# MPERS
# Supplemental Actuarial Valuation
# as of June 30, 2016

**REQUESTED BY:** Ms. Greta Bassett-Seymour, General Counsel
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

**DATE:** January 6, 2017

**SUBMITTED BY:** Kenneth G. Alberts and Heidi G. Barry, ASA, MAAA
Gabriel, Roeder, Smith & Company

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This report contains the results of a supplemental actuarial valuation of a proposed change to RSMo 104 which would create a Hybrid Plan for new hires, as requested by MPERS.

This report may be shared with other parties, but only in its entirety and only with the permission of MPERS.

Supplemental valuations do not predict the result of future actuarial valuations. (Future activities can affect future valuation results in an unpredictable manner.) Rather, supplemental valuations give an indication of the probable effect of the change only on future valuations without comment on the complete end result of the future valuations.

Heidi G. Barry is a Member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The valuation was based upon data furnished by MPERS for the June 30, 2016 actuarial valuation. Actuarial methods and assumptions, except where otherwise noted, were the same as those used in the last regular annual actuarial valuation as of June 30, 2016. In particular:

- The assumed rate of interest was 7.75%.
- The valuation method was the entry-age actuarial cost method.
- The amortization period was 8 years for unfunded retiree liabilities and 23 years for unfunded active liability; amortizations were calculated assuming payroll would increase 3.50% per year before the changes.
- Price inflation is assumed to be 3.00% per year.

A brief summary of the data used in this valuation is presented on the next page.

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| Group | Number | Covered Payroll/ Annual Benefits | Average in Years Age | Service |
|---|---|---|---|---|
| MoDOT Employees | 5,039 | $210,473,695 | 44.6 | 13.0 |
| Civilian Patrol Employees | 1,148 | 46,345,740 | 44.6 | 12.0 |
| Uniformed Patrol | 1,254 | 82,979,944 | 40.3 | 14.9 |
| Total | 7,441 | $339,799,379 | 43.9 | 13.1 |
| Retirees and Beneficiaries | 8,684 | $227,218,908 | 70.5 | N/A |

| Term Vested Number |
|---|
| 2,334 |

## Proposed Provisions

Establish a Hybrid Plan for any person who is hired for the first time as a non-uniformed MoDOT or civilian patrol state employee on or after January 1, 2018. For the Defined Contribution component, the member contribution rate would be 1.0% of payroll and the employer contribution rate would be 3.0% of payroll. Provisions for the Defined Benefit component of the Hybrid Plan would be similar to the current 2011 Tier Defined Benefit provisions, with the following exceptions:

- The benefit multiplier for the life annuity will be 1% instead of 1.7%.
- Annual post-retirement cost-of-living increases will be capped at 2% of current benefit instead of 5%.
- Normal retirement eligibility at age 67 with 5 years of service instead of 67 with 10 years of service once the System becomes 90% funded.
- Vesting is reduced to 5 years from 10 years once the System becomes 90% funded.
- Early retirement eligibility at age 62 with 5 years of service instead of age 62 with 10 years of service once the System becomes 90% funded.
- A defined contribution benefit is added to the defined benefit and is based on 1% member contributions, 3% employer contributions plus accumulated interest.

## Discussion

Benefits payable under the Closed Plan and the Y2K Plan for members first hired prior to January 1, 2018 are not affected by the proposal; therefore, there is no immediate change in the employer contribution rates. The long-term employer contribution for the 2011 Tier (the current open plan provisions) is 6.89% of pay for non-uniformed members. The estimated long-term employer contributions for the proposed Hybrid Plan are 5.86% of pay for non-uniformed members (including the DB and DC components) under the 10-year vesting/eligibility structure. This represents a decrease over the 2011 Tier benefits for non-uniformed members of approximately 1.03%.

It is important to note that most MPERS members are currently covered by older plans/tiers. The average long-term cost of benefits for the current members (based on their current benefits) is 11.92% of pay for non-uniformed members. The proposed plan represents a decrease in long-term employer costs over the average current level of approximately 6.06%. As discussed above, most of this decrease is attributable to the 2011 Tier. Changes in the employer contribution will evolve as new hires enter the plan.

Comment 7 on page 7 includes a discussion of the impact under the 5-year vesting/eligibility requirements.

Please see the comments on pages 6 and 7, and the projections on page 5 for more information.

