$180,281	$22,597,728	$27,800,954	

Chart 2
Income and Disbursements for HPRS

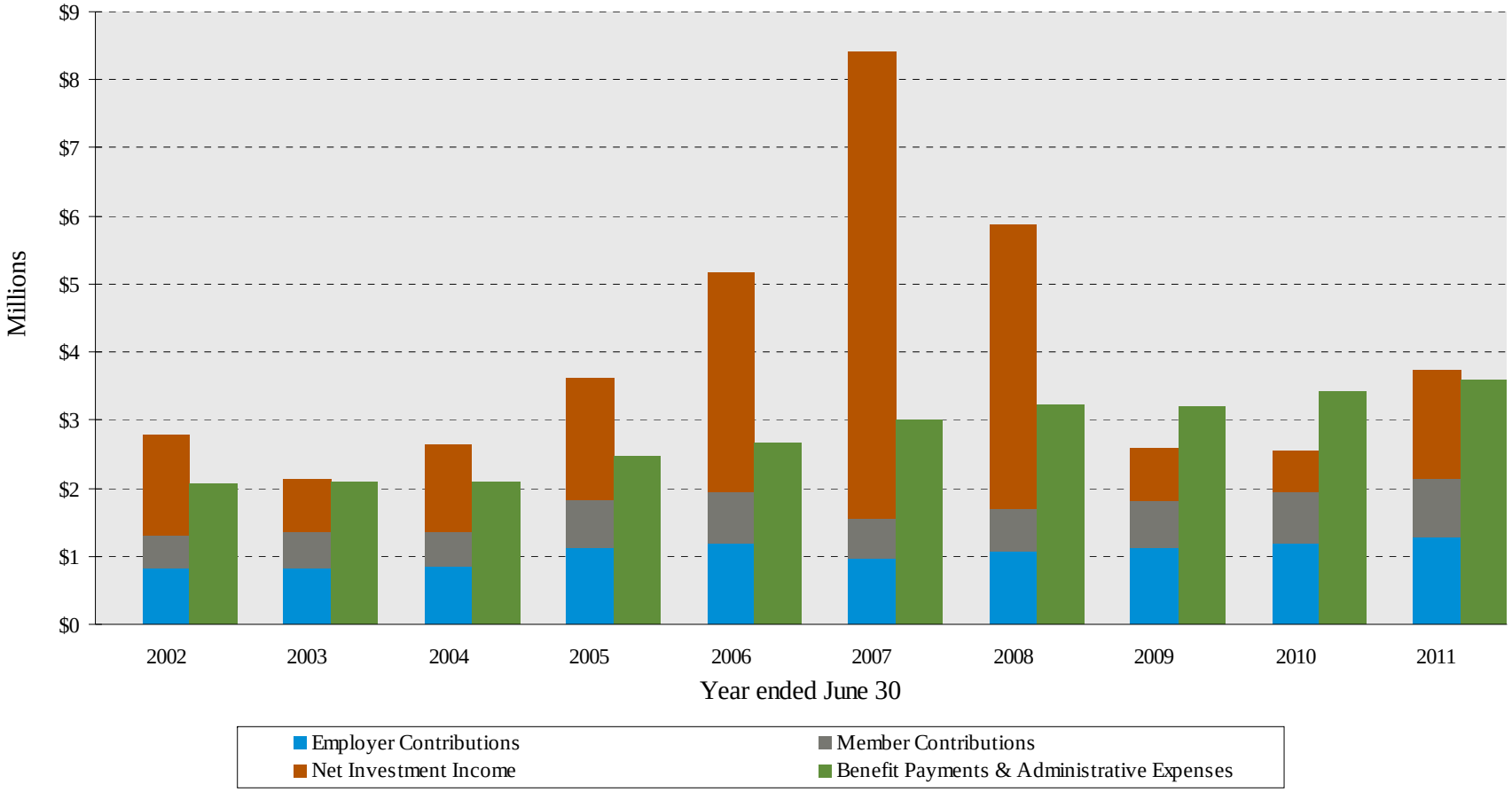
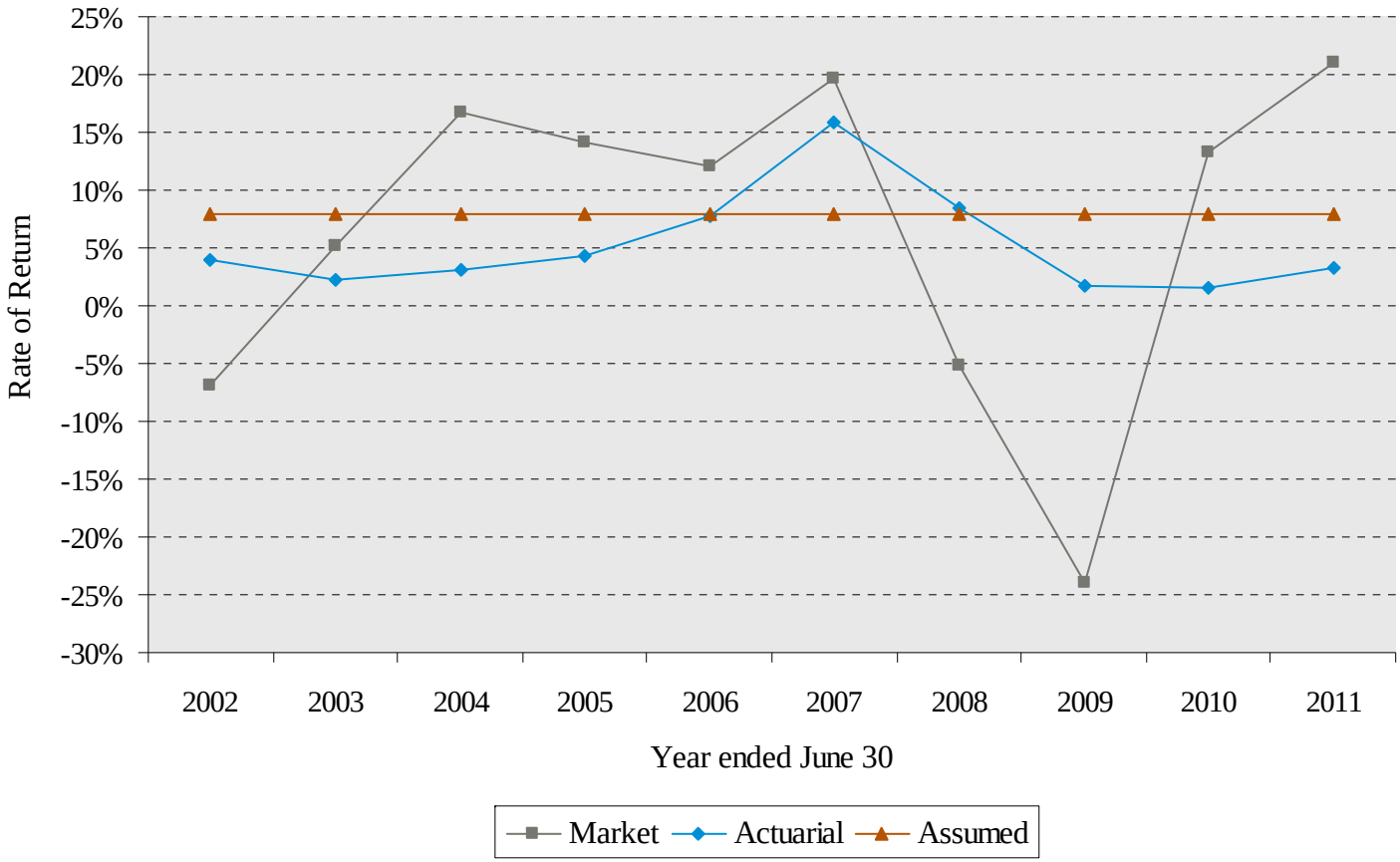


