



Actuarial Review of the Self-Insured Liability Program

*Outstanding Liabilities as of June 30, 2019
Forecast for Fiscal Year 2019-20*

Presented to

Municipal Pooling Authority

June 2019





Friday, June 7, 2019

Ms. Linda M. Cox
Chief Administrative Officer
Municipal Pooling Authority
1911 San Miguel Drive, Suite 100
Walnut Creek, CA 94596

Re: Actuarial Review of the Self-Insured Liability Program

Dear Ms. Cox:

As you requested, we have completed our review of Municipal Pooling Authority's (MPA's) self-insured liability program. Assuming an SIR of \$1,000,000 per occurrence, we estimate the ultimate cost of claims and expenses for claims incurred during the 2019-20 program year to be \$5,106,000. This amount includes allocated loss adjustment expenses (ALAE) and a discount for anticipated investment income, but excludes unallocated loss adjustment expenses (ULAE). ALAE is the direct cost associated with the defense of individual claims (e.g. legal fees, investigation fees, court charges). ULAE is the cost to administer all claims to final settlement, which may be years into the future (e.g. claims adjusters' salaries, taxes). The discount for investment income is calculated based on the likely payout pattern of the MPA's claims, assuming a 2.0% return on investments per year.

In addition, we estimate the program's liability for outstanding claims to be \$14,151,000 as of June 30, 2019, including ALAE and ULAE, and discounted for anticipated investment income. Given estimated program assets of \$23,108,000 as of June 30, 2019, the program was funded above the 90% confidence level.

The \$14,151,000 estimate is the minimum liability to be booked by MPA at June 30, 2019 for its liability program, in accordance with Governmental Accounting Standards Board (GASB) Statement #10. GASB #10 requires MPA to accrue a liability on its financial statements for the ultimate cost of claims and expenses associated with all reported and unreported claims, including ALAE and ULAE. GASB #10 does not prohibit the discounting of losses to recognize investment income.

Our conclusions regarding MPA's liability for unpaid loss and loss adjustment expenses (LAE) at June 30, 2019 are summarized in the table below.

Municipal Pooling Authority
Self-Insured Liability Program
Estimated Liability for Unpaid Loss and LAE
at June 30, 2019

	Expected	Marginally Acceptable 70% CL	Recommended Range			Conservative 90% CL
			Low 75% CL	Target 80% CL	High 85% CL	
Loss and ALAE	\$14,271,000	\$15,841,000	\$16,526,000	\$17,311,000	\$18,310,000	\$19,651,000
ULAE	620,000	688,000	718,000	752,000	795,000	854,000
Investment Income Offset	<u>(740,000)</u>	<u>(821,000)</u>	<u>(857,000)</u>	<u>(898,000)</u>	<u>(949,000)</u>	<u>(1,019,000)</u>
Discounted Loss and LAE	\$14,151,000	\$15,708,000	\$16,387,000	\$17,165,000	\$18,156,000	\$19,486,000
Assets	<u>23,108,000</u>	<u>23,108,000</u>	<u>23,108,000</u>	<u>23,108,000</u>	<u>23,108,000</u>	<u>23,108,000</u>
Surplus	\$8,957,000	\$7,400,000	\$6,721,000	\$5,943,000	\$4,952,000	\$3,622,000

GASB #10 does not address an actual asset requirement for the program, but only speaks to the liability to be recorded on MPA's financial statements.

Because actuarial estimates of claims costs are subject to some uncertainty, we recommend that an amount in addition to the discounted expected loss costs be set aside as a risk margin for contingencies. Generally, the amount should be sufficient to fund assets to the 75% to 85% confidence level for primary programs. We consider funding assets to the 70% confidence level to be marginally acceptable and funding assets to the 90% confidence level to be conservative.

The table below shows our funding recommendations for Municipal Pooling Authority for the 2019-20 fiscal year.

Municipal Pooling Authority
Self-Insured Liability Program
Loss and LAE Funding Guidelines for 2019-20
Self-Insured Retention (SIR) of \$1,000,000

	Expected	Marginally Acceptable 70% CL	Recommended Range			Conservative 90% CL
			Low 75% CL	Target 80% CL	High 85% CL	
Loss and ALAE	\$5,416,000	\$6,315,000	\$6,748,000	\$7,257,000	\$7,897,000	\$8,747,000
ULAE	0	0	0	0	0	0
Investment Income Offset	<u>(310,000)</u>	<u>(361,000)</u>	<u>(386,000)</u>	<u>(415,000)</u>	<u>(452,000)</u>	<u>(501,000)</u>
Discounted Loss and LAE	\$5,106,000	\$5,954,000	\$6,362,000	\$6,842,000	\$7,445,000	\$8,246,000
Non-Claims Related Expenses	<u>5,625,000</u>	<u>5,625,000</u>	<u>5,625,000</u>	<u>5,625,000</u>	<u>5,625,000</u>	<u>5,625,000</u>
Indicated Funding	\$10,731,000	\$11,579,000	\$11,987,000	\$12,467,000	\$13,070,000	\$13,871,000

The Non-Claims Related Expenses above include the following:

- CARMA Premium: \$3,718,000
- DOC Expense/Claim Administration: \$243,000
- Department Personnel: \$757,000
- G&A Expense: \$874,000
- Capital Equipment: \$33,000

The funding recommendations shown in the table above do not include any recognition of the anticipated funding margin (surplus or deficit) at June 30, 2019.

Municipal Pooling Authority
Self-Insured Liability Program
Loss and LAE Funding Rates Guidelines for 2019-20
Self-Insured Retention (SIR) of \$1,000,000
Discounted at 2.0%

Deductible	Loss &ALAE Deductible to \$1,000,000	Other Expenses	Excess Insurance Premium	Total Funding Rate
\$5,000	\$2.551	\$0.574	\$1.120	\$4.245
\$10,000	2.415	0.574	1.120	4.109
\$25,000	2.141	0.574	1.120	3.835
\$50,000	1.820	0.574	1.120	3.514
\$100,000	1.438	0.574	1.120	3.132

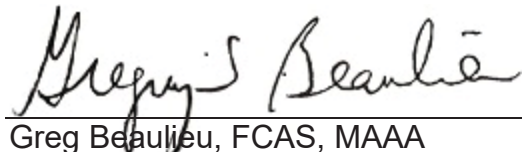
Note that while the projected expenses are for the 2019-20 fiscal year, the rate is a percentage of 2018-19 payroll. This is because in practice MPA collects 2019-20 contributions based on member payroll from 2018-19.

The report that follows outlines the scope of our study, its background, and our conclusions, recommendations, and assumptions. Judgments regarding the appropriateness of our conclusions and recommendations should be made only after studying the report in its entirety, including the graphs, attachments, exhibits and appendices. Our report has been developed for MPA's internal use. It is not intended for general circulation.

We appreciate the opportunity to be of service to Municipal Pooling Authority in preparing this report. Please feel free to call Greg Beaulieu at (916) 290-4632 or Becky Richard at (916) 244-1183 with any questions you may have concerning this report.

Sincerely,

Bickmore



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Senior Manager, Property and Casualty Actuarial Services, Bickmore
Fellow, Casualty Actuarial Society
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I. BACKGROUND

Municipal Pooling Authority began its self-insured liability program on July 1, 1990. Its current self-insured retention is \$1,000,000. Claims administration services are provided by MPA's Risk Management Department. Additional background on the program is given in Pool - Appendix J.

As of June 30, 2019, MPA is expected to have assets of \$23,108,000 for the program. Additional background on program funding is given in Pool - Exhibit 5.

The purpose of this review is to provide a guide to MPA to determine reasonable funding levels for its self-insurance program according to the funding policy MPA has adopted and to comply with Governmental Accounting Standards Board Statements #10 and #30. The specific objectives of the study are to estimate MPA's liability for outstanding claims as of June 30, 2019, project ultimate loss costs for 2019-20, and provide funding guidelines to meet these liabilities and future costs.

II. CONCLUSIONS AND RECOMMENDATIONS

A. LIABILITY FOR OUTSTANDING CLAIMS

Graph 1 on the following page summarizes our assessment of MPA's funding position as of June 30, 2019. The dark-colored bars indicate our estimates of the program's liability for outstanding claims before recognition of the investment income that can be earned on the assets held before the claim payments come due. The horizontal line across the graph indicates MPA's available assets at June 30th.

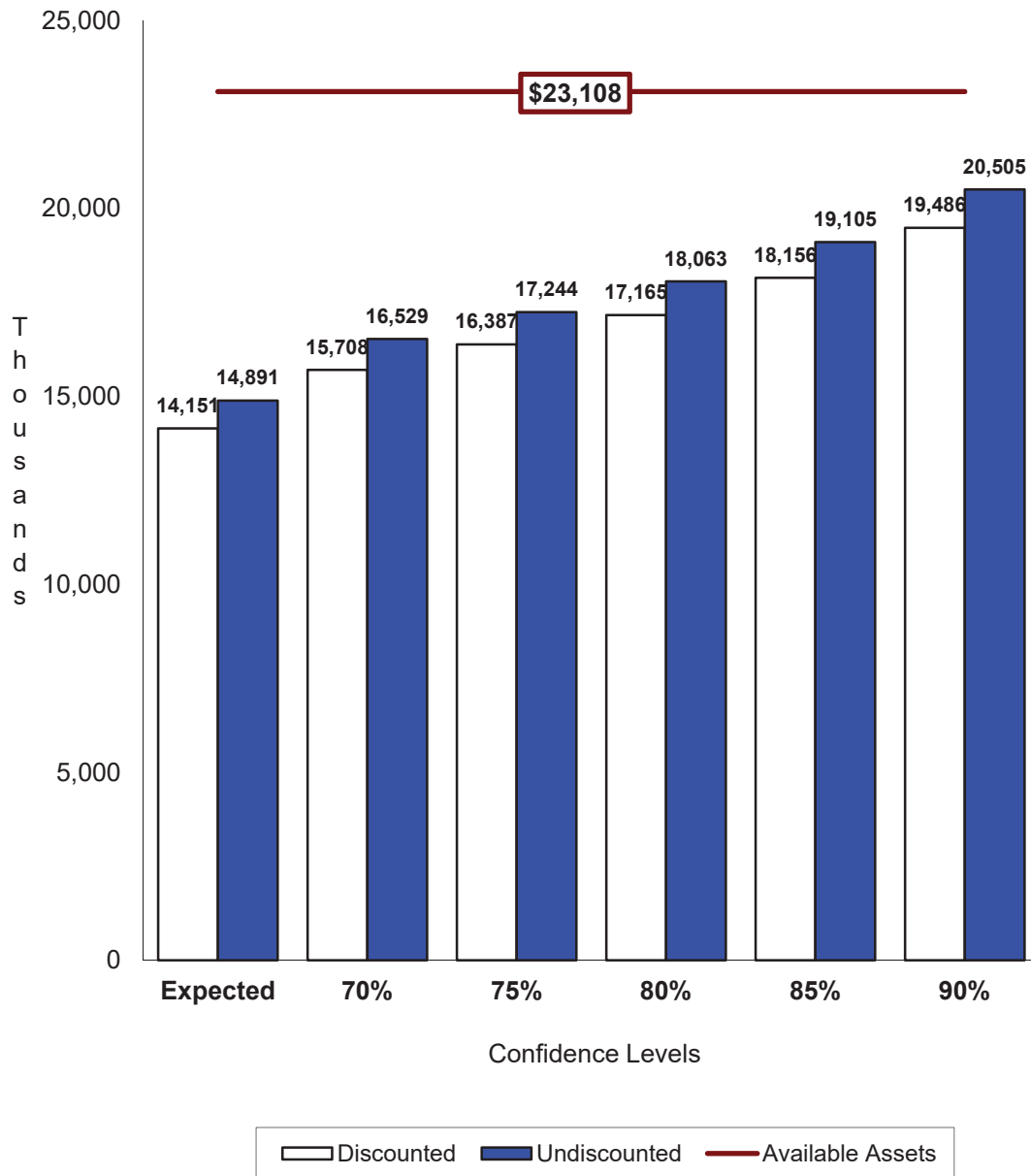
Our best estimate of the full value of MPA's liability for outstanding claims within its self-insured retention (SIR) is \$14,891,000 as of June 30, 2019. This amount includes losses, allocated loss adjustment expenses (ALAE), and unallocated loss adjustment expenses (ULAE). ALAE is the direct cost associated with the defense of individual claims (e.g. legal fees, investigation fees, court charges). ULAE is the cost to administer claims to final settlement, which may be years in the future (e.g. claims adjusters' salaries, taxes).

There is some measure of uncertainty associated with our best estimate because of the random nature of much of the process that determines ultimate claims costs. For this reason, we generally recommend that a program such as this include some funding margin for the possibility that actual loss costs will be greater than the best estimate. We generally measure the amount of this margin by thinking in terms of the probability distribution of actual possible results around our best estimate. As the margin grows, the probability that the corresponding funding amount will be sufficient to meet actual claim liabilities increases. We typically refer to this probability as the "confidence level" of funding. Graph 1 shows the liabilities for outstanding claims at several confidence levels that are typically of interest to risk managers in formulating funding policies for self-insurance programs.

MPA can earn investment income on the assets it holds until claims payments come due. Assuming a long-term average annual return on investments of 2.0%, we estimate the impact of investment income earnings to be about 5% if the program is funded within the range indicated in the graphs, resulting in a discounted liability for outstanding claims of \$14,151,000 as of June 30, 2019.

Investment income earnings will be less than this when the program does not maintain sufficient funding, and more when there is excess funding. Thus, thinking in terms of liabilities discounted for investment income can actually mask funding deficiencies and redundancies that might otherwise be obvious. However, the discounted liabilities do represent legitimate funding targets. The light-colored bars on Graph 1 shows our estimates of MPA's discounted liability for outstanding claims.

Municipal Pooling Authority
 Liability
 Available Assets vs Outstanding Liability (\$000's)
 at June 30, 2019



The table below displays a breakdown of the program's outstanding loss and LAE liabilities into case reserves and incurred but not reported (IBNR) reserves at June 30, 2019, before recognition of investment income.

Municipal Pooling Authority
Self-Insured Liability Program
Estimated Liability for Unpaid Loss and LAE at June 30, 2019

Year	Case Reserves	IBNR Reserves	Total Outstanding
Prior	\$0	\$0	\$0
1998-99	0	0	0
1999-00	0	0	0
2000-01	0	0	0
2001-02	0	0	0
2002-03	114,176	0	114,176
2003-04	0	0	0
2004-05	0	0	0
2005-06	3,706	0	3,706
2006-07	164	0	164
2007-08	280,498	0	280,498
2008-09	287	0	287
2009-10	1,183	0	1,183
2010-11	32,038	0	32,038
2011-12	40,170	17,950	58,120
2012-13	10,338	25,009	35,347
2013-14	42,508	122,868	165,376
2014-15	877,228	139,450	1,016,678
2015-16	1,425,456	273,839	1,699,295
2016-17	2,348,362	709,348	3,057,710
2017-18	1,154,823	2,082,885	3,237,708
2018-19	1,221,959	3,346,928	4,568,887
Loss and ALAE	\$7,552,896	\$6,718,277	\$14,271,173
ULAE		620,318	620,318
Total	\$7,552,896	\$7,338,595	\$14,891,491

B. PROGRAM FUNDING: GOALS AND OBJECTIVES

As self-insurance programs have proliferated among public entities, it has become apparent that there is a large measure of inconsistency in the way in which these programs recognize and account for their claims costs. This is the result of the fact that there have been several different sources of guidance available, none of which has been completely relevant to public entity self-insurance programs.

According to the Governmental Accounting Standards Board (GASB), the most relevant source of guidance on the subject is Financial Accounting Standards Board Statement #60. A liability for unpaid claim costs, including all loss adjustment expenses, should be accrued at the time the self-insured events occur. This liability should include an allowance for incurred but not reported claims. It may be discounted for investment income at an appropriate rate of return, provided the discounting is disclosed. The regulations detailing the way in which this must be done are outlined in GASB's statements #10 and #30. These regulations are required to be applied by MPA.

GASB #10 and #30 do not address asset requirements. They do, however, allow a range of amounts to be recognized for accounting purposes; specifically, GASB #10 and #30 allow recognition of a risk margin for unexpectedly adverse loss experience. Thus, for accounting purposes, it is possible to formulate a funding policy from a range of alternatives. The uncertainty in any estimate of the program's liability for outstanding claims should be taken into consideration in determining funding policy, but it may be offset by recognizing anticipated investment income earnings. This usually means developing a funding program based on discounted claims costs with some risk margin for unexpected adverse loss experience.

The amount of the risk margin should be a question of long-term funding policy. We recommend that the risk margin be determined by thinking in terms of the probability that a given level of assets will prove to be adequate. For example, a reasonable goal might be to maintain assets at the 85% confidence level.

A key factor to consider in determining funding policy is the degree to which stability is required in the level of contributions to the program from year to year. If you elect to maintain assets at a low confidence level, the chances are much greater that future events will prove that additional contributions should have been made for old claims. The additional contributions for old claims may be required at the same time that costs are increasing dramatically on new claims. The burden of funding for increases on past years as well as on current years, may well be prohibitive.

We generally recommend maintaining program assets at the 80% confidence level, after recognition of investment income, with a recommended range of the 75% to 85% confidence levels. We tend to think of the 70% confidence level as marginally acceptable and of the 90% confidence level as conservative. We recommend the 75% to 85% confidence level range because the probabilities are reasonably high that resulting assets will be sufficient to meet claim liabilities, yet the required risk margins are not so large that they will cause most self-insured entities to experience undue financial hardship. In addition, within this range, anticipated investment income generally offsets the required risk margin for the most part, which means that assets are likely sufficient on an undiscounted basis.

We also strongly believe, however, that the confidence level to which any future year is funded should be evaluated in light of the relative certainty of the assumptions underlying the actuarial analysis, MPA's other budgetary constraints, and the relative level of risk it is believed appropriate to assume. This means formulating both short and long-term funding goals, which may be the same in some years, but different in others.

In general, we recommend funding each year's claims costs in that year. When surpluses or deficits have developed on outstanding liabilities and funding adjustments are necessary, they should be clearly identified as such so that the habit of funding each year's claims costs that year is maintained. We also recommend that you reduce a surplus more slowly than you would accumulate funding to reduce a deficit.

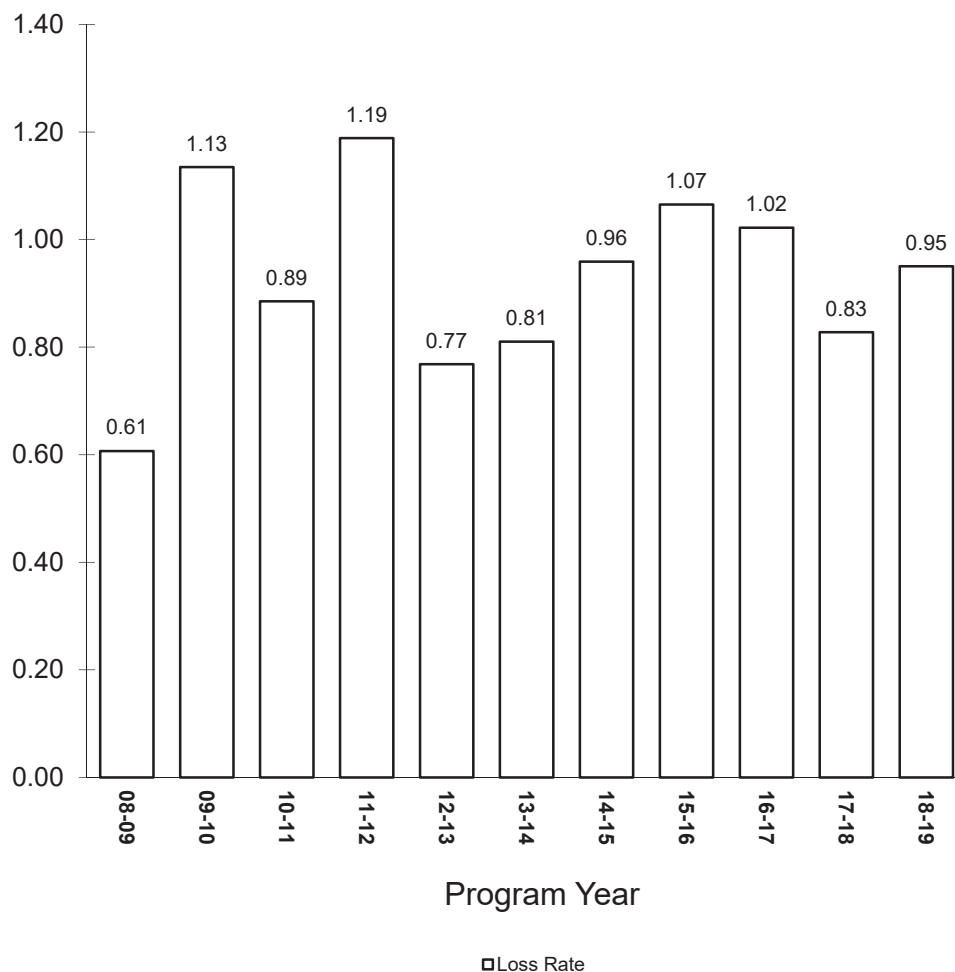
It is estimated that program assets will be \$23,108,000 at June 30, 2019, resulting in the program being funded above the 90% confidence level.

C. HISTORICAL TRENDS IN THE SELF-INSURANCE PROGRAM

MPA's loss rate (based on losses limited to \$100,000 per occurrence) has varied over the 10 year period shown below. The program's loss rate averaged \$0.90 per \$100 of payroll during the period 2008-09 to 2012-13. Since that time, the loss rate averaged \$0.94. Our projected loss rate for 2018-19 of \$0.95 per \$100 of payroll is based on the average of recent years.

