# Municipal Market Update and 2019 Outlook

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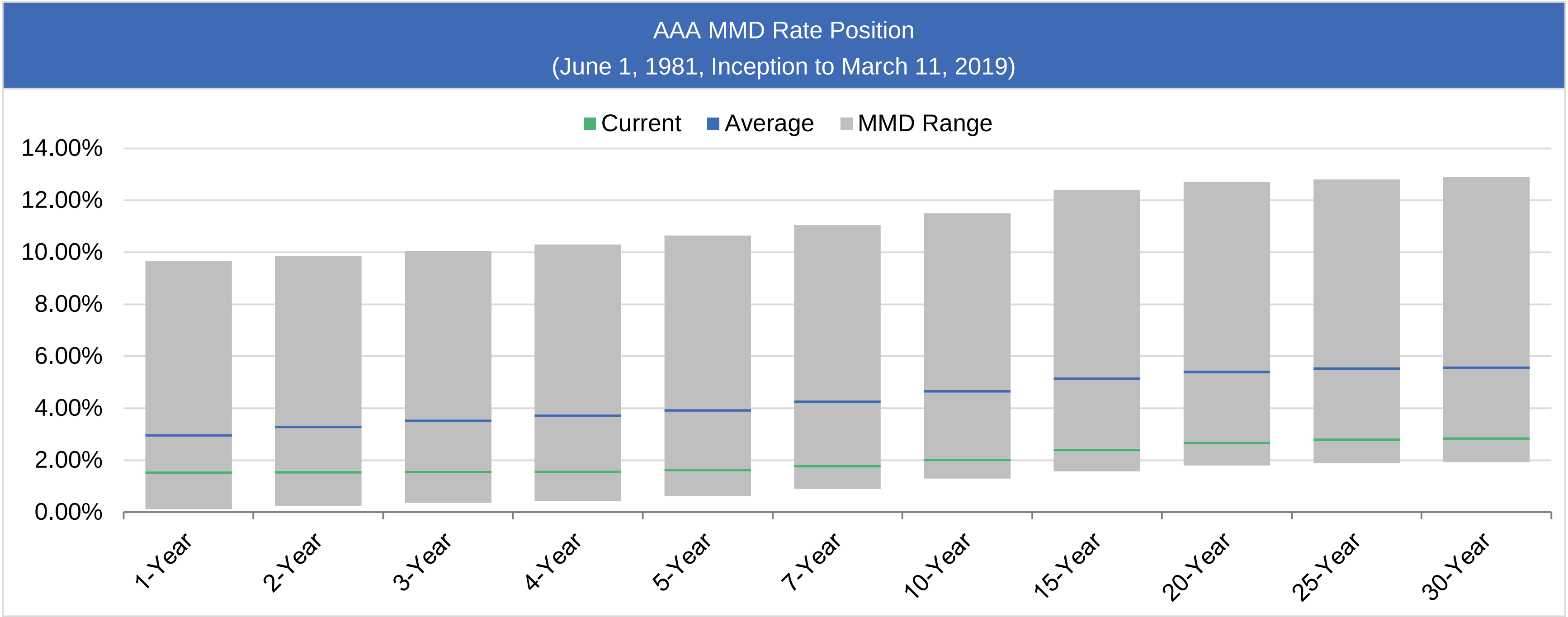
# Municipal Market Update

# AAA MMD Position Since Inception




Summary of March 11, 2019 vs. Historical (since Inception) MMD Rates

| Statistic | 1-Year | 2-Year | 3-Year | 4-Year | 5-Year | 7-Year | 10-Year | 15-Year | 20-Year | 25-Year | 30-Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| March 11, 2019 | 1.57% | 1.58% | 1.59% | 1.61% | 1.67% | 1.82% | 2.06% | 2.44% | 2.72% | 2.84% | 2.89% |
| Historical Average | 3.01% | 3.33% | 3.57% | 3.77% | 3.96% | 4.30% | 4.70% | 5.19% | 5.45% | 5.58% | 5.61% |
| Spread to Average | -1.44% | -1.75% | -1.98% | -2.16% | -2.29% | -2.48% | -2.64% | -2.75% | -2.73% | -2.74% | -2.72% |
| Minimum | 0.11% | 0.25% | 0.36% | 0.44% | 0.62% | 0.89% | 1.29% | 1.57% | 1.80% | 1.88% | 1.93% |
| Maximum | 9.65% | 9.85% | 10.05% | 10.30% | 10.65% | 11.05% | 11.50% | 12.40% | 12.70% | 12.80% | 12.90% |
| % of Time Lower | 31.67% | 27.82% | 24.63% | 22.56% | 19.72% | 13.51% | 9.04% | 7.47% | 7.54% | 6.66% | 6.24% |

*Source: Thomson Reuters*

# Current Interest Rate Snapshot

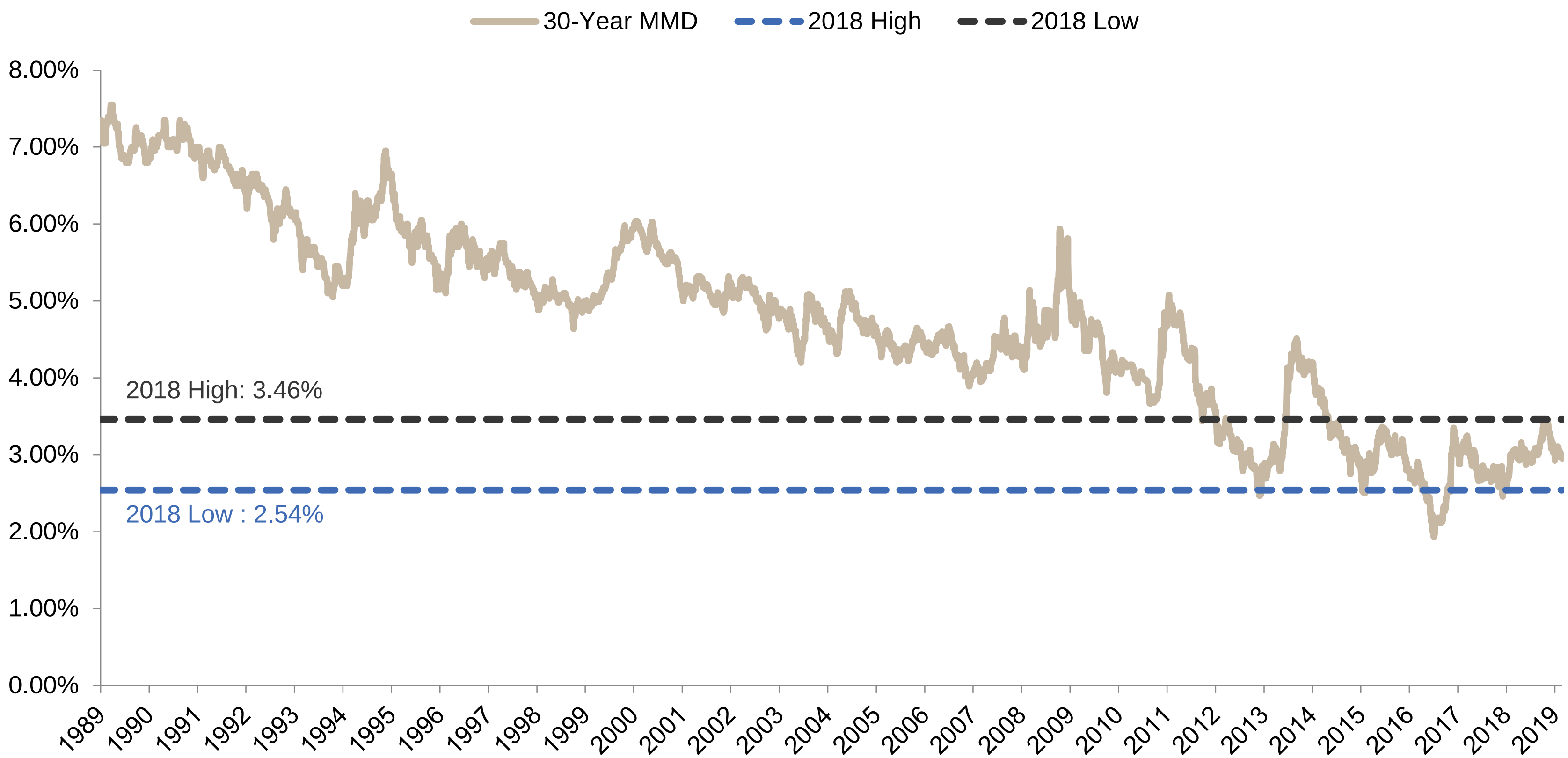
| March 11, 2019 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Maturity | UST | AAA MMD | AA MMD | AA Spread | A MMD | A Spread | Year | Maturity | UST | AAA MMD | AA MMD | AA Spread | A MMD | A Spread |
| 1-Year | 2019 | 2.53% | 1.57% | 1.58% | 0.01% | 1.77% | 0.20% | 16-Year | 2034 | - | 2.50% | 2.70% | 0.20% | 2.99% | 0.49% |
| 2-Year | 2020 | 2.48% | 1.58% | 1.60% | 0.02% | 1.83% | 0.25% | 17-Year | 2035 | - | 2.56% | 2.76% | 0.20% | 3.05% | 0.49% |
| 3-Year | 2021 | 2.45% | 1.59% | 1.62% | 0.03% | 1.88% | 0.29% | 18-Year | 2036 | - | 2.62% | 2.83% | 0.21% | 3.12% | 0.50% |
| 4-Year | 2022 | - | 1.61% | 1.66% | 0.05% | 1.95% | 0.34% | 19-Year | 2037 | - | 2.67% | 2.88% | 0.21% | 3.17% | 0.50% |
| 5-Year | 2023 | 2.44% | 1.67% | 1.73% | 0.06% | 2.04% | 0.37% | 20-Year | 2038 | 2.93% | 2.72% | 2.93% | 0.21% | 3.22% | 0.50% |
| 6-Year | 2024 | - | 1.75% | 1.83% | 0.08% | 2.13% | 0.38% | 21-Year | 2039 | - | 2.76% | 2.97% | 0.21% | 3.27% | 0.51% |
| 7-Year | 2025 | - | 1.82% | 1.91% | 0.09% | 2.21% | 0.39% | 22-Year | 2040 | - | 2.79% | 3.00% | 0.21% | 3.30% | 0.51% |
| 8-Year | 2026 | - | 1.90% | 2.02% | 0.12% | 2.31% | 0.41% | 23-Year | 2041 | - | 2.81% | 3.02% | 0.21% | 3.32% | 0.51% |
| 9-Year | 2027 | - | 1.97% | 2.11% | 0.14% | 2.39% | 0.42% | 24-Year | 2042 | - | 2.83% | 3.04% | 0.21% | 3.34% | 0.51% |
| 10-Year | 2028 | 2.64% | 2.06% | 2.22% | 0.16% | 2.49% | 0.43% | 25-Year | 2043 | - | 2.84% | 3.05% | 0.21% | 3.35% | 0.51% |
| 11-Year | 2029 | - | 2.17% | 2.36% | 0.19% | 2.61% | 0.44% | 26-Year | 2044 | - | 2.85% | 3.06% | 0.21% | 3.36% | 0.51% |
| 12-Year | 2030 | - | 2.27% | 2.46% | 0.19% | 2.72% | 0.45% | 27-Year | 2045 | - | 2.86% | 3.07% | 0.21% | 3.37% | 0.51% |
| 13-Year | 2031 | - | 2.34% | 2.54% | 0.20% | 2.80% | 0.46% | 28-Year | 2046 | - | 2.87% | 3.08% | 0.21% | 3.38% | 0.51% |
| 14-Year | 2032 | - | 2.40% | 2.60% | 0.20% | 2.86% | 0.46% | 29-Year | 2047 | - | 2.88% | 3.09% | 0.21% | 3.39% | 0.51% |
| 15-Year | 2033 | 2.84% | 2.44% | 2.64% | 0.20% | 2.92% | 0.48% | 30-Year | 2048 | 3.03% | 2.89% | 3.10% | 0.21% | 3.40% | 0.51% |