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## Actuarial Statement

| | Impact on MPERS DB Employer Contributions | | |
|---|---|---|---|
| | Present Benefits | Proposed Benefits# | Increase / (Decrease) |
| **FY 2020 Contribution** | | | |
| Total Normal Cost | 13.88 % | 13.60 % | (0.28) % |
| Member Contribution Rate | (1.20) | (1.20) | 0.00 |
| UAAL% | 40.90 | 40.87 | (0.03) |
| Subtotal Employer Contribution Rate | 53.58 % | 53.27 % | (0.31) % |
| Change in Stabilization Reserve Contributions* | 4.42 | 4.73 | 0.31 |
| Total Employer Contribution Rate | 58.00 % | 58.00 % | 0.00 % |
| Employer Normal Cost ($ millions) | $ 49.4 | $ 48.4 | $ (1.1) |
| Estimated Employer Contribution ($ millions) | $ 208.9 | $ 207.7 | $ (1.2) |
| **Valuation Results as of June 30, 2016 ($ millions)** | | | |
| Market Value of Assets (MVA) | $ 1,992.1 | $ 1,992.1 | $ - |
| Actuarial Accrued Liability (AAL) | 3,761.7 | 3,761.7 | - |
| Actuarial Value of Assets (AVA) | 2,086.7 | 2,086.7 | - |
| Unfunded Actuarial Accrued Liability (UAAL) | $ 1,675.1 | $ 1,675.1 | $ - |
| Percent Funded | 55.5 % | 55.5 % | 0.00 % |

* *At the September 25, 2014 Board Meeting, the Board adopted the use of a contributions stabilization reserve that would result in a MPERS employer contribution of 58% of payroll.*

\# *Prior to any potential changes to rate stabilization reserve (see Comment 10).*

Employer contributions for FYXX are determined from the 6/30/XX-2 valuation. Since the 6/30/2018 valuation will be the first valuation to include members covered under the proposed plan, the FY 2020 Employer Contribution will be the first to be affected (and is the one shown above).

The implementation of the Hybrid Plan has a short-term increase in Employer Contributions due to the 2-year lag described above. Employer contributions for the DC plan begin immediately upon the hiring of new participants beginning January 1, 2018.

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$ Thousands

| | Current Provisions (Beginning of Year) | | | | Proposed Provisions (Beginning of Year) | | | | Projected DB Employer Contributions | | | | | | Projected DC Employer Contributions | | Total Projected (DB +DC) Employer Contributions | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Current | | Est. Impact | | Proposed | | Proposed | | Proposed | |
| Fiscal Year | Projected AAL | Projected AVA | Funded Ratio | Projected MVA | Projected AAL | Projected AVA | Funded Ratio | Projected MVA | Rate | Dollars | Rate | Dollars | Rate | Dollars | Rate@ | Dollars | Rate | Dollars |
| 2017 | $ 3,761,733 | $ 2,086,654 | 55.5% | $ 1,992,074 | $ 3,761,733 | $ 2,086,654 | 55.5% | $ 1,992,074 | | | | | | | | | | |
| 2018 | 3,841,344 | 2,146,085 | 55.9% | 2,098,028 | 3,841,344 | 2,146,085 | 55.9% | 2,098,028 | 58.00% | $ 211,121 | 0.00 % | $ - | 58.00% | $ 211,121 | 0.06% | $ 218 | 58.06% | $ 211,339 |
| 2019 | 3,919,572 | 2,216,765 | 56.6% | 2,211,839 | 3,919,572 | 2,216,765 | 56.6% | 2,211,839 | 52.75% | 198,731 | 0.00 % | - | 52.75% | 198,731 | 0.24% | 904 | 52.99% | 199,635 |
| 2020 | 3,996,197 | 2,315,097 | 57.9% | 2,313,601 | 3,995,101 | 2,315,097 | 57.9% | 2,313,601 | 53.58% | 208,923 | (0.31)% | (1,209) | 53.27% | 207,714 | 0.36% | 1,404 | 53.63% | 209,118 |
| 2021 | 4,070,824 | 2,425,810 | 59.6% | 2,425,606 | 4,067,417 | 2,424,554 | 59.6% | 2,424,350 | 53.27% | 214,984 | (0.60)% | (2,421) | 52.67% | 212,563 | 0.48% | 1,937 | 53.15% | 214,500 |
| 2022 | 4,142,978 | 2,544,165 | 61.4% | 2,544,116 | 4,135,913 | 2,540,297 | 61.4% | 2,540,248 | 52.89% | 220,922 | (0.89)% | (3,718) | 52.00% | 217,204 | 0.60% | 2,506 | 52.60% | 219,710 |
| 2023 | 4,212,220 | 2,669,270 | 63.4% | 2,669,262 | 4,200,053 | 2,661,240 | 63.4% | 2,661,232 | 52.49% | 226,925 | (1.16)% | (5,015) | 51.33% | 221,910 | 0.72% | 3,113 | 52.05% | 225,022 |
| 2024 | 4,278,025 | 2,801,374 | 65.5% | 2,801,372 | 4,259,170 | 2,787,513 | 65.4% | 2,787,511 | 52.07% | 232,988 | (1.42)% | (6,354) | 50.65% | 226,634 | 0.84% | 3,759 | 51.49% | 230,392 |
| 2025 | 4,339,771 | 2,940,790 | 67.8% | 2,940,789 | 4,312,486 | 2,919,254 | 67.7% | 2,919,254 | 51.63% | 239,105 | (1.66)% | (7,688) | 49.97% | 231,417 | 0.96% | 4,446 | 50.93% | 235,863 |
| 2026 | 4,396,868 | 3,087,868 | 70.2% | 3,087,868 | 4,359,247 | 3,056,678 | 70.1% | 3,056,678 | 51.20% | 245,412 | (1.91)% | (9,155) | 49.29% | 236,257 | 1.08% | 5,177 | 50.37% | 241,434 |
| 2027 | 4,448,575 | 3,243,126 | 72.9% | 3,243,126 | 4,398,582 | 3,200,009 | 72.8% | 3,200,009 | 50.75% | 251,769 | (2.13)% | (10,567) | 48.62% | 241,202 | 1.20% | 5,953 | 49.82% | 247,155 |
| 2028 | 4,494,178 | 3,406,965 | 75.8% | 3,406,965 | 4,429,598 | 3,349,530 | 75.6% | 3,349,530 | 50.29% | 258,219 | (2.34)% | (12,015) | 47.95% | 246,204 | 1.32% | 6,778 | 49.27% | 252,982 |