Chart 3

Investment Returns

(PERS and HPRS Combined)



RESULTS OF ACTUARIAL VALUATION

The contribution requirement consists of the normal cost, administrative expense allowance, plus the cost of amortizing the unfunded actuarial accrued liability over a scheduled period of years. The Board has adopted an open amortization period of 20 years with increasing payments. The calculated employer contribution requirements on this basis for fiscal year 2011-2012 are shown below as a dollar amount and as a percentage of the covered payroll of contributing participants.

The components of the actuarial contribution requirement are as follows:

	Amount for 2011 – 2012	Percentage of Payroll
Total normal cost	$1,784,142	22.30%
Less member contributions	(864,253)	(10.80)
Net employer normal cost	$919,889	11.50%
Administrative expense allowance	18,000	0.22
Amortization payment	1,232,850	15.41
Total employer contribution	$2,170,739	27.13%

Covered payroll is $8,002,340 for 133 active members.

The total statutory contribution rate is 27.00% of payroll (10.30% for the member and 16.70% for the employer) as of July 1, 2011, but increases of 2.00% of payroll are scheduled January 1, 2012 and January 1, 2013, with the member and employer each being responsible for one-half of the increase. Compared to the ultimate statutory employer rate of 18.70%, and taking into account the ultimate statutory member rate of 12.30%, the plan has a deficit of 6.93% of payroll. This results in an infinite effective amortization period, since the contribution net of normal cost and administrative expenses is never projected to exceed interest on the Unfunded Actuarial Accrued Liability.

If deferred asset appreciation were taken into account on the valuation date, the effective amortization period would be 39.9 years.

A reconciliation of the change in cost rate since the previous valuation follows:

	As a Percentage of Payroll	Estimated Annual Dollar Cost[1]
Employer cost rate as of July 1, 2010	22.54%	$1,744,270
Investment loss	1.98%	158,265
Contribution loss	0.42%	33,434
Plan change[2]	(0.43%)	(34,418)
Assumption change	2.44%	196,966
Plan experience during the year[3]	0.71%	114,458
Effect of maintaining 20-year amortization schedule	(0.53%)	(42,236)
Employer cost rate as of July 1, 2011	27.13%	$2,170,739

[1] *Based on payroll for each valuation date shown.*

[2] *The scheduled 2.00% of payroll increase in the member contribution rate will ultimately decrease the employer cost rate by 1.93% of payroll, but only one fourth of the increase is reflected in the projected contributions for the 2011-2012 plan year.*

[3] *Includes 0.30% increase for retiree mortality loss, 0.28% increase for salary loss as well as the effect of other differences in actual versus expected experience including disability, withdrawal and retirement experience.*

The development of the unfunded/(surplus) actuarial accrued liability for the year ended June 30, 2011 is as follows:

1. Unfunded/(Surplus) actuarial accrued liability as of July 1, 2010		$12,456,514
2. Normal cost at beginning of year		1,593,392
3. Contributions		(2,125,571)
4. Assumed administrative expenses		16,000
5. Interest		1,039,609
6. Expected unfunded/(surplus) actuarial accrued liability – equals sum of (1) through (5)		$12,979,944
7. Changes due to:		
(a) Loss on investments	$2,267,721	
(b) Loss on contributions less than expected under funding policy	479,063	
(c) Loss on individual salary increases	325,304	
(d) Loss on retiree mortality	339,208	
(e) Change in assumptions	1,463,119	
(f) Loss on administrative expenses	6,734	
(g) (Gain)/Loss on other plan experience	(196,022)	
(h) Total changes – equals (sum of 7(a) through 7(g))		$4,685,127
8. Unfunded/(Surplus) actuarial accrued liability as of July 1, 2011 – equals (6) plus (7h)		$17,665,071

INFORMATION REQUIRED BY GASB

Governmental Accounting Standards Board (GASB) reporting information provides standardized information for comparative purposes of governmental pension plans. This information allows a reader of the financial statements to compare the funding status of one governmental plan to another on relatively equal terms.

Table 11 shows the schedule of funding progress and includes the Plan's funded ratio.

Table 12 shows the Annual Required Contribution (ARC), Annual Pension Cost (APC) and the Net Pension Obligation (NPO) for the prior six fiscal years ending June 30, 2011.

Chart 4 graphs the funded ratios under the GASB standard for the last ten years. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the plan as calculated under GASB. High ratios indicate a well-funded plan with assets sufficient to cover the Plan's accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

Funded ratios change over time due to several factors. These factors include the level of contributions, actuarial experience (including investment returns), plan amendments, and changes in actuarial assumptions.