*Source: Thomson Reuters*

# Interest Rates in 2018

**Long-term interest rates in 2018 remained within a historically low range, with the 30-year MMD remaining between a maximum of 3.46% and a minimum of 2.54%**

30-Year AAA MMD Position
(January 1, 1989 to March 11, 2019)

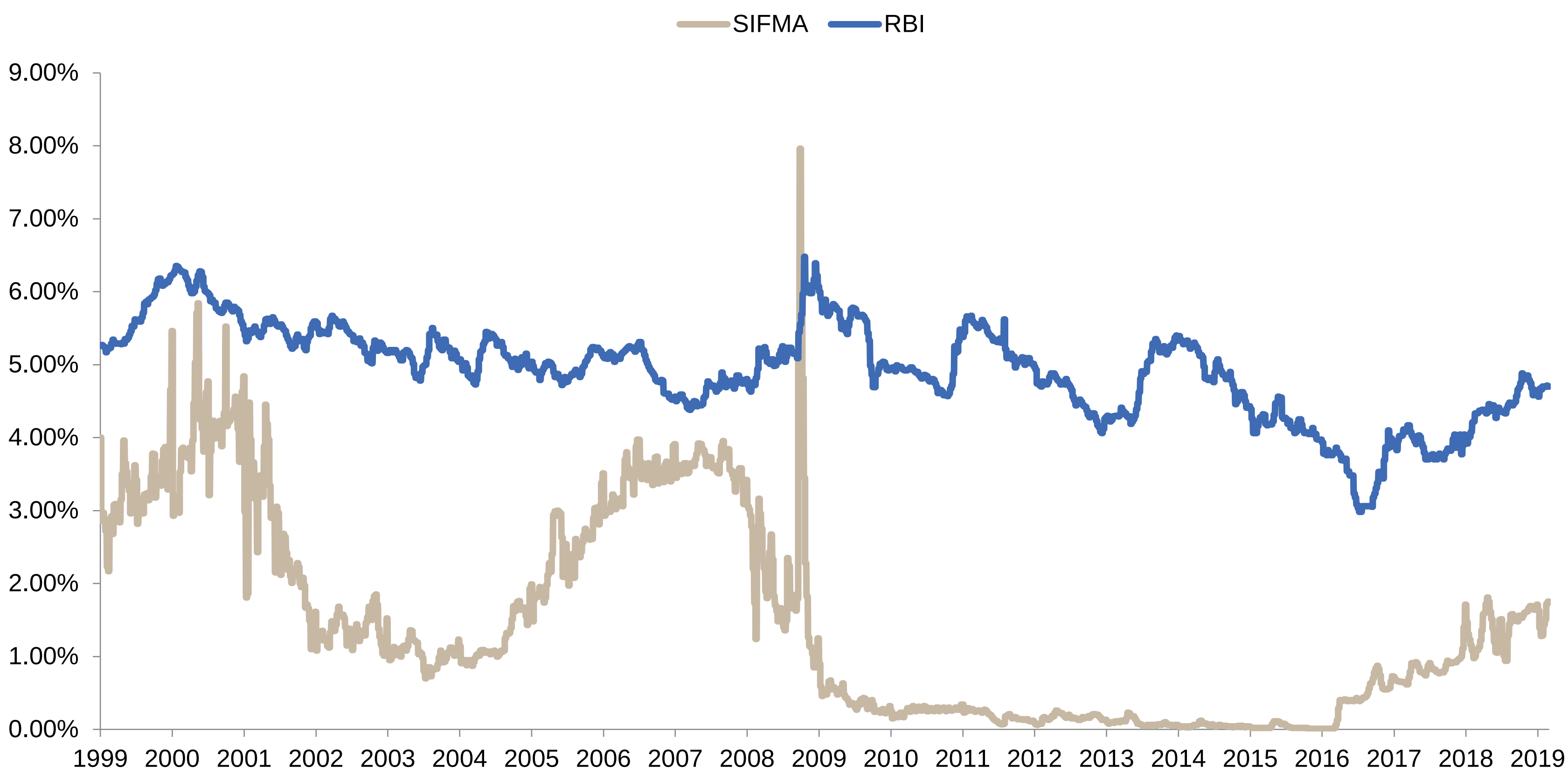



*Source: Thomson Reuters*

# Short-Term and Long-Term Tax-Exempt Interest Rate History

**SIFMA has remained at levels significantly below the Bond Buyer Revenue Bond Index since 2009, although short-term rates have ticked up over the last several years**

SIFMA vs. RBI (January 1, 1999 – March 11, 2019)



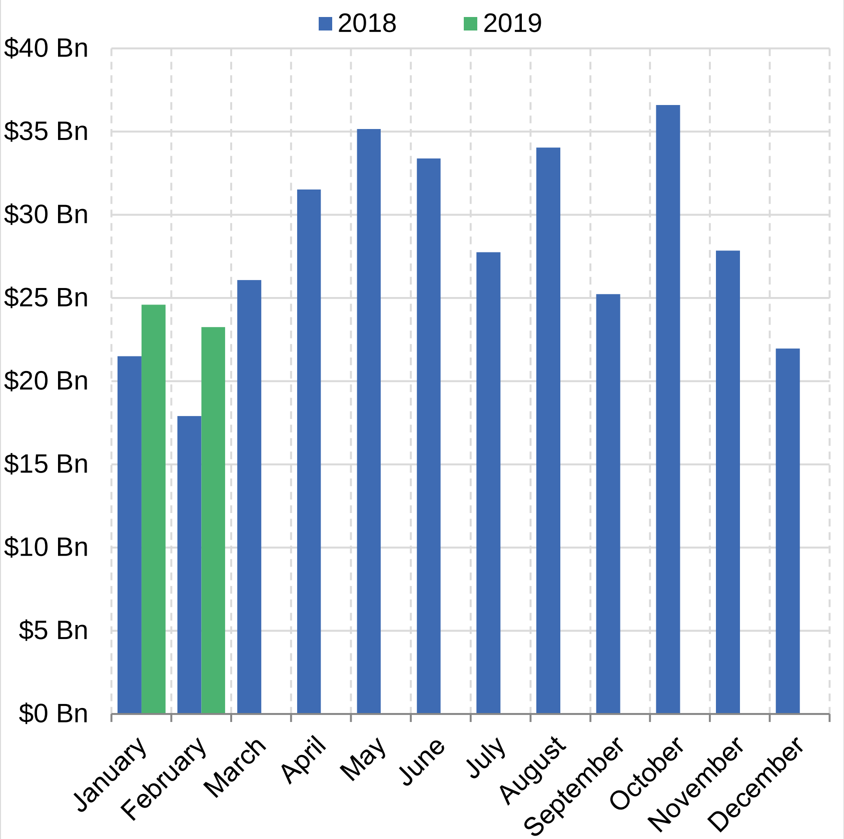



*Source: Thomson Reuters*

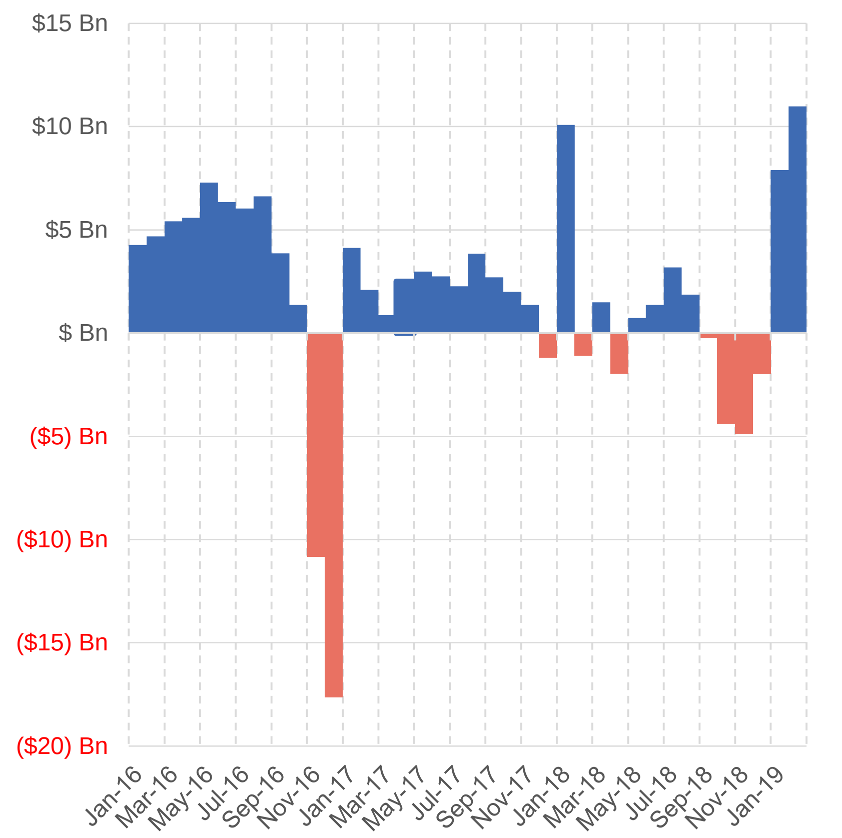
# Municipal Market Supply & Demand

**Municipal bond issuance was up 29.89% in February (year-over-year) and is up 21.43% year-to-date through the end of February.**

Overall Municipal Market Volume (Supply)

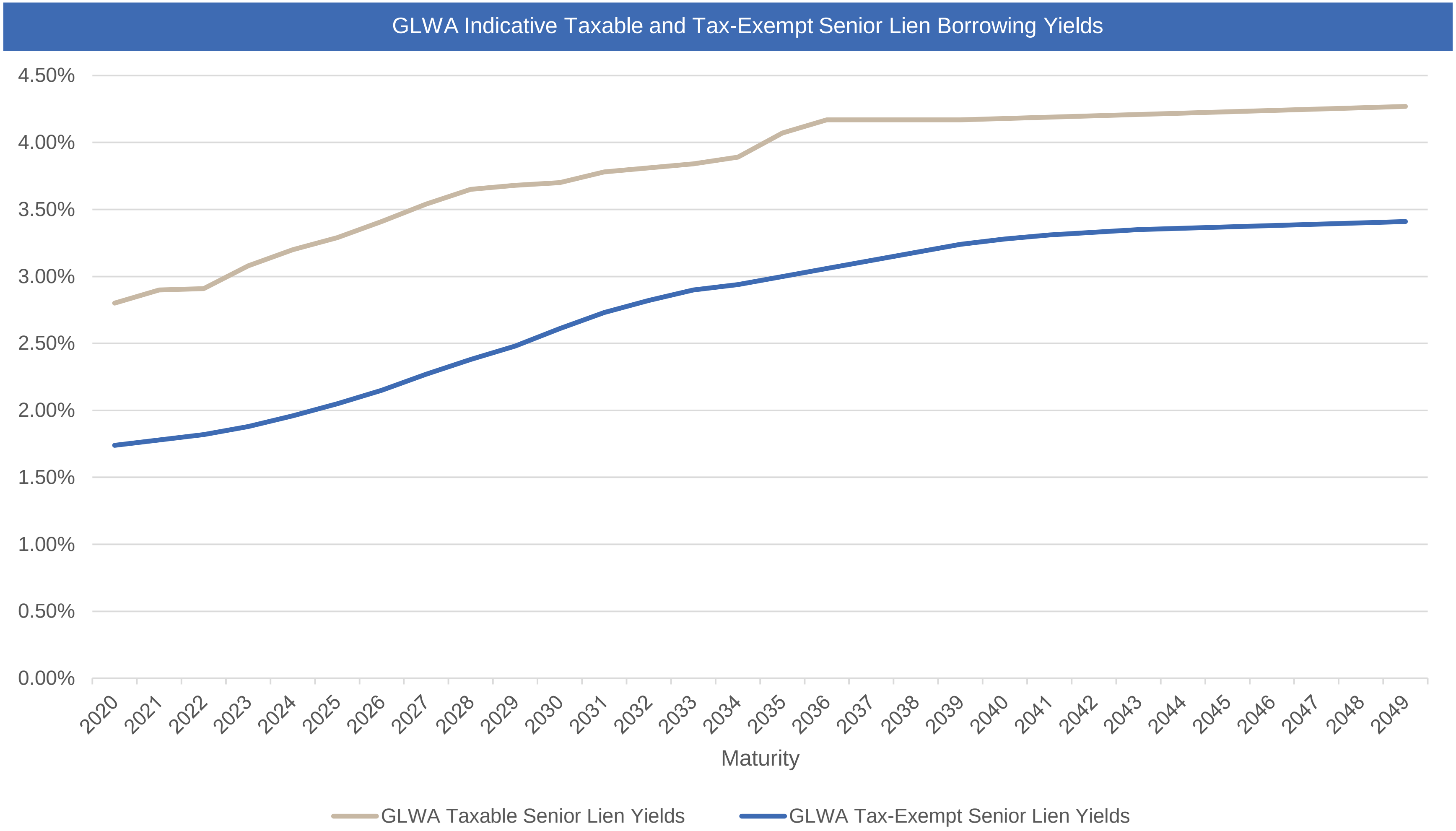



Municipal Fund Flows (Demand)




