

October 5, 2016

Senator Krebsbach, Chair
Legislative Employee Benefits Programs Committee
North Dakota State Government

Re: Legislative Studies

Dear Senator Krebsbach:

As requested, we have analyzed the impact of Bill No. 17.0118.02000 on the North Dakota Public Employees Retirement System (NDPERS).

Systems Affected:

North Dakota Public Employees Retirement System (PERS) and Defined Contribution Plan

Summary:

Bill No. 17.0118.02000 includes the following changes:

- PERS
 - Changes the definition of Retirement and Retirement Board
 - Decreases the employee contribution rate on behalf of peace officers employed by the Bureau of Criminal Investigation by 0.50% of salary from 6.00% of salary to 5.50% of salary, effective with the monthly reporting period of January 2018
 - Clarifies that disability benefits are only payable from the fund to which the member was actively contributing at the time the member became disabled
 - References normal retirement date as defined in Subsection 3, instead of defining normal retirement date for the purpose of calculating the actuarial reduction for early retirement benefits payable before normal retirement date
- Defined Contribution Plan
 - Adds the same language to the Defined Contribution Plan as the Main System Defined Benefit Plan relating to the treatment of late payments of employer contributions, thereby making the administrative remedies the same
 - Allows the board to pay administrative expenses of the defined contribution plan from fines and fees collected from vendors

Actuarial Impact of Bill 118 on the Law Enforcement with Prior Main Service System

We believe that the only change that has an actuarial impact is the reduction in the employee contribution rate on behalf of peace officers employed by the Bureau of Criminal Investigation (in the Law Enforcement with Prior Main System Service System) by 0.50% of salary (from 6.00% of salary to 5.50% of salary, effective with the monthly reporting period of January 2018.)

Following is a summary of the projected funded ratio on an actuarial value of assets basis and a market value of assets basis under the current provisions and the proposed provisions of Bill 118:

Year	Law Enforcement with Prior Main System Service					
	Funded Ratio (AVA)			Funded Ratio (MVA)		
	Current Provisions	Bill 118 Proposed Provisions	Change	Current Provisions	Bill 118 Proposed Provisions	Change
2015	72.8%	72.8%	0.0%	82.5%	82.5%	0.0%
2016	74.6%	74.6%	0.0%	84.5%	84.5%	0.0%
2017	77.6%	77.6%	0.0%	86.7%	86.7%	0.0%
2018	80.0%	80.0%	0.0%	88.9%	88.9%	0.0%
2019	81.4%	81.4%	0.0%	91.1%	91.0%	0.0%
2020	83.3%	83.2%	-0.1%	93.2%	93.1%	-0.1%
2025	92.1%	91.9%	-0.2%	103.1%	102.9%	-0.2%
2030	100.0%	99.7%	-0.3%	112.1%	111.8%	-0.3%
2035	107.4%	107.0%	-0.4%	120.4%	120.0%	-0.4%
2040	114.8%	114.4%	-0.5%	129.0%	128.5%	-0.5%
2045	123.5%	122.9%	-0.6%	138.9%	138.2%	-0.7%

The reduction in employee contribution rate is projected to very slightly decrease the future funded ratio. After 30 years (by the year 2045):

1. The Law Enforcement with Prior Main System Service System funded ratio is projected to be 0.6 percentage points lower (122.9 percent compared to 123.5 percent) on an actuarial value of assets basis
2. The Law Enforcement with Prior Main System Service System funded ratio is projected to be 0.7 percentage points lower (138.2 percent compared to 138.9 percent) on a market value of assets basis

We have assumed that there will be no additional future changes in the employee contribution rates.

The following exhibits provide additional information on the actuarial impact on NDPERS of the proposed changes in Bill 118:

- Exhibit I: Summary of Actuarial Valuation Results as of July 1, 2015
- Graph I: Comparison of Projected Valuation Results for the Law Enforcement With Prior Main System Service System under the Current and Proposed Provisions
- Exhibit II(a): Projected Valuation Results for the Law Enforcement With Prior Main System Service System under the Current Provisions

- Exhibit II(b): Projected Valuation Results for the Law Enforcement With Prior Main System Service System under the Proposed Provisions

Actuarial Impact of Bill 118 on the Defined Contribution Plan

There is no actuarial impact to the Defined Contribution Plan as a result of (1) the change to the treatment of late payments of employer contributions or (2) the payment of expenses from vendor fines and fees.

Policy Issue Analysis

Benefits Policy Issues

- Adequacy of Retirement Benefits

The decrease in employee contributions would have no impact on retirement benefits for existing members in the Law Enforcement With Prior Main System Service System.

The changes included in Bill 118 do not appear to impact the adequacy of benefits payable from the Defined Contribution Plan. Employees would likely benefit from having Defined Contribution Plan administrative expenses paid from vendor fines and fees.

- Competitiveness

The decrease in employee contributions to the Law Enforcement With Prior Main System Service System will have no impact on retirement benefits for existing members. It will, however, increase the employees' take-home pay. As such, this bill may increase the total compensation package offered by participating employers in the Law Enforcement With Prior Main System Service System.

- Benefits Equity and Group Integrity

The bill may increase the total compensation package offered by participating employers in the Law Enforcement With Prior Main System Service System.

- Purchasing Power Retention

No impact.

- Preservation of Benefits

Because the employer contribution to the Law Enforcement With Prior Main System Service System is equal to the "...amount determined by the board to be actuarially required to support the level of benefits" any reduction in the member contribution rate may, if necessary, be made up by the employer. As a result, members' promised benefits from the

Law Enforcement With Prior Main System Service System will not be impacted by the reduction in the member contribution rate.

- Portability

No impact.

- Ancillary Benefits

No impact.