Table 11

Supplementary Information Required by GASB – Schedule of Funding Progress

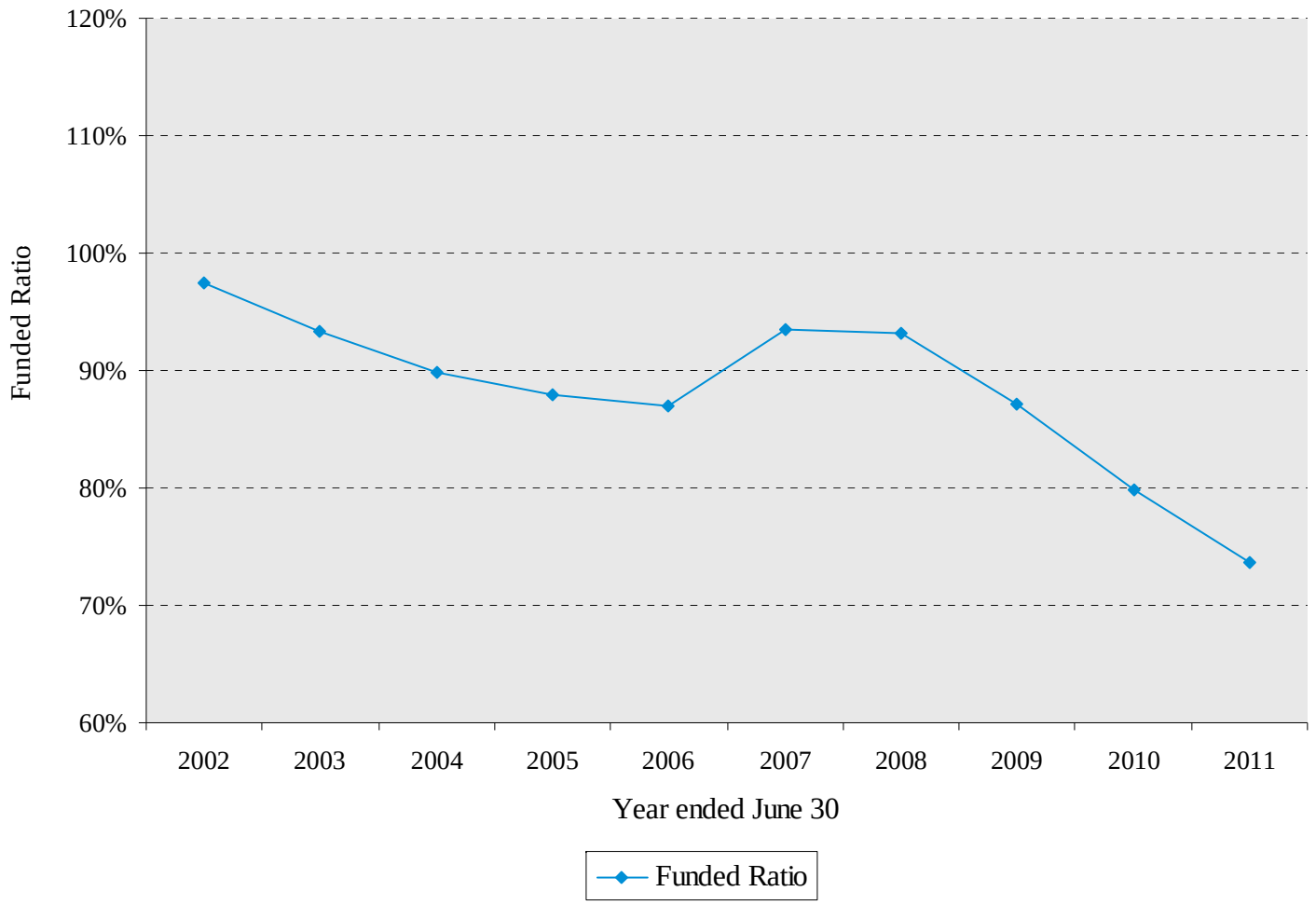
Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) – (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) – (a)] / (c)
07/01/2006	$42,758,360	$49,127,046	$6,368,686	87.0%	$5,688,205	112.0%
07/01/2007	48,167,914	51,536,518	3,368,604	93.5%	6,128,867	55.0%
07/01/2008	50,808,884	54,558,943	3,750,059	93.1%	6,508,644	57.6%
07/01/2009	50,197,136	57,555,716	7,358,580	87.2%	7,009,297	105.0%
07/01/2010	49,325,610	61,782,124	12,456,514	79.8%	7,737,624	161.0%
07/01/2011	49,479,855	67,144,926	17,665,071	73.7%	8,002,340	220.7%

Table 12

Development of the Net Pension Obligation (NPO) and the Annual Required Contribution (ARC) Pursuant to GASB 27