Graph 2

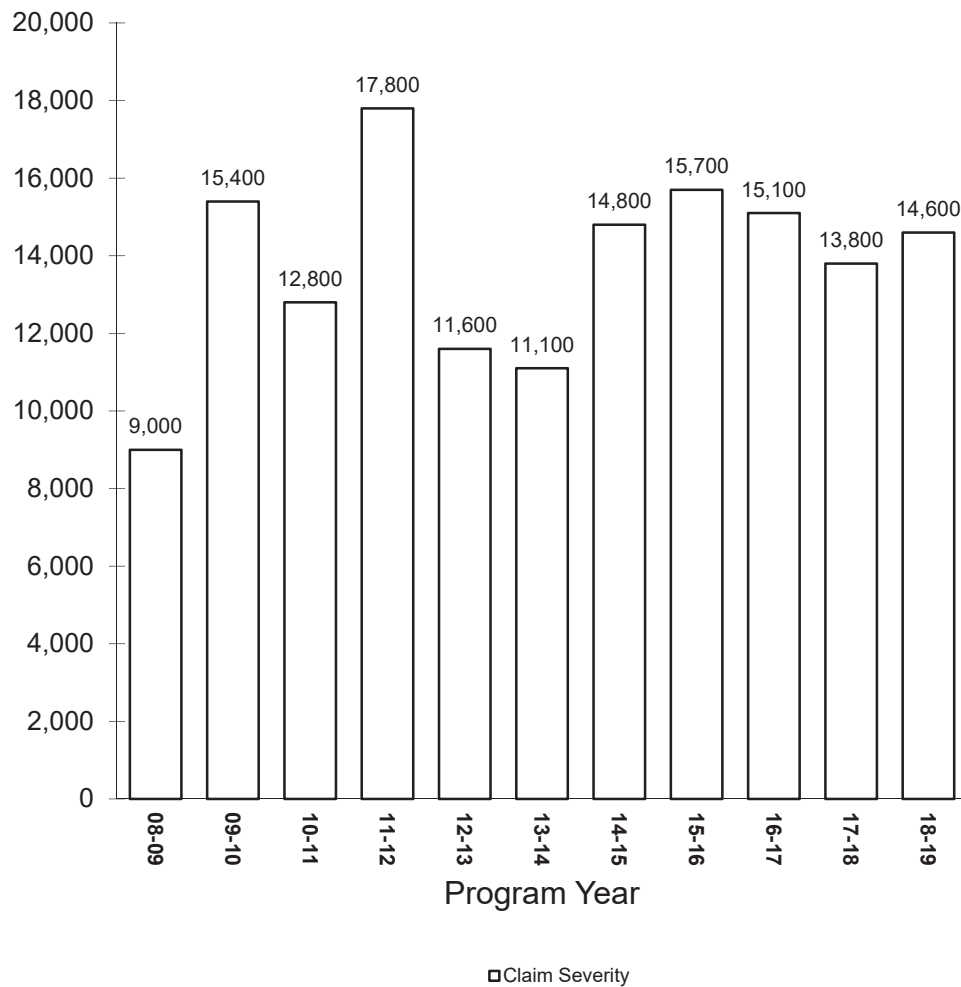
Municipal Pooling Authority
Liability
Dollars of Loss per
\$100 of Payroll



The following chart shows that MPA's average claim size, developed to ultimate and limited to \$100,000 per occurrence, has varied over the last several years, ranging from a low of \$9,000 in 2008-09 to a high of \$17,800 in 2011-12. The projected 2018-19 average cost per claim of \$14,600 based on the average of recent years.

Graph 3

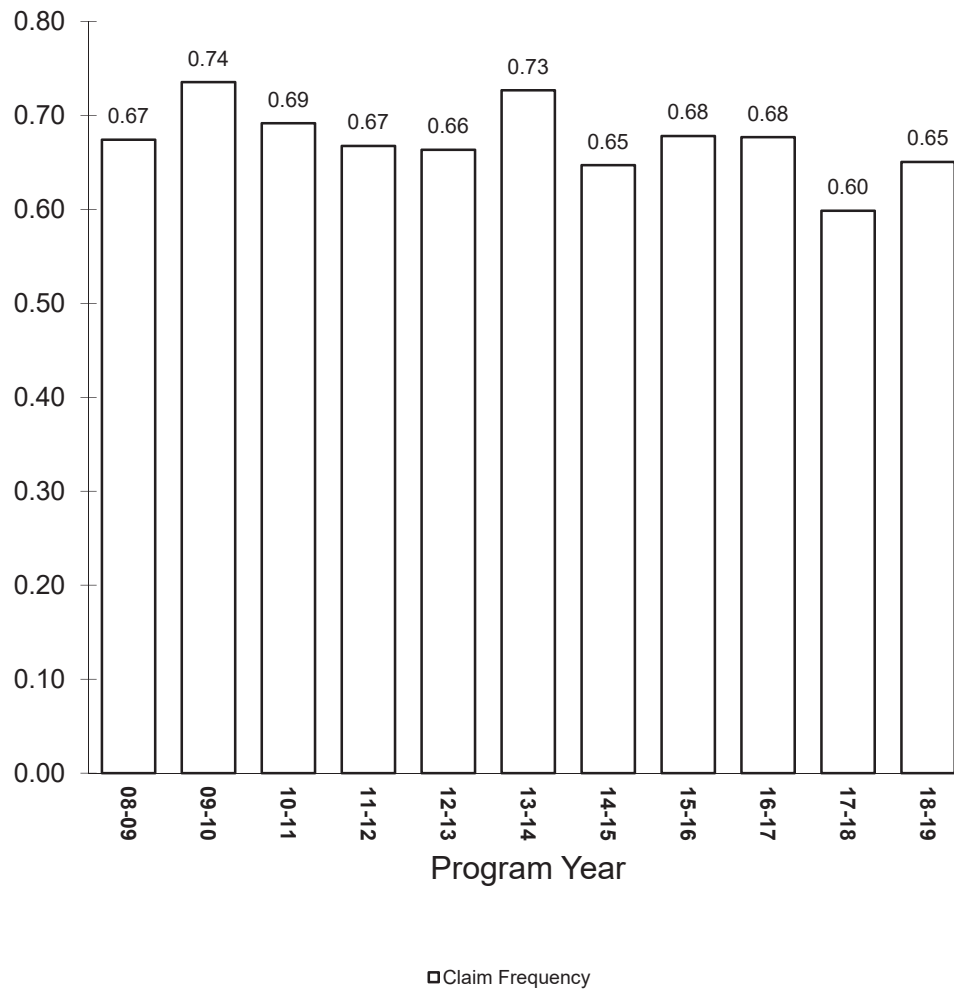
Municipal Pooling Authority
Liability
Dollars of Loss per Claim



The following chart shows that MPA’s average number of claims per \$1M of payroll, or frequency. Between 2008-09 and 2013-14, MPA’s frequency of claims per \$1 million payroll has averaged 0.69 per \$1M of payroll. Since that time, MPA’s average frequency has been 0.69 per \$1M of payroll. Our projection for 2018-19 is 0.65 based on the average of the most recent four years.

Graph 4

Municipal Pooling Authority
Liability
Number of Claims per
\$1 Million of Payroll



D. COMPARISON WITH PREVIOUS RESULTS

The prior report for Municipal Pooling Authority was dated June 7, 2018. In the table below we display actual versus expected development of incurred losses and ALAE by accident year between the January 31, 2018 evaluation date of the prior report and the September 30, 2018 evaluation date of the current report.

Actual Versus Expected Incurred Loss and ALAE Development

Accident Year	Expected Incurred Development	Actual Incurred Development	Actual Minus Expected
Prior	\$0	\$0	\$0
1998-99	0	0	0
1999-00	0	0	0
2000-01	0	0	0
2001-02	0	0	0
2002-03	0	114,337	114,337
2003-04	0	0	0
2004-05	0	0	0
2005-06	0	0	0
2006-07	0	0	0
2007-08	1,000	0	(1,000)
2008-09	0	0	0
2009-10	0	0	0
2010-11	18,000	0	(18,000)
2011-12	25,000	19,198	(5,802)
2012-13	65,000	(38,459)	(103,459)
2013-14	103,000	(164,422)	(267,422)
2014-15	102,000	692,055	590,055
2015-16	292,000	383,612	91,612
2016-17	587,000	490,682	(96,318)
2017-18	1,842,000	980,296	(861,704)
Total	\$3,035,000	\$2,477,299	(\$557,701)

As shown, actual incurred development was less than anticipated since the prior report. Based on the assumptions from the prior report, it was expected that incurred losses would increase by \$3,035,000 between the two evaluation dates. However, actual development was approximately \$2,477,000; or about \$558,000 less than expected. Although most accident years are emerging lower than expected, this favorable experience is partially offset by the unfavorable experience during the 2014-15 and 2015-16 accident years which are emerging much greater than expected.

In the table below we display actual versus expected development of paid losses and ALAE by accident year between the January 31, 2018 evaluation date of the prior report and the September 30, 2018 evaluation date of the current report.

Actual Versus Expected Paid Loss and ALAE Development

Accident Year	Expected Paid Development	Actual Paid Development	Actual Minus Expected
Prior	\$60,000	\$6,345	(\$53,655)
1998-99	0	0	0
1999-00	0	0	0
2000-01	0	0	0
2001-02	0	0	0
2002-03	102,000	399,090	297,090
2003-04	0	0	0
2004-05	0	0	0
2005-06	1,000	0	(1,000)
2006-07	0	0	0
2007-08	45,000	1,136	(43,864)
2008-09	0	0	0
2009-10	3,000	764	(2,236)
2010-11	13,000	1,160	(11,840)
2011-12	39,000	95,786	56,786
2012-13	63,000	101,066	38,066
2013-14	133,000	58,266	(74,734)
2014-15	509,000	1,037,081	528,081
2015-16	967,000	823,456	(143,544)
2016-17	1,118,000	658,453	(459,547)
2017-18	661,000	252,325	(408,675)
Total	\$3,714,000	\$3,434,928	(\$279,072)

As shown, actual paid development was less than anticipated since the prior report. Based on the assumptions from the prior report, it was expected that paid losses would increase by \$3,714,000 between the two evaluation dates. However, actual development was approximately \$3,435,000 or about \$279,000 less than expected. Although, most accident years are emerging lower than anticipated, this favorable development is partially offset by the unfavorable development for the 2011-12, 2012-13, and the 2014-15 accident years.

In the table below we display the change in our estimates of the program's ultimate losses and ALAE by accident year since our prior report.

Change in Ultimate Loss and ALAE

Accident Year	Prior Report	Current Report	Change In Ultimate
Prior	9,295,516	9,295,516	0
1998-99	2,510,333	2,510,333	0
1999-00	1,935,613	1,935,613	0
2000-01	3,056,849	3,056,849	0
2001-02	1,987,998	1,987,998	0
2002-03	3,700,584	3,814,921	114,337
2003-04	2,210,245	2,210,245	0
2004-05	3,113,942	3,113,942	0
2005-06	4,729,000	4,728,560	(440)
2006-07	5,875,500	5,875,102	(398)
2007-08	5,689,500	5,689,000	(500)
2008-09	2,662,500	2,663,000	500
2009-10	7,299,000	7,300,000	1,000
2010-11	4,475,000	4,466,000	(9,000)
2011-12	6,207,000	6,195,000	(12,000)
2012-13	3,797,000	3,624,000	(173,000)
2013-14	4,110,000	3,835,000	(275,000)
2014-15	5,496,000	6,157,000	661,000
2015-16	6,477,000	6,519,000	42,000
2016-17	7,651,000	7,658,000	7,000
2017-18	6,575,000	5,617,000	(958,000)
Total	\$98,854,580	\$98,252,079	(\$602,501)

As shown, overall we have decreased our estimated ultimate losses by \$603,000 since our prior report. This decrease can be tied to less than anticipated loss development between the two reports as previously discussed.

At the time of the prior report, we estimated the liability for outstanding claims as of June 30, 2018 to be \$14,056,000 at the discounted, expected level. Our current estimate as of June 30, 2019, is \$14,151,000, an increase in our assessment of MPA's outstanding liabilities, as shown below:

Outstanding Claim Liabilities for Loss and LAE

	Prior Report at June 30, 2018	Current Report at June 30, 2019	Change
(A) Case Reserves:	\$8,208,000	\$7,553,000	(\$655,000)
(B) IBNR Reserves:	5,926,000	6,718,000	792,000
(C) Claims Administration Reserves:	647,000	620,000	(27,000)
(D) Total Reserves:	\$14,781,000	\$14,891,000	\$110,000
(E) Offset for Investment Income:	(725,000)	(740,000)	(15,000)
(F) Total Outstanding Claim Liabilities:	\$14,056,000	\$14,151,000	\$95,000

As shown, our estimate of outstanding claims liabilities at the discounted, expected level has increased between June 30, 2018 and June 30, 2019 as reflected in our prior and current reports respectively.

The increase in claim reserves (case and IBNR) is driven primarily by growth in ultimate losses in the more recent years. Reserves for future claims administration expenses have increased, resulting in an \$110,000 increase in total claim reserves. This increase in reserves leads to a larger offset for investment income. The net change due to the above factors is an overall increase of \$95,000 in our estimate of outstanding claim liabilities for loss and LAE.

At the time of the prior report, available assets were estimated to be \$19,933,000 as of June 30, 2018, which corresponded to the then-estimated discounted liability for outstanding claims above the 90% confidence level. Available assets are currently estimated to be \$23,108,000 as of June 30, 2019, which again corresponds to the currently estimated liability for outstanding claims above the 90% confidence level. It can be summarized as follows:

Funding Margin			
	Prior Report at June 30, 2018	Current Report at June 30, 2019	Change
(A) Outstanding Liability at the Discounted Expected Level:	\$14,056,000	\$14,151,000	\$95,000
(B) Estimated Assets At June 30:	19,933,000	23,108,000	3,175,000
(C) Surplus:	\$5,877,000	\$8,957,000	\$3,080,000

As you can see, our estimate of the program's funding margin at the discounted, expected level has increased by \$3,080,000 between June 30, 2018 (as previously estimated) and June 30, 2019 (as currently estimated). This is driven by an increase in the estimated fund assets between the two points, somewhat offset by an increase in the estimated outstanding liability.

At the time of the prior report, our funding estimate for the 2018-19 year was \$11,161,000 at the discounted, 80% confidence level. That amount included allocated loss adjustment expenses (ALAE) and a discount for anticipated investment income, as well as all other program expenses. Our current estimate for the 2019-20 year is \$12,467,000 at the discounted, 80% confidence level, an increase in the program's expected loss costs, as shown in the table below:

Comparison of Funding for Loss and LAE

	Prior Report 2018-19 SIR = \$1,000,000	Current Report 2019-20 SIR = \$1,000,000	Change
(A) Ultimate Loss and ALAE:	\$4,993,000	\$5,416,000	\$423,000
(B) Offset for Investment Income:	(285,000)	(310,000)	(25,000)
(C) Recommended Loss and ALAE Funding:	\$4,708,000	\$5,106,000	398,000
(D) 80% Risk Margin:	1,615,000	1,736,000	121,000
(E) CARMA:	3,108,000	3,718,000	610,000
(F) Non-Claim Related Expenses:	1,730,000	1,907,000	177,000
(G) Total Funding:	11,161,000	12,467,000	1,306,000
(H) Rate:	3.437	3.755	0.318

As you can see, our discounted funding recommendations at the 80% confidence level have increased between 2018-19 and 2019-20, as shown in our prior and current reports respectively.

Our estimates of ultimate loss and ALAE have increased by \$423,000. This is driven primarily by an increase in payroll. Investment income is expected to be higher, resulting in an overall increase of \$398,000 in our annual funding estimate for loss and ALAE. The CARMA premium and other non-claim related expenses (claims administration, personnel, etc.) for 2019-20 are an increase over the 2018-19 budget, resulting in an overall increase of \$1,306,000 in our annual funding estimate.

E. DATA PROVIDED FOR THE ANALYSIS

Overall, the data utilized in preparing this report appears to be accurate.

Comments and issues regarding the data are as follows:

- We have assumed that the program's self-insured retention will remain at \$1,000,000 per occurrence for 2018-19 and 2019-20 (See Pool - Appendix J).
- We estimated the June 30, 2019 asset balance by beginning with the June 30, 2018 asset balance, and adjusting for anticipated revenue and expense for 2018-19 (see Pool - Exhibit 5).
- We received loss data evaluated as of September 30, 2018 (See Pool - Appendix K). We also utilized the data from MPA's most recent actuarial study for our assessment of loss development.
- We have assumed that MPA's payroll for 2018-19 will be \$332,012,023 based upon information provided by MPA (See Pool - Appendix L).

The data provided for the analysis appears to be reasonable for use in this actuarial valuation of liabilities and projection of loss costs.

III. ASSUMPTIONS AND LIMITATIONS

Any quantitative analysis is developed within a very specific framework of assumptions about conditions in the outside world, and actuarial analysis is no exception. We believe that it is important to review the assumptions we have made in developing the estimates presented in this report. By doing so, we hope you will gain additional perspective on the nature of the uncertainties involved in maintaining a self-insurance program. Our assumptions, and some observations about them, are as follows:

- Our analysis is based on loss experience, exposure data, and other general and specific information provided to us by MPA. We have accepted all of this information without audit.
- We have also made use of loss statistics that have been developed from the information gathered and compiled from other California public entities participating in an excess insurance liability program.
- We assumed that the future development of incurred and paid losses can be reasonably predicted on the basis of development of such losses in the recent past. We have also assumed that the historical development patterns for the participants of other California public entities with self-insured liability programs in the aggregate form a reasonable basis of comparison to the patterns from MPA's data.
- We have made use of cost relationships for claims of various sizes derived from the most recent actuarial review of other California public entities with self-insured liability programs in the aggregate.
- We have assumed that there is a continuing relationship between past and future loss costs.
- It is not possible to predict future claim costs precisely. Most of the costs of liability claims arise from a small number of incidents involving serious injury. A relatively small number of such claims could generate enough loss dollars to significantly reduce, or even deplete, the self-insurance fund.
- We cannot predict and have not attempted to predict the impact of future law changes and court rulings on claims costs. This is one major reason why we believe our funding recommendations are reasonable now, but should not be extrapolated into the future.
- We have assumed that the loss rate trend associated with claim costs increases at 2.5% per year. We have assumed that claim severity increases at 2.0% per year, and that claim frequency increases at 0.5% per year.
- We have assumed that payroll and other inflation-sensitive exposure measures increase 2.5% annually due to inflation.

- At MPA's instruction, we have assumed that assets held for investment will generate an average annual return of 2.0% over the duration of payment of the loss liabilities. It should be noted that actual future investment returns may vary significantly from this assumption, depending upon the prevailing investment market conditions.
- The claims costs we have estimated include indemnity and medical payments, and all loss adjustment expenses. We have included estimates for CARMA excess insurance contributions and other expenses associated with the program based upon information provided by MPA.
- Our funding recommendations do not include provisions for catastrophic events not in MPA's history, such as earthquakes, flooding, mass civil disorder, or mass occupational disease.
- Our estimates assume that all excess insurance is valid and collectible. Further, our funding recommendations do not include a provision for losses greater than MPA's excess coverage.
- MPA's assets available for the program are estimated to be \$23,108,000 as of June 30, 2019 for use in this report. This is shown in further detail in Pool - Exhibit 5.

IV. GLOSSARY OF ACTUARIAL TERMS

Accident Year - Year during which the accidents that generate a group of claims occurs, regardless of when the claims are reported, payments are made, or reserves are established.

Allocated Loss Adjustment Expenses (ALAE) - Expense incurred in settling claims that can be directly attributed to specific individual claims (e.g., legal fees, investigative fees, court charges, etc.)

Case Reserve - The amount left to be paid on a claim, as estimated by the claims administrator.

Claim Count Development Factor - A factor that is applied to the number of claims reported in a particular accident period in order to estimate the number of claims that will ultimately be reported.

Claim Frequency - Number of claims per \$1 million of payroll.

Confidence Level - An estimated probability that a given level of funding will be adequate to pay actual claims costs. For example, the 85% confidence level refers to an estimate for which there is an 85% chance that the amount will be sufficient to pay loss costs.

Discount Factor - A factor to adjust estimated loss costs to reflect anticipated investment income from assets held prior to actual claim payout.

Expected Losses - The best estimate of the full, ultimate value of loss costs.

Incurred but not Reported (IBNR) Losses - Losses for which the accident has occurred but the claim has not yet been reported. This is the ultimate value of losses, less any amount that has been set up as reported losses by the claims adjuster. It includes both amounts for claims incurred but not yet received by the administrator and loss development on already reported claims.

Loss Development Factor - A factor applied to losses for a particular accident period to reflect the fact that reported and paid losses do not reflect final values until all claims are settled (see Section IV).

Loss Rate - Ultimate losses per \$100 of payroll.

Non-Claims Related Expenses – Program expenses not directly associated with claims settlement and administration, such as excess insurance, safety program expenses, and general overhead. These exclude expenses associated with loss settlements (Indemnity/Medical, BI/PD), legal expenses associated with individual claims (ALAE), and claims administration (ULAE).

Outstanding Losses - Losses that have been incurred but not paid. This is the ultimate value of losses less any amount that has been paid.

Paid Losses - Losses actually paid on all reported claims.

Program Losses - Losses, including ALAE, limited to the SIR for each occurrence.

Reported Losses - The total expected value of losses as estimated by the claims administrator. This is the sum of paid losses and case reserves.

Self-Insured Retention (SIR) - The level at which an excess insurance policy is triggered to begin payments on a claim. Financially, this is similar to an insurance deductible.

Severity - Average claim cost.

Ultimate Losses - The value of claim costs at the time when all claims have been settled. This amount must be estimated until all claims are actually settled.

Unallocated Loss Adjustment Expenses (ULAE) – Claim settlement expenses that cannot be directly attributed to individual claims (e.g., claims adjusters' salaries, taxes, etc.)