- Social Security:

No impact

Funding Policy Issues

- Actuarial Impacts

As previously noted, the reduction in the member contribution rate to the Law Enforcement With Prior Main System Service System is projected to very slightly decrease the future funded ratio. (The Plan is still projected to reach 100% funded.)

- Investment Impacts

- Cash Flow: The 0.50% reduction in the member contribution rate will not have a material impact on cash flow to the Law Enforcement With Prior Main System Service System.
- Asset Allocation: No impact

Administration Issues

- Implementation Issues

This bill would have an impact on the employees, since their required contributions would decrease.

- Administrative Costs

There may be administrative costs associated with the decrease in member contributions, as well as with the “non actuarial” changes included in Bill 118. This will depend on the employer administrative practices.

- Needed Authority

The bill appears to provide appropriate levels of administrative and governance authority to the PERS Board to implement the changes made by the bill.

- Integration

No impact.

- Employee Communications

Employee communications will be necessary to describe the impact of decreased member contributions on employee pay, as well as any “non-actuarial” changes that may impact the members.

- Miscellaneous and Drafting Issues

There may be some drafting changes depending on administrative practices.

Projection Assumptions

Following is a summary of the assumptions made for new hires used in the projections. The average new hire information is based on the average of members with at least one year and less than five years of service. The average assumed new hire salary is based on projecting the valuation salary from the 2015 valuation back to hire age using the assumed salary increase assumption and then projecting back to the 2015 valuation using the assumed wage inflation assumption of 4.5 percent per year. The projections assume that the number of active members remains the same in each future year as the number as of the most recent valuation of July 1, 2015.

Average Age	37.1	31.6
Average Benefit Service	5.5	0.0
Average Salary	\$58,048	\$45,098
Normal Cost Rate (Benefits)	10.46%	10.44%

Disclosures and Additional Information