*Source: Bond Buyer, Investment Company Institute*

# GLWA Taxable and Tax-Exempt Borrowing Rates




*Indicative interest rates as of February 27, 2019. Tax-exempt borrowing yields assume 5% premium coupon structure with a ten year par call. Taxable borrowing yields assume a par coupon structure with a make whole call.*

## Interest Rate Forecasts

- The Federal Reserve signaled a slowdown in rate increases in 2019, with the following language first included in the January FOMC statement:
  - *"In light of global economic and financial developments and muted inflation pressures, the Committee will be patient as it determines what future adjustments to the target range for the federal funds rate may be appropriate to support these outcomes"*

| Bond Yield Forecast (As of March 11, 2019) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Average Forecasts** | **Current** | **Q1 19** | **Q2 19** | **Q3 19** | **Q4 19** | **Q1 20** | **Q2 20** |
| **30-Year UST** | 3.03% | 3.10% | 3.17% | 3.25% | 3.29% | 3.36% | 3.39% |
| **10-Year UST** | 2.64% | 2.82% | 2.91% | 2.99% | 3.03% | 3.08% | 3.09% |
| **5-Year UST** | 2.44% | 2.65% | 2.77% | 2.83% | 2.87% | 2.92% | 2.96% |
| **2-Year UST** | 2.47% | 2.63% | 2.74% | 2.81% | 2.86% | 2.88% | 2.91% |
| **3M LIBOR** | 2.60% | 2.72% | 2.81% | 2.89% | 2.95% | 2.99% | 2.99% |
| **Fed Funds Target Rate (Upper)** | 2.50% | 2.50% | 2.60% | 2.70% | 2.80% | 2.80% | 2.80% |
| **Fed Funds Target Rate (Lower)** | 2.25% | 2.25% | 2.37% | 2.46% | 2.55% | 2.54% | 2.55% |

*Source: Bloomberg.*

# Amendment to SEC Rule 15c2-12

# Amendments to Rule 15c2-12

- On August 31, 2018 the SEC posted amendments for Rule 15c2-12 of the Securities Exchange Act to the Federal Register that became effective on February 27, 2019
- The Amendments add two new events to the list of reportable events for which issuers would be obligated through new continuing disclosure agreements to report on EMMA within 10 days of occurrence

  1) *"Incurrence of a **financial obligation** of the issuer or obligated person, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a financial obligation of the issuer or obligated person, any of which affect security holders, if material"*
  2) *"Default, event of acceleration, termination event, modification of terms or other similar events under the terms of the **financial obligation** of the issuer or obligated person, any of which reflect financial difficulties."*

- Definition of "financial obligation" becomes important for determining compliance with the amended rule
  - *"The term "financial obligation" means a (i) debt obligation; (ii) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned debt obligation; or (iii) guarantee of (i) or (ii). The term financial obligation shall not include municipal securities as to which a final official statement has been provided to the MSRB consistent with this rule."*
  - Includes direct placements and bank loans – but also captures other types of financial transactions, such as capital leases, interest rate swaps, guarantees, etc.
- SEC has declined to provide further clarity on materiality but did state that issuers should use the same analysis regularly made when preparing disclosure documents

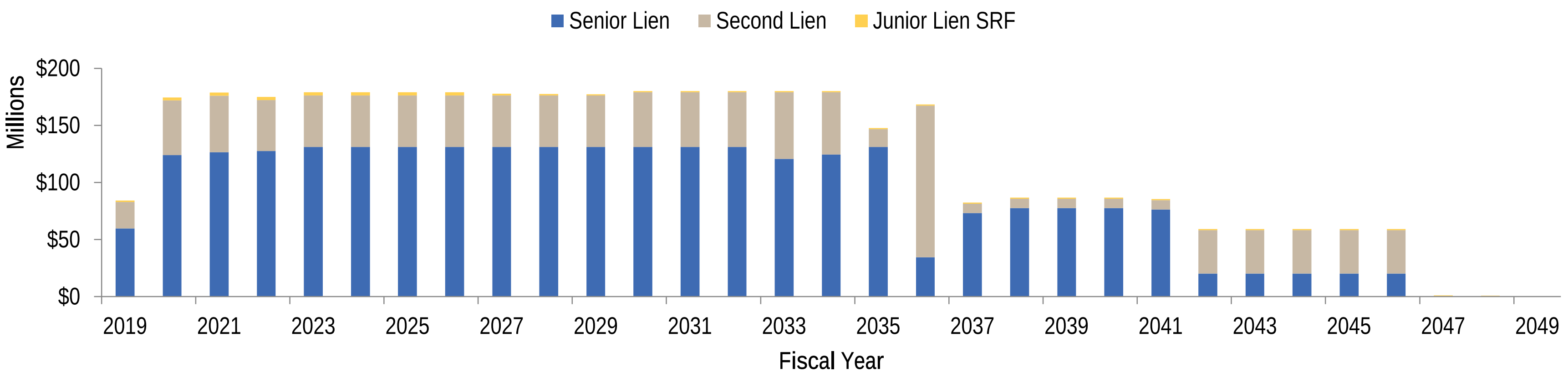
# Rationale and Background on the Amendments

- Concern that issuers were not properly disclosing the existence or terms of their bank loans and private placements initially highlighted in Securities and Exchange Commission ("SEC") report issued in July 2012
- GASB requires some debt information to be disclosed in notes to financial statements, but not necessarily the level of detail about particular covenants, events of default, remedies, priority rights, etc. for market participants to make informed investment decisions
- Issuers may agree to terms when incurring financial obligations that were not previously required to be disclosed even though they could adversely affect existing bondholders
    - Bank loan covenants and events of default can be different from or set at higher levels than those applicable to outstanding bonds, thereby enabling the bank to assert remedies prior to other bondholders
    - Recent changes to federal tax laws have triggered provisions commonly found in direct placements relating to the rate at which a direct placement will bear interest