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Funding Guidelines for Outstanding Liabilities at
June 30, 2019

(A) Estimated Ultimate Losses Incurred through 6/30/19: (From Pool - Appendix F)	\$75,407,000
(B) Estimated Paid Losses through 6/30/19: (From Pool - Appendix F)	61,136,000
(C) Estimated Liability for Claims Outstanding at 6/30/19: (From Pool - Appendix F)	<u>\$14,271,000</u>
(D) Estimated Liability for Outstanding Claims Administration Fees at 6/30/19:	620,000
(E) Total Outstanding Liability for Claims at 6/30/19: ((C) + (D))	<u>\$14,891,000</u>
(F) Reserve Discount Factor (Based on a Discount Rate of 2.0%. (Pool - Appendix H, Page 1, (H))	0.950
(G) Discounted Outstanding Liability for Claims at 6/30/19: ((E) x (F))	<u>\$14,151,000</u>

	Marginally Acceptable		Recommended		Conservative
Confidence Level of Adequacy:	70%	75%	80%	85%	90%
(H) Confidence Level Factor: (From Pool - Appendix I)	1.110	1.158	1.213	1.283	1.377
(I) Margin for Adverse Experience: (((G)-(D)) x [(H) - 1])	1,557,000	2,236,000	3,014,000	4,005,000	5,335,000
(J) Total Required Available Funding at 6/30/19:					
Undiscounted ((C) x (H) + (D))	<u>\$16,529,000</u>	<u>\$17,244,000</u>	<u>\$18,063,000</u>	<u>\$19,105,000</u>	<u>\$20,505,000</u>
NPV ((G) + (I))	15,708,000	16,387,000	17,165,000	18,156,000	19,486,000
(K) Estimated Actual Funding at 6/30/19: From Exhibit 6	\$23,108,000	\$23,108,000	\$23,108,000	\$23,108,000	\$23,108,000
(L) Indicated Funding Redundancy/ (Deficiency):					
Undiscounted	<u>\$6,579,000</u>	<u>\$5,864,000</u>	<u>\$5,045,000</u>	<u>\$4,003,000</u>	<u>\$2,603,000</u>
NPV	7,400,000	6,721,000	5,943,000	4,952,000	3,622,000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Funding Options for Program Year 2019-2020 (SIR = \$1,000,000)
One-Year Funding Plan

	<u>Dollar Amount</u>				
(A) Estimated Ultimate Losses Incurred in Accident Year 2019-2020: (From Pool - Appendix F)	\$5,416,000				
(B) Loss Discount Factor (Based on a Discount Rate of 2.0%.) (Pool - Appendix H, Page 2, (F))	0.943				
(C) Discounted Total Claims Costs Incurred in Accident Year 2019-2020: ((C) x (D))	<u>\$5,106,000</u>				
	<u>Marginally Acceptable</u>	<u>Recommended</u>			<u>Conservative</u>
	70%	75%	80%	85%	90%
(D) Confidence Level Factor: (From Pool - Appendix I)	1.166	1.246	1.340	1.458	1.615
(E) Margin for Adverse Experience: ((C) x [(D) - 1])	848,000	1,256,000	1,736,000	2,339,000	3,140,000
(F) Recommended Funding in 2019-2020 for Claims Costs and Other Expenses ((C) + (E))	<u>\$5,954,000</u>	<u>\$6,362,000</u>	<u>\$6,842,000</u>	<u>\$7,445,000</u>	<u>\$8,246,000</u>
(G) CARMA Expenses (Provided by the Authority)	3,718,000	3,718,000	3,718,000	3,718,000	3,718,000
(H) Administrative Expenses (Provided by the Authority)	1,907,000	1,907,000	1,907,000	1,907,000	1,907,000
(I) Total Recommended Funding in 2019-2020 ((F) + (G))	<u>\$11,579,000</u>	<u>\$11,987,000</u>	<u>\$12,467,000</u>	<u>\$13,070,000</u>	<u>\$13,871,000</u>

Municipal Pooling Authority - Liability - 100K & SIR Analyses

IBNR as of 6/30/19 at Expected Claims Level

Accident Year	Estimated Ultimate (A)	Reported as of 9/30/18 (B)	Estimated IBNR as of 9/30/18 (C)	Estimated Percent of IBNR Reported Between 10/1/18 and 6/30/19 (D)	Estimated IBNR Reported (E)	Estimated IBNR as of 6/30/19 (F)
Prior	\$6,108,185	\$6,108,185	\$0	100.0%	\$0	\$0
1998-1999	1,373,136	1,373,136	0	100.0%	0	0
1999-2000	1,034,249	1,034,249	(0)	100.0%	0	(0)
2000-2001	2,164,131	2,164,131	0	100.0%	0	0
2001-2002	1,053,868	1,053,868	0	100.0%	0	0
2002-2003	2,196,731	2,196,731	0	100.0%	0	0
2003-2004	1,294,611	1,294,611	(0)	100.0%	0	(0)
2004-2005	2,370,149	2,370,149	(0)	100.0%	0	(0)
2005-2006	3,590,940	3,590,940	(0)	100.0%	0	(0)
2006-2007	4,639,142	4,639,142	0	100.0%	0	0
2007-2008	4,547,325	4,547,107	218	100.0%	218	0
2008-2009	1,806,000	1,805,742	258	100.0%	258	(0)
2009-2010	5,816,000	5,814,541	1,459	100.0%	1,459	0
2010-2011	3,455,000	3,445,359	9,641	100.0%	9,641	(0)
2011-2012	4,799,000	4,769,050	29,950	39.9%	12,000	17,950
2012-2013	2,478,000	2,431,991	46,009	45.8%	21,000	25,009
2013-2014	2,772,000	2,567,132	204,868	40.1%	82,000	122,868
2014-2015	4,483,000	4,262,550	220,450	36.9%	81,000	139,450
2015-2016	4,593,000	4,094,161	498,839	45.2%	225,000	273,839
2016-2017	5,851,000	4,765,652	1,085,348	34.6%	376,000	709,348
2017-2018	4,005,000	462,115	3,542,885	41.2%	1,460,000	2,082,885
2018-2019	4,977,000	19,072	1,225,000	32.5%	1,611,000	3,346,928
Totals	\$75,407,467	\$64,809,613	\$6,864,926		\$3,879,576	\$6,718,278

Notes:

- (A) From Pool - Exhibit 3, Page 2.
- (B) Provided by the Authority. These losses exclude amounts incurred above the Authority's SIR for each year.
- (C) (A) - (B).
- (D) Percentage of incurred but not reported (IBNR) expected to be reported between 10/1/18 and 6/30/19. The percentage is based on the development pattern selected in Pool - Appendix A.
- (E) ((A) - (B)) x (D).
- (F) (A) - (B) - (E).

This exhibit shows the calculation of the amount of incurred but not reported losses we expect as of 6/30/19. This amount is dependent on both the strength of the case reserves and the average frequency and severity of the losses incurred.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Estimated Ultimate Limited Losses Within Member Deductible

Accident Year	Paid Losses Within Member Deductible as of 9/30/18 (A)	Case Reserves Within Member Deductible as of 9/30/18 (B)	Incurred Losses Within Member Deductible as of 9/30/18 (C)	Implicit Incurred Loss Development Factor (D)	Deductible (E)	Ratio of Losses Within Deductible to Loss Limited to \$100,000 (F)	Adjustment Incurred Loss Development Factor (G)	Ultimate Losses Within Member Deductible (H)
Prior	\$3,187,331	\$0	\$3,187,331	1.000	Various	0.561	1.000	\$3,187,331
1998-1999	1,137,197	0	1,137,197	1.000	Various	0.598	1.000	1,137,197
1999-2000	901,364	0	901,364	1.000	Various	0.905	1.000	901,364
2000-2001	892,718	0	892,718	1.000	Various	0.713	1.000	892,718
2001-2002	934,130	0	934,130	1.000	Various	0.623	1.000	934,130
2002-2003	1,617,696	494	1,618,190	1.000	Various	0.679	1.000	1,618,190
2003-2004	915,634	0	915,634	1.000	Various	0.549	1.000	915,634
2004-2005	743,793	0	743,793	1.000	Various	0.544	1.000	743,793
2005-2006	1,137,620	0	1,137,620	1.000	Various	0.387	1.000	1,137,620
2006-2007	1,235,960	0	1,235,960	1.000	Various	0.534	1.000	1,235,960
2007-2008	1,141,668	7	1,141,675	1.000	Various	0.467	1.000	1,141,675
2008-2009	856,452	206	856,658	1.000	Various	0.470	1.000	857,000
2009-2010	1,473,004	11,377	1,484,381	1.000	Various	0.471	1.000	1,484,000
2010-2011	1,001,067	10,376	1,011,443	1.001	Various	0.409	1.000	1,011,000
2011-2012	1,395,557	0	1,395,557	1.002	Various	0.476	1.000	1,396,000
2012-2013	1,145,867	0	1,145,867	1.003	Various	0.617	1.000	1,146,000
2013-2014	1,045,606	14,606	1,060,212	1.004	Various	0.520	1.002	1,063,000
2014-2015	1,537,210	126,907	1,664,117	1.009	Various	0.663	1.006	1,674,000
2015-2016	1,578,762	316,743	1,895,505	1.027	Various	0.590	1.016	1,926,000
2016-2017	1,055,293	658,734	1,714,026	1.104	Various	0.526	1.055	1,807,000
2017-2018	323,258	670,517	993,776	1.895	Various	0.695	1.622	1,612,000

Totals \$25,257,188 \$1,809,967 \$27,067,155 \$27,821,612

Projected Losses within Member Deductible for the Year 2018-2019 (I) \$1,793,000
 Projected Losses within Member Deductible for the Year 2019-2020 (J) \$1,850,000

Notes:

- (A) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (B) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (C) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (D) Based on the reported incurred losses limited to \$100,000 and the selected ultimate limited losses. from Pool - Exhibit 3, Page 4.
- (E) Based on individual member deductible per fiscal year and corresponding payroll.
- (F) Based on the ratio of losses to a \$100,000 limit.
- (G) Based on (D) and (F)
- (H) (C) x (G). This amount includes only the portion of loss under the members' deductible.
- (I)-(K) Based on the ratio of loss within member deductible to the ultimate loss. Assumes no deductibles change from 2017-2018.

This exhibit shows the calculation of estimated ultimate losses within the member deductible for each year based on paid losses and case reserves within the members deductible as reported by the claims administrator. These losses tend to "develop" or change from period to period as more information becomes available about the cases.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Estimated Ultimate Limited Losses Capped at \$100,000 per Claim

Accident Year	Reported Loss Development Method (A)	Paid Loss Development Method (B)	Exposure Method Based on Reported Losses (C)	Exposure Method Based on Paid Losses (D)	Frequency-Severity Method (E)	Selected Ultimate Limited Losses (F)
Prior	\$6,046,484	\$6,046,484	\$0	\$0	\$6,046,826	\$6,046,484
1998-1999	1,930,023	1,930,023			1,930,075	1,930,023
1999-2000	1,497,656	1,497,656			1,497,564	1,497,656
2000-2001	1,504,580	1,504,580			1,504,554	1,504,580
2001-2002	1,647,105	1,647,105			1,647,000	1,647,105
2002-2003	2,042,623	2,044,170			2,042,613	2,042,623
2003-2004	1,542,158	1,545,242	1,542,158	1,545,243	1,542,200	1,542,158
2004-2005	1,313,942	1,317,884	1,313,942	1,317,883	1,314,019	1,313,942
2005-2006	2,772,583	2,783,673	2,772,583	2,783,673	2,772,503	2,772,583
2006-2007	2,280,213	2,291,560	2,280,213	2,291,556	2,280,285	2,280,213
2007-2008	2,415,240	2,413,160	2,415,240	2,413,257	2,415,175	2,415,240
2008-2009	1,611,115	1,623,796	1,611,115	1,623,795	1,611,179	1,611,115
2009-2010	2,945,599	2,963,563	2,945,599	2,963,665	2,945,984	2,946,000
2010-2011	2,150,126	2,165,897	2,150,127	2,166,041	2,150,064	2,150,000
2011-2012	2,865,584	2,871,793	2,865,598	2,872,525	2,865,961	2,866,000
2012-2013	1,841,103	1,891,961	1,841,116	1,890,277	1,841,061	1,841,000
2013-2014	1,994,128	2,056,355	1,995,392	2,065,969	2,350,986	1,995,000
2014-2015	2,473,773	2,470,815	2,473,422	2,465,015	2,237,967	2,474,000
2015-2016	3,131,012	3,225,817	3,119,565	3,116,588	2,719,534	3,125,000
2016-2017	3,027,212	3,500,365	3,022,832	3,189,916	2,941,762	3,185,000
2017-2018	2,007,477	1,881,364	2,306,289	2,792,212	2,729,472	2,655,000
Totals						\$49,840,722
			Projected Losses for the Year 2018-2019 (G)			\$3,155,000
			Projected Losses for the Year 2019-2020 (H)			\$3,336,000

Notes:

- (A) From Pool - Appendix A, Page 1, Column (D).
- (B) From Pool - Appendix B, Page 1, Column (D).
- (C) Based on results in Pool - Appendix C, Page 1.
- (D) Based on results in Pool - Appendix C, Page 2.
- (E) Based on results in Pool - Appendix D, Page 1.
- (F) Selected averages of (A), (B), (C), (D), and (E).
- (G) From Pool - Exhibit 9, Page 1, Line (K) / Line (G) .
- (H) From Pool - Exhibit 9, Page 1, Line (K) / Line (G) .

This exhibit summarizes the results of the actuarial methods we have applied to estimate limited losses for each year. These results are used to select a limited loss rate for future years.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Selection of Increased Limits Factors (\$100,000 to \$1,000,000) for 2018-2019 and 2019-2020

Accident Year	Self-Insured Retention (A)	\$100,000 Limited Selected Ultimate Losses (B)	\$1,000,000 Limited Selected Ultimate Losses (C)	Implied Increased Limits Factor (D)	Modeled Increased Limits Factor (E)
Prior	\$1,000,000				1.267
1998-1999	1,000,000	1,930,023	2,510,333	1.301	1.473
1999-2000	1,000,000	1,497,656	1,935,613	1.292	1.497
2000-2001	1,000,000	1,504,580	3,056,849	2.032	1.522
2001-2002	1,000,000	1,647,105	1,987,998	1.207	1.548
2002-2003	1,000,000	2,042,623	3,814,921	1.868	1.575
2003-2004	1,000,000	1,542,158	2,210,245	1.433	1.605
2004-2005	1,000,000	1,313,942	3,113,942	2.370	1.634
2005-2006	1,000,000	2,772,583	4,728,560	1.705	1.664
2006-2007	1,000,000	2,280,213	5,875,102	2.577	1.697
2007-2008	1,000,000	2,415,240	5,689,000	2.355	1.728
2008-2009	1,000,000	1,611,115	2,663,000	1.653	1.763
2009-2010	1,000,000	2,946,000	7,300,000	2.478	1.797
2010-2011	1,000,000	2,150,000	4,466,000	2.077	1.832
2011-2012	1,000,000	2,866,000	6,195,000	2.162	1.868
2012-2013	1,000,000	1,841,000	3,624,000	1.968	1.906
2013-2014	1,000,000	1,995,000	3,835,000	1.922	1.944
2014-2015	1,000,000	2,474,000	6,157,000	2.489	1.983
2015-2016	1,000,000	3,125,000	6,519,000	2.086	2.022
2016-2017	1,000,000	3,185,000	7,658,000	2.404	2.064
2017-2018	1,000,000	2,655,000	5,617,000	2.116	2.104
Total ex Latest 2 Years		37,954,238	75,681,563	1.994	
Total 12/13-17/18		15,275,000	33,410,000	2.187	
All Years		43,794,238	88,956,563	2.031	
		Prior Selected 2017-2018 \$100K-SIR ILF:		2.132	
		(F) Selected 2018-2019 \$100K-SIR ILF:		2.146	
		(G) Selected 2019-2020 \$100K-SIR ILF:		2.178	

Notes:

- (A) Provided by the Authority.
- (B) From Pool - Exhibit 3, Page 4.
- (C) From , .
- (D) (C) / (B).
- (E) From Pool - Appendix C, Page 3.
- (F) - (G) Based on columns (D) and (E) - trended for inflation.

Municipal Pooling Authority - Liability
2019-20 Funding
at 80% Confidence Level

Deductible Amount	Per \$100 of Payroll		Excess of Deductibles to the Program's Self-Insured Retention At 80% Confidence Level Per \$100 of Payroll (E)	Present Value Factor at 2.0% Interest (F)	Recommended Unbalanced Funding Per \$100 of Payroll For Losses From In Excess of Deductibles to the Program's Self-Insured Retention (G)	Off Balance Factor (H)	Recommended Balanced Funding Per \$100 of Payroll For Losses From In Excess of Deductibles to the Program's Self-Insured Retention (I)	Estimated Operating and Administrative Expenses Per \$100 of Payroll (J)	Estimated Excess Insurance Premium Per \$100 of Payroll (K)	Rates Per \$100 of Payroll (L)	2018-19 Payroll (M)	2019-20 Recommended Funding (N)
	Excess of Deductibles to \$100,000 Per Occurrence (A)	Excess of Occurrence to the Program's Self-Insured Retention (B)										
\$5,000	\$0.816	\$1.184	\$2.680	0.961	\$2.575	0.991	\$2.551	\$0.574	\$1.120	\$4.245	\$70,177,104	\$2,979,000
10,000	0.715	1.184	2.545	0.958	2.437	0.991	2.415	0.574	1.120	4.109	59,524,545	2,446,000
25,000	0.508	1.184	2.267	0.953	2.161	0.991	2.141	0.574	1.120	3.835	69,076,823	2,649,000
50,000	0.284	1.184	1.967	0.934	1.837	0.991	1.820	0.574	1.120	3.514	57,749,253	2,029,000
100,000	0.000	1.184	1.587	0.914	1.451	0.991	1.438	0.574	1.120	3.132	75,484,298	2,364,000
											Total: \$332,012,023	\$12,467,000

(A) Based on deductible analysis and Pool - Exhibit 3, Page 4.

(B) Based on \$100K & \$1M analyses and Exhibit 6.

(C) (A) + (B)

(D) Based on Pool - Appendix I

(E) (C) x (D)

(F) Based on Pool - Appendix H

(G) (E) x (F)

(H) Off-Balance Factor

(I) (G) x (H)

(J) Includes projected Fiscal Year 2019-20 Administrative Expenses Premium of \$0.574 per \$100 of payroll.

(K) Includes projected Fiscal Year 2019-20 Excess Insurance Premium of \$1.120 per \$100 of payroll. Includes CARMA, but excludes ERMA EPL Premium.

(L) (I) + (J) + (K)

(M) Provided by Authority

(N) (L) x (M)

Municipal Pooling Authority - Liability

Estimated Financial Position of the Liability
Insurance Pool as of June 30, 2019

Liability Insurance

1. Estimated Assets Available to Pay Claims as of June 30, 2018	\$21,795,000
2. Premiums Collected in Fiscal Year 2018-2019 (gross of member rebates and retrospective premiums)	\$12,471,000
3. Estimated Investment Income Earned in Fiscal Year 2018-2019 at 2.0% Interest	\$135,000
4. Other Income (Reserves)	7,000
5. Operating and Administrative Expenses Estimated for between 2/1/19 and 6/30/19 (including the excess insurance premium and the premium for coverage of employment practices liability claims)	6,101,000
6. Estimated Pooled Losses Paid in Fiscal Year 2018-2019	5,199,000
7. Estimated Assets Available to Pay Claims as of June 30, 2019 (1)+(2)+(3)+(4)-(5)-(6)	\$23,108,000
8a. Estimated Claim Liability Reserve for Pooled Losses as of June 30, 2019	14,271,000
8b. Estimated Liability for Outstanding Claims Administration Fee as of June 30, 2019	620,000
9. Excess (Deficiency) of the Net Assets of the Liability Insurance Pool in Comparison With the Estimated Claim Liability Reserve as of June 30, 2019. (7)-(8a)-(8b)	8,217,000
10a. Estimated Present Value of the Claim Liability Reserve for Pooled Losses as of June 30, 2019	\$13,562,000
10b. Estimated Present Value of Outstanding Liability for Claims Administration Fee as of June 30, 2019	\$589,000
11. Excess (Deficiency) of Assets Available to Pay Claims in Comparison With the Estimated Present Value of the Claim Liability Reserve as of June 30, 2019 (7)-(10a)-(10b)	\$8,957,000

Municipal Pooling Authority - Liability

Estimated Assets Available to Pay Claims
as of June 30, 2018

Liability Insurance

Assets:

1. Cash and Cash Equivalents as of June 30, 2018	\$7,564,000
2. Investments as of June 30, 2018	-
3. Receivables as of June 30, 2018	
Member Agencies	185,000
Excess Insurance	-
Interest	101,000
Other	503,000
Interprogram Receivables	-
Total	
4. Prepaid Expenses as of June 30, 2018	<u>39,000</u>
5. Total Current Assets as of June 30, 2018	\$8,393,000
6. Member Agencies Receivable as of June 30, 2018	-
7. Interprogram Receivables as of June 30, 2018	-
8. Investments as of June 30, 2018	13,518,000
9. Capital Assets (Net) as of June 30, 2018	<u>43,000</u>
10. Total Noncurrent Assets as of June 30, 2018	\$13,561,000
11. Total Assets as of June 30, 2018 (5)+(10)	<u>=====</u> \$21,954,000
Non- Claims Liabilities:	
12. Accounts Payable as of June 30, 2018	-
13. Accrued Vacation & Payroll Payable as of June 30, 2018	32,000
14. Other Payable as of June 30, 2018	83,000
15. Member Dividends Payable as of June 30, 2018	-
16. Capital Assets (Net) as of June 30, 2018	43,000
17. Total Liabilities as of June 30, 2018	<u>=====</u> \$159,000
18. Estimated Assets Available to Pay Claims as of June 30, 2018 (11)-(17)	\$21,795,000

Municipal Pooling Authority - Liability

Selected Increased Limit Factors

	Trended Incurred Losses Limited to										
	\$5,000	\$10,000	\$25,000	\$50,000	\$100,000	\$150,000	\$250,000	\$500,000	\$1,000,000	\$2,500,000	Unlimited
2007-2008	493,864	793,079	1,389,077	1,875,189	2,553,359	3,155,456	3,728,639	4,978,639	6,842,279	7,451,050	7,451,050
2008-2009	482,355	748,399	1,291,143	1,887,645	2,729,763	3,285,335	4,130,915	5,570,207	6,586,537	7,073,285	7,073,285
2009-2010	426,756	609,790	962,924	1,394,473	1,832,543	2,099,057	2,276,456	2,526,456	3,026,456	3,245,450	3,245,450
2010-2011	568,016	929,894	1,626,474	2,312,384	3,237,821	3,893,521	4,909,972	6,714,681	8,638,787	8,722,888	8,722,888
2011-2012	456,796	689,037	1,152,886	1,684,093	2,336,283	2,816,958	3,548,854	4,374,497	5,052,308	5,223,968	5,223,968
2012-2013	458,312	693,044	1,256,203	1,984,273	3,044,660	3,717,803	4,608,348	5,496,256	6,787,772	7,085,143	7,085,143
2013-2014	420,066	646,761	1,085,664	1,493,519	1,991,562	2,291,562	2,834,332	3,379,476	3,902,281	4,028,443	4,028,443
2014-2015	442,743	663,598	1,092,128	1,556,390	2,097,190	2,466,131	2,861,731	3,361,731	3,905,433	4,009,513	4,009,513
2015-2016	448,138	686,983	1,204,442	1,780,248	2,578,653	3,136,912	3,973,049	5,174,570	6,666,958	6,817,454	6,817,454
2016-2017	554,170	863,287	1,526,129	2,317,642	3,280,898	3,928,997	4,991,635	6,800,653	7,538,916	7,538,916	7,538,916
2017-2018	549,355	848,882	1,506,980	2,325,975	3,307,709	4,002,423	4,978,141	6,105,535	7,939,962	9,078,995	9,078,995
Total	5,300,572	8,172,753	14,094,051	20,611,832	28,990,441	34,794,156	42,842,071	54,482,702	66,887,690	70,275,107	70,275,107
2007-2008	0.193	0.311	0.544	0.734	1.000	1.236	1.460	1.950	2.680	2.918	2.918
2008-2009	0.177	0.274	0.473	0.692	1.000	1.204	1.513	2.041	2.413	2.591	2.591
2009-2010	0.233	0.333	0.525	0.761	1.000	1.145	1.242	1.379	1.652	1.771	1.771
2010-2011	0.175	0.287	0.502	0.714	1.000	1.203	1.516	2.074	2.668	2.694	2.694
2011-2012	0.196	0.295	0.493	0.721	1.000	1.206	1.519	1.872	2.163	2.236	2.236
2012-2013	0.151	0.228	0.413	0.652	1.000	1.221	1.514	1.805	2.229	2.327	2.327
2013-2014	0.211	0.325	0.545	0.750	1.000	1.151	1.423	1.697	1.959	2.023	2.023
2014-2015	0.211	0.316	0.521	0.742	1.000	1.176	1.365	1.603	1.862	1.912	1.912
2015-2016	0.174	0.266	0.467	0.690	1.000	1.216	1.541	2.007	2.585	2.644	2.644
2016-2017	0.169	0.263	0.465	0.706	1.000	1.198	1.521	2.073	2.298	2.298	2.298
2017-2018	0.166	0.257	0.456	0.703	1.000	1.210	1.505	1.846	2.400	2.745	2.745
Total	0.183	0.282	0.486	0.711	1.000	1.200	1.478	1.879	2.307	2.424	2.424
7-Year Avg	0.179	0.273	0.473	0.705	1.000	1.200	1.491	1.862	2.243	2.349	2.349
5-Year Avg	0.182	0.280	0.484	0.715	1.000	1.194	1.482	1.873	2.260	2.374	2.374
3-Year Avg	0.169	0.262	0.462	0.701	1.000	1.207	1.521	1.972	2.416	2.556	2.556
Prior	0.190	0.292	0.497	0.718	1.000	1.192	1.449	1.762	2.132	2.224	2.231
Selection	0.188	0.289	0.495	0.717	1.000	1.195	1.460	1.773	2.146	2.239	2.246

Municipal Pooling Authority - Liability

Estimated Claim Liability Reserve For Pooled Losses as of

Claims Incurred in Fiscal Year:	Estimated Ultimate Losses Gross of Deductibles and Net of Excess Insurance Recoveries (1)	Estimated Ultimate Losses Within Deductibles (2)	Estimated Ultimate Pooled Losses (1)-(2) (3)	Estimated Ultimate Pooled Losses (4)	Pooled Losses Paid as of 9/30/2018 (5)	Estimated Pooled Losses Unpaid as of 9/30/2018 (3)+(4)-(5) (6)
Prior	\$9,295,516	\$3,187,331	\$6,108,185	\$0	\$6,054,707	\$53,000
1998-1999	2,510,333	1,137,197	1,373,136	0	1,373,136	0
1999-2000	1,935,613	901,364	1,034,249	0	1,034,249	0
2000-2001	3,056,849	892,718	2,164,131	0	2,164,131	0
2001-2002	1,987,998	934,130	1,053,868	0	1,053,868	0
2002-2003	3,814,921	1,618,190	2,196,731	0	1,968,835	228,000
2003-2004	2,210,245	915,634	1,294,611	0	1,294,611	0
2004-2005	3,113,942	743,793	2,370,149	0	2,370,149	0
2005-2006	4,728,560	1,137,620	3,590,940	0	3,586,420	5,000
2006-2007	5,875,102	1,235,960	4,639,142	0	4,638,938	0
2007-2008	5,689,000	1,141,675	4,547,325	0	4,215,375	332,000
2008-2009	2,663,000	857,000	1,806,000	0	1,805,643	0
2009-2010	7,300,000	1,484,000	5,816,000	0	5,814,477	2,000
2010-2011	4,466,000	1,011,000	3,455,000	0	3,412,789	42,000
2011-2012	6,195,000	1,396,000	4,799,000	0	4,723,224	76,000
2012-2013	3,624,000	1,146,000	2,478,000	0	2,430,682	47,000
2013-2014	3,835,000	1,063,000	2,772,000	0	2,562,132	210,000
2014-2015	6,157,000	1,674,000	4,483,000	0	3,067,014	1,416,000
2015-2016	6,519,000	1,926,000	4,593,000	0	2,154,987	2,438,000
2016-2017	7,658,000	1,807,000	5,851,000	0	1,489,073	4,362,000
2017-2018	5,617,000	1,612,000	4,005,000	0	22,581	3,983,000
2018-2019	6,770,000	1,793,000	4,977,000	0	0	4,977,000
Totals	\$105,022,079	\$29,614,612	\$75,407,467	\$0	\$57,237,021	\$18,171,000

(6) Estimated Pooled Losses Paid From 10/01/18 through 06/30/19 3,899,000

(7) Estimated Claim Liability Reserve as of 06/30/19 \$14,272,000

=====

Notes: 1. Losses include allocated loss expenses.