The actuarial assumptions used in this analysis were the same assumptions used in the actuarial valuation as of July 1, 2015, including an assumed rate of investment return of 8.00 percent on the market value of assets in each future year. A summary of the actuarial assumptions can be found in Appendix I of this letter.

A summary of the current benefit provisions can be found in Appendix II of this letter.

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Future actuarial measurements may differ significantly from the current measurements presented in this cost analysis, due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions, contribution amounts or applicable law.

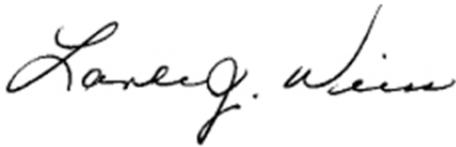
If any of the provisions, underlying data or assumptions used in this analysis appear to be incorrect or unreasonable, please let us know as soon as possible so we can update the analysis.

The signing actuaries are independent of the plan sponsor.

Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Please let us know if you have any questions or would like to discuss the results of this analysis further.

Sincerely,



Lance J. Weiss, EA, MAAA, FCA
Senior Consultant and Team Leader



Amy Williams, ASA, MAAA, FCA
Consultant

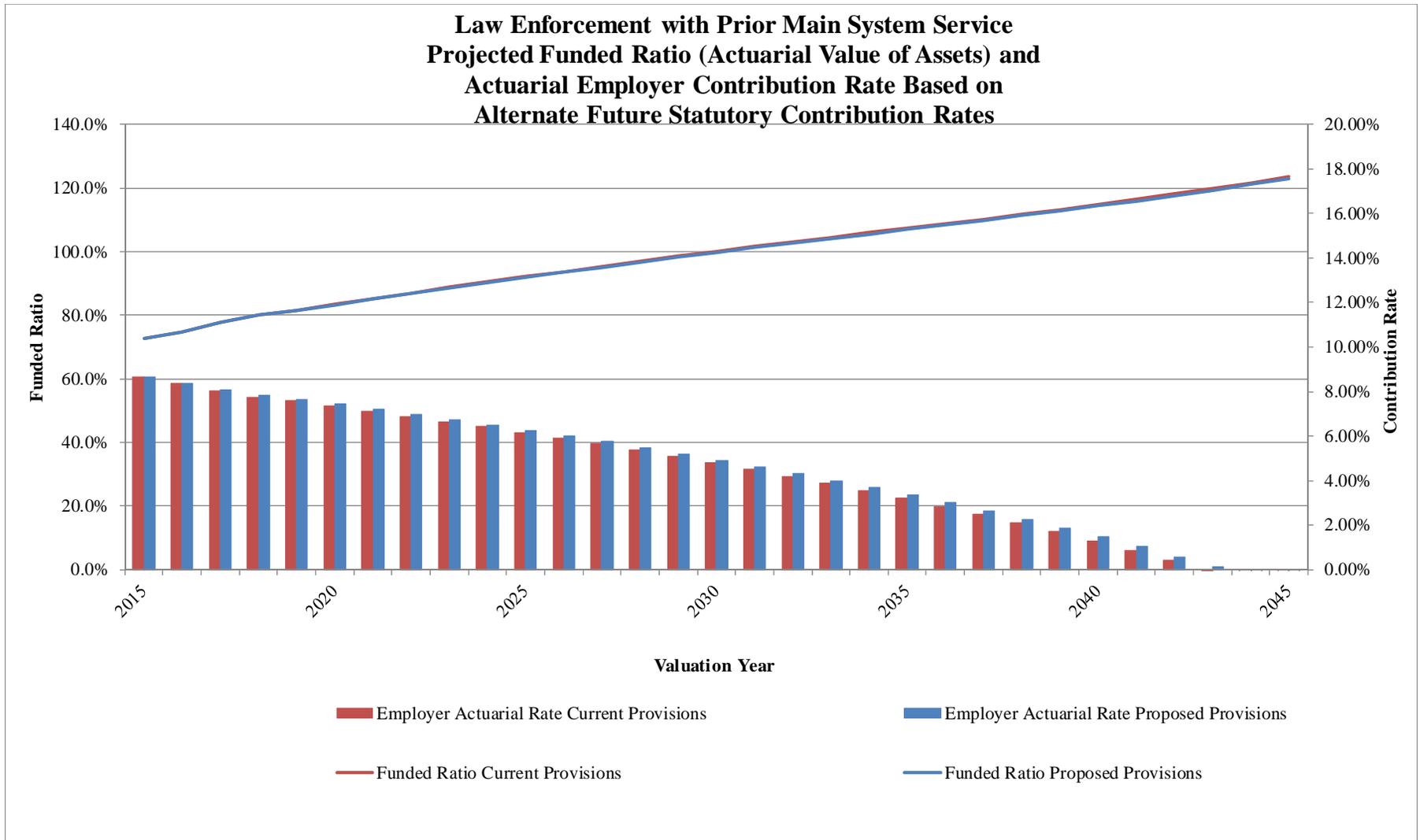
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cc: Mr. Sparb Collins, NDPERS
Ms. Sharon Schiermeister, NDPERS
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				Actuarial Value of Assets Basis				Market Value of Assets Basis			
	Total Normal Cost*	Employee Rate	Net Employer Normal Cost	Unfunded Liability Rate	Total Employer Actuarial Rate	Employer Approved Rate	Approved Rate Deficiency	Unfunded Liability Rate	Total Employer Actuarial Rate	Employer Approved Rate	Approved Rate Deficiency
2015 Valuation Results	12.02%	5.59%	6.43%	3.35%	9.78%	9.81%	-0.03%	2.10%	8.53%	9.81%	-1.28%
GRS 2015 Replication Results											
BCI Employees	10.79%	6.00%	4.79%	3.58%	8.37%	9.81%	-1.44%	2.31%	7.10%	9.81%	-2.71%
Non BCI Employees	10.60%	5.50%	5.10%	3.58%	8.68%	9.81%	-1.13%	2.31%	7.41%	9.81%	-2.40%
Total	10.63%	5.54%	5.09%	3.58%	8.67%	9.81%	-1.14%	2.31%	7.40%	9.81%	-2.41%
Illustrative 2015 Results with Change in Contribution Rates											
BCI Employees	10.78%	5.50%	5.28%	3.58%	8.86%	9.31%	-0.45%	2.31%	7.59%	9.31%	-1.72%
Non BCI Employees	10.60%	5.50%	5.10%	3.58%	8.68%	9.81%	-1.13%	2.31%	7.41%	9.81%	-2.40%
Total	10.62%	5.50%	5.12%	3.58%	8.70%	9.81%	-1.11%	2.31%	7.43%	9.81%	-2.38%