@ *The ultimate DC contribution is 3.0% of projected payroll.*

| Fiscal Year | EOY Valuation Payroll Projected | Pre 1/1/2018 Payroll* | Post 1/1/2018 Payroll |
|---|---|---|---|
| 2017 | $ 351,692 | $ 351,692 | $ - |
| 2018 | 364,002 | 356,722 | 7,280 |
| 2019 | 376,742 | 346,603 | 30,139 |
| 2020 | 389,928 | 343,137 | 46,791 |
| 2021 | 403,575 | 339,003 | 64,572 |
| 2022 | 417,700 | 334,160 | 83,540 |
| 2023 | 432,320 | 328,563 | 103,757 |
| 2024 | 447,451 | 322,165 | 125,286 |
| 2025 | 463,112 | 314,916 | 148,196 |
| 2026 | 479,321 | 306,766 | 172,555 |
| 2027 | 496,097 | 297,658 | 198,439 |
| 2028 | 513,460 | 287,538 | 225,922 |

Projection results are before applying any changes to the contribution stabilization reserve for FY 2019 and later DB contribution rates.
Projections assume all members hired after January 1, 2018 are new hires (not re-hires) and are covered by the new Hybrid Plan.

** DB, DC and Total Contribution Rates are based on open group payroll.*
*Numbers may not add due to rounding.*

## Comments

**Comment 1:** For purposes of this supplemental valuation, the change in the DB employer contribution rate is reflected beginning July 1, 2019. DB Employer contributions for FYXX are determined from the 6/30/XX-2 valuation. Since the 6/30/2018 valuation will be the first valuation to include members covered under the proposed plan, the FY 2020 Employer Contribution will be the first to be affected. The change in DC employer contribution rate is reflected beginning January 1, 2018. Since the DB plan remains open in the Hybrid Plan, there is no change in the amortization of the Unfunded Accrued Liability contributions.

**Comment 2:** The proposed plan does not indicate if the DC account can be annuitized by the plan for members covered by the Hybrid Plan. If such an option is allowed, cost estimates could be different than contained herein, depending on how account balances are annuitized.

**Comment 3:** The long-term cost of the proposed plan was estimated by modeling what the entry-age normal cost would be if all current MPERS members were covered by the proposed provisions. Additional cost for expenses and disability insurance premiums were assumed not to change as a result of the proposed plan changes. Implementation of the DC plan may result in additional administrative expenses.