2. Fiscal years begin on July 1.

3. Losses on claims closed prior to 1992-93 are generally not included.

Municipal Pooling Authority - Liability

Present Value of the Estimated Claim Liability Reserve for Pooled Losses

Claims Incurred in Fiscal Year:	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39
Estimated Unpaid Losses as of 06/30/19 (000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Prior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998-1999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999-2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000-2001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001-2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002-2003	114	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003-2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005-2006	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006-2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007-2008	280	69	52	35	53	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0
2008-2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009-2010	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010-2011	32	10	6	3	3	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0
2011-2012	58	18	12	7	4	3	2	3	2	1	1	0	0	0	0	0	0	0	0	0
2012-2013	35	11	8	5	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0
2013-2014	165	53	36	24	16	9	5	4	3	4	3	1	1	0	0	0	0	0	0	0
2014-2015	1,017	318	222	150	103	67	40	23	18	12	18	12	6	6	0	0	0	0	0	0
2015-2016	1,699	656	327	228	154	105	69	41	24	18	12	18	12	6	6	0	0	0	0	0
2016-2017	3,058	1,232	705	351	245	165	113	74	44	25	26	19	13	19	7	7	0	0	0	0
2017-2018	3,238	1,143	844	483	240	168	113	78	51	30	17	13	9	13	9	4	4	0	0	0
2018-2019	4,569	969	1,271	939	537	267	187	86	56	33	19	13	15	10	15	10	5	5	0	0
Total	\$14,271	\$4,537	\$3,540	\$2,226	\$1,358	\$827	\$552	\$371	\$237	\$160	\$113	\$90	\$77	\$62	\$48	\$36	\$21	\$9	\$5	\$0
Present Value Factors at 2.0% Interest	0.947	0.954	0.954	0.950	0.945	0.944	0.943	0.941	0.939	0.936	0.937	0.941	0.947	0.955	0.963	0.968	0.965	0.971	0.971	0.990
Present Value of Future Payments (1)x(2)	\$4,296	\$3,378	\$2,124	\$1,291	\$781	\$521	\$350	\$224	\$150	\$106	\$84	\$73	\$59	\$46	\$35	\$20	\$9	\$5	\$5	\$0
Total Present Value of the Estimated Reserve (sum of line (3))	\$13,552																			

Notes: The loss payment pattern is based on the Authority's historical pattern of paying pooled liability insurance losses.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Selection of Projected Limited Loss Rate
and Projection of Program Losses and ULAE

Accident Year	Ultimate Limited Losses (A)	Trend Factor (B)	Trended Limited Losses (C)	Composite Exposure (D)	Trended Limited Loss Rate (E)
Prior	\$0	1.683	\$0	0	0.000
1998-1999	0	1.642	0	0	0.000
1999-2000	0	1.602	0	0	0.000
2000-2001	0	1.562	0	0	0.000
2001-2002	0	1.524	0	0	0.000
2002-2003	0	1.487	0	0	0.000
2003-2004	1,542,158	1.450	2,236,129	2,734,838	0.818
2004-2005	1,313,942	1.415	1,859,228	2,789,102	0.667
2005-2006	2,772,583	1.380	3,826,165	2,893,961	1.322
2006-2007	2,280,213	1.346	3,069,167	3,059,541	1.003
2007-2008	2,415,240	1.313	3,171,210	3,321,810	0.955
2008-2009	1,611,115	1.281	2,063,838	3,398,124	0.607
2009-2010	2,946,000	1.250	3,682,500	3,242,785	1.136
2010-2011	2,150,000	1.219	2,620,850	2,960,293	0.885
2011-2012	2,866,000	1.189	3,407,674	2,866,820	1.189
2012-2013	1,841,000	1.160	2,135,560	2,779,599	0.768
2013-2014	1,995,000	1.132	2,258,340	2,787,221	0.810
2014-2015	2,474,000	1.104	2,731,296	2,848,498	0.959
2015-2016	3,125,000	1.077	3,365,625	3,159,667	1.065
2016-2017	3,185,000	1.051	3,347,435	3,275,766	1.022
2017-2018	2,655,000	1.025	2,721,375	3,287,287	0.828
Totals	\$35,172,251		\$42,496,392	45,405,312	\$0.936
12/13-16/17	12,620,000		13,838,256	14,850,751	0.932
13/14-17/18	13,434,000		14,424,071	15,358,439	0.939
			(F) Selected Limited Rate:		\$0.950
			Prior Selected Limited Rate:		\$0.950
Program Year:		2018-2019	2019-2020		
(G) Factor to SIR:		2.146	2.178		
(H) Trend Factor:		1.000	1.025		
(I) Program Rate:		\$2.039	\$2.121		
(J) Composite Exposure:		3,320,120	3,425,841		
(K) Projected Program Losses:		6,770,000	7,266,000		

Notes appear on the next page.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Selection of Projected Limited Loss Rate
and Projection of Program Losses and ULAE

Notes:

- (A) From Pool - Exhibit 3, Page 4, Column (F).
For purposes of projecting future losses, losses are capped at \$100,000 per occurrence.
- (B) From Pool - Appendix E, Column (B).
- (C) $(A) \times (B)$.
- (D) From Pool - Appendix L, Page Page 2, Column (G).
- (E) $(C) / (D)$.
- (F) Selected based on (E).
- (G) Based on a Burr distribution, a mathematical model of claim sizes.
- (H) From Pool - Appendix E.
 - (I) $(F) \times (G) \times (H)$.
- (J) From Pool - Appendix L, Page Page 2, Column (G).
- (K) $(I) \times (J)$.
- (L) Based on an estimated claim closing pattern and the Authority's historical claims administration expenses.
- (M) $(K) + (L)$.

This exhibit shows the calculation of future loss costs based on the past loss rates per exposure. The projections will be accurate only to the extent that what has happened in the past is representative of what will happen in the future.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Reported Loss Development

Accident Year (A)	Limited Reported Losses as of 9/30/18 (B)	Reported Loss Development Factor (C)	Ultimate Limited Losses (D)	Program Reported Losses of 9/30/18 (E)	Reported Loss Development Factor (F)	Ultimate Program Losses (G)
Prior	\$6,046,484	1.000	\$6,046,484	\$9,295,516	1.000	\$9,295,516
1998-1999	1,930,023	1.000	1,930,023	2,510,333	1.000	2,510,333
1999-2000	1,497,656	1.000	1,497,656	1,935,613	1.000	1,935,613
2000-2001	1,504,580	1.000	1,504,580	3,056,849	1.000	3,056,849
2001-2002	1,647,105	1.000	1,647,105	1,987,998	1.000	1,987,998
2002-2003	2,042,623	1.000	2,042,623	3,814,921	1.000	3,814,921
2003-2004	1,542,158	1.000	1,542,158	2,210,245	1.000	2,210,245
2004-2005	1,313,942	1.000	1,313,942	3,113,942	1.000	3,113,942
2005-2006	2,772,583	1.000	2,772,583	4,728,560	1.000	4,728,560
2006-2007	2,280,213	1.000	2,280,213	5,875,102	1.000	5,875,102
2007-2008	2,415,240	1.000	2,415,240	5,688,782	1.000	5,688,782
2008-2009	1,611,115	1.000	1,611,115	2,662,400	1.000	2,662,400
2009-2010	2,945,599	1.000	2,945,599	7,298,922	1.000	7,298,922
2010-2011	2,147,978	1.001	2,150,126	4,456,802	1.002	4,465,716
2011-2012	2,859,864	1.002	2,865,584	6,164,607	1.005	6,195,430
2012-2013	1,835,596	1.003	1,841,103	3,577,858	1.013	3,624,370
2013-2014	1,986,183	1.004	1,994,128	3,627,344	1.027	3,725,282
2014-2015	2,451,708	1.009	2,473,773	5,926,667	1.055	6,252,634
2015-2016	3,042,772	1.029	3,131,012	5,989,666	1.152	6,900,095
2016-2017	2,885,807	1.049	3,027,212	6,479,678	1.323	8,572,614
2017-2018	1,400,891	1.433	2,007,477	1,455,891	2.179	4,197,494
Totals	\$48,160,120		\$49,039,736	\$91,857,696		\$98,112,818

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Provided by the Authority. These losses exclude amounts over \$100,000 per occurrence.
- (C) From Pool - Appendix A, Page 2.
- (D) (B) x (C). These estimated losses exclude amounts over \$100,000 per occurrence.
- (E) Losses capped at the Authority's SIR. Amounts are provided by the Authority.
- (F) Derived from factors on Pool - Appendix A, Page 4.
- (G) (E) x (F).

This method tends to understate ultimate losses for the most recent several years because the large losses for those years generally have not yet emerged at the time of our review.

This exhibit shows the calculation of estimated ultimate losses for each year based on paid losses and case reserves as reported by the claims administrator. These losses tend to "develop" or change from period to period as more information becomes available about the cases. This development tends to follow quantifiable patterns over time.

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Reported Loss Development

Accident Year	Limited Losses Reported as of:										
	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months
1997-1998	169,078	1,483,452	1,697,868	1,744,090	1,757,353	1,703,500	1,690,716	1,690,716	2,091,435	2,091,435	2,091,435
1998-1999	529,294	2,393,742	2,735,181	2,396,200	2,418,279	2,421,333	2,424,187	2,588,886	2,588,886	2,588,886	2,588,886
1999-2000	294,294	1,992,953	2,392,205	1,992,514	2,008,270	1,952,977	1,974,534	2,016,005	2,066,477	2,066,890	2,071,991
2000-2001	265,206	2,123,030	1,993,309	1,819,047	1,751,137	1,741,747	1,741,747	1,820,083	1,820,083	1,820,083	1,820,083
2001-2002	311,603	1,658,179	1,974,557	1,729,496	1,711,881	1,776,881	1,761,355	1,761,355	1,760,696	1,760,695	1,760,695
2002-2003	309,264	2,175,213	2,755,377	2,013,855	2,048,961	2,050,970	2,049,949	2,049,949	2,049,949	2,049,949	2,149,949
2003-2004	220,107	1,485,260	1,519,014	1,543,247	1,556,078	1,541,307	1,539,283	1,539,282	1,539,282	1,539,282	1,539,282
2004-2005	188,923	1,016,513	1,170,405	1,307,276	1,335,738	1,292,074	1,292,074	1,292,073	1,292,073	1,304,762	1,304,762
2005-2006	246,989	2,074,287	2,910,735	3,046,058	2,945,077	2,775,199	2,779,169	2,773,257	2,773,260	2,772,583	2,772,583
2006-2007	164,943	1,931,880	2,394,480	2,470,190	2,540,276	2,232,651	2,232,651	2,280,213	2,280,214	2,280,213	2,280,213
2007-2008	134,123	1,745,953	2,296,443	2,122,407	2,198,687	2,228,445	2,320,240	2,360,240	2,360,240	2,405,240	2,415,240
2008-2009	163,703	1,059,457	1,425,937	1,605,086	1,653,231	1,641,891	1,646,892	1,666,892	1,611,115	1,611,115	1,611,115
2009-2010	295,937	1,742,879	3,017,268	3,327,448	3,115,671	2,924,825	2,940,755	2,945,341	2,945,599	2,945,599	
2010-2011	142,201	1,782,520	2,170,413	2,237,016	2,054,881	2,148,787	2,163,783	2,147,602	2,147,978		
2011-2012	238,903	1,770,073	2,703,704	2,642,857	2,672,182	2,704,169	2,822,729	2,859,864			
2012-2013	94,815	1,366,827	1,949,263	2,038,683	1,918,528	1,876,988	1,835,596				
2013-2014	109,986	1,995,919	2,437,225	2,356,313	2,082,429	1,986,183					
2014-2015	159,053	2,035,387	2,246,639	2,496,222	2,451,708						
2015-2016	222,396	1,828,479	3,595,786	3,042,772							
2016-2017	72,515	2,604,620	2,885,807								
2017-2018	150,406	1,400,891									
2018-2019	194,605										

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Reported Loss Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months
1997-1998	8.774	1.145	1.027	1.008	0.969	0.992	1.000	1.237	1.000	1.000	1.000
1998-1999	4.523	1.143	0.876	1.009	1.001	1.001	1.068	1.000	1.000	1.000	1.000
1999-2000	6.772	1.200	0.833	1.008	0.972	1.011	1.021	1.025	1.000	1.002	1.000
2000-2001	8.005	0.939	0.913	0.963	0.995	1.000	1.045	1.000	1.000	1.000	1.000
2001-2002	5.321	1.191	0.876	0.990	1.038	0.991	1.000	1.000	1.000	1.000	1.000
2002-2003	7.034	1.267	0.731	1.017	1.001	1.000	1.000	1.000	1.000	1.049	1.000
2003-2004	6.748	1.023	1.016	1.008	0.991	0.999	1.000	1.000	1.000	1.000	1.065
2004-2005	5.381	1.151	1.117	1.022	0.967	1.000	1.000	1.000	1.010	1.000	1.007
2005-2006	8.398	1.403	1.046	0.967	0.942	1.001	0.998	1.000	1.000	1.000	1.000
2006-2007	11.712	1.239	1.032	1.028	0.879	1.000	1.021	1.000	1.000	1.000	1.000
2007-2008	13.018	1.315	0.924	1.036	1.014	1.041	1.017	1.000	1.019	1.004	1.000
2008-2009	6.472	1.346	1.126	1.030	0.993	1.003	1.012	0.967	1.000	1.000	
2009-2010	5.889	1.731	1.103	0.936	0.939	1.005	1.002	1.000	1.000		
2010-2011	12.535	1.218	1.031	0.919	1.046	1.007	0.993	1.000			
2011-2012	7.409	1.527	0.977	1.011	1.012	1.044	1.013				
2012-2013	14.416	1.426	1.046	0.941	0.978	0.978					
2013-2014	18.147	1.221	0.967	0.884	0.954						
2014-2015	12.797	1.104	1.111	0.982							
2015-2016	8.222	1.967	0.846								
2016-2017	35.918	1.108									
2017-2018	9.314										
Average Dollar-weighted Averages	10.324	1.283	0.979	0.987	0.982	1.005	1.013	1.016	1.002	1.005	1.007
3-yr	13.101	1.349	0.954	0.936	0.984	1.014	1.003	0.992	1.007	1.002	1.000
4-yr	13.021	1.319	0.971	0.957	0.999	1.011	1.005	0.994	1.005	1.001	1.001
Industry Factors Prior	5.584	1.394	1.028	0.965	0.964	1.000	1.000	1.000	1.000	1.000	1.000
Selected	12.878	1.366	1.020	1.020	1.005	1.001	1.001	1.001	1.001	1.000	1.000
Cumulated	18.454	1.433	1.049	1.029	1.009	1.004	1.003	1.002	1.001	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Reported Loss Development

Limited Losses Reported as of:

Accident Year	135 Months	147 Months	159 Months	171 Months	183 Months	195 Months	207 Months	219 Months	231 Months	243 Months	255 Months
1997-1998	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721
1998-1999	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886
1999-2000	2,071,991	2,073,489	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	
2000-2001	1,820,083	1,820,083	1,820,083	1,820,083	1,820,084	1,820,083	1,820,083	1,820,083	1,820,083		
2001-2002	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695			
2002-2003	2,149,949	2,149,949	2,141,098	2,141,098	2,141,098	2,141,098					
2003-2004	1,639,282	1,542,158	1,542,158	1,542,158	1,542,158						
2004-2005	1,313,942	1,313,942	1,313,942	1,313,942							
2005-2006	2,772,583	2,772,583	2,772,583								
2006-2007	2,280,214	2,280,213									
2007-2008	2,415,240										
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
2018-2019											

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

	135-147 Months	147-159 Months	159-171 Months	171-183 Months	183-195 Months	195-207 Months	207-219 Months	219-231 Months	231-243 Months	243-255 Months	255-Ult. Months
1997-1998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
1998-1999	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1999-2000	1.001	0.992	1.000	1.000	1.000	1.000	1.000	1.000			
2000-2001	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
2001-2002	1.000	1.000	1.000	1.000	1.000	1.000					
2002-2003	1.000	0.996	1.000	1.000	1.000						
2003-2004	0.941	1.000	1.000	1.000							
2004-2005	1.000	1.000	1.000								
2005-2006	1.000	1.000									
2006-2007	1.000										
2007-2008											
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
Average	0.994	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Dollar-weighted											
Averages											
3-yr	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
4-yr	0.988	0.999	1.000	1.000	1.000	1.000	1.000				
Industry											
Factors	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Prior	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Selected	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Cumulated	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
 Reported between \$100,000 and \$1,000,000 Loss Development

Accident Year	Losses Reported as of:										
	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months
1997-1998									1,721,945	1,745,817	1,745,817
1998-1999								1,480,310	1,480,310	1,480,310	1,480,310
1999-2000							460,684	460,684	447,620	447,620	447,620
2000-2001						1,630,606	1,630,606	1,552,269	1,552,269	1,552,269	1,552,269
2001-2002					260,876	333,680	373,680	373,680	373,680	393,744	355,342
2002-2003				1,347,188	927,667	1,031,606	998,427	998,427	998,427	998,427	1,141,807
2003-2004			225,624	753,386	700,696	703,320	673,087	668,087	668,087	668,087	668,087
2004-2005		300,000	575,000	900,000	1,185,000	1,281,292	1,447,400	1,778,109	1,799,275	1,800,000	1,800,000
2005-2006		213,359	1,322,004	2,245,154	2,430,884	1,866,893	1,924,857	2,274,857	2,385,301	2,185,301	2,190,180
2006-2007		975,135	1,744,073	2,888,802	3,570,836	3,615,136	3,610,583	3,594,889	3,594,889	3,594,889	3,594,889
2007-2008		142,500	171,414	1,470,476	2,028,873	2,043,546	2,447,953	3,250,985	3,250,985	3,250,985	3,318,985
2008-2009		933,775	933,775	1,002,041	1,091,420	1,051,285	1,051,285	1,051,285	1,051,285	1,051,285	1,051,285
2009-2010		685,920	1,194,566	2,056,548	2,768,458	2,984,657	3,411,428	4,410,202	4,353,324	4,353,324	
2010-2011		680,673	1,251,956	2,467,395	2,573,921	2,796,885	2,785,974	2,373,824	2,308,824		
2011-2012		7,089	614,161	2,348,916	3,526,354	3,593,370	3,602,679	3,304,742			
2012-2013		85,000	137,002	713,401	2,154,562	1,826,896	1,742,262				
2013-2014		586,675	1,420,772	1,454,452	1,784,928	1,641,161					
2014-2015		282,501	1,918,033	2,806,910	3,474,960						
2015-2016	404,561	957,300	3,204,852	2,946,894							
2016-2017		1,470,145	3,593,872								
2017-2018		55,000									
2018-2019											

Amounts Include All Locations Except Richmond
 The 2012-13 diagonal is valued as of 10/31/12.
 The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Reported Loss Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months
1997-1998									1.014	1.000	1.000
1998-1999								1.000	1.000	1.000	1.000
1999-2000							1.000	0.972	1.000	1.000	1.000
2000-2001						1.000	0.952	1.000	1.000	1.000	1.000
2001-2002					1.279	1.120	1.000	1.000	1.054	0.902	1.000
2002-2003				0.689	1.112	0.968	1.000	1.000	1.000	1.144	1.131
2003-2004			3.339	0.930	1.004	0.957	0.993	1.000	1.000	1.000	1.045
2004-2005		1.917	1.565	1.317	1.081	1.130	1.228	1.012	1.000	1.000	1.000
2005-2006		6.196	1.698	1.083	0.768	1.031	1.182	1.049	0.916	1.002	1.000
2006-2007		1.789	1.656	1.236	1.012	0.999	0.996	1.000	1.000	1.000	1.000
2007-2008		1.203	8.579	1.380	1.007	1.198	1.328	1.000	1.000	1.021	0.986
2008-2009		1.000	1.073	1.089	0.963	1.000	1.000	1.000	1.000	1.000	
2009-2010		1.742	1.722	1.346	1.078	1.143	1.293	0.987	1.000		
2010-2011		1.839	1.971	1.043	1.087	0.996	0.852	0.973			
2011-2012		86.636	3.825	1.501	1.019	1.003	0.917				
2012-2013		1.612	5.207	3.020	0.848	0.954					
2013-2014		2.422	1.024	1.227	0.919						
2014-2015		6.789	1.463	1.238							
2015-2016	2.366	3.348	0.920								
2016-2017		2.445									
2017-2018											
Average Dollar-weighted Averages	2.366	9.149	2.619	1.315	1.014	1.038	1.057	0.999	0.999	1.006	1.015
3-yr		3.217	1.102	1.490	0.946	0.990	1.029	0.984	1.000	1.009	0.995
4-yr		3.075	1.186	1.494	0.982	1.030	1.027	0.989	1.000	1.007	0.996
Industry Factors	6.803	2.353	1.344	1.178	1.052	1.027	1.016	1.005	1.003	1.000	1.000
Prior	6.803	2.353	1.344	1.178	1.052	1.027	1.016	1.005	1.003	1.000	1.000
Selected	6.803	2.353	1.344	1.178	1.052	1.027	1.016	1.005	1.003	1.000	1.000
Cumulated	28.062	4.125	1.753	1.304	1.107	1.052	1.024	1.008	1.003	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Reported between \$100,000 and \$1,000,000 Loss Development