*Includes assumed administrative expenses.

Unfunded liability rate is based on 20-year open level percentage of payroll amortization of the unfunded liability.



North Dakota Public Employees Retirement System - Law Enforcement with Prior Main System Service
 Projection Results Based on the Actuarial Valuation as of July 1, 2015

Current Plan Provisions
 (\$ in thousands)

Year	Results Based on Actuarial Value of Assets										Results Based on Market Value of Assets								
	Present Value Future Benefits	Actuarial Accrued Liability	Assets	Unfunded			Projected Payroll	Employer Actuarial Rate (%)			Statutory Contribution Amount (\$)			Benefit Payments and Expenses	Employer			Member Counts	
				Accrued Liability	Funded Ratio	Funded Ratio		Normal Cost	Amortization of UAL	Total	Employer (9.81%)	Employee (5.50%)	Total		Assets	Funded Ratio	Rate	Active	Ben Recip.
2015	\$ 51,268	\$ 34,797	\$ 25,335	\$ 9,462	72.8%	\$ 18,459	5.09%	3.58%	8.67%	\$ 3,328	\$ 997	\$ 4,325	\$ 1,411	\$ 28,692	82.5%	7.40%	318	73	
2016	54,862	37,088	27,656	9,432	74.6%	19,426	4.99%	3.39%	8.38%	1,811	1,022	2,833	2,512	31,321	84.5%	7.06%	318	87	
2017	59,266	40,195	31,190	9,005	77.6%	20,438	4.96%	3.07%	8.03%	1,906	1,083	2,988	1,998	34,856	86.7%	6.78%	318	100	
2018	63,838	43,511	34,792	8,719	80.0%	21,681	4.95%	2.81%	7.76%	2,005	1,139	3,144	2,140	38,688	88.9%	6.50%	318	112	
2019	68,649	47,087	38,349	8,738	81.4%	22,969	4.94%	2.65%	7.59%	2,127	1,208	3,335	2,277	42,882	91.1%	6.22%	318	123	
2020	73,724	50,947	42,448	8,499	83.3%	24,336	4.91%	2.44%	7.35%	2,253	1,279	3,533	2,416	47,473	93.2%	5.91%	318	134	
2021	79,128	55,133	46,950	8,183	85.2%	25,747	4.90%	2.22%	7.12%	2,387	1,355	3,743	2,544	52,516	95.3%	5.61%	318	144	
2022	84,897	59,636	51,856	7,780	87.0%	27,162	4.88%	2.00%	6.88%	2,526	1,434	3,960	2,711	58,016	97.3%	5.30%	318	156	
2023	91,027	64,430	57,150	7,280	88.7%	28,623	4.87%	1.78%	6.65%	2,665	1,512	4,177	2,927	63,956	99.3%	4.99%	318	170	
2024	97,482	69,547	62,875	6,672	90.4%	30,176	4.87%	1.54%	6.41%	2,808	1,593	4,401	3,140	70,384	101.2%	4.68%	318	181	
2025	104,329	75,018	69,075	5,943	92.1%	31,778	4.86%	1.31%	6.17%	2,960	1,680	4,640	3,360	77,345	103.1%	4.35%	318	194	
2026	111,575	80,880	75,800	5,080	93.7%	33,450	4.85%	1.06%	5.91%	3,117	1,768	4,886	3,575	84,895	105.0%	4.01%	318	207	
2027	119,265	87,173	83,104	4,069	95.3%	35,202	4.84%	0.81%	5.65%	3,281	1,861	5,143	3,790	93,092	106.8%	3.67%	318	219	
2028	127,453	93,937	91,044	2,894	96.9%	37,046	4.83%	0.55%	5.38%	3,453	1,958	5,412	4,005	102,001	108.6%	3.31%	318	232	
2029	136,140	101,202	99,664	1,538	98.5%	38,980	4.82%	0.28%	5.10%	3,634	2,061	5,695	4,239	111,675	110.3%	2.95%	318	245	
2030	145,394	109,035	109,050	(15)	100.0%	41,011	4.80%	0.00%	4.80%	3,824	2,168	5,992	4,457	122,205	112.1%	2.56%	318	257	
2031	155,269	117,455	119,242	(1,786)	101.5%	43,101	4.79%	-0.29%	4.50%	4,023	2,281	6,304	4,708	133,640	113.8%	2.17%	318	272	
2032	165,786	126,465	130,264	(3,798)	103.0%	45,254	4.78%	-0.59%	4.19%	4,228	2,397	6,626	5,008	146,013	115.5%	1.77%	318	287	
2033	176,967	136,079	142,155	(6,077)	104.5%	47,479	4.76%	-0.89%	3.87%	4,439	2,517	6,956	5,346	159,367	117.1%	1.34%	318	304	
2034	188,829	146,289	154,939	(8,650)	105.9%	49,780	4.75%	-1.21%	3.54%	4,658	2,641	7,299	5,744	173,731	118.8%	0.90%	318	318	
2035	201,344	157,074	168,623	(11,550)	107.4%	52,160	4.75%	-1.55%	3.20%	4,883	2,769	7,652	6,221	189,118	120.4%	0.46%	318	340	
2036	214,513	168,358	183,171	(14,813)	108.8%	54,563	4.74%	-1.89%	2.85%	5,117	2,901	8,018	6,822	205,490	122.1%	-0.01%	318	366	
2037	228,285	180,086	198,565	(18,479)	110.3%	57,033	4.74%	-2.26%	2.48%	5,353	3,035	8,387	7,519	222,831	123.7%	-0.49%	318	393	
2038	242,628	192,285	214,875	(22,590)	111.7%	59,629	4.75%	-2.64%	2.11%	5,595	3,172	8,767	8,234	241,211	125.4%	-0.98%	318	420	
2039	257,546	204,889	232,085	(27,196)	113.3%	62,262	4.75%	-3.05%	1.70%	5,850	3,316	9,166	9,064	260,614	127.2%	-1.50%	318	447	
2040	273,003	217,909	250,251	(32,342)	114.8%	65,024	4.76%	-3.47%	1.29%	6,108	3,463	9,571	9,920	281,100	129.0%	-2.02%	318	474	
2041	289,009	231,347	269,429	(38,082)	116.5%	67,889	4.77%	-3.91%	0.86%	6,379	3,617	9,996	10,822	302,730	130.9%	-2.57%	318	502	
2042	305,587	245,214	289,686	(44,472)	118.1%	70,881	4.77%	-4.38%	0.39%	6,660	3,776	10,436	11,758	325,574	132.8%	-3.14%	318	529	
2043	322,783	259,578	311,148	(51,570)	119.9%	74,037	4.78%	-4.86%	-0.08%	6,953	3,943	10,896	12,675	349,771	134.7%	-3.72%	318	550	
2044	340,619	274,469	333,912	(59,443)	121.7%	77,353	4.78%	-5.36%	-0.58%	7,263	4,118	11,381	13,618	375,429	136.8%	-4.33%	318	575	
2045	359,115	289,873	358,033	(68,160)	123.5%	80,805	4.79%	-5.89%	-1.10%	7,588	4,303	11,891	14,632	402,615	138.9%	-4.95%	318	597	

Employee rate is 6.00% and employer rate is 9.81% for BCI employees.

North Dakota Public Employees Retirement System - Law Enforcement with Prior Main System Service
 Projection Results Based on the Actuarial Valuation as of July 1, 2015
 Proposed Plan Provisions - 0.50 percent of pay decrease to the employee contribution rate for the Bureau of Criminal Investigation (BCI) members
 (\$ in thousands)