Plan Year Ended June 30	Employer Annual Required Contribution (a)	Employer Amount Contributed (b)	Interest on NPO (h) x 8.0% (c)	ARC Adjustment (h) / (e) (d)	Amortization Factor (e)	Pension Cost (a) + (c) – (d) (f)	Change in NPO (f) – (b) (g)	NPO Balance NPO + (g) (h)
2006	$904,817	$931,206	($51,324)	($44,774)	14.3286	$898,267	($32,939)	($674,484)
2007	1,076,146	960,487	(53,959)	(47,072)	14.3286	1,069,259	108,772	(565,712)
2008	905,591	1,058,825	(45,257)	(39,481)	14.3286	899,815	(159,010)	(724,722)
2009	1,025,737	1,122,720	(57,978)	(50,579)	14.3286	1,018,338	(104,382)	(829,104)
2010	1,312,591	1,196,562	(66,328)	(57,864)	14.3286	1,304,127	107,565	(721,539)
2011	1,744,270	1,285,699	(57,723)	(50,357)	14.3286	1,736,904	451,205	(270,335)

Chart 4
Funded Ratio (HPRS)



ACTUARIAL ASSUMPTIONS AND COST METHODS

The actuarial assumptions and cost methods used in the actuarial valuation as of July 1, 2011 have been updated since the previous valuation. A summary of the actuarial assumptions and cost methods follows. Details can be found in Exhibit II. Assumptions that have changed since the previous valuation can be found in Exhibit III.

Investment Yield

The actuarial calculations are based on the assumption that the investment return on the actuarial value of assets of the System will be 8.00% per year, net of investment expenses.

Salary Increases

Because the retirement benefits provided by the System are based on a member's final average salary, increases in salaries affect the employer's contribution requirements. A salary scale is used in an actuarial valuation to project each member's future salary increases.

During each of the first five years of service, the assumed salary increase depends on the number of years of service. After five years of service, salary increases are age-related.

Inflation

The assumed inflation rate is 3.50% per annum.

Payroll Growth

The assumed payroll growth rate is 4.50% per annum.

Age at Retirement

Retirement rates reflect the expected percentage of members who will retire at each age. From ages 50 to 54, 25% of the members who are not eligible for early retirement under the Rule of 80 are assumed to retire each year. In the first year of eligibility for unreduced retirement (age 55 or Rule of 80) 75% of the members are assumed to retire. Beyond that first year of eligibility for unreduced retirement, 100% of members are assumed to retire.

Those retiring with a reduced benefit are assumed to delay commencement until they satisfy the Rule of 80 if that is more valuable.

Inactive vested members eligible for deferred benefits are assumed to retire at age 55.

Withdrawal Rates Before Retirement

Withdrawal rates used in this actuarial valuation are intended to reflect the percentage of employees who will leave service at each age prior to retirement for reasons other than death or disability.

During the first year of service the assumed withdrawal rate is 10%. For each of the next four years of service, the assumed withdrawal rate is 5% per year. After five years of service, the assumed withdrawal rate is 2.5% per year for those under age 35 and 1% per year for those age 35 and older. No withdrawal is assumed once the employee has reached eligibility for early retirement.

Disability Incidence Rates Before Retirement

Disability rates used in this actuarial valuation are intended to reflect the percentage of employees who will leave service at each age prior to retirement due to disability. The assumed disability incidence rates increase from 0.05% at age 25 to 0.55% at age 55.

Mortality Rates

The reserve required to pay a member's retirement benefits depends on the period over which payments will be received. The valuation uses the RP 2000 Combined Healthy Mortality Table set back one year for healthy members and the RP 2000 Disabled Retiree Mortality Table set back one for males (not set back for females) for disabled members. The table below shows sample mortality rates and life expectancies underlying the healthy mortality tables.

	Retired Members			
	Males		Females	
Age	Deaths per 1,000 Lives	Expected Number of Years of Life Remaining	Deaths per 1,000 Lives	Expected Number of Years of Life Remaining
55	3.2	26.6	2.4	29.3
60	5.9	22.1	4.4	24.8
65	11.3	17.9	8.6	20.4
70	19.8	14.1	14.9	16.5
75	33.9	10.7	25.5	12.9
80	57.9	7.8	41.5	9.8
85	99.8	5.4	69.5	7.1

Administrative Expenses

Annual administrative expenses are assumed to be $18,000.

Marital Status for Non-Retired Members

At retirement or death, 90% of non-retired members are assumed to have spouses. Males are assumed to be three years older than their female spouses.

Valuation of Assets

Investments are carried at an adjusted market value. The net market appreciation (depreciation) is spread over five years in equal dollar amounts, beginning with the year of occurrence. The actuarial value of assets is the market value less deferred appreciation (depreciation). A characteristic of this asset valuation method is that, over time, it is more likely than not to produce an actuarial value of assets that is less than the market value of assets.