Accident Year	Losses Reported as of:										
	135 Months	147 Months	159 Months	171 Months	183 Months	195 Months	207 Months	219 Months	231 Months	243 Months	255 Months
1997-1998	1,745,817	1,745,817	1,780,817	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811
1998-1999	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310
1999-2000	447,620	437,958	437,958	437,958	437,958	437,958	437,958	437,958	437,958	437,958	
2000-2001	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269		
2001-2002	355,342	355,342	355,342	355,342	355,342	340,892	340,892				
2002-2003	1,291,873	1,363,770	1,363,770	1,465,461	1,657,961	1,772,299					
2003-2004	698,183	668,087	668,087	668,087	668,087						
2004-2005	1,800,000	1,800,000	1,800,000	1,800,000							
2005-2006	2,190,180	1,955,977	1,955,977								
2006-2007	3,594,889	3,594,889									
2007-2008	3,273,542										
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
2018-2019											

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

	135-147 Months	147-159 Months	159-171 Months	171-183 Months	183-195 Months	195-207 Months	207-219 Months	219-231 Months	231-243 Months	243-255 Months	255-Ult. Months
1997-1998	1.000	1.020	0.988	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
1998-1999	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1999-2000	0.978	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
2000-2001	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
2001-2002	1.000	1.000	1.000	1.000	0.959	1.000					
2002-2003	1.056	1.000	1.075	1.131	1.069						
2003-2004	0.957	1.000	1.000	1.000							
2004-2005	1.000	1.000	1.000								
2005-2006	0.893	1.000									
2006-2007	1.000										
2007-2008											
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
Average Dollar-weighted Averages	0.988	1.002	1.008	1.019	1.005	1.000	1.000	1.000	1.000	1.000	
3-yr	0.969	1.000	1.027	1.077	1.028	1.000	1.000	1.000			
4-yr	0.968	1.000	1.024	1.048	1.025	1.000	1.000				
Industry Factors	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Prior	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Selected	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Cumulated	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Paid Loss Development

Accident Year (A)	Limited Paid Losses as of 9/30/18 (B)	Paid Loss Development Factor (C)	Ultimate Limited Losses (D)	Program Paid Losses of 9/30/18 (E)	Paid Loss Development Factor (F)	Ultimate Program Losses (G)
Prior	\$6,046,484	1.000	\$6,046,484	\$9,242,038	1.000	\$9,242,038
1998-1999	1,930,023	1.000	1,930,023	2,510,333	1.000	2,510,333
1999-2000	1,497,656	1.000	1,497,656	1,935,613	1.001	1,937,549
2000-2001	1,504,580	1.000	1,504,580	3,056,849	1.001	3,059,906
2001-2002	1,647,105	1.000	1,647,105	1,987,998	1.002	1,991,974
2002-2003	2,042,128	1.001	2,044,170	3,586,531	1.004	3,600,877
2003-2004	1,542,158	1.002	1,545,242	2,210,245	1.006	2,223,506
2004-2005	1,313,942	1.003	1,317,884	3,113,942	1.009	3,141,967
2005-2006	2,772,583	1.004	2,783,673	4,724,040	1.011	4,776,004
2006-2007	2,280,159	1.005	2,291,560	5,874,898	1.015	5,963,021
2007-2008	2,398,767	1.006	2,413,160	5,357,043	1.019	5,458,827
2008-2009	1,610,909	1.008	1,623,796	2,662,095	1.025	2,728,647
2009-2010	2,934,221	1.010	2,963,563	7,287,481	1.035	7,542,543
2010-2011	2,138,102	1.013	2,165,897	4,413,856	1.052	4,643,377
2011-2012	2,823,789	1.017	2,871,793	6,118,781	1.077	6,589,927
2012-2013	1,835,074	1.031	1,891,961	3,576,549	1.120	4,005,735
2013-2014	1,971,577	1.043	2,056,355	3,607,738	1.175	4,239,092
2014-2015	2,250,287	1.098	2,470,815	4,604,224	1.312	6,040,742
2015-2016	2,496,762	1.292	3,225,817	3,733,749	1.664	6,212,958
2016-2017	1,641,822	2.132	3,500,365	2,544,366	2.976	7,572,033
2017-2018	345,839	5.440	1,881,364	345,839	8.699	3,008,453
Totals	\$45,023,967		\$49,673,263	\$82,494,208		\$96,489,509

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Provided by the Authority. These losses exclude amounts over \$100,000 per occurrence.
- (C) From Pool - Appendix B, Page 2.
- (D) (B) x (C). These estimated losses exclude amounts over \$100,000 per occurrence.
- (E) Losses capped at the Authority's SIR. Amounts are provided by the Authority.
- (F) Derived from factors on Pool - Appendix B, Page 4.
- (G) (E) x (F).

This method tends to understate ultimate losses for the most recent several years because the large losses for those years generally have not yet emerged at the time of our review.

This exhibit shows the calculation of estimated ultimate losses for each year based on paid losses as reported by the claims administrator. These losses tend to "develop" or change from period to period as more information becomes available about the cases. This development tends to follow quantifiable patterns over time.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Paid Loss Development

Limited Losses Paid as of:

Accident Year	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months
1997-1998	36,369	544,195	1,066,982	1,443,311	1,653,983	1,685,050	1,678,047	1,679,541	2,090,565	2,091,200	2,091,200
1998-1999	74,732	881,651	1,698,019	2,142,970	2,340,559	2,394,548	2,421,686	2,588,886	2,588,886	2,588,886	2,588,886
1999-2000	63,040	522,319	1,248,203	1,856,586	1,914,759	1,930,952	1,958,533	1,985,027	2,049,475	2,050,069	2,051,491
2000-2001	61,525	517,656	1,038,085	1,437,230	1,699,567	1,741,747	1,741,747	1,820,083	1,820,083	1,820,083	1,820,083
2001-2002	35,892	525,326	1,088,151	1,678,740	1,704,721	1,711,211	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695
2002-2003	56,886	423,517	1,209,671	1,669,493	1,978,800	2,042,565	2,042,449	2,042,449	2,042,449	2,049,949	2,105,300
2003-2004	21,792	507,209	920,162	1,371,999	1,491,288	1,539,282	1,539,282	1,539,282	1,539,282	1,539,282	1,539,282
2004-2005	41,320	344,663	629,114	1,088,778	1,223,314	1,292,073	1,292,073	1,292,073	1,292,073	1,304,762	1,304,762
2005-2006	47,511	735,664	1,792,959	2,516,628	2,737,275	2,759,638	2,771,738	2,771,826	2,773,260	2,772,583	2,772,583
2006-2007	80,775	426,040	1,091,919	1,846,954	2,166,534	2,231,889	2,231,889	2,280,159	2,280,159	2,280,159	2,280,159
2007-2008	36,550	446,730	1,214,293	1,913,002	2,090,917	2,125,363	2,141,570	2,263,998	2,313,733	2,337,148	2,396,947
2008-2009	29,427	428,542	751,266	1,336,912	1,529,368	1,579,306	1,585,563	1,608,569	1,610,909	1,610,909	1,610,909
2009-2010	111,515	581,807	1,389,045	2,172,952	2,555,279	2,778,915	2,879,606	2,931,982	2,932,938	2,934,221	
2010-2011	23,256	414,841	995,267	1,617,716	1,934,070	2,090,073	2,136,783	2,138,102	2,138,102		
2011-2012	36,595	419,903	1,040,534	2,054,041	2,508,516	2,645,334	2,716,253	2,823,789			
2012-2013	27,342	298,068	725,800	1,323,002	1,684,171	1,831,830	1,835,074				
2013-2014	22,981	547,388	1,283,522	1,761,374	1,905,803	1,971,577					
2014-2015	6,781	356,629	979,244	1,769,926	2,250,287						
2015-2016	24,287	478,043	1,791,821	2,496,762							
2016-2017	3,313	731,409	1,641,822								
2017-2018	1,626	345,839									
2018-2019	37,731										

Amounts Include All Locations Except Richmond
 The 2012-13 diagonal is valued as of 10/31/12.
 The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Paid Loss Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months
1997-1998	14.963	1.961	1.353	1.146	1.019	0.996	1.001	1.245	1.000	1.000	1.000
1998-1999	11.798	1.926	1.262	1.092	1.023	1.011	1.069	1.000	1.000	1.000	1.000
1999-2000	8.286	2.390	1.487	1.031	1.008	1.014	1.014	1.032	1.000	1.001	1.000
2000-2001	8.414	2.005	1.385	1.183	1.025	1.000	1.045	1.000	1.000	1.000	1.000
2001-2002	14.636	2.071	1.543	1.015	1.004	1.029	1.000	1.000	1.000	1.000	1.000
2002-2003	7.445	2.856	1.380	1.185	1.032	1.000	1.000	1.000	1.004	1.027	1.013
2003-2004	23.275	1.814	1.491	1.087	1.032	1.000	1.000	1.000	1.000	1.000	1.065
2004-2005	8.341	1.825	1.731	1.124	1.056	1.000	1.000	1.000	1.010	1.000	1.007
2005-2006	15.484	2.437	1.404	1.088	1.008	1.004	1.000	1.001	1.000	1.000	1.000
2006-2007	5.274	2.563	1.691	1.173	1.030	1.000	1.022	1.000	1.000	1.000	1.000
2007-2008	12.222	2.718	1.575	1.093	1.016	1.008	1.057	1.022	1.010	1.026	1.001
2008-2009	14.563	1.753	1.780	1.144	1.033	1.004	1.015	1.001	1.000	1.000	
2009-2010	5.217	2.387	1.564	1.176	1.088	1.036	1.018	1.000	1.000		
2010-2011	17.838	2.399	1.625	1.196	1.081	1.022	1.001	1.000			
2011-2012	11.474	2.478	1.974	1.221	1.055	1.027	1.040				
2012-2013	10.901	2.435	1.823	1.273	1.088	1.002					
2013-2014	23.819	2.345	1.372	1.082	1.035						
2014-2015	52.592	2.746	1.807	1.271							
2015-2016	19.683	3.748	1.393								
2016-2017	220.769	2.245									
2017-2018	212.693										
Average	34.271	2.355	1.560	1.143	1.037	1.010	1.019	1.022	1.002	1.005	1.008
Dollar-weighted											
Averages											
3-yr	53.216	2.818	1.487	1.203	1.057	1.018	1.021	1.000	1.004	1.010	1.000
4-yr	53.099	2.695	1.538	1.209	1.063	1.024	1.020	1.006	1.003	1.007	1.001
Industry											
Factors	6.365	2.439	1.593	1.198	1.064	1.038	1.018	1.010	1.009	1.008	1.007
Prior	20.056	2.516	1.678	1.169	1.051	1.013	1.012	1.004	1.003	1.002	1.002
Selected	23.610	2.552	1.650	1.177	1.052	1.012	1.013	1.004	1.003	1.002	1.002
Cumulated	128.438	5.440	2.132	1.292	1.098	1.043	1.031	1.017	1.013	1.010	1.008

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Paid Loss Development

Limited Losses Paid as of:

Accident Year	135 Months	147 Months	159 Months	171 Months	183 Months	195 Months	207 Months	219 Months	231 Months	243 Months	255 Months
1997-1998	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721	2,091,721
1998-1999	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886	2,588,886
1999-2000	2,052,135	2,056,966	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	2,057,287	
2000-2001	1,820,083	1,820,083	1,820,083	1,820,083	1,820,083	1,820,083	1,820,083	1,820,083	1,820,083		
2001-2002	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695	1,760,695			
2002-2003	2,133,151	2,134,723	2,140,604	2,140,604	2,140,604	2,140,604					
2003-2004	1,639,282	1,542,158	1,542,158	1,542,158	1,542,158						
2004-2005	1,313,942	1,313,942	1,313,942	1,313,942							
2005-2006	2,772,583	2,772,583	2,772,583								
2006-2007	2,280,159	2,280,159									
2007-2008	2,398,767										
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
2018-2019											

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

	135-147 Months	147-159 Months	159-171 Months	171-183 Months	183-195 Months	195-207 Months	207-219 Months	219-231 Months	231-243 Months	243-255 Months	255-Ult. Months
1997-1998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
1998-1999	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1999-2000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
2000-2001	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
2001-2002	1.000	1.000	1.000	1.000	1.000	1.000					
2002-2003	1.001	1.003	1.000	1.000	1.000						
2003-2004	0.941	1.000	1.000	1.000							
2004-2005	1.000	1.000	1.000								
2005-2006	1.000	1.000									
2006-2007	1.000										
2007-2008											
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
Average Dollar-weighted Averages	0.994	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
3-yr	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
4-yr	0.988	1.001	1.000	1.000	1.000	1.000	1.000				
Industry Factors	1.005	1.005	1.004	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Prior	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000
Selected	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000
Cumulated	1.006	1.005	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Paid between \$100,000 and \$1,000,000 Loss Development

Accident Year	Losses Paid as of:										
	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months
1997-1998									1,700,278	1,713,809	1,716,370
1998-1999								1,480,310	1,480,310	1,480,310	1,480,310
1999-2000							460,684	460,684	397,620	397,620	397,620
2000-2001						1,630,606	1,630,606	1,552,269	1,552,269	1,552,269	1,552,269
2001-2002					235,876	256,134	302,428	314,846	321,368	355,096	355,342
2002-2003				889,688	920,523	998,119	998,427	998,427	998,427	998,427	998,427
2003-2004			29,250	115,359	628,669	662,233	668,087	668,087	668,087	668,087	668,087
2004-2005				900,000	900,000	984,422	1,089,555	1,499,571	1,792,269	1,799,413	1,800,000
2005-2006		72,583	260,334	977,166	1,748,126	1,805,909	1,857,740	2,068,349	2,376,539	2,178,756	2,180,217
2006-2007			287,044	1,715,313	2,444,181	3,544,921	3,594,739	3,594,739	3,594,739	3,594,739	3,594,739
2007-2008			24,275	528,137	1,663,549	1,696,161	1,778,667	2,935,719	2,935,719	2,935,719	2,956,497
2008-2009		24,699	924,600	965,050	1,049,821	1,051,186	1,051,186	1,051,186	1,051,186	1,051,186	1,051,186
2009-2010		6,166	751,815	856,719	1,897,915	2,237,403	2,817,995	3,598,254	4,353,261	4,353,261	
2010-2011			18,211	963,898	1,983,645	2,092,425	2,265,791	2,270,752	2,275,753		
2011-2012				289,888	2,473,154	2,909,761	2,957,840	3,294,992			
2012-2013				107,583	1,378,946	1,637,936	1,741,475				
2013-2014			281,864	1,161,519	1,251,563	1,636,161					
2014-2015			900,000	1,181,963	2,353,937						
2015-2016		42,909	300,665	1,236,987							
2016-2017		691,590	902,544								
2017-2018											
2018-2019											

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Paid Loss Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months
1997-1998									1.008	1.001	1.001
1998-1999								1.000	1.000	1.000	1.000
1999-2000							1.000	0.863	1.000	1.000	1.000
2000-2001						1.000	0.952	1.000	1.000	1.000	1.000
2001-2002					1.086	1.181	1.041	1.021	1.105	1.001	1.000
2002-2003				1.035	1.084	1.000	1.000	1.000	1.000	1.000	1.006
2003-2004			3.944	5.450	1.053	1.009	1.000	1.000	1.000	1.000	1.045
2004-2005				1.000	1.094	1.107	1.376	1.195	1.004	1.000	1.000
2005-2006		3.587	3.754	1.789	1.033	1.029	1.113	1.149	0.917	1.001	0.936
2006-2007			5.976	1.425	1.450	1.014	1.000	1.000	1.000	1.000	1.000
2007-2008			21.756	3.150	1.020	1.049	1.651	1.000	1.000	1.007	1.001
2008-2009		37.435	1.044	1.088	1.001	1.000	1.000	1.000	1.000	1.000	
2009-2010		121.929	1.140	2.215	1.179	1.259	1.277	1.210	1.000		
2010-2011			52.929	2.058	1.055	1.083	1.002	1.002			
2011-2012				8.531	1.177	1.017	1.114				
2012-2013				12.818	1.188	1.063					
2013-2014			4.121	1.078	1.307						
2014-2015			1.313	1.992							
2015-2016		7.007	4.114								
2016-2017		1.305									
2017-2018											

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months
Average Dollar-weighted Averages		34.253	10.009	3.356	1.133	1.062	1.117	1.034	1.003	1.001	0.999
3-yr			2.415	2.034	1.212	1.049	1.140	1.110	1.000	1.003	0.984
4-yr				2.721	1.168	1.102	1.123	1.077	1.000	1.002	0.987
Industry Factors	11.179	4.014	2.045	1.416	1.206	1.095	1.073	1.046	1.033	1.021	1.009
Prior	11.179	4.014	2.045	1.416	1.206	1.095	1.073	1.046	1.033	1.021	1.009
Selected	11.179	4.014	2.045	1.416	1.206	1.095	1.073	1.046	1.033	1.021	1.009
Cumulated	212.692	19.026	4.740	2.318	1.637	1.357	1.239	1.155	1.104	1.069	1.047

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Paid between \$100,000 and \$1,000,000 Loss Development

Accident Year	<u>Losses Paid as of:</u>										
	135 Months	147 Months	159 Months	171 Months	183 Months	195 Months	207 Months	219 Months	231 Months	243 Months	255 Months
1997-1998	1,718,602	1,724,011	1,768,678	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811	1,759,811
1998-1999	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310	1,480,310
1999-2000	397,620	437,958	437,958	437,958	437,958	437,958	437,958	437,958	437,958	437,958	
2000-2001	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269	1,552,269		
2001-2002	355,342	355,342	355,342	355,342	355,342	340,892	340,892				
2002-2003	1,004,125	1,045,572	1,079,420	1,135,175	1,145,313	1,544,403					
2003-2004	698,183	668,087	668,087	668,087	668,087						
2004-2005	1,800,000	1,800,000	1,800,000	1,800,000							
2005-2006	2,040,217	1,951,457	1,951,457								
2006-2007	3,594,739	3,594,739									
2007-2008	2,958,277										
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
2018-2019											

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

	135-147 Months	147-159 Months	159-171 Months	171-183 Months	183-195 Months	195-207 Months	207-219 Months	219-231 Months	231-243 Months	243-255 Months	255-Ult. Months
1997-1998	1.003	1.026	0.995	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
1998-1999	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
1999-2000	1.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
2000-2001	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
2001-2002	1.000	1.000	1.000	1.000	0.959	1.000					
2002-2003	1.041	1.032	1.052	1.009	1.348						
2003-2004	0.957	1.000	1.000	1.000							
2004-2005	1.000	1.000	1.000								
2005-2006	0.956	1.000									
2006-2007	1.000										
2007-2008											
2008-2009											
2009-2010											
2010-2011											
2011-2012											
2012-2013											
2013-2014											
2014-2015											
2015-2016											
2016-2017											
2017-2018											
Average Dollar-weighted Averages	1.006	1.006	1.006	1.001	1.051	1.000	1.000	1.000	1.000	1.000	
3-yr	0.988	1.000	1.016	1.005	1.126	1.000	1.000	1.000			
4-yr	0.985	1.006	1.014	1.003	1.110	1.000	1.000				
Industry Factors	1.008	1.007	1.005	1.005	1.004	1.003	1.003	1.001	1.001	1.001	1.001
Prior	1.008	1.007	1.005	1.005	1.004	1.003	1.003	1.001	1.001	1.001	1.000
Selected	1.008	1.007	1.005	1.005	1.004	1.003	1.003	1.001	1.001	1.001	1.000
Cumulated	1.038	1.030	1.023	1.018	1.013	1.009	1.006	1.003	1.002	1.001	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Exposure and Development Method
Based on Reported Losses

Accident Year	Composite Exposure (A)	Reported Losses as of 9/30/18 (B)	Loss Development Factor (C)	Percentage of Losses Yet to Be Reported (D)	Program Rate (E)	Incurred but not Reported (IBNR) (F)	Ultimate Program Losses (G)
Prior	0	\$0	1.000	0.000	0.704	\$0	\$0
1998-1999	0		1.000	0.000	0.838	0	
1999-2000	0		1.000	0.000	0.874	0	
2000-2001	0		1.000	0.000	0.911	0	
2001-2002	0		1.000	0.000	0.950	0	
2002-2003	0		1.000	0.000	0.991	0	
2003-2004	2,734,838	2,210,245	1.000	0.000	0.905	0	2,210,245
2004-2005	2,789,102	3,113,942	1.000	0.000	0.770	0	3,113,942
2005-2006	2,893,961	4,728,560	1.000	0.000	1.594	0	4,728,560
2006-2007	3,059,541	5,875,102	1.000	0.000	1.264	0	5,875,102
2007-2008	3,321,810	5,688,782	1.000	0.000	1.256	0	5,688,782
2008-2009	3,398,124	2,662,400	1.000	0.000	0.835	0	2,662,400
2009-2010	3,242,785	7,298,922	1.000	0.000	1.632	0	7,298,922
2010-2011	2,960,293	4,456,802	1.002	0.002	1.330	7,874	4,464,676
2011-2012	2,866,820	6,164,607	1.005	0.005	1.868	26,776	6,191,383
2012-2013	2,779,599	3,577,858	1.013	0.013	1.262	45,602	3,623,460
2013-2014	2,787,221	3,627,344	1.027	0.026	1.606	116,383	3,743,727
2014-2015	2,848,498	5,926,667	1.055	0.052	1.679	248,697	6,175,364
2015-2016	3,159,667	5,989,666	1.152	0.132	1.756	732,386	6,722,052
2016-2017	3,275,766	6,479,678	1.323	0.244	1.837	1,468,290	7,947,968
2017-2018	3,287,287	1,455,891	2.179	0.541	1.919	3,412,792	4,868,683
Totals	45,405,312	\$69,256,466				\$6,058,800	\$75,315,266

Notes:

- (A) Provided by the Authority.
- (B) Provided by the Authority. These losses exclude amounts incurred above the Authority's SIR for each year.
- (C) From Pool - Appendix A, Page 1, Column (F).
- (D) $1 - 1/(C)$.
- (E) From Pool - Appendix C, Page 3, Column (H).
- (F) $(A) \times (D) \times (E)$.
- (G) $(B) + (F)$.