Year	Results Based on Actuarial Value of Assets										Results Based on Market Value of Assets					Member Counts		
	Present Value Future Benefits	Actuarial Accrued Liability	Assets	Unfunded Accrued Liability	Funded Ratio	Projected Payroll	Employer Actuarial Rate (%)			Statutory Contribution Amount (\$)			Benefit Payments and Expenses	Assets	Funded Ratio			Employer Actuarial Rate
						Normal Cost	Amortization of UAL	Total	Employer (9.81%)	Employee (5.50%)	Total						Active	Ben Recip.
2015	\$ 51,268	\$ 34,795	\$ 25,335	\$ 9,460	72.8%	\$ 18,459	5.09%	3.58%	8.67%	\$ 3,328	\$ 997	\$ 4,325	\$ 1,411	\$ 28,692	82.5%	7.40%	318	73
2016	54,862	37,085	27,656	9,430	74.6%	19,426	4.99%	3.39%	8.38%	1,811	1,022	2,833	2,512	31,321	84.5%	7.06%	318	87
2017	59,266	40,192	31,190	9,002	77.6%	20,438	5.00%	3.07%	8.07%	1,906	1,083	2,988	1,998	34,856	86.7%	6.82%	318	100
2018	63,838	43,508	34,785	8,723	80.0%	21,681	5.02%	2.81%	7.83%	2,005	1,132	3,137	2,139	38,681	88.9%	6.57%	318	112
2019	68,649	47,083	38,326	8,757	81.4%	22,969	5.00%	2.66%	7.66%	2,127	1,192	3,319	2,277	42,859	91.0%	6.28%	318	123
2020	73,724	50,943	42,409	8,535	83.2%	24,336	4.98%	2.45%	7.43%	2,253	1,263	3,517	2,416	47,432	93.1%	5.99%	318	134
2021	79,128	55,128	46,892	8,236	85.1%	25,747	4.97%	2.23%	7.20%	2,387	1,338	3,726	2,544	52,455	95.2%	5.69%	318	144
2022	84,897	59,631	51,778	7,853	86.8%	27,162	4.95%	2.02%	6.97%	2,526	1,416	3,942	2,710	57,931	97.1%	5.39%	318	156
2023	91,027	64,424	57,049	7,375	88.6%	28,623	4.94%	1.80%	6.74%	2,665	1,494	4,158	2,926	63,847	99.1%	5.08%	318	170
2024	97,482	69,541	62,750	6,791	90.2%	30,176	4.93%	1.57%	6.50%	2,808	1,574	4,382	3,139	70,247	101.0%	4.77%	318	181
2025	104,329	75,011	68,923	6,088	91.9%	31,778	4.92%	1.34%	6.26%	2,960	1,660	4,620	3,359	77,177	102.9%	4.44%	318	194
2026	111,575	80,872	75,618	5,254	93.5%	33,450	4.91%	1.10%	6.01%	3,117	1,748	4,865	3,574	84,694	104.7%	4.11%	318	207
2027	119,265	87,164	82,889	4,275	95.1%	35,202	4.90%	0.85%	5.75%	3,281	1,840	5,121	3,788	92,854	106.5%	3.77%	318	219
2028	127,453	93,927	90,792	3,135	96.7%	37,046	4.88%	0.59%	5.47%	3,453	1,936	5,389	4,004	101,723	108.3%	3.41%	318	232
2029	136,140	101,190	99,372	1,818	98.2%	38,980	4.87%	0.33%	5.20%	3,634	2,038	5,672	4,238	111,351	110.0%	3.05%	318	245
2030	145,394	109,021	108,714	307	99.7%	41,011	4.86%	0.05%	4.91%	3,824	2,144	5,968	4,455	121,831	111.8%	2.68%	318	257
2031	155,269	117,439	118,856	(1,417)	101.2%	43,101	4.85%	-0.23%	4.62%	4,023	2,256	6,279	4,706	133,212	113.4%	2.30%	318	272
2032	165,786	126,447	129,825	(3,378)	102.7%	45,254	4.83%	-0.52%	4.31%	4,228	2,371	6,599	5,006	145,524	115.1%	1.89%	318	287
2033	176,967	136,058	141,657	(5,599)	104.1%	47,479	4.82%	-0.82%	4.00%	4,439	2,489	6,928	5,344	158,812	116.7%	1.48%	318	304
2034	188,829	146,266	154,376	(8,110)	105.5%	49,780	4.81%	-1.14%	3.67%	4,658	2,611	7,269	5,742	173,104	118.3%	1.05%	318	318
2035	201,344	157,047	167,989	(10,941)	107.0%	52,160	4.80%	-1.46%	3.34%	4,883	2,738	7,621	6,218	188,410	120.0%	0.60%	318	340
2036	214,513	168,328	182,458	(14,130)	108.4%	54,563	4.80%	-1.81%	2.99%	5,117	2,869	7,986	6,819	204,695	121.6%	0.15%	318	366
2037	228,285	180,053	197,767	(17,714)	109.8%	57,033	4.80%	-2.17%	2.63%	5,353	3,001	8,354	7,516	221,941	123.3%	-0.33%	318	393
2038	242,628	192,249	213,984	(21,735)	111.3%	59,629	4.80%	-2.54%	2.26%	5,595	3,137	8,732	8,231	240,216	125.0%	-0.81%	318	420
2039	257,546	204,849	231,092	(26,243)	112.8%	62,262	4.81%	-2.94%	1.87%	5,850	3,280	9,129	9,060	259,505	126.7%	-1.32%	318	447
2040	273,003	217,865	249,147	(31,281)	114.4%	65,024	4.81%	-3.36%	1.45%	6,108	3,424	9,532	9,916	279,866	128.5%	-1.84%	318	474
2041	289,009	231,299	268,204	(36,904)	116.0%	67,889	4.82%	-3.79%	1.03%	6,379	3,576	9,955	10,818	301,359	130.3%	-2.38%	318	502
2042	305,587	245,162	288,327	(43,165)	117.6%	70,881	4.83%	-4.25%	0.58%	6,660	3,734	10,394	11,753	324,055	132.2%	-2.94%	318	529
2043	322,783	259,521	309,645	(50,124)	119.3%	74,037	4.83%	-4.72%	0.11%	6,953	3,898	10,852	12,670	348,091	134.1%	-3.52%	318	550
2044	340,619	274,408	332,251	(57,844)	121.1%	77,353	4.84%	-5.22%	-0.38%	7,263	4,072	11,335	13,612	373,572	136.1%	-4.11%	318	575
2045	359,115	289,807	356,201	(66,394)	122.9%	80,805	4.84%	-5.73%	-0.89%	7,588	4,254	11,843	14,625	400,566	138.2%	-4.73%	318	597

Employee rate is 6.00% and employer rate is 9.81% for BCI employee until January 1, 2018. Beginning January 1, 2018, the employee rate decreases to 5.50%.