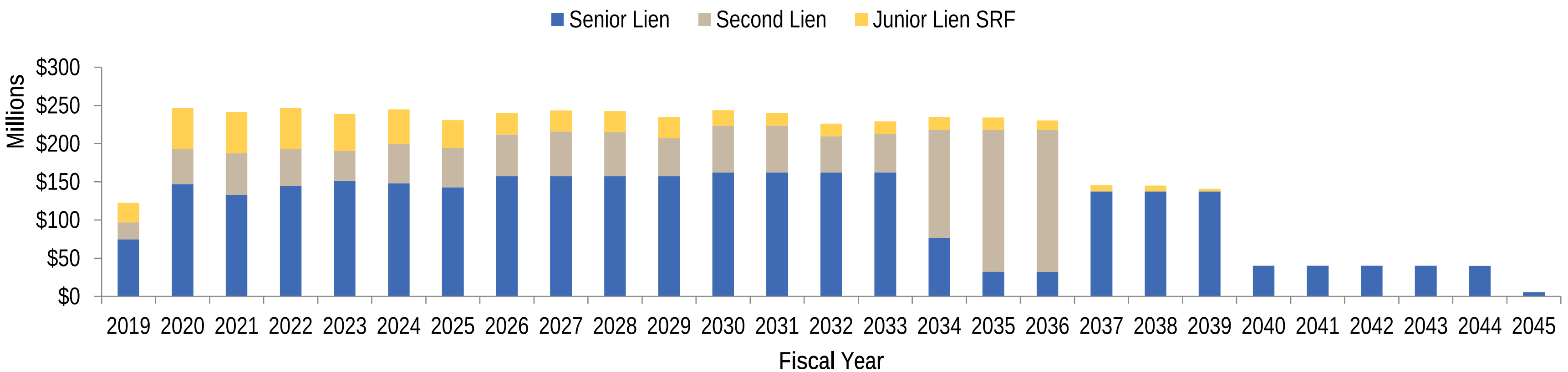
# Status of GLWA Debt Profile

# GLWA Current Debt Structure as of January 1, 2019

## Water



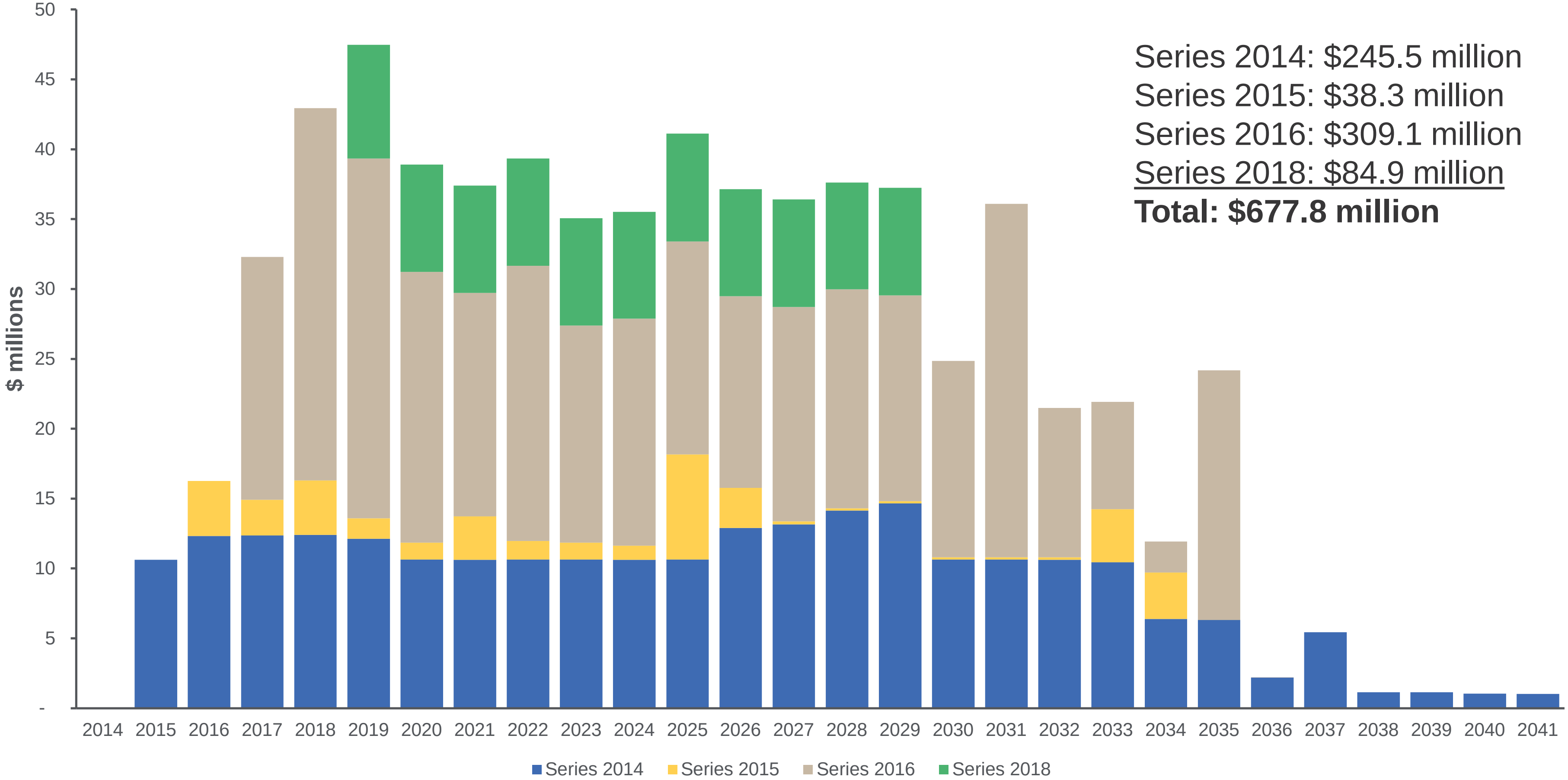

## Sewer




*Note: Assumes Series 2006D Variable Rate Bonds calculated at 1.85% interest rate (GLWA planning rate). Funds for Estimated SRF Schedules have not been fully drawn. Debt service schedule reflects amortization of full authorized amount. Excludes FY2019 debt service paid through 1/1/2019.*

## History of Debt Service Savings Achieved Since 2014

**Through the leadership of the Authority's management team, the financing team has been able to achieve nearly $678 million of debt service savings for the systems since the tender and refunding transaction in 2014**



# GLWA Fixed Rate Callable Debt (Call Dates Through 2022)

| Water | | | | | | |
|---|---|---|---|---|---|---|
| Series Name | Indenture | Lien | Tax Status | Outstanding ($000s) | Next Call Date | Callable Par ($000s) |
| Series 2011A Senior | Water | Senior | Tax-Exempt | 293,970 | 7/1/2021 | 289,605 |
| Series 2011B Senior | Water | Senior | Taxable | 3,950 | 7/1/2021 | 2,295 |
| Series 2011C Senior | Water | Senior | Tax-Exempt | 75,145 | 7/1/2021 | 74,125 |

| Sewer | | | | | | |
|---|---|---|---|---|---|---|
| Series Name | Indenture | Lien | Tax Status | Outstanding ($000s) | Next Call Date | Callable Par ($000s) |
| Series 2012A Senior | Sewer | Senior | Tax-Exempt | 495,175 | 7/1/2022 | 437,795 |
| Series 2014C-1 Senior | Sewer | Senior | Tax-Exempt | 123,220 | 7/1/2022 | 123,200 |
| Series 2014C-2 Senior | Sewer | Senior | AMT | 27,470 | 7/1/2022 | 27,450 |
| Series 2005A Sec.(Call Mod)[1] | Sewer | Second | Tax-Exempt | 31,785 | 7/1/2021 | 31,785 |
| Series 2006B Sec.(Call Mod)[2] | Sewer | Second | Tax-Exempt | 55,000 | 7/1/2021 | 55,000 |

*Note: excludes series of debt with callable amounts of $100,000 or less outstanding.*

1. *The call date on $31.8 million of the series 2005A Sewer Bonds was modified to July 1, 2021.*
2. *The call date on $55.0 million of the Series 2006B Sewer Bonds was modified to July 1, 2021.*

# Taxable Advance Refunding Candidate Summary

| | Sewer System Debt Generating Savings (Taxable Advance Refunding) | | | Water System Debt Generating Savings (Taxable Advance Refunding) | | |
|---|---|---|---|---|---|---|
| **Refunded Series** | **Series** | **Call Date** | **Par ($000s)** | **Series** | **Call Date** | **Par ($000s)** |
| Senior | 2012A | 7/1/2022 | 358,595 | 2011A | 7/1/2021 | 289,605 |
| | | | | 2011B | 7/1/2021 | 2,295 |
| | | | | 2011C | 7/1/2021 | 74,125 |
| **Total Senior** | | | **358,595** | | | **366,025** |
| Second | 2005A | 7/1/2021 | 31,785 | - | - | - |
| | 2006B | 7/1/2021 | 30,870 | | | |
| **Total Second** | | | **62,655** | | | **-** |
| **Total Refunded** | | | **421,250** | | | **366,025** |

*Note: Series 2012A Sewer Bonds partially funded Extraordinary Working Capital projects. The ability to refinance the portion of the Series 2012A Bonds related to the Extraordinary Working Capital on a tax-exempt basis is subject to opinion of Tax Counsel.*

## Refunding Opportunities in the Wake of Tax Reform

- The elimination of tax-exempt advance refundings and the subsequent dependence on taxable bonds to advance refund outstanding debt has generally led to increased cost and decreased the viability of issuing traditional advance refunding bonds
  - Despite increased borrowing costs, savings is available to GLWA by issuing taxable advance refunding bonds
- While taxable advance refundings allow GLWA to generate debt service savings by taking advantage of current low interest rates, GLWA would forgo the benefit of tax-exempt financing
  - If rates stayed the same as they are now, tax-exempt current refundings at the call dates could generate up to $34 million of additional savings for Water and $55 million of additional savings for Sewer on an NPV basis
  - This represents an implied interest rate penalty of up to 150 basis points for “locking in” savings today vs waiting and taking on interest rate risk
- Current refundings (within 90 days of call date on refunded debt) will be more efficient than advance refundings (no additional escrow cost) and ultimately could afford more savings than tax-exempt advance refundings that are no longer permissible due to tax reform
  - Does involve more interest rate risk for GLWA between now and current refunding date
  - GLWA would get the benefit of “moving down the curve” for financing rates, and could always look at taxable advance refunding options
- Effective on March 1, Department of Treasury suspended the sale of SLGS as part of “extraordinary measures” to prevent the United States from defaulting on its obligations, which requires open market escrows for any defeasance or taxable refunding currently.

# Water – Senior Series 2011A/B/C (Taxable Advance Refunding)

**Water – Senior Lien | Series 2011A | Refunding Screen | ($ in 000s)**

| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
|---|---|---|---|---|---|---|---|---|
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2027 | 3,930 | 5.25% | 7/1/2021 | 3.54% | 212 | 5.41% | 82 | 72.2% |
| 7/1/2031 | 14,540 | 5.00% | 7/1/2021 | 3.70% | 753 | 5.18% | 347 | 68.5% |
| 7/1/2036 | 27,855 | 5.00% | 7/1/2021 | 4.03% | 1,428 | 5.13% | 842 | 62.9% |
| 7/1/2037 | 20,845 | 5.75% | 7/1/2021 | 4.17% | 2,599 | 12.47% | 692 | 79.0% |
| 7/1/2041 | 222,435 | 5.25% | 7/1/2021 | 4.18% | 18,374 | 8.26% | 7,375 | 71.4% |
| | **289,605** | | | | **23,366** | **8.07%** | **9,338** | **71.4%** |

**Water – Senior Lien | Series 2011B | Refunding Screen | ($ in 000s)**

| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
|---|---|---|---|---|---|---|---|---|
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2033 | 2,295 | 5.25% | 7/1/2021 | 3.49% | 213 | 9.28% | 46 | 82.2% |
| | **2,295** | | | | **213** | **9.28%** | **46** | **82.2%** |

**Water – Senior Lien | Series 2011C | Refunding Screen | ($ in 000s)**

| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
|---|---|---|---|---|---|---|---|---|
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2023 | 2,000 | 5.25% | 7/1/2021 | 3.08% | 34 | 1.69% | 23 | 59.0% |
| 7/1/2024 | 10,490 | 5.25% | 7/1/2021 | 3.20% | 313 | 2.99% | 148 | 67.9% |
| 7/1/2025 | 9,645 | 5.25% | 7/1/2021 | 3.29% | 403 | 4.18% | 153 | 72.4% |
| 7/1/2027 | 5,000 | 5.25% | 7/1/2021 | 3.54% | 270 | 5.41% | 104 | 72.2% |
| 7/1/2027 | 4,585 | 4.50% | 7/1/2021 | 3.54% | 77 | 1.69% | 94 | 45.1% |
| 7/1/2041 | 42,405 | 5.00% | 7/1/2021 | 4.18% | 2,196 | 5.18% | 1,401 | 61.1% |
| | **74,125** | | | | **3,294** | **4.44%** | **1,924** | **63.1%** |

*Assumptions: Matched lien refunding with Delivery Date of July 1, 2019; SLGS escrow; refunding bonds issued with par coupon structure and a make whole call; COI and UD of $5/$1000 and $5/$1000, respectively; uniform savings structure; no Debt Service Reserve Fund releases or deposits; Interest rates as of February 28, 2019; PV at Arbitrage Yield. Totals show sum of selected bonds.*

# Base Case Taxable Advance Refunding – Water System

## Savings Summary

- Over $42 million in gross cashflow savings can be achieved (>$27 million present value)
- Potential to accelerate savings as desired

## Refunding Candidates

- Includes all bonds generating >3% savings[1]
- Refunding on a tax-exempt basis not an option under current tax law

## Assumptions

- Uninsured, matched lien refunding
- Interest rates as of February 28, 2019
- Contribution of accrued interest from DS fund
- Conservatively assumes no DSRF release
- SLGS escrow as of February 28, 2019
- Savings structured for level aggregate savings by lien
- Par coupon structure
- Assumes make whole call option

| Refunding Results | |
|---|---|
| Delivery Date: | 7/1/2019 |
| Call Date: | MWC |
| Advance Refunded Par ($): | 366,025,000 |
| NPV Savings ($): | 27,665,093 |
| NPV Savings as % : | 7.56% |
| Negative Arbitrage ($) [2]: | (11,608,444) |
| Escrow Efficiency [2]: | 70.4% |
| TIC: | 4.15% |
| WAM: | 17.6 yrs |
| Refunded Bonds WAM: | 18.0 yrs |

| Date | Prior Net Cashflow ($) | Refunding DS ($) | Savings ($) |
|---|---|---|---|
| 7/1/2020 | 19,091,363 | 17,180,959 | 1,910,404 |
| 7/1/2021 | 19,091,363 | 17,183,819 | 1,907,544 |
| 7/1/2022 | 19,296,363 | 17,388,869 | 1,907,494 |
| 7/1/2023 | 21,294,063 | 19,386,489 | 1,907,574 |
| 7/1/2024 | 29,626,163 | 27,717,909 | 1,908,254 |
| 7/1/2025 | 28,229,938 | 26,319,309 | 1,910,629 |
| 7/1/2026 | 18,037,475 | 16,127,704 | 1,909,772 |
| 7/1/2027 | 31,553,175 | 29,642,406 | 1,910,769 |
| 7/1/2028 | 21,258,125 | 19,349,990 | 1,908,135 |
| 7/1/2029 | 21,042,925 | 19,132,270 | 1,910,655 |
| 7/1/2030 | 20,293,075 | 18,383,886 | 1,909,189 |
| 7/1/2031 | 20,250,375 | 18,339,986 | 1,910,389 |
| 7/1/2032 | 20,095,825 | 18,187,412 | 1,908,413 |
| 7/1/2033 | 20,039,625 | 18,127,246 | 1,912,379 |
| 7/1/2034 | 19,746,925 | 17,835,822 | 1,911,103 |
| 7/1/2035 | 19,696,425 | 17,785,796 | 1,910,630 |
| 7/1/2036 | 28,909,175 | 27,001,278 | 1,907,897 |
| 7/1/2037 | 43,511,675 | 41,603,922 | 1,907,754 |
| 7/1/2038 | 73,184,588 | 71,272,517 | 1,912,071 |
| 7/1/2039 | 73,186,800 | 71,277,373 | 1,909,427 |
| 7/1/2040 | 73,191,225 | 71,281,729 | 1,909,497 |
| 7/1/2041 | 71,899,250 | 69,989,633 | 1,909,618 |
| | 712,525,913 | 670,516,321 | 42,009,592 |