This exhibit shows the calculation of ultimate losses based on the assumption that there is an underlying relationship between losses and exposure that changes in regular ways over time. The method relies on the premise that the losses that are currently unreported will cost what this relationship would suggest.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Exposure and Development Method
Based on Paid Losses

Accident Year	Composite Exposure (A)	Paid Losses as of 9/30/18 (B)	Loss Development Factor (C)	Percentage of Losses Yet to Be Paid (D)	Program Rate (E)	Incurred but not Paid (F)	Ultimate Program Losses (G)
Prior	0	\$0	1.000	0.000	0.704	\$0	\$0
1998-1999	0		1.000	0.000	0.838	0	
1999-2000	0		1.001	0.001	0.874	0	
2000-2001	0		1.001	0.001	0.911	0	
2001-2002	0		1.002	0.002	0.950	0	
2002-2003	0		1.004	0.004	0.991	0	
2003-2004	2,734,838	2,210,245	1.006	0.006	0.905	14,850	2,225,095
2004-2005	2,789,102	3,113,942	1.009	0.009	0.770	19,328	3,133,270
2005-2006	2,893,961	4,724,040	1.011	0.011	1.594	50,743	4,774,783
2006-2007	3,059,541	5,874,898	1.015	0.015	1.264	58,009	5,932,907
2007-2008	3,321,810	5,357,043	1.019	0.019	1.256	79,272	5,436,315
2008-2009	3,398,124	2,662,095	1.025	0.024	0.835	68,098	2,730,193
2009-2010	3,242,785	7,287,481	1.035	0.034	1.632	179,936	7,467,417
2010-2011	2,960,293	4,413,856	1.052	0.049	1.330	192,922	4,606,778
2011-2012	2,866,820	6,118,781	1.077	0.071	1.868	380,221	6,499,002
2012-2013	2,779,599	3,576,549	1.120	0.107	1.262	375,340	3,951,889
2013-2014	2,787,221	3,607,738	1.175	0.149	1.606	666,965	4,274,703
2014-2015	2,848,498	4,604,224	1.312	0.238	1.679	1,138,265	5,742,489
2015-2016	3,159,667	3,733,749	1.664	0.399	1.756	2,213,802	5,947,551
2016-2017	3,275,766	2,544,366	2.976	0.664	1.837	3,995,675	6,540,041
2017-2018	3,287,287	345,839	8.699	0.885	1.919	5,582,849	5,928,688
Totals	45,405,312	\$60,174,846				\$15,016,275	\$75,191,121

Notes:

- (A) Provided by the Authority.
- (B) Provided by the Authority. These losses exclude amounts paid above the Authority's SIR for each year.
- (C) From Pool - Appendix B, Page 1, Column (F).
- (D) $1 - 1/(C)$.
- (E) From Pool - Appendix C, Page 3, Column (H).
- (F) $(A) \times (D) \times (E)$.
- (G) $(B) + (F)$.

This exhibit shows the calculation of ultimate losses based on the assumption that there is an underlying relationship between losses and exposure that changes in regular ways over time. The method relies on the premise that the losses that are currently unreported will cost what this relationship would suggest.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Exposure and Development Method

Accident Year	Composite Exposure (A)	Ultimate Limited Losses (B)	Trend Factor (C)	Trended Limited Losses (D)	Trended Limited Loss Rate (E)	Limited Loss Rate (F)	Factor to SIR (G)	Program Loss Rate (H)
Prior	0	\$0	1.683	\$0		0.556	1.267	0.704
1998-1999	0		1.642			0.569	1.473	0.838
1999-2000	0		1.602			0.584	1.497	0.874
2000-2001	0		1.562			0.599	1.522	0.911
2001-2002	0		1.524			0.614	1.548	0.950
2002-2003	0		1.487			0.629	1.575	0.991
2003-2004	2,734,838	1,542,158	1.450	2,236,129	0.818	0.564	1.605	0.905
2004-2005	2,789,102	1,313,942	1.415	1,859,228	0.667	0.471	1.634	0.770
2005-2006	2,893,961	2,772,583	1.380	3,826,165	1.322	0.958	1.664	1.594
2006-2007	3,059,541	2,280,213	1.346	3,069,167	1.003	0.745	1.697	1.264
2007-2008	3,321,810	2,415,240	1.313	3,171,210	0.955	0.727	1.728	1.256
2008-2009	3,398,124	1,611,115	1.281	2,063,838	0.607	0.474	1.763	0.835
2009-2010	3,242,785	2,946,000	1.250	3,682,500	1.136	0.908	1.797	1.632
2010-2011	2,960,293	2,150,000	1.219	2,620,850	0.885	0.726	1.832	1.330
2011-2012	2,866,820	2,866,000	1.189	3,407,674	1.189	1.000	1.868	1.868
2012-2013	2,779,599	1,841,000	1.160	2,135,560	0.768	0.662	1.906	1.262
2013-2014	2,787,221	1,994,000	1.132	2,257,208	0.810	0.826	1.944	1.606
2014-2015	2,848,498	2,474,000	1.104	2,731,296	0.959	0.847	1.983	1.679
2015-2016	3,159,667	3,131,000	1.077	3,372,087	1.067	0.868	2.022	1.756
2016-2017	3,275,766	3,264,000	1.051	3,430,464	1.047	0.890	2.064	1.837
2017-2018	3,287,287	1,944,000	1.025	1,992,600	0.606	0.912	2.104	1.919
Total/Avg	45,405,312	\$34,545,251		\$41,855,976	\$0.922			
12/13-16/17	14,850,751	12,704,000		13,926,615	\$0.938			
13/14-17/18	15,358,439	12,807,000		13,783,655	\$0.897			
			Selected Limited Rate:		\$0.935			
			Prior Selected Limited Rate:		\$0.930			

Notes:

- (A) Provided by the Authority.
- (B) Selected average of results from Appendices A and B.
- (C) From Pool - Appendix E, Column (B).
- (D) (B) x (C).
- (E) (D) / (A).
- (F) Selected Limited Rate / (C). For 2012-2013 and prior (B) / (A).
- (G) Based on a Burr distribution, a mathematical model of claim sizes.
- (H) (F) x (G).

This exhibit shows the calculation of the underlying historical relationship between losses and exposure that is needed to apply the estimation methods shown on pages 1 and 2 of this Appendix.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Frequency and Severity Method

Accident Year	Ultimate Program Severity (A)	Ultimate Claims (B)	Ultimate Program Losses (C)
Prior	\$10,928	701	\$7,660,528
1998-1999	13,869	205	2,843,145
1999-2000	10,992	204	2,242,368
2000-2001	12,308	186	2,289,288
2001-2002	11,801	216	2,549,016
2002-2003	14,693	219	3,217,767
2003-2004	12,375	200	2,475,000
2004-2005	10,579	203	2,147,537
2005-2006	20,143	229	4,612,747
2006-2007	22,625	171	3,868,875
2007-2008	22,557	185	4,173,045
2008-2009	15,864	179	2,839,656
2009-2010	27,720	191	5,294,520
2010-2011	23,444	168	3,938,592
2011-2012	33,256	161	5,354,216
2012-2013	22,074	159	3,509,766
2013-2014	25,539	179	4,571,481
2014-2015	26,569	167	4,437,023
2015-2016	27,639	199	5,500,161
2016-2017	28,777	211	6,071,947
2017-2018	29,909	192	5,742,528
Total		4,525	\$85,339,206

Notes:

- (A) From Pool - Appendix D, Page 2, Column (H).
- (B) From Pool - Appendix D, Page 2, Column (B).
- (C) (A) x (B).

This exhibit shows the calculation of the estimated ultimate losses for each year based on the observed average frequency and severity of claims.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Frequency and Severity Method

Accident Year	Ultimate Limited Losses (A)	Ultimate Claims (B)	Ultimate Limited Severity (C)	Trend Factor (D)	Trended Limited Severity (E)	Limited Severity (F)	Factor to SIR (G)	Program Severity (H)
Prior	\$6,046,484	701	\$8,626	1.516	\$13,077	\$8,626	1.267	\$10,928
1998-1999	1,930,023	205	9,415	1.486	13,991	9,415	1.473	13,869
1999-2000	1,497,656	204	7,341	1.457	10,696	7,341	1.497	10,992
2000-2001	1,504,580	186	8,089	1.428	11,551	8,089	1.522	12,308
2001-2002	1,647,105	216	7,625	1.400	10,675	7,625	1.548	11,801
2002-2003	2,042,623	219	9,327	1.373	12,806	9,327	1.575	14,693
2003-2004	1,542,158	200	7,711	1.346	10,379	7,711	1.605	12,375
2004-2005	1,313,942	203	6,473	1.319	8,538	6,473	1.634	10,579
2005-2006	2,772,583	229	12,107	1.294	15,666	12,107	1.664	20,143
2006-2007	2,280,213	171	13,335	1.268	16,909	13,335	1.697	22,625
2007-2008	2,415,240	185	13,055	1.243	16,227	13,055	1.728	22,557
2008-2009	1,611,115	179	9,001	1.219	10,972	9,001	1.763	15,864
2009-2010	2,946,000	191	15,424	1.195	18,432	15,424	1.797	27,720
2010-2011	2,150,000	168	12,798	1.172	14,999	12,798	1.832	23,444
2011-2012	2,866,000	161	17,801	1.149	20,453	17,801	1.868	33,256
2012-2013	1,841,000	159	11,579	1.126	13,038	11,579	1.906	22,074
2013-2014	1,995,000	179	11,145	1.104	12,304	13,134	1.944	25,539
2014-2015	2,474,000	167	14,814	1.082	16,029	13,401	1.983	26,569
2015-2016	3,125,000	199	15,704	1.061	16,662	13,666	2.022	27,639
2016-2017	3,185,000	211	15,095	1.040	15,699	13,942	2.064	28,777
2017-2018	2,671,000	192	13,911	1.020	14,189	14,216	2.104	29,909

Average Limited Severity \$13,966
Average 13/14-16/17 Limited Severity: \$15,174
Average 13/14-17/18 Limited Severity: \$14,977

Selected Limited Severity: \$15,100
Prior Selected Limited Severity: \$14,500

Notes:

- (A) Selected average of results from Appendices A, B, and C.
- (B) Pool - Appendix D, Page 3, Column (C).
- (C) (A) / (B).
- (D) From Pool - Appendix E, Column (J).
- (E) (C) x (D).
- (F) Selected Limited Severity / (D).
- (G) Based on a Burr distribution, a mathematical model of claim sizes.
- (H) (F) x (G).

This exhibit shows the calculation of the historical average cost per claim, or severity. The observed average severity is used in the method shown on page 1 of this Appendix.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Frequency and Severity Method
Projection of Ultimate Claims

Accident Year	Reported Claim Development (A)	Closed Claim Development (B)	Selected Ultimate Claims (C)	Composite Exposure (10,000s) (D)	Claim Frequency (E)	Trend Factor (F)	Trended Claim Frequency (G)
Prior	701	701	701			1.110	
1998-1999	205	205	205			1.105	
1999-2000	204	205	204			1.099	
2000-2001	186	187	186			1.094	
2001-2002	216	217	216			1.088	
2002-2003	219	219	219			1.083	
2003-2004	200	201	200	273.484	0.731	1.078	0.788
2004-2005	203	204	203	278.910	0.728	1.072	0.780
2005-2006	229	230	229	289.396	0.791	1.067	0.844
2006-2007	171	173	171	305.954	0.559	1.062	0.594
2007-2008	185	186	185	332.181	0.557	1.056	0.588
2008-2009	179	181	179	339.812	0.527	1.051	0.554
2009-2010	191	192	191	324.279	0.589	1.046	0.616
2010-2011	168	168	168	296.029	0.568	1.041	0.591
2011-2012	161	160	161	286.682	0.562	1.036	0.582
2012-2013	159	161	159	277.960	0.572	1.030	0.589
2013-2014	179	184	179	278.722	0.642	1.025	0.658
2014-2015	167	169	167	284.850	0.586	1.020	0.598
2015-2016	199	197	199	315.967	0.630	1.015	0.639
2016-2017	211	192	211	327.577	0.644	1.010	0.650
2017-2018	192	182	192	328.729	0.584	1.005	0.587
Total	4,525	4,514	4,525	4,540.531			0.641

(H) Selected 2018-2019 Frequency: 0.650
Prior Selected Frequency: 0.700

Program Year:	2018-2019	2019-2020
(I) Trend Factor:	1.000	1.005
(J) Selected Frequency:	0.650	0.653
(K) Composite Exposure:	332.012	342.584
(L) Ultimate Claims:	216	224

Notes:

- (A) From Pool - Appendix D, Page 4, (C).
- (B) From Pool - Appendix D, Page 5, (C).
- (C) Selected from (A) and (B).
- (D) From Pool - Appendix L, Page 2, (G).
- (E) (C) / (D).
- (F) From Pool - Appendix E.
- (G) (E) x (F).
- (H) The selected frequency of 0.650 is based on (G).
- (I) From Pool - Appendix E.
- (J) (H) x (I).
- (K) From Pool - Appendix L, Page 2, (G).
- (L) (J) x (K).

This exhibit summarizes the estimated numbers of claims and shows the estimated frequencies per 10,000 units of Composite Exposure, Pool - Appendix L, Page 2, Item (G).

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Frequency and Severity Method
Reported Claim Count Development

Accident Year	Claims Reported as of 9/30/2018 (A)	Reported Claim Development Factor (B)	Ultimate Claims (C)	Trended Claim Frequency (D)
Prior	701	1.000	701	
1998-1999	205	1.000	205	
1999-2000	204	1.000	204	
2000-2001	186	1.000	186	
2001-2002	216	1.000	216	
2002-2003	219	1.000	219	
2003-2004	200	1.000	200	0.788
2004-2005	203	1.000	203	0.780
2005-2006	229	1.000	229	0.844
2006-2007	171	1.000	171	0.594
2007-2008	185	1.000	185	0.588
2008-2009	179	1.000	179	0.554
2009-2010	191	1.000	191	0.616
2010-2011	168	1.000	168	0.591
2011-2012	161	1.000	161	0.582
2012-2013	159	1.000	159	0.589
2013-2014	179	1.002	179	0.658
2014-2015	167	1.002	167	0.598
2015-2016	200	0.997	199	0.639
2016-2017	218	0.966	211	0.651
2017-2018	264	0.728	192	0.587
Total	4,605		4,525	0.641

Notes:

- (A) Provided by the Authority.
- (B) From Pool - Appendix D, Page 6.
- (C) (A) x (B).
- (D) (C) / [Pool - Appendix D, Page 3, (D)] x [Pool - Appendix D, Page 3, (F)].

This exhibit shows the calculation of estimated ultimate claims for each year based on reported claims as provided by the Authority. These numbers of claims tend to "develop" or change from period to period as more claims are filed. This development tends to follow quantifiable patterns over time.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Frequency and Severity Method
Closed Claim Count Development

Accident Year	Claims Closed as of 9/30/2018 (A)	Closed Claim Development Factor (B)	Ultimate Claims (C)	Trended Claim Frequency (D)
Prior	700	1.001	701	
1998-1999	205	1.002	205	
1999-2000	204	1.003	205	
2000-2001	186	1.004	187	
2001-2002	216	1.005	217	
2002-2003	218	1.006	219	
2003-2004	200	1.007	201	0.792
2004-2005	202	1.008	204	0.784
2005-2006	228	1.009	230	0.848
2006-2007	171	1.010	173	0.601
2007-2008	184	1.011	186	0.591
2008-2009	179	1.012	181	0.560
2009-2010	190	1.013	192	0.619
2010-2011	166	1.014	168	0.591
2011-2012	158	1.015	160	0.578
2012-2013	158	1.020	161	0.597
2013-2014	178	1.033	184	0.677
2014-2015	158	1.069	169	0.605
2015-2016	173	1.138	197	0.633
2016-2017	151	1.273	192	0.592
2017-2018	114	1.593	182	0.556
Total	4,339		4,514	0.638

Notes:

- (A) Provided by the Authority.
- (B) From Pool - Appendix D, Page 7.
- (C) (A) x (B).
- (D) (C) / [Pool - Appendix D, Page 3, (D)] x [Pool - Appendix D, Page 3, (F)].

This exhibit shows the calculation of estimated ultimate claims for each year based on closed claims as provided by the Authority. These numbers of closed claims tend to "develop" or change from period to period as more claims are closed. This development tends to follow quantifiable patterns over time.

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Reported Claim Count Development

Accident Year	Claims Reported as of:													
	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months	135 Months	147 Months	159 Months
1997-1998	99	276	191	190	190	189	189	194	198	198	198	198	198	198
1998-1999	111	313	244	243	244	243	248	245	245	245	245	245	245	245
1999-2000	94	292	249	240	239	244	249	249	249	249	249	249	249	250
2000-2001	116	299	231	229	227	225	225	225	225	225	225	225	225	225
2001-2002	99	309	254	246	246	246	246	246	246	245	245	245	245	245
2002-2003	96	330	250	244	245	244	244	244	244	244	245	245	245	245
2003-2004	82	299	210	202	198	198	198	197	197	197	197	198	200	200
2004-2005	74	286	206	188	188	187	187	186	186	196	196	203	203	203
2005-2006	78	320	229	229	231	228	228	228	229	229	229	229	229	229
2006-2007	74	253	168	167	164	164	164	171	172	171	171	172	171	
2007-2008	92	242	188	183	183	182	185	186	186	185	185	185		
2008-2009	80	240	188	179	179	179	179	179	179	179	179			
2009-2010	84	249	191	193	189	190	192	192	191	191				
2010-2011	78	238	170	165	164	167	167	167	168					
2011-2012	61	204	166	161	160	160	161	161						
2012-2013	53	231	167	160	160	161	159							
2013-2014	55	241	194	180	180	179								
2014-2015	40	257	194	168	167									
2015-2016	41	315	213	200										
2016-2017	46	317	218											
2017-2018	52	264												
2018-2019	58													

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Reported Claim Count Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months	135-147 Months	147-159 Months	159-171 Months
1997-1998	2.788	0.692	0.995	1.000	0.995	1.000	1.026	1.021	1.000	1.000	1.000	1.000	1.000	1.000
1998-1999	2.820	0.780	0.996	1.004	0.996	1.021	0.988	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1999-2000	3.106	0.853	0.964	0.996	1.021	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.004	1.000
2000-2001	2.578	0.773	0.991	0.991	0.991	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2001-2002	3.121	0.822	0.969	1.000	1.000	1.000	1.000	1.000	0.996	1.000	1.000	1.000	1.000	1.000
2002-2003	3.438	0.758	0.976	1.004	0.996	1.000	1.000	1.000	1.000	1.004	1.000	1.000	1.000	1.000
2003-2004	3.646	0.702	0.962	0.980	1.000	1.000	0.995	1.000	1.000	1.000	1.005	1.010	1.000	1.000
2004-2005	3.865	0.720	0.913	1.000	0.995	1.000	0.995	1.000	1.054	1.000	1.036	1.000	1.000	1.000
2005-2006	4.103	0.716	1.000	1.009	0.987	1.000	1.000	1.004	1.000	1.000	1.000	1.000	1.000	
2006-2007	3.419	0.664	0.994	0.982	1.000	1.000	1.043	1.006	0.994	1.000	1.006	0.994		
2007-2008	2.630	0.777	0.973	1.000	0.995	1.016	1.005	1.000	0.995	1.000	1.000			
2008-2009	3.000	0.783	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
2009-2010	2.964	0.767	1.010	0.979	1.005	1.011	1.000	0.995	1.000					
2010-2011	3.051	0.714	0.971	0.994	1.018	1.000	1.000	1.006						
2011-2012	3.344	0.814	0.970	0.994	1.000	1.006	1.000							
2012-2013	4.358	0.723	0.958	1.000	1.006	0.988								
2013-2014	4.382	0.805	0.928	1.000	0.994									
2014-2015	6.425	0.755	0.866	0.994										
2015-2016	7.683	0.676	0.939											
2016-2017	6.891	0.688												
2017-2018	5.077													
Average	3.938	0.749	0.965	0.996	1.000	1.004	1.003	1.002	1.003	1.000	1.004	1.000	1.000	1.000
Claim-weighted Averages														
3-yr	6.446	0.703	0.912	0.998	1.000	0.998	1.000	1.000	0.998	1.000	1.002	0.998	1.000	1.000
4-yr	6.441	0.725	0.922	0.997	1.005	1.001	1.000	1.000	0.997	1.000	1.010	1.001	1.000	1.000
Industry Factors	5.326	1.198	1.023	1.005	1.005	1.005	1.004	1.003	1.001	1.002	1.000	1.000	1.000	1.000
Prior	4.692	0.756	0.970	0.994	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Selected	5.129	0.754	0.969	0.995	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Cumulated	3.734	0.728	0.966	0.997	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Municipal Pooling Authority - Liability - 100K & SIR Analyses
Closed Claim Count Development

Accident Year	Claims Closed as of:													
	3 Months	15 Months	27 Months	39 Months	51 Months	63 Months	75 Months	87 Months	99 Months	111 Months	123 Months	135 Months	147 Months	159 Months
1997-1998	21	132	154	176	181	186	187	193	196	196	196	197	197	197
1998-1999	32	149	196	230	237	239	246	245	245	245	245	245	245	245
1999-2000	29	155	202	229	234	239	245	244	244	244	244	244	245	250
2000-2001	36	150	191	214	223	225	225	225	225	225	225	225	225	225
2001-2002	30	172	203	235	243	243	245	245	244	244	245	245	245	245
2002-2003	31	152	202	228	238	241	243	243	243	244	244	243	243	244
2003-2004	19	158	176	190	193	194	196	197	197	197	197	198	200	200
2004-2005	18	154	177	173	180	185	185	185	185	195	195	202	202	202
2005-2006	19	152	186	206	219	222	225	226	228	228	228	228	228	228
2006-2007	22	98	119	133	148	159	161	171	171	171	171	171	171	
2007-2008	17	124	149	168	172	174	178	182	183	183	183	184		
2008-2009	19	130	150	165	172	177	177	177	179	179	179			
2009-2010	17	122	144	160	168	181	184	188	190	190				
2010-2011	16	113	131	141	155	160	163	165	166					
2011-2012	16	95	126	143	151	155	157	158						
2012-2013	11	93	117	134	146	155	158							
2013-2014	9	118	149	165	174	178								
2014-2015	6	93	129	145	158									
2015-2016	9	99	148	173										
2016-2017	3	111	151											
2017-2018	3	114												
2018-2019	3													

Amounts Include All Locations Except Richmond
The 2012-13 diagonal is valued as of 10/31/12.
The 2013-14 through 2017-18 diagonal is valued as of 9/30.