ACTUARIAL ASSUMPTIONS

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using the *Individual Entry Age Normal actuarial cost method* having the following characteristics:

- The normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and
- Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. The unfunded actuarial accrued liability is amortized using 20-year open level-percentage of pay amortization of the unfunded liability as of the valuation date.

Actuarial Value of Pension Plan Assets. The asset value is the actuarial value of assets which is calculated by recognizing 100 percent of the current year's interest and dividends and 20 percent of the current year and previous four years' total appreciation/(depreciation). The total appreciation/(depreciation) for a given year is fully recognized after a five-year period.

Valuation Assumptions

The contribution and benefit values of the System are calculated by applying actuarial assumptions to the benefit provisions and census information furnished, using the actuarial cost method described above.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by the assets of the Plan;
- Patterns of pay increases to members;
- Rates of mortality among members, retirees and beneficiaries;
- Rates of withdrawal of active members;
- Rates of disability among members; and
- The age patterns of actual retirement.

In a valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives; a period of time which can be as long as a century.

Actual experience of the Plan will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time-to-time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations). Thus, an experience review of the North Dakota Public Employees Retirement System for the period July 1, 2009, to July 1, 2014, was performed to compare the demographic and economic experience against the actuarial assumptions used in the valuations. The actuarial assumptions described in this section were adopted by the Board for use beginning with the July 1, 2015, valuation. Additional information

ACTUARIAL ASSUMPTIONS

regarding the rationale for the assumptions may be found in the 2015 experience review report. **The experience review was performed by the prior actuary.** All actuarial assumptions are expectations of future experience, not current market measures.

Current Valuation Assumptions and Methods

The assumed rate of investment return used was 8.00%, net of expenses, annually.

The assumed rate of price inflation is 3.50 percent.

No Cost of Living Adjustments (COLA) are provided to benefits recipients. Therefore, there is no assumption for this valuation.

The rates of annual salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

Service At Beginning of Year	State Employee	Non-State Employee	Law Enforcement	Judges
1	12.00%	15.00%	20.00%	
2	9.50%	10.00%	20.00%	
3	7.25%	8.00%	20.00%	
4			10.00%	
5			10.00%	
Age				
Under 30	6.75%	9.55%	6.75%	4.00%
30-39	6.00%	9.50%	6.00%	4.00%
40-49	5.75%	9.00%	5.75%	4.00%
50-59	5.25%	8.50%	5.25%	4.00%
60+	4.50%	8.25%	4.50%	4.00%

The assumed rate of total payroll growth used in amortizing the unfunded liability as a level percentage of pay is:

Main System and Law Enforcement: 4.50 percent
Judges: 4.00 percent

The assumed increase in the Social Security Taxable Wage Base is 3.25 percent.

ACTUARIAL ASSUMPTIONS

The mortality assumptions are as follows:

	Male Setback	Female Setback
RP-2000 Combined Healthy Mortality Table (healthy mortality)	2 years	3 years
RP-2000 Disabled Retiree Mortality Table (disabled post retirement)*	1 year	0 years

*Rates multiplied by 125 percent.

To provide a margin for future mortality improvements, generational mortality improvements from the year 2014 using the Social Security Administration (SSA) 2014 Intermediate Cost scale were assumed.

Following is a table with the life expectancies by age as of the valuation date.

<u>Age</u>	<u>Healthy Mortality</u>		<u>Disabled Mortality</u>	
	<u>Post-Retirement</u>		<u>Future Life</u>	
	<u>Future Life</u>		<u>Future Life</u>	
	<u>Expectancy (years) in 2015</u>		<u>Expectancy (years) in 2015</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
20	67.55	71.96	32.00	49.54
25	62.15	66.55	30.13	45.71
30	56.76	61.13	28.14	41.80
35	51.39	55.72	26.03	37.81
40	46.08	50.35	23.67	33.67
45	40.81	45.01	20.99	29.37
50	35.60	39.74	18.12	25.13
55	30.48	34.54	15.64	21.39
60	25.54	29.47	13.47	18.11
65	20.89	24.62	11.45	15.12
70	16.65	20.14	9.49	12.35
75	12.83	16.03	7.64	9.85
80	9.52	12.38	6.04	7.71
85	6.79	9.21	4.74	5.90
90	4.72	6.63	3.58	4.44
95	3.36	4.84	2.52	3.36
100	2.56	3.82	1.90	2.73
105	2.13	3.11	1.59	2.13

ACTUARIAL ASSUMPTIONS

Rates of separation from active membership are represented by the following table (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members terminating employment.

Service Beginning of Year	Service and Age-Based Rates For First Five Years of Service					
	Main System			Law Enforcement		
	Age					
	Under 30	30-39	40+	Under 30	30-39	40+
0	22.00%	16.00%	12.00%	25.00%	20.00%	17.00%
1	18.00%	14.00%	10.00%	23.00%	17.00%	15.00%
2	16.00%	12.00%	10.00%	20.00%	15.00%	12.00%
3	14.00%	12.00%	8.00%	17.00%	13.00%	10.00%
4	14.00%	11.00%	7.00%	15.00%	11.00%	7.00%

Age	Age-Based Rates Only After First Five Years of Service	
	Main System	Law Enforcement
20-24	8.80%	8.80%
25-29	8.80%	8.80%
30-34	5.50%	5.50%
35-39	4.70%	4.70%
40-44	3.90%	3.90%
45-49	3.70%	3.70%
50-54	3.40%	3.40%
55-59	0.10%	0.10%
60+	0.20%	0.20%

No pre-retirement termination is assumed for Judges.

Vested participants that terminate are assumed to elect the option with the greater present value:

- 1) *A refund of their accumulated contributions with interest or*
- 2) *A deferred benefit.*

Withdrawal rates end upon eligibility for early retirement.