1. *Also includes several small refunding candidates (<$5 million) generating positive savings less than 3% which mature shortly after the call date or represent the last outstanding principal amount for a particular series.*
2. *Negative arbitrage and escrow efficiency calculated for illustrative purposes assuming earnings cap on investments at refunding bond yield.*

# Sewer – Senior Series 2012A (Taxable Advance Refunding)

| Sewer – Senior Lien \| Series 2012A \| Refunding Screen \| ($ in 000s) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2023 | 17,985 | 5.00% | 7/1/2022 | 3.08% | (213) | -1.18% | 326 | - |
| 7/1/2026 | 9,170 | 5.25% | 7/1/2022 | 3.41% | 210 | 2.29% | 255 | 45.1% |
| 7/1/2027 | 2,310 | 5.25% | 7/1/2022 | 3.54% | 63 | 2.74% | 73 | 46.4% |
| 7/1/2032 | 65,730 | 5.00% | 7/1/2022 | 3.78% | 2,253 | 3.43% | 2,517 | 47.2% |
| 7/1/2039 | 292,865 | 5.25% | 7/1/2022 | 4.17% | 14,655 | 5.00% | 14,554 | 50.2% |
| 7/1/2039 | 49,735 | 5.00% | 7/1/2022 | 4.17% | 1,228 | 2.47% | 2,464 | 33.3% |
| | **358,595** | | | | **16,907** | **4.71%** | **17,071** | **49.8%** |

*Assumptions: Matched lien refunding with Delivery Date of July 1, 2019; SLGS escrow; refunding bonds issued with par coupon structure and a make whole call; COI and UD of $5/$1000 and $5/$1000, respectively; uniform savings structure; no Debt Service Reserve Fund releases or deposits; Interest rates as of February 28, 2019; PV at Arbitrage Yield. Totals show sum of selected bonds.*

# Sewer – Second Series 2005A / 2006B (Taxable Advance Refunding)

| Sewer – Second Lien \| Series 2005A \| Refunding Screen \| ($ in 000s) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2034 | 15,490 | 5.00% | 7/1/2021 | 3.99% | 835 | 5.39% | 456 | 64.7% |
| 7/1/2035 | 16,295 | 5.00% | 7/1/2021 | 4.17% | 602 | 3.69% | 536 | 52.9% |
| | **31,785** | | | | **1,437** | **4.52%** | **992** | **59.2%** |

| Sewer – Second Lien \| Series 2006B \| Refunding Screen \| ($ in 000s) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Candidate | | | | New Yield | PV Savings | | Negative Arb. ($ in 000s) | Savings Efficiency |
| Maturity | Par ($ in 000s) | Rate | Call Date | | $ in 000s | % | | |
| 7/1/2034 | 7,890 | 5.00% | 7/1/2021 | 3.99% | 425 | 5.39% | 232 | 64.7% |
| 7/1/2035 | 22,980 | 5.00% | 7/1/2021 | 4.17% | 849 | 3.69% | 756 | 52.9% |
| 7/1/2036 | 24,130 | 5.00% | 7/1/2021 | 4.27% | 684 | 2.83% | 840 | 44.9% |
| | **30,870** | | | | **1,274** | **4.13%** | **988** | **56.3%** |

*Assumptions: Matched lien refunding with Delivery Date of July 1, 2019; SLGS escrow; refunding bonds issued with par coupon structure and a make whole call; COI and UD of $5/$1000 and $5/$1000, respectively; uniform savings structure; no Debt Service Reserve Fund releases or deposits; Interest rates as of February 28, 2019; PV at Arbitrage Yield. Totals show sum of selected bonds.*

# Base Case Taxable Refunding – Sewer System

### Savings Summary

- Nearly $30 million in gross cashflow savings can be achieved (>$20 million present value)
- Potential to accelerate savings as desired

### Refunding Candidates

- Includes all bonds generating >3% savings[1]
- Refunding on a tax-exempt basis not an option under current tax law

### Assumptions

- Uninsured, matched lien refunding
- Interest rates as of February 28, 2019
- Contribution of accrued interest from DS fund
- Conservatively assumes no DSRF release
- SLGS escrow as of February 28, 2019
- Savings structured for level aggregate savings by lien
- Par coupon structure
- Assumes make whole call option

| Refunding Results | |
|---|---|
| Delivery Date: | 7/1/2019 |
| Call Date: | MWC |
| | |
| Advance Refunded Par ($): | 421,250,000 |
| | |
| NPV Savings ($): | 20,652,291 |
| NPV Savings as % : | 4.90% |
| Negative Arbitrage ($) [1]: | (19,025,527) |
| Escrow Efficiency [1]: | 52.0% |
| | |
| TIC: | 4.14% |
| WAM: | 16.8 yrs |
| Refunded Bonds WAM: | 17.4 yrs |

| Date | Prior Net Cashflow ($) | Refunding DS ($) | Savings ($) |
|---|---|---|---|
| 7/1/2020 | 21,794,663 | 20,258,480 | 1,536,183 |
| 7/1/2021 | 21,794,663 | 20,255,130 | 1,539,533 |
| 7/1/2022 | 21,794,663 | 20,253,750 | 1,540,913 |
| 7/1/2023 | 21,794,663 | 20,260,733 | 1,533,930 |
| 7/1/2024 | 21,794,663 | 20,257,773 | 1,536,890 |
| 7/1/2025 | 21,794,663 | 20,255,798 | 1,538,865 |
| 7/1/2026 | 21,794,663 | 20,260,107 | 1,534,556 |
| 7/1/2027 | 21,794,663 | 20,259,631 | 1,535,032 |
| 7/1/2028 | 27,809,663 | 26,273,989 | 1,535,674 |
| 7/1/2029 | 23,013,913 | 21,478,714 | 1,535,199 |
| 7/1/2030 | 27,817,913 | 26,281,379 | 1,536,534 |
| 7/1/2031 | 34,882,913 | 33,345,509 | 1,537,404 |
| 7/1/2032 | 58,418,663 | 56,883,544 | 1,535,119 |
| 7/1/2033 | 18,508,163 | 16,971,830 | 1,536,333 |
| 7/1/2034 | 43,358,163 | 41,821,839 | 1,536,324 |
| 7/1/2035 | 57,976,988 | 56,438,157 | 1,538,831 |
| 7/1/2036 | 16,622,638 | 15,322,507 | 1,300,131 |
| 7/1/2037 | 106,489,138 | 105,189,696 | 1,299,442 |
| 7/1/2038 | 106,458,788 | 105,159,094 | 1,299,694 |
| 7/1/2039 | 106,418,275 | 105,117,947 | 1,300,328 |
| | 802,132,513 | 772,345,604 | 29,786,909 |

1. *Negative arbitrage and escrow efficiency calculated for illustrative purposes assuming earnings cap on investments at refunding bond yield.*

# Rating Agency Water & Sewer Sector Views and Scorecards

## Moody’s Water & Sewer Sector Outlook

- Anticipate **overall stability** in 2019 supported by strong rate management and liquidity, balanced by significant capital needs driven by deferred investment
- Strengthening debt service coverage levels, with growing net revenues outpacing debt service costs; although a credit positive, this is unlikely unsustainable in the long run as utilities address deferred investments
- Liquidity, pivotal to the sector’s stability, will continue to strenghthen as utilities accumulate reserves for future rate stabilization, unexpected system shocks and capital needs
- While strong debt service coverage and liquidity better equip systems to meet immediate operating challenges, Moody’s expects large capital needs to accumulate as the rate of sector infrastructure investment remains low
  - Incremental investment continues to lag system depreciation, evidenced by a declining trend in the median useful life of all systems
  - Sufficient funding of system investment is becoming an increasingly important factor within the sector
- Accelerating large-scale capital investment will require expansion of low-interest financing options, as increasing rates at a pace that fully addresses capital funding needs could be politically untenable

*Source: Moody’s Report, “2019 outlook stable as debt service coverage strengthens but capital needs rise” December 5, 2018.*

## Fitch's Water & Sewer Sector Outlook

- **Stable outlook**, with the key factors in the sector's performance stability being essentiality of the services, lack of competition, and generally autonomous rate-setting authority
- Fitch expects revenues will climb between 2% and 4% in 2019 based on anticipated adjustments by rated credits, flat consumption patterns and moderate economic expansion nationally, helping to offset rising operating and debt costs and preserve good coverage and robust reserves
- Despite slight increase in capital spending anticipated in 2019, sustained capital investment increases will be necessary to preserve service levels and meet future demands over the intermediate term
- Affordability cushion lower than in prior years but remains overall
  - With utilities anticipating ongoing rate adjustments that continue to outpace CPI, affordability is becoming an increasing focus and could pressure finance and debt ratios over time
- With user charges continuing to outpace inflationary growth, the issue of affordability is becoming an increasing focus among sector stakeholders and could pressure finance and debt ratios beyond the outlook period
- Low cost of capital is a credit positive and should remain favorable over the near-term
- Regulatory environment is expected to remain stable, although delayed revisions to the Lead & Copper Rule expected to be released in Q12019 could have significant implications for water utilities
- Increased volatility in weather extremes has potential to escalate sector capital needs

*Source: Fitch "2019 Outlook: Water and Sewer Sector" December 6, 2018. 'Sector Briefing: Water and Sewer" October 2018.*

## Standard & Poor's Water & Sewer Sector Outlook

- Status of the sector is currently strong in spite of political and economic turmoil
  - Credit increases still outpace credit downgrades in 2018
- Bill affordability and debt service coverage are two factors most likely to erode in 2019 and are most likely to impact ratings
  - Increasing fixed costs and increasing personnel costs for current and retired employees are leading causes
- Management and governance is an area that can stabilize or relieve utilities under ratings stress
- **Willingness to raise rates -** which remain the sole source of operating revenues for nearly every utility - is cited as an ever-important issue

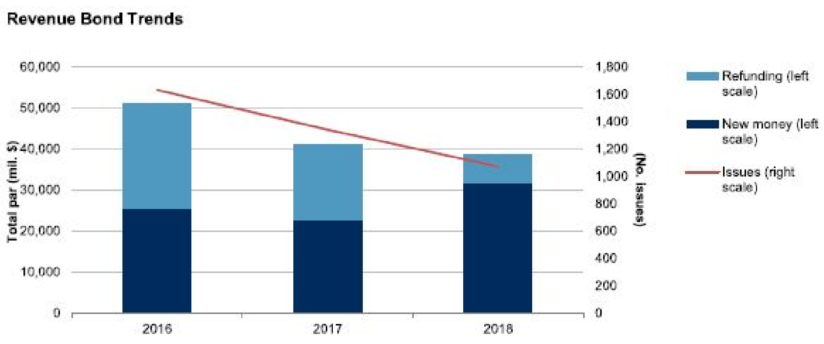
| S&P Credit Risks and Opportunities | |
|---|---|
| **Risks** | **Opportunities** |
| • A federal infrastructure package, if any, that keeps the focus on surface and air transportation | • Highly rated and well-run state revolving funds (SRFs) remaining a popular alternative to municipal bonds for many borrowers |
| • Succession planning in a tight labor market, increasing personnel costs | • Very low likelihood of new or stronger environmental regulations |
| • Bearish and volatile equity markets that aren't helping close pension funding gaps | • Some recent federal legislation that was or is likely to be helpful |
| • Rising interest rates possibly curtailing non-mandatory capital expenditures (capex), increasing the risk of deferred maintenance | |