Actuarial Cost Method

The System is funded using the Entry Age Normal Actuarial Cost Method. This method produces costs that will remain relatively level as a percentage of covered payroll.

Under the Entry Age Normal Method, the total contribution requirement has three components - an annual normal cost, an allowance for administrative expenses and a payment with respect to the unfunded actuarial accrued liability. The annual normal cost is calculated for each member as the level percentage of pay required over the member's period of covered employment to pay the total expected benefits, with the normal cost determined as if the current benefit accrual rate had always been in effect. If the actuarial assumptions are met, the total normal cost rate will remain level as a percentage of payroll.

The normal cost payments are sufficient to finance the benefit program only if there are no changes in plan design and all actuarial assumptions are realized. To the extent that actual experience is less favorable than assumed, additional liabilities not funded through normal cost payments arise. Also, benefit liberalizations that improve earned benefits or benefit eligibility produce additional liabilities. The Board has adopted a policy of calculating an amortization payment for the Unfunded Actuarial Accrued Liability (UAAL) by using an open period of 20 years. The annual payments are determined as a level percent of payroll, with payroll expected to increase 4.50% per year. This results in a payment towards the UAAL that is less than interest on the UAAL. Under this method, the UAAL would grow from year to year even if the actuarial required contribution was made and all actuarial assumptions were met.

Actuarial Valuation Certificate

December 13, 2011

NORTH DAKOTA HIGHWAY PATROLMEN'S RETIREMENT SYSTEM

This is to certify that we have prepared an Actuarial Valuation of the System as of July 1, 2011 in accordance with generally accepted actuarial principles and practices.

The certificate contains the following attached exhibits:

I. Actuarial Valuation Results

II. Actuarial Assumptions and Cost Methods

III. Changes in Actuarial Assumptions and Cost Methods

IV. Summary of Plan Provisions

V. Changes in Plan Provisions

The valuation was based on information supplied by the Retirement Office with respect to member and financial data. We have not verified, and customarily would not verify, such information but we have no reason to doubt its substantial accuracy.

To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate and in our opinion each individual assumption used (a) is reasonably related to the experience of the System and to reasonable expectations and (b) represents our best estimate of anticipated experience under the System.

We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We are available to provide further information or to answer any questions regarding the report.

Brad Ramirez, FSA, MAAA, FCA, EA
Consulting Actuary

Mark Hamwee, FSA, MAAA, EA
Vice President & Associate Actuary

Kurt Schneider, ASA, MAAA, EA
Associate Actuary

EXHIBIT I

ACTUARIAL VALUATION RESULTS

1.	Actuarial accrued liability on July 1, 2011:		
	a. Active members	$29,741,365	
	b. Retired members and beneficiaries	36,030,468	
	c. Inactive non-retired members	1,373,093	
	d. Total		$67,144,926
2.	Assets at actuarial value ($52,705,421 at market value)		49,479,855
3.	Unfunded (Surplus) actuarial accrued liability - equals (1) minus (2)		17,665,071
4.	Member and employer normal cost for ensuing year*		1,784,142
5.	Estimated annual salaries of covered members		8,002,340
6.	Member normal cost equals - 10.8%** of (5)		864,253
7.	Employer normal cost for ensuing year - equals (4) minus (6)		919,889
8.	Amortization payment - equals 20-year amortization of item (3) as a level percent of aggregate salary*		1,232,850
9.	Administrative expenses		18,000
10.	Total employer cost for ensuing year - equals (7) plus (8) plus (9)		2,170,739
11.	Total employer cost as percentage of payroll - equals (10) divided by (5)		27.13%

* *Adjusted for interest to recognize payments through the year.*

** *Reflects a scheduled increase from 10.3% to 11.3% on January 1, 2012. An additional scheduled increase to 12.3% effective January 1, 2013 is not yet recognized.*

EXHIBIT II

ACTUARIAL ASSUMPTIONS AND COST METHODS

1. <u>Mortality Tables</u>:

Healthy: The RP-2000 Combined Healthy Mortality Table set back one year.

Disabled: The RP-2000 Disabled Retiree Mortality Table set back one year for males (not set back for females).

Sample healthy rates are as follows:

	Rate (%)	
Age	**Male**	**Female**
25	0.04	0.02
30	0.04	0.02
35	0.07	0.04
40	0.10	0.06
45	0.14	0.10
50	0.20	0.16
55	0.32	0.24
60	0.59	0.44
65	1.13	0.86

These mortality tables were determined to contain provision appropriate to reasonably reflect past and future mortality improvement, based on a review of mortality experience in 2010.