Early retirement eligibility is as follows:

Main System: Earlier of (i) age 55 and 3 years of service, and (ii) eligibility for Rule of 85.

Law Enforcement: Age 50 and 3 years of service.

Account Balance Due to Vested Employer Contribution (PEP): Participation Under Chapter 54-52.2: If not elected: None. If elected: 100% of active members of the Main System and Law Enforcement. Contribution: Maximum allowed, based on service at the beginning of the Plan year.

ACTUARIAL ASSUMPTIONS

Rates of disability:

Before age 65: Males: 20% of OASDI disability incidence rates.
 Females: 10% of OASDI disability incidence rates.
 Age 65 and later: 0.25% per year.

Rates of disability were as follows:

Age	All Plans	
	Male	Female
20	0.0120%	0.0060%
25	0.0171%	0.0085%
30	0.0220%	0.0110%
35	0.0295%	0.0147%
40	0.0440%	0.0220%
45	0.0719%	0.0360%
50	0.1212%	0.0606%
55	0.2018%	0.1009%
60	0.3254%	0.1627%
65	0.2500%	0.2500%

Social Security Disability (for Judges' disability benefit offset):

Eligibility: 50%
 Consumer Price Index Increases: 3.5% per annum
 Wage Base Increases: 5.0% per annum

Workers' Compensation (for Judges' disability benefit offset):

None assumed.

ACTUARIAL ASSUMPTIONS

Rates of retirement for members eligible to retire during the next year were as follows:

<u>Age</u>	<u>Main System</u>		<u>Law Enforcement</u>	<u>Judges</u>
	<u>Reduced</u>	<u>Unreduced</u>	<u>Unreduced</u>	<u>Unreduced</u>
50		30.00%	25.00%	
51		10.00%	25.00%	
52		10.00%	25.00%	
53		10.00%	25.00%	
54		10.00%	25.00%	
55	1.00%	10.00%	10.00%	10.00%
56	1.00%	8.00%	10.00%	10.00%
57	1.00%	8.00%	10.00%	10.00%
58	1.00%	8.00%	10.00%	10.00%
59	1.00%	8.00%	10.00%	10.00%
60	2.00%	8.00%	10.00%	10.00%
61	5.00%	15.00%	10.00%	10.00%
62	10.00%	30.00%	50.00%	10.00%
63	10.00%	30.00%	50.00%	10.00%
64	10.00%	20.00%	50.00%	10.00%
65		30.00%	50.00%	20.00%
66		20.00%	20.00%	20.00%
67		15.00%	20.00%	20.00%
68		15.00%	20.00%	20.00%
69		15.00%	20.00%	20.00%
70		15.00%	20.00%	20.00%
71		15.00%	20.00%	20.00%
72		15.00%	20.00%	20.00%
73		15.00%	20.00%	20.00%
74		15.00%	20.00%	20.00%
75+		100.00%	100.00%	100.00%

ACTUARIAL ASSUMPTIONS

Assumed Service**Credit:**

All active members (full time and part time) are assumed to earn one full year of service for each assumed future year of service.

Marital Status:

It is assumed that 75 percent of participants in the Main System and Law Enforcement and 100 percent of Judges have an eligible spouse at the time of retirement or pre-retirement death. The male spouse is assumed to be three years older than the female spouse.

**Form of Payment
Election
Assumption:**

Form of Payment	Main System and Law Enforcement	Judges
Life Annuity	50%	0%
50% Joint and Survivor	45%	100%
Refund of Member Contributions	5%	0%

Benefit Service:

Exact fractional years of service are used to determine the amount of benefit payable.

Decrement Timing:

All decrements are assumed to occur at the middle of the year.

Decrement**Operation:**

Turnover decrements do not operate after the member reaches retirement eligibility (early or normal).

Eligibility Testing:

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Pay Increase Timing:

End of (fiscal) year.

Expenses:

Assumed administrative expenses were added to the Normal Cost and are based on the prior year's expenses, adjusted for inflation. The assumed amount added to the Normal Cost is:

Expenses	Main System	Judges	Law Enforcement		Total
			With Prior	Without	
Assumed FY 2015	\$ 1,100,000	\$ 7,500	\$ 5,500	\$ 7,500	\$ 1,120,500
Actual FY 2015	2,318,204	11,168	28,834	7,151	2,365,357
Assumed FY 2016	2,399,341	11,559	29,843	7,402	2,448,145

BENEFIT PROVISIONS

This section summarizes the major benefit provisions of the North Dakota Public Employees 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:

Main System and Judges:

Attainment of age 65, or at any age with age plus service equal to at least 85 (Rule of 85).

For members enrolled after December 31, 2015, into the Main System, attainment of age 65, or at age 60 with age plus service equal to at least 90 (Rule of 90).

Law Enforcement:

Attainment of age 55 and three consecutive years of service, or if not former National Guard, at any age with age plus service equal to at least 85 (Rule of 85). Former National Guard is eligible for Rule of 85 on August 1, 2015.

➤ Benefit:

Main System and Law Enforcement:

2.00% of final average salary multiplied by service.

Judges:

3.50% of final average salary for each of the first ten years of service, 2.80% for each of the next ten years of service and 1.25% for service in excess of twenty years.

2. Early Retirement:

➤ Eligibility:

Main System:

Attainment of age 55 with three years of service.

Judges:

Attainment of age 55 with five years of service.

BENEFIT PROVISIONS

Law Enforcement:

Attainment of age 50 with three years of service.

➤ Benefit:

Main System:

The Normal Service Retirement Benefit as determined above. A benefit that begins before age 65 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before the earlier of age 65 or the age at which the Rule of 85 is met.