*Source: S&P Report, "U.S. Municipal Water and Sewer Utilities 2019 Sector Outlook: Stable, Although Potential Disruptions Are Not Making Planning Easy" January 15, 2019.*

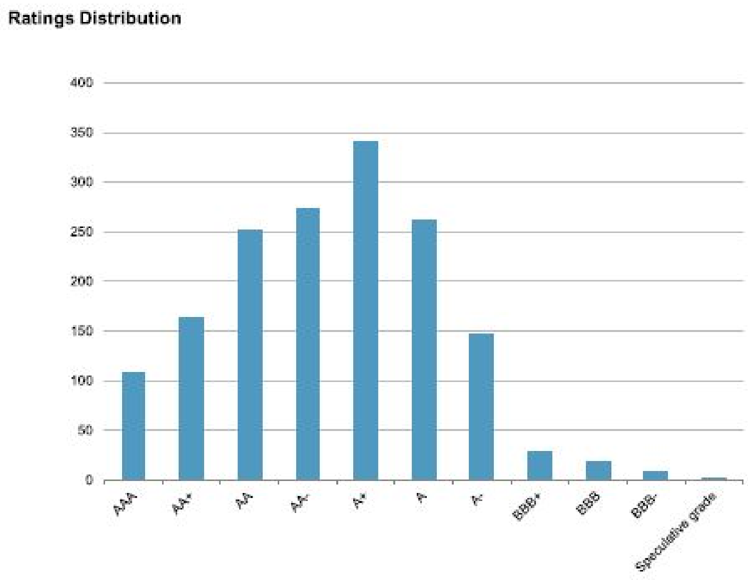
# Standard & Poor's Water & Sewer Sector Outlook (cont'd)

- Slowing economy unlikely to hurt utility credit quality under anything but extreme circumstances
- If utilities receive more flexibility in implementing corrective action, debt use and rate increases would be more spread out
- Even with tight state budgets, state bond banks and federal SRF's remain highly rated and well capitalized

| S&P Rating Trends | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| Ratings outstanding | 1,509 | 1,568 | 1,638 | 1,650 | 1,578 | 1,605 |
| % ratings that changed during the year | 3.90% | 4.40% | 8.61% | 13.94% | 7.79% | 4.78% |
| Upgrades to downgrades | 2.9x | 2.0x | 2.1x | 1.9x | 1.8x | 1.8x |
| Positive outlooks | 26 | 23 | 31 | 14 | 4 | 12 |
| Non-stable outlooks | 49 | 55 | 70 | 42 | 10 | 27 |




Source: Bond Buyer municipal market data and S&P Global Ratings.


Source: S&P Global Ratings. Data as of Dec. 31, 2018.

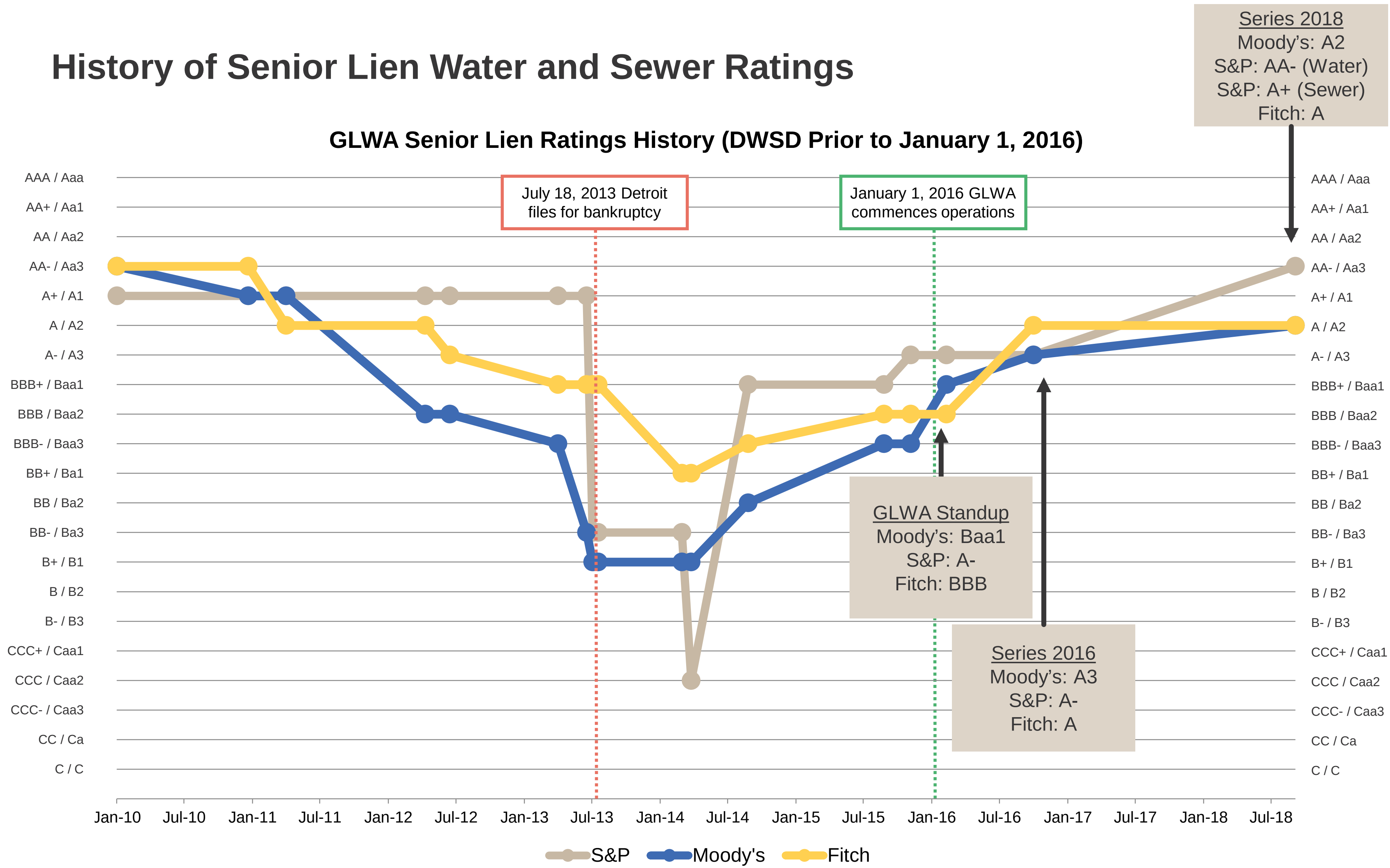

*Source: S&P Report, "U.S. Municipal Water and Sewer Utilities 2019 Sector Outlook: Stable, Although Potential Disruptions Are Not Making Planning Easy" January 15, 2019.*

# Current Water and Sewer Ratings

| Water | | | |
|---|---|---|---|
| | Moody’s | S&P | Fitch |
| Senior Lien | A2 | AA- | A |
| Second Lien | A3 | A+ | A- |
| Outlook | Stable | Stable | Positive |

| Sewer | | | |
|---|---|---|---|
| | Moody’s | S&P | Fitch |
| Senior Lien | A2 | A+ | A |
| Second Lien | A3 | A | A- |
| Outlook | Stable | Positive | Positive |

# History of Senior Lien Water and Sewer Ratings




*Note: in cases where a rating agency rates Water Senior and Sewer Senior Lien differently, chart displays highest of the two ratings.*

# Current Rating Agency Views

| Summary of Rating Agency Views | | |
|---|---|---|
| **Moody's Investors Service**<br>**Andrew Van Dyke Dobos / Matt Butler** | **Standard & Poor's**<br>**Scott Garrigan / Ted Chapman** | **Fitch Ratings**<br>**Doug Scott / Eva Rippeteau** |
| A2 (Sr.) / A3 (2nd)<br>Stable Outlook | Water: AA- (Sr.) / A+ (2nd); Sewer: A+ (Sr.) / A- (2nd)<br>Positive Outlook | A (Sr.) / A- (2nd)<br>Positive Outlook |
| **Strengths** | | |
| — Very wide service area that includes a population of 3.8 million<br>— Commitment to revenue enhancements will likely support sound debt service coverage and healthy liquidity<br>— GLWA management team has implemented operating adjustments to cut costs and improve financial metrics, and is committed to continued efforts<br>— Simplified monthly fixed rate structure mitigates declining usage while providing stable cash flow throughout the year | — Diverse revenue stream from a large number of wholesale customers<br>— Revenues from both wholesale customers and the DWSD retail system that are mostly fixed<br>— Oversight through an agency relationship and cooperation with DWSD<br>— Strong overall management and governance functions, including comprehensive internal policies and controls<br>— Financial performance continues to exceed projections<br>— GLWA is not under any regulatory-driven capital costs from consent orders or consent decrees<br>— Limited future exposure to pension cost escalation from legacy Detroit obligations | — Essential service provider in expansive service territory<br>— Strong rate adjustment history in support of financial and capital needs<br>— Over 75% of operating revenues coming from suburban customers with higher wealth metrics<br>— All system funds and accounts are separate and distinct Detroit funds including the city's general fund<br>— Changes in rate setting practices and reserve accumulation should help to insulate GLWA from high city retail delinquencies |
| **Challenges** | | |
| — Declining water consumption trend<br>— High leverage will moderate slowly given outstanding capital improvement needs and plans to issue debt<br>— High combined operating needs and fixed costs leave little margin to miss revenue targets<br>— Economic and demographic weaknesses in portions of the service area | — Ongoing negative revenue variances from the DWSD local sewer system<br>— Significant economic stress and a "very weak economy" in Detroit, which could continue to place downward pressure on utility collection rates<br>— Large amount of accounts receivable and high allowances for doubtful accounts<br>— Significantly less affordable rates for customers living in Detroit compared to suburban residents<br>— System leverage that is high and unlikely to abate significantly | — Debt load is expected to remain elevated for the foreseeable future<br>— Continued annual rate adjustments are needed to meet rising debt service obligations and sustain financial performance |

*Source: Moody's reports dated September 4, 2018; S&P reports dated September 5, 2018; Fitch report dated September 13, 2018.*