2. <u>Annual Withdrawal Rates</u>:

First year of service:	10% per year.
Second through fifth years of service:	5% per year.
After five years of service:	
Under age 35:	2.5% at each age.
Age 35 and older:	1% at each age.

Withdrawal rates end upon eligibility for early retirement (age 50 and 10 years of service).

3. **Disability Incidence Rates:**

Age based rates. Sample rates:

Age	Rate
25	0.05%
30	0.12
35	0.20
40	0.30
45	0.37
50	0.38
55	0.55

4. **Refund of Employee Contributions:**

Inactive vested members are assumed to elect a refund of employee contributions in lieu of a deferred pension benefit when it is more valuable than the deferred annuity.

5. **Retirement Rates:**

The following annual rates apply for active members:

Age	Early Retirement	First Year Eligible for Unreduced Retirement*	After First Year Eligible for Unreduced Retirement*
50 and Over	25%**	75%	100%

** Age 55 and 10 years of service or Rule of 80*

** *Those retiring with a reduced benefit are assumed to delay commencement until they satisfy the Rule of 80 if that is more valuable.*

Inactive vested members eligible for deferred benefits are assumed to retire at age 55.

6. **Net Investment Return:**

8.00% per annum, net of investment expenses.

7. **Inflation:**

3.50% per annum.

8. **Payroll Growth:**

4.50% per annum.

9. **Annual Administrative Expenses:**

$18,000.

10. Salary Scale:

Less than five years of service:

Service	Percentage Increase
0	8.25%
1	7.25
2	6.75
3	6.50
4	6.25

Five or more years of service (sample rates are as follows):

Age	Percentage Increase	Age	Percentage Increase
25	6.25%	45	5.11%
30	5.93	50	5.02
35	5.50	55	4.93
40	5.23	60	4.86

11. Percent Married and Age of Spouse:

At retirement or death, 90% of non-retired members are assumed to have spouses. Males are assumed to be three years older than their female spouses.

12. Workers' Compensation:

None assumed for disability benefit offset.

13. Indexing for Benefits of Inactive Vested Members:

4.50% per annum.

14. Split Service:

Liabilities held in both plans based on service in each plan; based on actuarial assumptions of the plan in which currently active.

15. Transfers to Main System:

Annual withdrawal, disability incidence and retirement rate assumptions for members who have transferred to the Main System follow those specified in the Main System, and are applied to the benefits held in the HPRS.

16. <u>Actuarial Cost Method</u>:

Entry Age Normal Actuarial Cost Method. The unfunded actuarial accrued liability is amortized in installments assuming a 4.50% payroll growth assumption and an open 20-year period.

17. <u>Actuarial Value of Assets</u>:

Adjusted market value that immediately recognizes interest and dividends. The procedure recognizes 20% of each Plan Year's total appreciation (depreciation) beginning with the year of occurrence. After five years, the appreciation (depreciation) is fully recognized. A characteristic of this asset valuation method is that, over time, it is more likely than not to produce an actuarial value of assets that is less than the market value of assets.

EXHIBIT III

CHANGES IN ACTUARIAL ASSUMPTIONS AND COST METHODS

Based on the results of the Actuarial Experience Study completed in early 2010 the Board approved several changes to the following actuarial assumptions. Previously, these assumptions were as follows:

1. Mortality Tables:

Healthy: 1983 Group Annuity Mortality Table, set back one year for males (not set back for females).

Disabled: Pension Benefit Guaranty Corporation Disabled Life Mortality Table for Individuals Receiving Social Security Disability Benefits.

2. Annual Withdrawal Rates:

First five years of service: 5% per year.

After five years of service:

Under age 35: 2% at each age.

Age 35 and older: 1% at each age.

Withdrawal rates end upon eligibility for early retirement (age 50 and 10 years of service or Rule 80).

3. Retirement Rates:

The following annual rates apply for active members:

Age	Eligible for Rule of 80	Not Eligible for Rule of 80
50 – 54	100%	50%*
55+	100	100

* Those retiring with a reduced benefit are assumed to delay commencement until they satisfy the Rule of 80 if that is more valuable.

Inactive vested members eligible for deferred benefits are assumed to retire at age 55.

4. Annual Administrative Expenses:

$16,000.

5. Salary Scale:

Less than five years of service: 7.00% per annum.