Closed Claim Count Development Factors:

	3-15 Months	15-27 Months	27-39 Months	39-51 Months	51-63 Months	63-75 Months	75-87 Months	87-99 Months	99-111 Months	111-123 Months	123-135 Months	135-147 Months	147-159 Months	159-171 Months
1997-1998	6.286	1.167	1.143	1.028	1.028	1.005	1.032	1.016	1.000	1.000	1.005	1.000	1.000	1.005
1998-1999	4.656	1.315	1.173	1.030	1.008	1.029	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1999-2000	5.345	1.303	1.134	1.022	1.021	1.025	0.996	1.000	1.000	1.000	1.000	1.004	1.020	1.000
2000-2001	4.167	1.273	1.120	1.042	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2001-2002	5.733	1.180	1.158	1.034	1.000	1.008	1.000	0.996	1.000	1.004	1.000	1.000	1.000	1.000
2002-2003	4.903	1.329	1.129	1.044	1.013	1.008	1.000	1.000	1.004	1.000	0.996	1.000	1.004	1.000
2003-2004	8.316	1.114	1.080	1.016	1.005	1.010	1.005	1.000	1.000	1.000	1.005	1.010	1.000	1.000
2004-2005	8.556	1.149	0.977	1.040	1.028	1.000	1.000	1.000	1.054	1.000	1.036	1.000	1.000	1.000
2005-2006	8.000	1.224	1.108	1.063	1.014	1.014	1.004	1.009	1.000	1.000	1.000	1.000	1.000	
2006-2007	4.455	1.214	1.118	1.113	1.074	1.013	1.062	1.000	1.000	1.000	1.000	1.000		
2007-2008	7.294	1.202	1.128	1.024	1.012	1.023	1.022	1.005	1.000	1.000	1.005			
2008-2009	6.842	1.154	1.100	1.042	1.029	1.000	1.000	1.011	1.000	1.000				
2009-2010	7.176	1.180	1.111	1.050	1.077	1.017	1.022	1.011	1.000					
2010-2011	7.063	1.159	1.076	1.099	1.032	1.019	1.012	1.006						
2011-2012	5.938	1.326	1.135	1.056	1.026	1.013	1.006							
2012-2013	8.455	1.258	1.145	1.090	1.062	1.019								
2013-2014	13.111	1.263	1.107	1.055	1.023									
2014-2015	15.500	1.387	1.124	1.090										
2015-2016	11.000	1.495	1.169											
2016-2017	37.000	1.360												
2017-2018	38.000													
Average	10.371	1.253	1.118	1.052	1.027	1.013	1.010	1.004	1.004	1.000	1.004	1.001	1.003	1.001
Claim-weighted Averages														
3-yr	21.600	1.413	1.134	1.077	1.036	1.017	1.014	1.009	1.000	1.000	1.002	1.000	1.000	1.000
4-yr	19.857	1.371	1.136	1.072	1.035	1.017	1.010	1.008	1.000	1.000	1.010	1.003	1.001	1.000
Industry Factors	5.740	1.748	1.155	1.058	1.037	1.022	1.014	1.009	1.008	1.006	1.005	1.004	1.002	1.002
Prior	8.866	1.250	1.114	1.061	1.035	1.012	1.005	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Selected	9.242	1.251	1.119	1.065	1.035	1.013	1.005	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Cumulated	14.723	1.593	1.273	1.138	1.069	1.033	1.020	1.015	1.014	1.013	1.012	1.011	1.010	1.009

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Loss Trend Factors

Accident Year	Benefit Level Factor (A)	Factor to	Factor to	Factor to	Factor to	Factor to	Factor to	Factor to	Factor to	Factor to
		2018-2019 Loss Rate Level (B)	2019-2020 Loss Rate Level (C)	2020-2021 Loss Rate Level (D)	2021-2022 Loss Rate Level (E)	2018-2019 Frequency Level (F)	2019-2020 Frequency Level (G)	2020-2021 Frequency Level (H)	2021-2022 Frequency Level (I)	2018-2019 Severity Level (J)
Prior	1.000	1.683	1.725	1.769	1.813	1.110	1.116	1.122	1.127	1.516
1998-1999	1.000	1.642	1.683	1.725	1.769	1.105	1.110	1.116	1.122	1.486
1999-2000	1.000	1.602	1.642	1.683	1.725	1.099	1.105	1.110	1.116	1.457
2000-2001	1.000	1.562	1.602	1.642	1.683	1.094	1.099	1.105	1.110	1.428
2001-2002	1.000	1.524	1.562	1.602	1.642	1.088	1.094	1.099	1.105	1.400
2002-2003	1.000	1.487	1.524	1.562	1.602	1.083	1.088	1.094	1.099	1.373
2003-2004	1.000	1.450	1.487	1.524	1.562	1.078	1.083	1.088	1.094	1.346
2004-2005	1.000	1.415	1.450	1.487	1.524	1.072	1.078	1.083	1.088	1.319
2005-2006	1.000	1.380	1.415	1.450	1.487	1.067	1.072	1.078	1.083	1.294
2006-2007	1.000	1.346	1.380	1.415	1.450	1.062	1.067	1.072	1.078	1.268
2007-2008	1.000	1.313	1.346	1.380	1.415	1.056	1.062	1.067	1.072	1.243
2008-2009	1.000	1.281	1.313	1.346	1.380	1.051	1.056	1.062	1.067	1.219
2009-2010	1.000	1.250	1.281	1.313	1.346	1.046	1.051	1.056	1.062	1.195
2010-2011	1.000	1.219	1.250	1.281	1.313	1.041	1.046	1.051	1.056	1.172
2011-2012	1.000	1.189	1.219	1.250	1.281	1.036	1.041	1.046	1.051	1.149
2012-2013	1.000	1.160	1.189	1.219	1.250	1.030	1.036	1.041	1.046	1.126
2013-2014	1.000	1.132	1.160	1.189	1.219	1.025	1.030	1.036	1.041	1.104
2014-2015	1.000	1.104	1.132	1.160	1.189	1.020	1.025	1.030	1.036	1.082
2015-2016	1.000	1.077	1.104	1.132	1.160	1.015	1.020	1.025	1.030	1.061
2016-2017	1.000	1.051	1.077	1.104	1.132	1.010	1.015	1.020	1.025	1.040
2017-2018	1.000	1.025	1.051	1.077	1.104	1.005	1.010	1.015	1.020	1.020
2018-2019	1.000	1.000	1.025	1.051	1.077	1.000	1.005	1.010	1.015	1.000
2019-2020	1.000	--	1.000	1.025	1.051	--	1.000	1.005	1.010	0.980
2020-2021	1.000	--	--	1.000	1.025	--	--	1.000	1.005	--
2021-2022	1.000	--	--	--	1.000	--	--	--	1.000	--

Notes:

- (A) No benefit level adjustment applied.
- (B) - (E) (A) adjusted for a 2.5% annual loss rate trend.
- (F) - (I) (A) adjusted for a 0.5% annual frequency trend.
- (J) (A) adjusted for a 2.0% annual severity trend.

This exhibit shows the calculation of the ways in which we expect claims costs to have changed over the past twenty years due to changes in inflation.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Payment and Reserve Forecast

<u>Accident Year</u>	<u>As of</u> <u>9/30/2018</u>	<u>Calendar Period</u>	
		<u>10/1/2018</u> <u>to</u> <u>6/30/2019</u>	<u>7/1/2019</u> <u>to</u> <u>6/30/2020</u>
Prior			
Ultimate Loss	\$11,733,569	\$11,733,569	\$11,733,569
Paid in Calendar Period	-	53,478	
Paid to Date	11,680,091	11,733,569	11,733,569
Outstanding Liability	53,478	0	0
2002-2003			
Ultimate Loss	\$2,196,731	\$2,196,731	\$2,196,731
Paid in Calendar Period	-	113,720	57,088
Paid to Date	1,968,835	2,082,555	2,139,643
Outstanding Liability	227,896	114,176	57,088
2003-2004			
Ultimate Loss	\$1,294,611	\$1,294,611	\$1,294,611
Paid in Calendar Period	-		
Paid to Date	1,294,611	1,294,611	1,294,611
Outstanding Liability	(0)	(0)	(0)
2004-2005			
Ultimate Loss	\$2,370,149	\$2,370,149	\$2,370,149
Paid in Calendar Period	-		
Paid to Date	2,370,149	2,370,149	2,370,149
Outstanding Liability	(0)	(0)	(0)
2005-2006			
Ultimate Loss	\$3,590,940	\$3,590,940	\$3,590,940
Paid in Calendar Period	-	814	819
Paid to Date	3,586,420	3,587,234	3,588,053
Outstanding Liability	4,520	3,706	2,887
2006-2007			
Ultimate Loss	\$4,639,142	\$4,639,142	\$4,639,142
Paid in Calendar Period	-	40	41
Paid to Date	4,638,938	4,638,978	4,639,019
Outstanding Liability	204	164	123
2007-2008			
Ultimate Loss	\$4,547,325	\$4,547,325	\$4,547,325
Paid in Calendar Period	-	51,452	69,283
Paid to Date	4,215,375	4,266,827	4,336,110
Outstanding Liability	331,950	280,498	211,215

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Payment and Reserve Forecast

<u>Accident Year</u>	<u>As of</u> <u>9/30/2018</u>	<u>Calendar Period</u>	
		<u>10/1/2018</u> <u>to</u> <u>6/30/2019</u>	<u>7/1/2019</u> <u>to</u> <u>6/30/2020</u>
2008-2009			
Ultimate Loss	\$1,806,000	\$1,806,000	\$1,806,000
Paid in Calendar Period	-	70	57
Paid to Date	1,805,643	1,805,713	1,805,770
Outstanding Liability	357	287	230
2009-2010			
Ultimate Loss	\$5,816,000	\$5,816,000	\$5,816,000
Paid in Calendar Period	-	340	301
Paid to Date	5,814,477	5,814,817	5,815,118
Outstanding Liability	1,523	1,183	882
2010-2011			
Ultimate Loss	\$3,455,000	\$3,455,000	\$3,455,000
Paid in Calendar Period	-	10,173	9,611
Paid to Date	3,412,789	3,422,962	3,432,573
Outstanding Liability	42,211	32,038	22,427
2011-2012			
Ultimate Loss	\$4,799,000	\$4,799,000	\$4,799,000
Paid in Calendar Period	-	17,656	18,308
Paid to Date	4,723,224	4,740,880	4,759,188
Outstanding Liability	75,776	58,120	39,812
2012-2013			
Ultimate Loss	\$2,478,000	\$2,478,000	\$2,478,000
Paid in Calendar Period	-	11,971	11,134
Paid to Date	2,430,682	2,442,653	2,453,787
Outstanding Liability	47,318	35,347	24,213
2013-2014			
Ultimate Loss	\$2,772,000	\$2,772,000	\$2,772,000
Paid in Calendar Period	-	44,492	52,590
Paid to Date	2,562,132	2,606,624	2,659,214
Outstanding Liability	209,868	165,376	112,786
2014-2015			
Ultimate Loss	\$4,483,000	\$4,483,000	\$4,483,000
Paid in Calendar Period	-	399,308	318,220
Paid to Date	3,067,014	3,466,322	3,784,542
Outstanding Liability	1,415,986	1,016,678	698,458

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Payment and Reserve Forecast

<u>Accident Year</u>	<u>As of</u> <u>9/30/2018</u>	<u>Calendar Period</u>	
		<u>10/1/2018</u> <u>to</u> <u>6/30/2019</u>	<u>7/1/2019</u> <u>to</u> <u>6/30/2020</u>
2015-2016			
Ultimate Loss	\$4,593,000	\$4,593,000	\$4,593,000
Paid in Calendar Period	-	738,718	655,928
Paid to Date	2,154,987	2,893,705	3,549,633
Outstanding Liability	2,438,013	1,699,295	1,043,367
2016-2017			
Ultimate Loss	\$5,851,000	\$5,851,000	\$5,851,000
Paid in Calendar Period	-	1,304,216	1,232,257
Paid to Date	1,489,073	2,793,289	4,025,546
Outstanding Liability	4,361,927	3,057,711	1,825,454
2017-2018			
Ultimate Loss	\$4,005,000	\$4,005,000	\$4,005,000
Paid in Calendar Period	-	744,712	1,142,911
Paid to Date	22,581	767,293	1,910,204
Outstanding Liability	3,982,419	3,237,707	2,094,796
2018-2019			
Ultimate Loss	\$1,244,000	\$4,977,000	\$4,977,000
Paid in Calendar Period	-	408,114	968,604
Paid to Date	(0)	408,114	1,376,718
Outstanding Liability	1,244,000	4,568,886	3,600,282
2019-2020			
Ultimate Loss	-	-	\$5,416,000
Paid in Calendar Period	-	-	476,608
Paid to Date	-	-	476,608
Outstanding Liability	-	-	4,939,392
Totals			
Ultimate Loss	\$71,674,467	\$75,407,467	\$80,823,467
Paid in Calendar Period	-	3,899,274	5,013,760
Paid to Date	57,237,020	61,136,294	66,150,054
Outstanding Liability	14,437,447	14,271,173	14,673,413
Total Outstanding ULAE	467,000	620,318	739,432
Outstanding Liability plus ULAE	14,904,447	14,891,491	15,412,845

Notes appear on the next page.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Payment and Reserve Forecast

Notes to previous page:

- Accident Year is associated with date of loss. Calendar Period is associated with date of transaction. For example, for the losses which occurred during 2016-2017, \$1,304,216 is expected to be paid between 10/1/18 and 6/30/19, \$2,793,289 will have been paid by 6/30/19, and the reserve for remaining payments on these claims should be \$3,057,711.
- Ultimate Losses for each accident year are from Pool - Exhibit 3, Page 2.
- Paid in Calendar Period is a proportion of the Outstanding Liability from the previous calendar period. These proportions are derived from the paid loss development pattern selected in Appendix B. For example, $\$1,232,257 = \$3,057,711 \times 40.3\%$.
- Paid to Date is Paid in Calendar Period plus Paid to Date from previous calendar period. For example, $\$4,025,546 = \$1,232,257 + \$2,793,289$.
- Outstanding Liability is Ultimate Loss minus Paid to Date. For example, $\$3,057,711 = \$5,851,000 - \$2,793,289$.

This exhibit shows the calculation of the liability for outstanding claims as of the date of evaluation, the end of the current fiscal year, and the end of the coming fiscal year. It also shows the expected claims payout during the remainder of the current fiscal year and the coming fiscal year. Refer to the Totals at the end of the exhibit for the balance sheet information. The top parts of the exhibit show information for each program year.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Short- and Long-Term Liabilities

<u>Liabilities as of 9/30/18:</u>		<u>Expected</u>	<u>Discounted</u>
<u>Current (Short Term)</u>	Loss and ALAE:	\$3,491,160	\$3,456,763
	ULAE:	84,318	83,487
	Short-Term Loss and LAE:	<u>\$3,575,478</u>	<u>\$3,540,250</u>
<u>Non-Current (Long Term)</u>	Loss and ALAE:	\$10,946,287	\$10,261,921
	ULAE:	382,682	360,263
	Long-Term Loss and LAE:	<u>\$11,328,969</u>	<u>\$10,622,184</u>
<u>Total Liability</u>	Loss and ALAE:	\$14,437,447	\$13,718,684
	ULAE:	467,000	443,750
	Total Loss and LAE:	<u>\$14,904,447</u>	<u>\$14,162,434</u>
<u>Liabilities as of 6/30/19:</u>			
<u>Current (Short Term)</u>	Loss and ALAE:	\$4,537,152	\$4,492,450
	ULAE:	196,878	194,938
	Short-Term Loss and LAE:	<u>\$4,734,030</u>	<u>\$4,687,388</u>
<u>Non-Current (Long Term)</u>	Loss and ALAE:	\$9,734,021	\$9,069,642
	ULAE:	423,440	394,559
	Long-Term Loss and LAE:	<u>\$10,157,461</u>	<u>\$9,464,201</u>
<u>Total Liability</u>	Loss and ALAE:	\$14,271,173	\$13,562,092
	ULAE:	620,318	589,497
	Total Loss and LAE:	<u>\$14,891,491</u>	<u>\$14,151,589</u>

		<u>Discounted with a Margin for Contingencies</u>				
		<u>70%</u>	<u>75%</u>	<u>80%</u>	<u>85%</u>	<u>90%</u>
		<u>Confidence</u>	<u>Confidence</u>	<u>Confidence</u>	<u>Confidence</u>	<u>Confidence</u>
<u>Liabilities as of 9/30/18:</u>						
<u>Current (Short Term)</u>	Loss and ALAE:	\$3,837,007	\$4,002,932	\$4,193,054	\$4,435,027	\$4,759,963
	ULAE:	92,671	96,678	101,270	107,114	114,962
	Short-Term Loss and LAE:	<u>\$3,929,678</u>	<u>\$4,099,610</u>	<u>\$4,294,324</u>	<u>\$4,542,141</u>	<u>\$4,874,925</u>
<u>Non-Current (Long Term)</u>	Loss and ALAE:	\$11,390,732	\$11,883,304	\$12,447,710	\$13,166,045	\$14,130,665
	ULAE:	399,892	417,185	436,998	462,217	496,082
	Long-Term Loss and LAE:	<u>\$11,790,624</u>	<u>\$12,300,489</u>	<u>\$12,884,708</u>	<u>\$13,628,262</u>	<u>\$14,626,747</u>
<u>Total Liability</u>	Loss and ALAE:	\$15,227,739	\$15,886,236	\$16,640,764	\$17,601,072	\$18,890,628
	ULAE:	492,563	513,863	538,268	569,331	611,044
	Total Loss and LAE:	<u>\$15,720,302</u>	<u>\$16,400,099</u>	<u>\$17,179,032</u>	<u>\$18,170,403</u>	<u>\$19,501,672</u>
<u>Liabilities as of 6/30/19:</u>						
<u>Current (Short Term)</u>	Loss and ALAE:	\$4,986,620	\$5,202,257	\$5,449,342	\$5,763,813	\$6,186,104
	ULAE:	216,381	225,738	236,460	250,105	268,430
	Short-Term Loss and LAE:	<u>\$5,203,001</u>	<u>\$5,427,995</u>	<u>\$5,685,802</u>	<u>\$6,013,918</u>	<u>\$6,454,534</u>
<u>Non-Current (Long Term)</u>	Loss and ALAE:	\$10,067,302	\$10,502,646	\$11,001,476	\$11,636,351	\$12,488,897
	ULAE:	437,961	456,899	478,599	506,220	543,307
	Long-Term Loss and LAE:	<u>\$10,505,263</u>	<u>\$10,959,545</u>	<u>\$11,480,075</u>	<u>\$12,142,571</u>	<u>\$13,032,204</u>
<u>Total Liability</u>	Loss and ALAE:	\$15,053,922	\$15,704,903	\$16,450,818	\$17,400,164	\$18,675,001
	ULAE:	654,342	682,637	715,059	756,325	811,737
	Total Loss and LAE:	<u>\$15,708,264</u>	<u>\$16,387,540</u>	<u>\$17,165,877</u>	<u>\$18,156,489</u>	<u>\$19,486,738</u>

Note: Current (short term) liabilities are the portion of the total estimated liability shown on Pool - Appendix F that is expected to be paid out within the coming year. Totals may vary from Pool - Exhibit 1, due to rounding.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Discount Factors to be Applied to Overall Reserves

Accident Year	Full Value of Reserve at 9/30/18 (A)	Discount Factor (B)	Discounted Reserve at 9/30/18 (C)	Full Value of Reserve at 6/30/19 (D)	Discount Factor (E)	Discounted Reserve at 6/30/19 (F)
Prior	\$53,478	1.000	\$53,478	\$0	1.000	\$0
1998-1999	0	0.993	0	0	1.000	0
1999-2000	(0)	0.976	0	(0)	0.990	0
2000-2001	0	0.971	0	0	0.971	0
2001-2002	0	0.966	0	0	0.971	0
2002-2003	227,896	0.967	220,384	114,176	0.965	110,134
2003-2004	(0)	0.964	0	(0)	0.968	0
2004-2005	(0)	0.957	0	(0)	0.963	0
2005-2006	4,520	0.949	4,290	3,706	0.955	3,540
2006-2007	204	0.943	193	164	0.947	156
2007-2008	331,950	0.938	311,292	280,498	0.941	264,029
2008-2009	357	0.936	334	287	0.937	269
2009-2010	1,523	0.938	1,429	1,183	0.936	1,107
2010-2011	42,211	0.941	39,709	32,038	0.939	30,080
2011-2012	75,776	0.943	71,441	58,120	0.941	54,711
2012-2013	47,318	0.944	44,676	35,347	0.943	33,342
2013-2014	209,868	0.945	198,337	165,376	0.944	156,192
2014-2015	1,415,986	0.949	1,343,655	1,016,678	0.945	961,013
2015-2016	2,438,013	0.953	2,323,908	1,699,295	0.950	1,614,570
2016-2017	4,361,927	0.954	4,162,207	3,057,711	0.954	2,917,718
2017-2018	3,982,419	0.949	3,777,902	3,237,707	0.954	3,089,459
2018-2019	1,244,000	0.937	1,165,449	4,568,886	0.947	4,325,772
Totals	\$14,437,447		\$13,718,684	\$14,271,173		\$13,562,092

(G) Discount Factor at 9/30/18 for Overall Reserve: 0.950
(H) Discount Factor at 6/30/19 for Overall Reserve: 0.950

Notes:

- (A) From Pool - Appendix F, Outstanding Liability at 9/30/18.
- (B) Based on Pool - Appendix H, Page 2, Column (E).
- (C) (A) x (B).
- (D) From Pool - Appendix F, Outstanding Liability at 6/30/19.
- (E) Based on Pool - Appendix H, Page 2, Column (E).
- (F) (D) x (E).
- (G) Total of (C) / Total of (A).
- (H) Total of (F) / Total of (D).

This exhibit shows the expected impact of anticipated investment income on the liability for outstanding claims at the date of evaluation and the end of the current fiscal year. For example, if the discount factor in item (G) is 0.950, the discounted liability for outstanding claims is 95.0% of the full value.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Calculation of Discount Factors

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
22	0.0%	0.000	0.000	1.000
21	0.1%	0.001	0.001	0.990
20	0.0%	0.001	0.001	0.971
19	0.1%	0.002	0.002	0.971
18	0.1%	0.003	0.003	0.965
17	0.3%	0.006	0.006	0.968
16	0.3%	0.009	0.009	0.963
15	0.3%	0.011	0.012	0.955
14	0.3%	0.014	0.015	0.947
13	0.4%	0.018	0.019	0.941
12	0.5%	0.022	0.023	0.937
11	0.8%	0.029	0.031	0.936
10	1.3%	0.041	0.044	0.939
9	1.9%	0.059	0.063	0.941
8	2.7%	0.085	0.090	0.943
7	3.9%	0.122	0.129	0.944
6	5.5%	0.174	0.184	0.945
5	10.8%	0.278	0.292	0.950
4	18.5%	0.455	0.477	0.954
3	24.8%	0.692	0.725	0.954
2	18.9%	0.865	0.914	0.947
1	8.6%	0.934	1.000	0.934

(F) Discount Factor for Future Funding: 0.943

* Assumed Investment Rate: 2.0%

Notes:

- (A) This is the year of payment relative to the accident year. For example, year 7 refers to payments made in the seventh year after the inception of the accident year. We assume that payments are made at midyear.
- (B) Percent of ultimate loss paid this year. This payment pattern is based on the paid loss development pattern selected in Pool - Appendix B, Page 2.
- (C) Discounted Reserves at the beginning of this year is next year's Discounted Reserves discounted one year plus this year's payments discounted six months. For example, in year 2, 86.5% = [69.2% / 1.020] + [18.9% / (1.010)].
- (D) Summation of future (B) values. This is the percent of ultimate loss unpaid at the beginning of the year.
- (E) (C) / (D).
- (F) (E) at year 1, with interest accumulated for six months. We assume that the required funding is deposited at the middle of the first year.

This exhibit shows the calculation of the effect of anticipated investment income on future claims costs. Thus, if the discount factor in item (F) is 0.94, on a discounted basis, \$0.94 must be budgeted for every \$1 that will actually be paid on claims that will be incurred in the next fiscal year.