# Moody’s Water & Sewer Utility Scorecard (Water System)

| | | | Scoring on Moody's Municipal Utility Methodology | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Factor | Description | Weight | Aaa<br>0.50-1.49 | Aa<br>1.50-2.49 | A<br>2.50-3.49 | Baa<br>3.50-4.49 | Ba<br>4.50-5.49 | GLWA Input | Category Score | GLWA Score |
| System Characteristics (30%) | Asset Condition - Remaining Useful Life (Net Fixed Assets / Annual Depreciation) | 10% | > 75 Years | 75 years ≥ n > 25 years | 25 years ≥ n > 12 years | 12 years ≥ n > 9 years | 9 years ≥ n > 6 years | 14 years | 3 | 0.300 |
| | System Size: (O&M in 000s) | 7.5% | > $65 million | $65 M ≥ n > $30 M | $30 M ≥ n > $10 M | $10 M ≥ n > $3 M | $3 M ≥ n > $1 M | $167.0 million | 1 | 0.075 |
| | Service Area Wealth: MFI | 12.5% | > 150% of US median | 150% to 90% of US Median | 90% to 75% of US Median | 75% to 50% of US Median | 50% to 40% of US Median | 101.2% | 2 | 0.250 |
| | | | | | | | | | | |
| Financial Strength and Liquidity (40%) | Annual Debt Service Coverage | 15% | > 2.00x | 2.00x ≥ n > 1.70x | 1.70x ≥ n > 1.25x | 1.25x ≥ n > 1.00x | 1.00x ≥ n > 0.70x | 1.5x | 3 | 0.450 |
| | Days Cash on Hand | 15% | > 250 days | 250 days ≥ n > 150 days | 150 days ≥ n > 35 days | 35 days ≥ n > 15 days | 15 days ≥ n > 7 days | 693 days | 1 | 0.150 |
| | Debt to Operating Revenues | 10% | Less than 2.00x | 2.00x < n ≤ 4.00x | 4.00X < n ≤ 7.00X | 7.00X < n ≤ 8.00X | 8.00X < n ≤ 9.00X | 5.4x | 3 | 0.300 |
| | | | | | | | | | | |
| Management of System (20%) | Rate Management | 10% | Excellent rate setting; no material political, practical, or regulatory limit to rate increases | Strong rate setting; little material political, practical, or regulatory limit to rate increases | Average rate setting; some material political, practical, or regulatory limit to rate increases | Adequate rate setting; political, practical, or regulatory impediments place material limits to rate increases | Below average rate setting; political, practical, or regulatory impediments place material limits to rate increases | Average rate setting | 3 | 0.300 |
| | Regulatory Compliance and Capital Planning | 10% | Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period | Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan | Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan | Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan | Not fully addressing compliance issues; Limited or weak capital planning | Addressing compliance Issues | 3 | 0.300 |
| | | | | | | | | | | |
| Legal Provisions (10%) | Rate Covenant | 5% | >1.30x | 1.30x ≥ n > 1.20x | 1.20x ≥ n > 1.10x | 1.10x ≥ n > 1.00x | ≤ 1.00x | 1.20x | 3 | 0.150 |
| | Debt Service Reserve Requirement | 5% | DSRF funded at MADS | DSRF funded at lesser of standard 3 prong test | DSRF funded at less than 3 prong test | No explicit DSRF | No explicit DSRF | Lesser of 3 test | 2 | 0.100 |
| | | | | | | | | | *(Aa3 = 2.17 to 2.50; A1 = 2.50 to 2.83)* | 2.375 |

*Source: Moody’s Municipal Utility Debt Methodology, October 2017. Data from Series 2018 Moody’s Report and Moody’s Financial Ratio Analysis database as of February 27, 2019, updated where available with GLWA FY18 results.*

# Moody’s Water & Sewer Utility Scorecard (Sewer System)

| | | | | | Scoring on Moody's Municipal Utility Methodology | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Factor** | **Description** | **Weight** | **Aaa 0.50-1.49** | **Aa 1.50-2.49** | **A 2.50-3.49** | **Baa 3.50-4.49** | **Ba 4.50-5.49** | **GLWA Input** | **Category Score** | **GLWA Score** |
| System Characteristics (30%) | Asset Condition - Remaining Useful Life (Net Fixed Assets / Annual Depreciation) | **10%** | > 75 Years | 75 years ≥ n > 25 years | 25 years ≥ n > 12 years | 12 years ≥ n > 9 years | 9 years ≥ n > 6 years | 15 years | **3** | **0.300** |
| | System Size: (O&M in 000s) | **7.5%** | > $65 million | $65 M ≥ n > $30 M | $30 M ≥ n > $10 M | $10 M ≥ n > $3 M | $3 M ≥ n > $1 M | $265.3 million | **1** | **0.075** |
| | Service Area Wealth: MFI | **12.5%** | > 150% of US median | 150% to 90% of US Median | 90% to 75% of US Median | 75% to 50% of US Median | 50% to 40% of US Median | 101.2% | **2** | **0.250** |
| Financial Strength and Liquidity (40%) | Annual Debt Service Coverage | **15%** | > 2.00x | 2.00x ≥ n > 1.70x | 1.70x ≥ n > 1.25x | 1.25x ≥ n > 1.00x | 1.00x ≥ n > 0.70x | 1.3x | **3** | **0.450** |
| | Days Cash on Hand | **15%** | > 250 days | 250 days ≥ n > 150 days | 150 days ≥ n > 35 days | 35 days ≥ n > 15 days | 15 days ≥ n > 7 days | 287 days | **1** | **0.150** |
| | Debt to Operating Revenues | **10%** | Less than 2.00x | 2.00x < n ≤ 4.00x | 4.00X < n ≤ 7.00X | 7.00X < n ≤ 8.00X | 8.00X < n ≤ 9.00X | 5.4x | **3** | **0.300** |
| Management of System (20%) | Rate Management | **10%** | Excellent rate setting; no material political, practical, or regulatory limit to rate increases | Strong rate setting; little material political, practical, or regulatory limit to rate increases | Average rate setting; some material political, practical, or regulatory limit to rate increases | Adequate rate setting; political, practical, or regulatory impediments place material limits to rate increases | Below average rate setting; political, practical, or regulatory impediments place material limits to rate increases | Average rate setting | **3** | **0.300** |
| | Regulatory Compliance and Capital Planning | **10%** | Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period | Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan | Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan | Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan | Not fully addressing compliance issues; Limited or weak capital planning | Addressing compliance Issues | **3** | **0.300** |
| Legal Provisions (10%) | Rate Covenant | **5%** | >1.30x | 1.30x ≥ n > 1.20x | 1.20x ≥ n > 1.10x | 1.10x ≥ n > 1.00x | ≤ 1.00x | 1.20x | **3** | **0.150** |
| | Debt Service Reserve Requirement | **5%** | DSRF funded at MADS | DSRF funded at lesser of standard 3 prong test | DSRF funded at less than 3 prong test | No explicit DSRF | No explicit DSRF | Lesser of 3 test | **2** | **0.100** |
| | | | | | | | | | *(Aa3 = 2.17 to 2.50; A1 = 2.50 to 2.83)* | **2.375** |

*Source: Moody’s Municipal Utility Debt Methodology, October 2017. Data from Series 2018 Moody’s Report and Moody’s Financial Ratio Analysis database as of February 27, 2019, updated where available with GLWA FY18 results.*

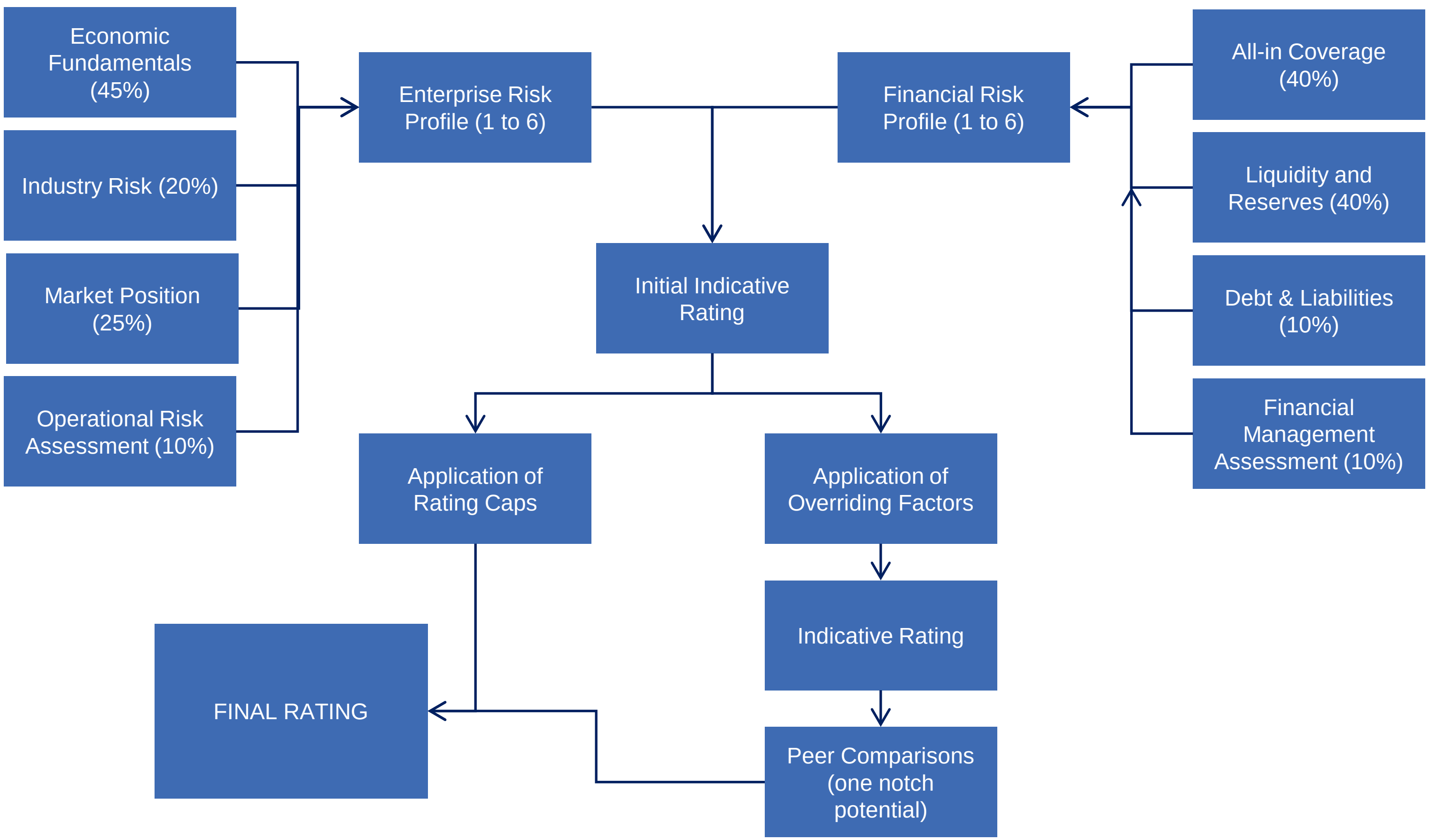
## S&P Retail Water & Sewer Utility Ratings Framework

- **S&P uses a hybrid approach to the rating process for GLWA, whereby retail metrics are considered but within the context of the Wholesale Utility Criteria**
- Rating caps and overriding factors are applied after initial score calculated and can result in a substantially different final rating from initial indicative rating
- The weighted average of the two individual factors are rounded to the nearest whole number and the interaction between the Enterprise Risk Profile and the Financial Risk Profile determines the initial indicative rating for the Utility issuer (see table below)

| | | Financial Risk Profile | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Extremely Strong 1** | **Very Strong 2** | **Strong 3** | **Adequate 4** | **Vulnerable 5** | **Highly Vulnerable 6** |
| **Enterprise Risk Profile** | **Extremely Strong 1** | AAA | AA+ | AA- | A | BBB+ / BBB | BB+ / BB |
| | **Very Strong 2** | AA+ | AA / AA- | A+ | A- | BBB / BBB- | BB / BB- |
| | **Strong 3** | AA- | A+ | A | BBB+ / BBB | BBB- / BB+ | BB- |
| | **Adequate 4** | A | A / A- | A- / BBB+ | BBB / BBB- | BB | B+ |
| | **Vulnerable 5** | BBB+ | BBB / BBB- | BBB- / BB+ | BB | BB- | B |
| | **Highly Vulnerable 6** | BBB- | BB | BB- | B+ | B | B- |

*Source: S&P U.S. Public Finance Waterworks; Sanitary Sewer, And Drainage Utility Systems: Methodology & Assumptions" January 19, 2016.*

# S&P Retail Water & Sewer Utility Scorecard Calculation




Source: *S&P U.S. Public Finance Waterworks; Sanitary Sewer, And Drainage Utility Systems: Methodology & Assumptions" January 19, 2016.*