Five or more years of service (for selected ages):

Age	Annual Increase
25	5.90%
30	5.60
35	5.30
40	5.10
45	4.90
50	4.80
55	4.70

6. Indexing for Benefits of Inactive Vested Members:

5.00% per annum.

EXHIBIT IV

SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major benefit provisions of the North Dakota Highway Patrolmen's Retirement System as included in the valuation. It is not intended to be, nor should it be, interpreted as a complete statement of all plan provisions.

1. Normal Service Retirement:

Eligibility:

Attainment of age 55 with at least 10 years of eligible employment or with age plus service equal to at least 80 (Rule of 80).

Benefit:

3.60% of final average salary for each of the first 25 years of service plus 1.75% of final average salary for service in excess of 25 years.

2. Early Service Retirement:

Eligibility:

Attainment of age 50 with 10 years of eligible employment.

Benefit:

The Normal Service Retirement Benefit as determined above, reduced by one-half of one percent for each month before age 55.

3. Disability Benefit:

Eligibility:

Accumulation of six months of service and inability to engage in substantial gainful activity.

Benefit:

70% of the member's final average salary at disability minus workers' compensation, with a minimum of $100 per month.

EXHIBIT IV (continued)

4. Deferred Retirement:

Eligibility:

Ten years of eligible employment.

Benefit:

The Normal Service Retirement Benefit payable at age 55 or the Rule of 80, if earlier. Vested benefits are indexed at a rate set by the Retirement Board based on the increase in final average salary from date of termination to benefit commencement date, as follows:

Year Beginning	Average Monthly Increase	Three-Year Average Increase	Cumulative Salary Increase
7/1/1994	3.00%	3.01%	3.01%
7/1/1995	2.00	2.86	5.95
7/1/1996	2.00	2.33	8.42
7/1/1997	3.00	2.33	10.95
7/1/1998	1.80	2.27	13.47
7/1/1999	1.26	2.02	15.76
7/1/2000	2.00	1.69	17.71
7/1/2001	1.81	1.69	19.70
7/1/2002	1.73	1.85	21.91
7/1/2003	0.00	1.18	23.35
7/1/2004	0.00	0.58	24.06
7/1/2005	4.00	1.33	25.72
7/1/2006	4.00	2.67	29.07
7/1/2007	4.00	4.00	34.23
7/1/2008	4.00	4.00	39.60
7/1/2009	5.00	4.33	45.65
7/1/2010	5.00	4.67	52.45
7/1/2011	2.00	4.00	58.55

Reduced early retirement benefits can be elected upon attainment of age 50.

EXHIBIT IV (continued)

5. <u>Pre-Retirement Death Benefits</u>:

Eligibility:

Ten years of eligible employment.

Benefit:

One of the following options:

- Lump sum payment of member's accumulated contributions with interest.
- Monthly payment of the member's accrued benefit for 60 months to the surviving spouse.
- 50% of the member's accrued benefit (not reduced on account of age) for the surviving spouse's lifetime.

Eligibility:

Less than 10 years of service nor a surviving spouse.

Benefit:

Lump sum payment of member's accumulated contributions with interest.

6. <u>Normal and Optional Forms of Payment</u>:

Normal form of payment:

Monthly benefit for life with 50% of the benefit continuing for the life of the surviving spouse (if any).

Optional forms of payment:

- 100% joint and survivor annuity
- Twenty-year certain and life annuity
- Ten-year certain and life annuity
- A partial lump sum payment in addition to one of the annuity options above.
- Effective March 1, 2011, an actuarially equivalent graduated benefit option with either a one percent or two percent increase to be applied the first day of January of each year. Not available for disability or early retirements or in combination with a partial lump sum option or a deferred normal retirement option.

EXHIBIT IV (continued)

7. <u>Final Average Salary</u>:

Average of the highest salary received by the member for any 36 months employed during the last 120 months of employment.

8. <u>Contributions</u>:

Member contributions as a percent of monthly salary:

Current:	10.30%
Effective January 2012:	11.30%
Effective January 2013:	12.30%

Member contributions earn interest at an annual rate of 7.50% compounded monthly.

State contributions as a percent of monthly salary for each participating member:

Current:	16.70%
Effective January 2012:	17.70%
Effective January 2013:	18.70%

EXHIBIT V

CHANGES IN PLAN PROVISIONS

As a result of legislation passed in 2011, the contribution rates for the member and the State are scheduled to increase one percent each in January of 2012 and again in January of 2013 as shown on the previous page.

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