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$5,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.1%	0.001	0.001	0.990
16	0.1%	0.002	0.002	0.980
15	0.1%	0.003	0.003	0.971
14	0.1%	0.004	0.004	0.961
13	0.1%	0.005	0.005	0.952
12	0.1%	0.006	0.006	0.943
11	0.2%	0.007	0.008	0.941
10	0.3%	0.010	0.011	0.941
9	0.3%	0.013	0.014	0.937
8	0.6%	0.018	0.020	0.939
7	1.3%	0.031	0.033	0.949
6	2.0%	0.051	0.053	0.953
5	7.1%	0.119	0.124	0.966
4	17.9%	0.294	0.302	0.973
3	30.0%	0.585	0.602	0.972
2	25.8%	0.829	0.860	0.964
1	14.0%	0.951	1.000	0.951
(F) Discount Factor for Future Funding:				0.961
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$10,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.1%	0.001	0.001	0.990
16	0.1%	0.002	0.002	0.980
15	0.1%	0.003	0.003	0.971
14	0.1%	0.004	0.005	0.961
13	0.1%	0.005	0.006	0.952
12	0.1%	0.006	0.007	0.943
11	0.2%	0.009	0.009	0.941
10	0.3%	0.012	0.013	0.941
9	0.3%	0.015	0.016	0.937
8	0.7%	0.021	0.023	0.939
7	1.5%	0.036	0.038	0.949
6	2.3%	0.058	0.061	0.953
5	8.0%	0.136	0.141	0.966
4	19.8%	0.329	0.339	0.972
3	31.5%	0.635	0.654	0.971
2	24.2%	0.862	0.896	0.962
1	10.4%	0.948	1.000	0.948
(F) Discount Factor for Future Funding:				0.958
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$25,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.1%	0.001	0.001	0.990
16	0.1%	0.003	0.003	0.980
15	0.1%	0.004	0.004	0.971
14	0.1%	0.005	0.006	0.961
13	0.1%	0.007	0.007	0.952
12	0.1%	0.008	0.008	0.943
11	0.3%	0.010	0.011	0.941
10	0.4%	0.014	0.015	0.941
9	0.4%	0.018	0.019	0.936
8	0.8%	0.026	0.027	0.939
7	1.8%	0.043	0.046	0.949
6	2.8%	0.070	0.073	0.953
5	9.5%	0.163	0.169	0.966
4	22.7%	0.384	0.396	0.972
3	32.9%	0.703	0.725	0.970
2	21.1%	0.898	0.936	0.960
1	6.4%	0.944	1.000	0.944
(F) Discount Factor for Future Funding:				0.953
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$50,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.3%	0.003	0.003	0.990
16	0.3%	0.006	0.006	0.980
15	0.3%	0.009	0.010	0.971
14	0.3%	0.012	0.013	0.961
13	0.3%	0.015	0.016	0.952
12	0.3%	0.018	0.019	0.943
11	0.6%	0.024	0.026	0.940
10	0.9%	0.033	0.035	0.940
9	0.9%	0.041	0.044	0.936
8	1.8%	0.059	0.062	0.939
7	4.1%	0.098	0.103	0.948
6	5.9%	0.154	0.162	0.952
5	18.6%	0.336	0.349	0.964
4	34.1%	0.667	0.689	0.967
3	26.1%	0.912	0.950	0.960
2	4.8%	0.942	0.998	0.943
1	0.2%	0.925	1.000	0.925
(F) Discount Factor for Future Funding:				0.934
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$100,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.7%	0.007	0.007	0.990
16	0.7%	0.014	0.014	0.980
15	0.7%	0.021	0.021	0.971
14	0.7%	0.027	0.029	0.961
13	0.7%	0.034	0.036	0.952
12	0.7%	0.040	0.042	0.942
11	1.4%	0.053	0.056	0.940
10	2.0%	0.072	0.076	0.940
9	2.0%	0.090	0.096	0.935
8	3.8%	0.125	0.134	0.938
7	8.2%	0.204	0.215	0.946
6	11.1%	0.310	0.326	0.949
5	28.9%	0.590	0.616	0.958
4	31.1%	0.886	0.926	0.957
3	7.2%	0.940	0.999	0.942
2	0.1%	0.923	1.000	0.923
1	0.0%	0.905	1.000	0.905
(F) Discount Factor for Future Funding:				0.914
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$250,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.6%	0.006	0.006	0.990
16	0.6%	0.013	0.013	0.980
15	0.6%	0.019	0.019	0.971
14	0.6%	0.025	0.026	0.961
13	0.6%	0.030	0.032	0.952
12	0.6%	0.036	0.038	0.942
11	1.2%	0.047	0.050	0.940
10	1.8%	0.065	0.069	0.940
9	1.8%	0.081	0.086	0.936
8	3.4%	0.113	0.121	0.938
7	7.5%	0.185	0.195	0.947
6	10.3%	0.283	0.298	0.949
5	27.7%	0.552	0.576	0.959
4	32.8%	0.866	0.904	0.959
3	9.4%	0.942	0.998	0.945
2	0.2%	0.926	1.000	0.926
1	0.0%	0.908	1.000	0.908
(F) Discount Factor for Future Funding:				0.917
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability

Calculation of Discount Factors at the \$500,000 Deductible Level

Payment Year (A)	Payment Pattern (B)	Discounted* Reserves (C)	Undiscounted Reserves (D)	Discount Factor (E)
21	0.0%	0.000	0.000	1.000
20	0.0%	0.000	0.000	1.000
19	0.0%	0.000	0.000	1.000
18	0.0%	0.000	0.000	1.000
17	0.6%	0.006	0.006	0.990
16	0.6%	0.013	0.013	0.980
15	0.6%	0.019	0.019	0.971
14	0.6%	0.025	0.026	0.961
13	0.6%	0.030	0.032	0.952
12	0.6%	0.036	0.038	0.942
11	1.2%	0.047	0.050	0.940
10	1.8%	0.065	0.069	0.940
9	1.8%	0.081	0.086	0.936
8	3.4%	0.113	0.121	0.938
7	7.5%	0.185	0.195	0.947
6	10.3%	0.283	0.298	0.949
5	27.7%	0.552	0.576	0.959
4	32.8%	0.866	0.904	0.959
3	9.4%	0.942	0.998	0.945
2	0.2%	0.926	1.000	0.926
1	0.0%	0.908	1.000	0.908
(F) Discount Factor for Future Funding:				0.917
* Assumed Investment Rate:				2.0%

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Confidence Level Table

Probability	Projected Losses	Outstanding Losses
95%	1.877	1.537
90	1.615	1.377
85	1.458	1.283
80	1.340	1.213
75	1.246	1.158
70	1.166	1.110
65	1.097	1.069
60	1.033	1.031
55	0.975	0.996
50	0.920	0.963
45	0.869	0.931
40	0.818	0.900
35	0.768	0.870
30	0.717	0.839
25	0.666	0.806

To read table: For the above retention, there is a 90% chance that final loss settlements will be less than 1.615 times the average expected amount of losses.

This exhibit shows the loads that must be applied to bring estimated losses at the expected level to the various indicated confidence levels.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Program History

Policy Year Start Date	Policy Year End Date	Policy Year	Self-Insured Retention	
			Per Occurrence	Aggregate
7/1/1986	6/30/1998	Prior	1,000,000	(none)
7/1/1998	6/30/1999	1998-1999	1,000,000	(none)
7/1/1999	6/30/2000	1999-2000	1,000,000	(none)
7/1/2000	6/30/2001	2000-2001	1,000,000	(none)
7/1/2001	6/30/2002	2001-2002	1,000,000	(none)
7/1/2002	6/30/2003	2002-2003	1,000,000	(none)
7/1/2003	6/30/2004	2003-2004	1,000,000	(none)
7/1/2004	6/30/2005	2004-2005	1,000,000	(none)
7/1/2005	6/30/2006	2005-2006	1,000,000	(none)
7/1/2006	6/30/2007	2006-2007	1,000,000	(none)
7/1/2007	6/30/2008	2007-2008	1,000,000	(none)
7/1/2008	6/30/2009	2008-2009	1,000,000	(none)
7/1/2009	6/30/2010	2009-2010	1,000,000	(none)
7/1/2010	6/30/2011	2010-2011	1,000,000	(none)
7/1/2011	6/30/2012	2011-2012	1,000,000	(none)
7/1/2012	6/30/2013	2012-2013	1,000,000	(none)
7/1/2013	6/30/2014	2013-2014	1,000,000	(none)
7/1/2014	6/30/2015	2014-2015	1,000,000	(none)
7/1/2015	6/30/2016	2015-2016	1,000,000	(none)
7/1/2016	6/30/2017	2016-2017	1,000,000	(none)
7/1/2017	6/30/2018	2017-2018	1,000,000	(none)
7/1/2018	6/30/2019	2018-2019	1,000,000	(none)
7/1/2019	6/30/2020	2019-2020	1,000,000	(none)

This exhibit summarizes some of the key facts about the history of the program.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Incurred Losses as of 9/30/18

Accident Year (A)	Unlimited Incurred (B)	Additions to Losses (C)	Additions to Losses (D)	Adjusted Incurred (E)	Incurred Over SIR (F)	Incurred Over \$100,000 (G)	Incurred Capped at \$100,000 (H)	Incurred \$100,000 to SIR Layer (I)	Incurred Capped at SIR (J)	Incurred Capped at SIR & Aggregate (K)
Prior	\$9,295,516	0	0	\$9,295,516	\$0	\$3,249,032	\$6,046,484	\$3,249,032	\$9,295,516	\$9,295,516
1998-1999	2,510,333	0	0	2,510,333	0	580,310	1,930,023	580,310	2,510,333	2,510,333
1999-2000	1,935,613	0	0	1,935,613	0	437,958	1,497,656	437,958	1,935,613	1,935,613
2000-2001	3,056,849	0	0	3,056,849	0	1,552,269	1,504,580	1,552,269	3,056,849	3,056,849
2001-2002	1,987,998	0	0	1,987,998	0	340,892	1,647,105	340,892	1,987,998	1,987,998
2002-2003	3,814,921	0	0	3,814,921	0	1,772,299	2,042,623	1,772,299	3,814,921	3,814,921
2003-2004	2,210,245	0	0	2,210,245	0	668,087	1,542,158	668,087	2,210,245	2,210,245
2004-2005	3,150,494	0	0	3,150,494	36,553	1,836,553	1,313,942	1,800,000	3,113,942	3,113,942
2005-2006	4,728,560	0	0	4,728,560	0	1,955,977	2,772,583	1,955,977	4,728,560	4,728,560
2006-2007	5,875,102	0	0	5,875,102	0	3,594,889	2,280,213	3,594,889	5,875,102	5,875,102
2007-2008	5,688,782	0	0	5,688,782	0	3,273,542	2,415,240	3,273,542	5,688,782	5,688,782
2008-2009	2,662,400	0	0	2,662,400	0	1,051,285	1,611,115	1,051,285	2,662,400	2,662,400
2009-2010	7,298,922	0	0	7,298,922	0	4,353,324	2,945,599	4,353,324	7,298,922	7,298,922
2010-2011	4,456,802	0	0	4,456,802	0	2,308,824	2,147,978	2,308,824	4,456,802	4,456,802
2011-2012	6,164,607	0	0	6,164,607	0	3,304,742	2,859,864	3,304,742	6,164,607	6,164,607
2012-2013	3,577,858	0	0	3,577,858	0	1,742,262	1,835,596	1,742,262	3,577,858	3,577,858
2013-2014	3,627,344	0	0	3,627,344	0	1,641,161	1,986,183	1,641,161	3,627,344	3,627,344
2014-2015	5,926,667	0	0	5,926,667	0	3,474,960	2,451,708	3,474,960	5,926,667	5,926,667
2015-2016	5,989,666	0	0	5,989,666	0	2,946,894	3,042,772	2,946,894	5,989,666	5,989,666
2016-2017	6,479,678	0	0	6,479,678	0	3,593,872	2,885,807	3,593,872	6,479,678	6,479,678
2017-2018	1,455,891	0	0	1,455,891	0	55,000	1,400,891	55,000	1,455,891	1,455,891
2018-2019	194,605	0	0	194,605	0	0	194,605	0	194,605	194,605
Total	\$92,088,854	\$0	\$0	\$92,088,854	\$36,553	\$43,734,130	\$48,354,724	\$43,697,578	\$92,052,302	\$92,052,302

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (C)
- (D)
- (E) (B) + (C) + (D).
- (F) Sum of incurred losses in excess of SIR.
- (G) Sum of incurred losses in excess of \$100,000.
- (H) (E) - (G).
- (I) (G) - (F).
- (J) (E) - (F).
- (K) Minimum of (J) and the aggregate stop loss. See Pool - Appendix J.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Paid Losses as of 9/30/18

Accident Year (A)	Unlimited Paid (B)	Additions to Losses (C)	Additions to Losses (D)	Adjusted Paid (E)	Paid Over SIR (F)	Paid Over \$100,000 (G)	Paid Capped at \$100,000 (H)	Paid to SIR Layer (I)	Paid Capped at SIR (J)	Paid Capped at SIR & Aggregate (K)
Prior	9,242,038	0	0	\$9,242,038	\$0	\$3,195,554	\$6,046,484	\$3,195,554	\$9,242,038	\$9,242,038
1998-1999	2,510,333	0	0	2,510,333	0	580,310	1,930,023	580,310	2,510,333	2,510,333
1999-2000	1,935,613	0	0	1,935,613	0	437,958	1,497,656	437,958	1,935,613	1,935,613
2000-2001	3,056,849	0	0	3,056,849	0	1,552,269	1,504,580	1,552,269	3,056,849	3,056,849
2001-2002	1,987,998	0	0	1,987,998	0	340,892	1,647,105	340,892	1,987,998	1,987,998
2002-2003	3,586,531	0	0	3,586,531	0	1,544,403	2,042,128	1,544,403	3,586,531	3,586,531
2003-2004	2,210,245	0	0	2,210,245	0	668,087	1,542,158	668,087	2,210,245	2,210,245
2004-2005	3,125,614	0	0	3,125,614	11,672	1,811,672	1,313,942	1,800,000	3,113,942	3,113,942
2005-2006	4,724,040	0	0	4,724,040	0	1,951,457	2,772,583	1,951,457	4,724,040	4,724,040
2006-2007	5,874,898	0	0	5,874,898	0	3,594,739	2,280,159	3,594,739	5,874,898	5,874,898
2007-2008	5,357,043	0	0	5,357,043	0	2,958,277	2,398,767	2,958,277	5,357,043	5,357,043
2008-2009	2,662,095	0	0	2,662,095	0	1,051,186	1,610,909	1,051,186	2,662,095	2,662,095
2009-2010	7,287,481	0	0	7,287,481	0	4,353,261	2,934,221	4,353,261	7,287,481	7,287,481
2010-2011	4,413,856	0	0	4,413,856	0	2,275,753	2,138,102	2,275,753	4,413,856	4,413,856
2011-2012	6,118,781	0	0	6,118,781	0	3,294,992	2,823,789	3,294,992	6,118,781	6,118,781
2012-2013	3,576,549	0	0	3,576,549	0	1,741,475	1,835,074	1,741,475	3,576,549	3,576,549
2013-2014	3,607,738	0	0	3,607,738	0	1,636,161	1,971,577	1,636,161	3,607,738	3,607,738
2014-2015	4,604,224	0	0	4,604,224	0	2,353,937	2,250,287	2,353,937	4,604,224	4,604,224
2015-2016	3,733,749	0	0	3,733,749	0	1,236,987	2,496,762	1,236,987	3,733,749	3,733,749
2016-2017	2,544,366	0	0	2,544,366	0	902,544	1,641,822	902,544	2,544,366	2,544,366
2017-2018	345,839	0	0	345,839	0	0	345,839	0	345,839	345,839
2018-2019	37,731	0	0	37,731	0	0	37,731	0	37,731	37,731
Total	\$82,543,611	\$0	\$0	\$82,543,611	\$11,672	\$37,481,915	\$45,061,696	\$37,470,242	\$82,531,938	\$82,531,938

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (C)
- (D)
- (E) (B) + (C) + (D).
- (F) Sum of paid losses in excess of SIR.
- (G) Sum of paid losses in excess of \$100,000.
- (H) (E) - (G).
- (I) (G) - (F).
- (J) (E) - (F).
- (K) Minimum of (J) and the aggregate stop loss. See Pool - Appendix J.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Case Reserves as of 9/30/18

Accident Year (A)	Unlimited Reserves (B)	Additions to Losses (C)	Additions to Losses (D)	Adjusted Reserves (E)	Reserves Over SIR (F)	Reserves Over \$100,000 (G)	Reserves Capped at \$100,000 (H)	Reserves \$100,000 to SIR Layer (I)	Reserves Capped at SIR (J)	Reserves Capped at SIR & Aggregate (K)
Prior	\$53,478	\$0	\$0	\$53,478	\$0	\$53,478	\$0	\$53,478	\$53,478	\$53,478
1998-1999	0	0	0	0	0	0	0	0	0	0
1999-2000	0	0	0	0	0	0	0	0	0	0
2000-2001	0	0	0	0	0	0	0	0	0	0
2001-2002	0	0	0	0	0	0	0	0	0	0
2002-2003	228,390	0	0	228,390	0	227,896	494	227,896	228,390	228,390
2003-2004	0	0	0	0	0	0	0	0	0	0
2004-2005	24,880	0	0	24,880	24,880	24,880	0	0	0	0
2005-2006	4,520	0	0	4,520	0	4,520	0	4,520	4,520	4,520
2006-2007	204	0	0	204	0	150	54	150	204	204
2007-2008	331,739	0	0	331,739	0	315,265	16,473	315,265	331,739	331,739
2008-2009	305	0	0	305	0	99	206	99	305	305
2009-2010	11,441	0	0	11,441	0	63	11,378	63	11,441	11,441
2010-2011	42,947	0	0	42,947	0	33,071	9,876	33,071	42,947	42,947
2011-2012	45,826	0	0	45,826	0	9,750	36,076	9,750	45,826	45,826
2012-2013	1,309	0	0	1,309	0	787	523	787	1,309	1,309
2013-2014	19,606	0	0	19,606	0	5,000	14,606	5,000	19,606	19,606
2014-2015	1,322,444	0	0	1,322,444	0	1,121,023	201,421	1,121,023	1,322,444	1,322,444
2015-2016	2,255,917	0	0	2,255,917	0	1,709,907	546,011	1,709,907	2,255,917	2,255,917
2016-2017	3,935,313	0	0	3,935,313	0	2,691,328	1,243,985	2,691,328	3,935,313	3,935,313
2017-2018	1,110,052	0	0	1,110,052	0	55,000	1,055,052	55,000	1,110,052	1,110,052
2018-2019	156,873	0	0	156,873	0	0	156,873	0	156,873	156,873
Total	\$9,545,243	\$0	\$0	\$9,545,243	\$24,880	\$6,252,216	\$3,293,028	\$6,227,336	\$9,520,363	\$9,520,363

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Pool - Appendix K, Page 1, Column (B) - Pool - Appendix K, Page 2, Column (B).
- (C) Pool - Appendix K, Page 1, Column (C) - Pool - Appendix K, Page 2, Column (C).
- (D) Pool - Appendix K, Page 1, Column (D) - Pool - Appendix K, Page 2, Column (D).
- (E) (B) + (C) + (D).
- (F) Sum of case reserves in excess of SIR.
- (G) Sum of case reserves in excess of \$100,000.
- (H) (E) - (G).
- (I) (G) - (F).
- (J) (E) - (F).
- (K) Minimum of (J) and the aggregate stop loss. See Pool - Appendix J.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Claim Counts as of 9/30/18

Accident Year (A)	Reported Claims (B)	Additions to Reported Claims (C)	Additions to Reported Claims (D)	Adjusted Reported Claims (E)	Closed Claims (F)	Additions to Closed Claims (G)	Additions to Closed Claims (H)	Adjusted Closed Claims (I)	Open Claims (J)	Adjusted Open Claims (K)
Prior	701	0	0	701	700	0	0	700	1	1
1998-1999	205	0	0	205	205	0	0	205	0	0
1999-2000	204	0	0	204	204	0	0	204	0	0
2000-2001	186	0	0	186	186	0	0	186	0	0
2001-2002	216	0	0	216	216	0	0	216	0	0
2002-2003	219	0	0	219	218	0	0	218	1	1
2003-2004	200	0	0	200	200	0	0	200	0	0
2004-2005	203	0	0	203	202	0	0	202	1	1
2005-2006	229	0	0	229	228	0	0	228	1	1
2006-2007	171	0	0	171	171	0	0	171	0	0
2007-2008	185	0	0	185	184	0	0	184	1	1
2008-2009	179	0	0	179	179	0	0	179	0	0
2009-2010	191	0	0	191	190	0	0	190	1	1
2010-2011	168	0	0	168	166	0	0	166	2	2
2011-2012	161	0	0	161	158	0	0	158	3	3
2012-2013	159	0	0	159	158	0	0	158	1	1
2013-2014	179	0	0	179	178	0	0	178	1	1
2014-2015	167	0	0	167	158	0	0	158	9	9
2015-2016	200	0	0	200	173	0	0	173	27	27
2016-2017	217	0	1	218	151	0	0	151	66	67
2017-2018	264	0	0	264	114	0	0	114	150	150
2018-2019	58	0	0	58	3	0	0	3	55	55
Total	4,662	0	1	4,663	4,342	0	0	4,342	320	321

Notes:

- (A) Years are 7/1 to 6/30.
- (B) Provided by the Authority. Amounts are gross of deductibles, net of recoveries.
- (C)
- (D)
- (E) (B) + (C) + (D).
- (F) Provided by the Authority.
- (G)
- (H)
- (I) (F) + (G) + (H).
- (J) (B) - (F).
- (K) (E) - (I).

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Exposure Measures

Accident Year	Population (A)	Gross Revenue (\$00) (B)	Total Payroll (\$00) (C)	Sheriff's Payroll (\$00) (D)	Number of Police Vehicles (E)	Number of Employees (FTE) (F)	Inflation Trend Factor (G)
Prior							
1998-1999							
1999-2000							
2000-2001							
2001-2002							
2002-2003							
2003-2004			1,888,700				1.448
2004-2005			1,973,887				1.413
2005-2006			2,098,594				1.379
2006-2007			2,274,752				1.345
2007-2008			2,531,867				1.312
2008-2009			2,654,784				1.280
2009-2010			2,596,305				1.249
2010-2011			2,428,460				1.219
2011-2012			2,411,119				1.189
2012-2013			2,396,206				1.160
2013-2014			2,462,209				1.132
2014-2015			2,580,161				1.104
2015-2016			2,933,767				1.077
2016-2017			3,116,809				1.051
2017-2018			3,207,109				1.025
2018-2019			3,320,120				1.000
2019-2020			3,425,841				1.000

Notes: All exposure data provided by the Authority.

Municipal Pooling Authority - Liability - 100K & SIR Analyses

Adjusted Exposure Measures

Accident Year	Population (A)	Gross Revenue (B)	Total Payroll (C)	Sheriff's Payroll (D)	Number of Police Vehicles (E)	Number of Employees (FTE) (F)	Composite Exposure (G)
Prior							
1998-1999							
1999-2000							
2000-2001							
2001-2002							
2002-2003							
2003-2004			2,734,838				2,734,838
2004-2005			2,789,102				2,789,102
2005-2006			2,893,961				2,893,961
2006-2007			3,059,541				3,059,541
2007-2008			3,321,810				3,321,810
2008-2009			3,398,124				3,398,124
2009-2010			3,242,785				3,242,785
2010-2011			2,960,293				2,960,293
2011-2012			2,866,820				2,866,820
2012-2013			2,779,599				2,779,599
2013-2014			2,787,221				2,787,221
2014-2015			2,848,498				2,848,498
2015-2016			3,159,667				3,159,667
2016-2017			3,275,766				3,275,766
2017-2018			3,287,287				3,287,287
2018-2019			3,320,120				3,320,120
2019-2020			3,425,841				3,425,841
Weight	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	

Notes: Monetary exposures have been adjusted for inflation before calculating the adjusted exposure measures. All exposures from page 1 have been adjusted to a common level.
 Composite Exposure = (0.0% x Population) + (0.0% x Revenue) + (100.0% x Total Payroll) + (0.0% x Sheriff's Payroll) + (0.0% x Police Vehicles) + (0.0% x (FTE)).