For members enrolled after December 31, 2015, into the Main System, a benefit that begins before age 65 (or Rule of 90, if earlier) is reduced by 2/3% of one percent for each month before the earlier of age 65 or the age at which the Rule of 90 is met.

Judges:

The Normal Service Retirement Benefit as determined above. A benefit that begins before age 65 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before age 65 or the age at which the Rule of 85 is met.

Law Enforcement:

The Normal Service Retirement Benefit as determined above. A benefit that begins before age 55 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before age 55 or the age at which the Rule of 85 is met.

3. Disability Benefit:

➤ Eligibility:

Six months of service and inability to engage in any substantial gainful activity.

➤ Benefit:

Main System and Law Enforcement:

25% of the member's final average salary at disability minus workers' compensation benefits, with a minimum of \$100 per month.

Judges:

70% of the member's final average salary at disability minus Social Security and Workers' Compensation benefits paid.

BENEFIT PROVISIONS

4. Deferred Vested Retirement:

➤ Eligibility:

Main System and Law Enforcement:

Three years of service.

Judges:

Five years of service.

➤ Benefit:

Main System and Judges:

The Normal Service Retirement Benefit payable at age 65 or the Rule of 85, if earlier. Reduced early retirement benefits can be elected upon attainment of age 55.

Law Enforcement:

The Normal Service Retirement Benefit payable at age 55 or the Rule of 85, if earlier. Reduced early retirement benefit can be selected upon attainment of age 50.

5. Pre-Retirement Death Benefits:

(a) Vested participants with a surviving spouse

➤ Eligibility:

Main System and Law Enforcement:

Three years of service.

Judges:

Five years of service.

➤ Benefit:

Main System and Law Enforcement:

One of the following options:

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

BENEFIT PROVISIONS

- 50% of the member's accrued benefit (not reduced on account of age) payable for the surviving spouse's lifetime.
- Continuation portion of 100% joint and survivor annuity (only if participant was eligible for normal retirement).
- A partial lump sum payment in addition to the one of the annuity options above.

Judges:

One of the following options:

- Lump sum payment of member's accumulated contributions with interest.
- 100% of the member's accrued benefit (not reduced on account of age) payable for the spouse's lifetime.

(b) Non-vested members or vested members without a surviving spouse

➤ Eligibility:

Main System, Judges and Law Enforcement:

Non-vested or no surviving spouse.

➤ Benefit:

Main System, Judges and Law Enforcement:

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

6. Refund of Member Contributions:

Paid to terminated non-vested members and terminated vested members who choose a refund of employee contributions in lieu of a monthly retirement benefit.

BENEFIT PROVISIONS

7. Accumulated Member Contributions:

Member contributions accumulate with interest at the following rates:

<u>Time Period</u>	<u>Per Annum Interest Rate</u>
Through June 30, 1981	5.0%
July 1, 1981, to June 30, 1986	6.0%
After June 30, 1986	0.5% less than the actuarial interest rate assumption

8. Standard and Optional Forms of Payment:

Standard form of payment:

Main System and Law Enforcement:

Monthly benefit for life with a refund to beneficiary at death of the remaining balance (if any) of accumulated member contributions.

Judges:

Monthly benefit for life, with 50% payable to an eligible survivor.

Optional forms of payment:

- Life annuity (for Judges).
 - 50% joint and survivor annuity with pop-up (for Main System and Law Enforcement).
 - 100% joint and survivor annuity with pop-up.
 - Twenty-year certain and life annuity.
 - Ten-year certain and life annuity.
 - Social Security level income annuity.
 - A partial lump sum payment in addition to one of the annuity options above.
 - 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, a deferred normal retirement option, or a Social Security level income annuity.

BENEFIT PROVISIONS

9. Final Average Salary:

Average of the highest salary received by the member for any 36 months employed during the last 180 months of employment.

10. Contributions:

Contribution rates specified in the Century Code (except employer rate for Law Enforcement); differ between permanent full-time employees and part-time temporary employees. Rates are as follow:

	<u>Rates Set by Statute</u>		<u>Rates Determined by the Board of Retirement</u>
	<u>Member</u>	<u>Employer</u>	<u>Employer</u>
Main System Full-Time Employees	7.00%	7.12%	
Main System Part-Time Employees	14.12%	0.00%	
Judges	8.00%	17.52%	
Law Enforcement with prior Main System service	5.50%		9.81%
➤ BCI Employees ¹	6.00%		10.31%
➤ National Guard members ²	4.50%		7.00%
Law Enforcement without prior Main System service	5.50%		7.93%

¹ Effective July 1, 2016, the employer contribution rate for BCI employees of the State Law Enforcement plan will be reduced by 0.5% to 9.81%.

² Effective August 1, 2015, the member contribution rate for former National Guard members increased to 6.00% and the employer contribution rate increased to 9.81%. Effective January 1, 2016, the contribution rate for National Guard members of the State Law Enforcement plan will be reduced by 0.50% to 5.50%.

BENEFIT PROVISIONS

Effective January 1, 2000:

A member's account balance includes vested employer contributions equal to the member's contributions to the deferred compensation Plan under chapter 54-52.2. The vested employer contribution may not exceed:

1. For months one through 12 of service credit, \$25 or 1% of the member's monthly salary, whichever is greater.
2. For months 13 through 24 of service credit, \$25 or 2% of the member's monthly salary, whichever is greater.
3. For months 25 through 36 of service credit, \$25 or 3% of the member's monthly salary, whichever is greater.
4. For service exceeding 36 months, \$25 or 4% of the member's monthly salary, whichever is greater.

Vested employer contributions are credited monthly to the member's account balance.

11. Rollovers:

The fund may accept rollovers from other qualified plans under rules adopted by the Board for the purchase of additional service credit.