**Comment 4:** The simplified projections on page 5 show the possible total contributions in each of the next ten years before and after the proposed change. These projections also account for the market gains and losses prior to June 30, 2016 that are scheduled to be recognized in the next two years. Due to time constraints, the simplified projection methods are based on:

- the June 30, 2016 covered payroll projected with wage inflation;
- a closed group payroll population projection to determine the (current) Defined Benefit payroll;
- computed contributions based on funding value and market value as of June 30, 2016;
- closed amortization periods that are the equivalent single amortization period for the specific group (Non-Uniform – 14.5 years on a valuation asset basis);
- no future gains or losses (beyond the market gains and losses already experienced); and
- the cost of the 5-year vesting is not shown in the projection due to not achieving 90% funded status. The long-term effect of this change is highly dependent on the assumptions and demographics in place at implementation, both of which may materially change in the future.

**Comment 5:** SB 228 states that annual post-retirement cost-of-living increases will be capped at 2%, instead of the current 5%. If the proposed COLA provision (80% of CPI, capped at 2% annually) had been in place during the past 20 years the average annual COLA would have been approximately 1.5%, based on historical CPI increases over the last 20 years. Therefore, we have used an assumed COLA of 1.5% for the cost estimates of the normal cost under the proposed provisions.

## Comments

**Comment 6:** For the simplified projections shown, we assumed that Tier 2011 hires' payroll would represent an additional 5% of the total each year and that 80% of the new hires would be Non-Uniform members. The table below shows the percentages of payroll in the first few years of the projection as an illustration:

| | Before Proposal | | After Proposal | | |
|---|---|---|---|---|---|
| | | | | Post-2018 | |
| June 30, | Pre-2011 | Post-2011 | Pre-2018 | Non-Uniform | Uniform |
| 2017 | 75% | 25% | 100% | | |
| 2018 | 70% | 30% | 95% | 4% | 1% |
| 2019 | 65% | 35% | 90% | 8% | 2% |
| 2020 | 60% | 40% | 85% | 12% | 3% |

**Comment 7:** SB 228 states that the vesting/eligibility requirement will drop from 10 years to 5 years once the System becomes at least 90% funded. It cannot be known in advance when the System will reach a particular funding level. In addition, if the funded status does reach at least 90% in the future, it may subsequently go below 90% in future years as a result of experience gains or losses. SB 228 does not state what would occur in this scenario. The estimated long-term employer contributions for the proposed Hybrid Plan are 5.73% of pay for non-uniformed members (including the DB and DC components) under the 5-year vesting/eligibility structure. This represents a decrease over the 2011 Tier benefits for non-uniformed members of approximately 1.16% of pay. The proposed plan represents a decrease in long-term employer costs over the average current level of approximately 6.19% of pay under the 5-year vesting/eligibility structure. The results in the Discussion on page 3 illustrate the impact under the 10-year vesting/eligibility requirement. The net long-term employer contributions under the 5-year vesting/eligibility requirement are slightly less than under the 10-year vesting/eligibility requirement, mostly due to lower potential future refunds.

**Comment 8:** The proposal does not specify vesting of the 3% employer defined contribution rate nor does it discuss the treatment of forfeitures for non-vested employer DC contributions. For purposes of this supplemental valuation, we have assumed that the DC vesting will be immediate and therefore there will be no forfeitures.

**Comment 9:** It was assumed that the proposed change in benefits would not result in a change in average member behavior (such as accelerating or delaying patterns of retirement). If such a change emerges, cost implications will be different than shown herein.

**Comment 10:** The Board has adopted a contribution policy that includes a Contribution Stabilization Reserve Fund. If the Contribution Stabilization Reserve Fund is maintained so as to keep the defined benefit contribution level, then the proposed plan change may result in: 1) an increase in employer contributions due to the DC component; and 2) an acceleration of the funded status of the DB plan.

## Comments

**Comment 11:** This calculation is based upon assumptions regarding future events, which may or may not materialize. It is also based upon present and proposed plan provisions that are outlined in the report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the authors of this report prior to relying on information in the report.

**Comment 12:** This report is intended to describe the financial effects of the proposed plan changes. No statement in this report is intended to be interpreted as a recommendation in favor of or in opposition to the proposed changes.

**Comment 13:** In the event that more than one plan change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

**Comment 14:** This report includes a measure of the AVA as a percent of AAL. Unless otherwise indicated, with regard to any such measurements in this report:

(1) This measurement is inappropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan’s benefit obligations.
(2) The measurement is inappropriate for assessing the need for or amount of future employer contributions.

**Comment 15:** A determination regarding the ability of the Plan sponsor to adhere to the funding policy is not required by actuarial standards, is not within the actuarial skill set and is out of scope for this project. Consequently, the actuary performed no such determination.

**Comment 16:** A comparison of the expected benefit levels and a comparison of the volatility of valuation results (before and after the proposed changes) was outside the scope of this project.