# S&P Retail Water & Sewer Utility Scorecard

| Enterprise Risk Profile | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Description** | **Weight** | **1** | **2** | **3** | **4** | **5** | **6** | **Pos / Neg** | **GLWA** |
| **Enterprise Risk Profile** | | **Extremely Strong** | **Very Strong** | **Strong** | **Adequate** | **Vulnerable** | **Highly Vulnerable** | **Notching Factors** | **Score** |
| Economic Fundamentals | **45%** | Stronger than US rate of GDP growth and/or >100%/125% of US median household effective buying income | Same/weaker rate than US rate of GDP growth and/or >100%/125% of US median household effective buying income | Same as US rate of GDP growth and 75-100% of US median household effective buying income | Same or weaker rate of US GDP growth and 50-75% of US median household effective buying income | Weaker rate of US GDP growth and 35-75% of US median household effective buying income | Weaker rate of US GDP growth and <35% of US median household effective buying income | **Economies of scale** | **(3 – 1) = 2** |
| Industry Risk | **20%** | Very low competitive risk of "1" applied to most utilities, given monopolies with autonomy over rates | - | - | - | - | - | | **1** |
| Market Position | **25%** | Utility bill less than 2.25% of Median Household Effective Buying Income and less than 10% of service population living in poverty | Utility bill less than 2.25-4.50% of Median Household Effective Buying Income and less than 20% of service population living in poverty | Utility bill 4.50%+ of Median Household Effective Buying Income and less than 30% of service population living in poverty | Utility bill 4.50%+ of Median Household Effective Buying Income and less than 30% of service population living in poverty | Utility bill more than 2.00% of Median Household Effective Buying Income and more than 20-30+% of service population living in poverty | Utility bill more than 2.00% of Median Household Effective Buying Income and more than 30% of service population living in poverty | | **Retail Metric** |
| Operational Management Assessment | **10%** | Strong management, including secure water supply and system capacity. Mgmt communicates long term needs and strategic goals. Multi year, preapproved rate actions. | Strong management, with water supply and system capacity sufficient for existing customer base. Public out reach and transparency on planning. Rate actions done year to year. | Good management, with water supply and system capacity sufficient for existing customer base. Public out reach and transparency on planning. Rate actions done year to year. | Adequate management, with water supply and system capacity needs in 10-20 years. Management depth and breadth limited. Rate actions driven by legal covenants. | Management capabilities limited, with water supply and system capacity not sufficient current. Management depth limited, with reliance on outside parties. Rate actions only driven by weak condition. | - | | **2** |

**Note: S&P uses a hybrid approach to the rating process for GLWA, whereby retail metrics are considered but within the context of the Wholesale Utility Criteria**

*Source: S&P U.S. Public Finance Waterworks; Sanitary Sewer, And Drainage Utility Systems: Methodology & Assumptions" January 19, 2016. Certain data from Series 2018 Rating Report. Indicative scores are PFM's interpretation of methodology; actual implementation may differ.*

## S&P Retail Water & Sewer Utility Scorecard (Cont'd)

| Financial Risk Profile | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **Weight** | **1** | **2** | **3** | **4** | **5** | **6** | **GLWA** |
| **Financial Risk Profile** | | **Extremely Strong** | **Very Strong** | **Strong** | **Adequate** | **Vulnerable** | **Highly Vulnerable** | **Score** |
| All-in Annual Debt Service Coverage | **40%** | Greater than 1.60X | 1.40X to < 1.60X **(Water)** | 1.20X to < 1.40X **(Sewer)** | 1.10X to < 1.20X | 1.00X to < 1.10X | <1.00X | **2 - 3** |
| Liquidity and Reserves | **40%** | Greater than 150 days and more than $75 million | 90- 150 days and between $20-$75 million | 60-90 days and between $5-$20 million | 30-60 days and between $1-$5 million | 15-30 days and $1 million | <15 days and $500,000 | **1** |
| Debt and Liabilities | **10%** | Up to 20% | 20% to 35% | 35% to 50% | 50% to 65% | 65% to 80% | >80% | **6** |
| Financial Management Assessment | **10%** | Strong revenue and expense tracking and budget monitoring. Good long-term financial planning and assessment. Formal financial, investment and debt policies. | Revenue and expense tracking and budget monitoring but less robust. Good financial planning but limited in term. Formal financial, investment and debt policies, but may be lacking in certain areas. | Revenue and expense tracking done but with optimistic assumptions. Financial planning but limited updates. Some formal finance policies, but may be lacking in certain areas. | Revenue and expense projections exist, but with optimistic assumptions and limited testing. Financial planning done, but may not be realistic. Finance and investments driven by state requirements. | Revenue and expense projections ignore shortfalls, with no formal review. No long term financial planning done. Absence of formal or informal policies with use of riskier structures. | - | **1** |

**Note: S&P uses a hybrid approach to the rating process for GLWA, whereby retail metrics are considered but within the context of the Wholesale Utility Criteria**

*Source: S&P U.S. Public Finance Waterworks; Sanitary Sewer, And Drainage Utility Systems: Methodology & Assumptions" January 19, 2016. Certain data from Series 2018 Rating Report. Indicative scores are PFM's interpretation of methodology; actual implementation may differ.*

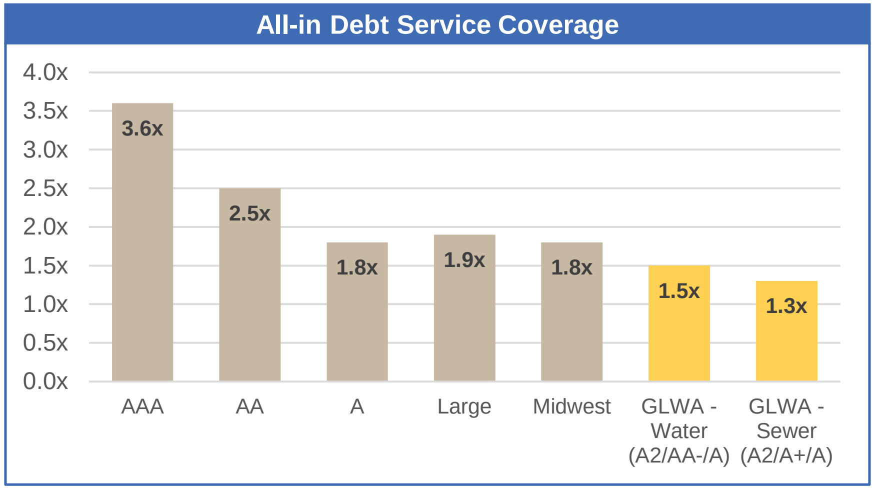
# Peer Comparison and Comparable Utility Metrics

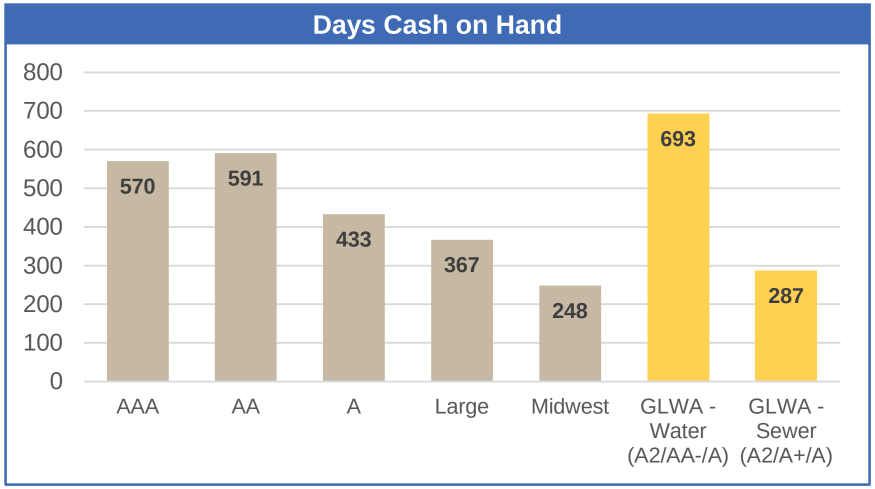
# Key Financial Metrics for GLWA

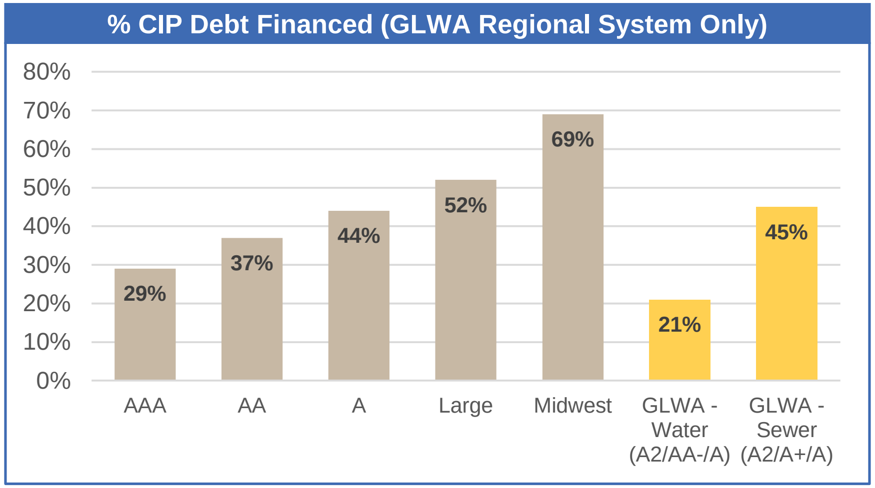
The maintenance of key financial metrics is critically important to GLWA's ongoing positioning for rating upgrades and its objective of lowering GLWA's fixed costs for both the Water and Sewer enterprises.

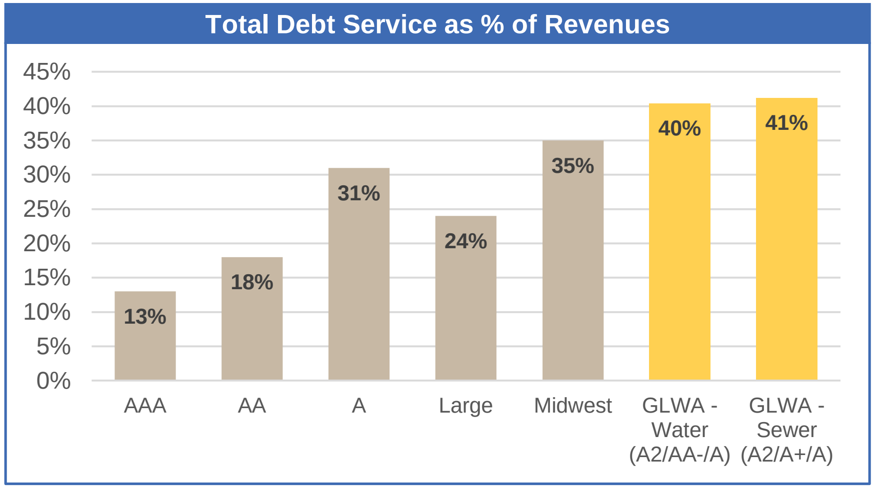
- GLWA  highest senior lien water and sewer ratings of A2/AA-/A remain among the lower half of utility ratings nationally
- GLWA continues to push forward with efforts to improve all bond ratings up to AA category ratings for both the water and sewer sectors, recognizing that debt service (for planned new money and refinancing bonds) accounts for close to 50% of the annual budget
- With continued improvement in senior lien bond ratings for water and sewer, significant reductions in fixed cost could be achieved relative to the maintenance of current ratings
- GLWA has identified a group of peer utilities against which it is benchmarking performance and establishing targets for key metric of debt service coverage and liquidity to improve bond ratings
- GLWA is also using rating agency medians on a broader range of variables to assess the progress for the upgrade of its senior lien bond ratings
- Ongoing benchmarking and continued progress in improving key financial metrics of GLWA are critical to the achievement of lower debt service cost and a path to higher credit quality

# Financial Metrics Compared to 2018 Fitch Medians



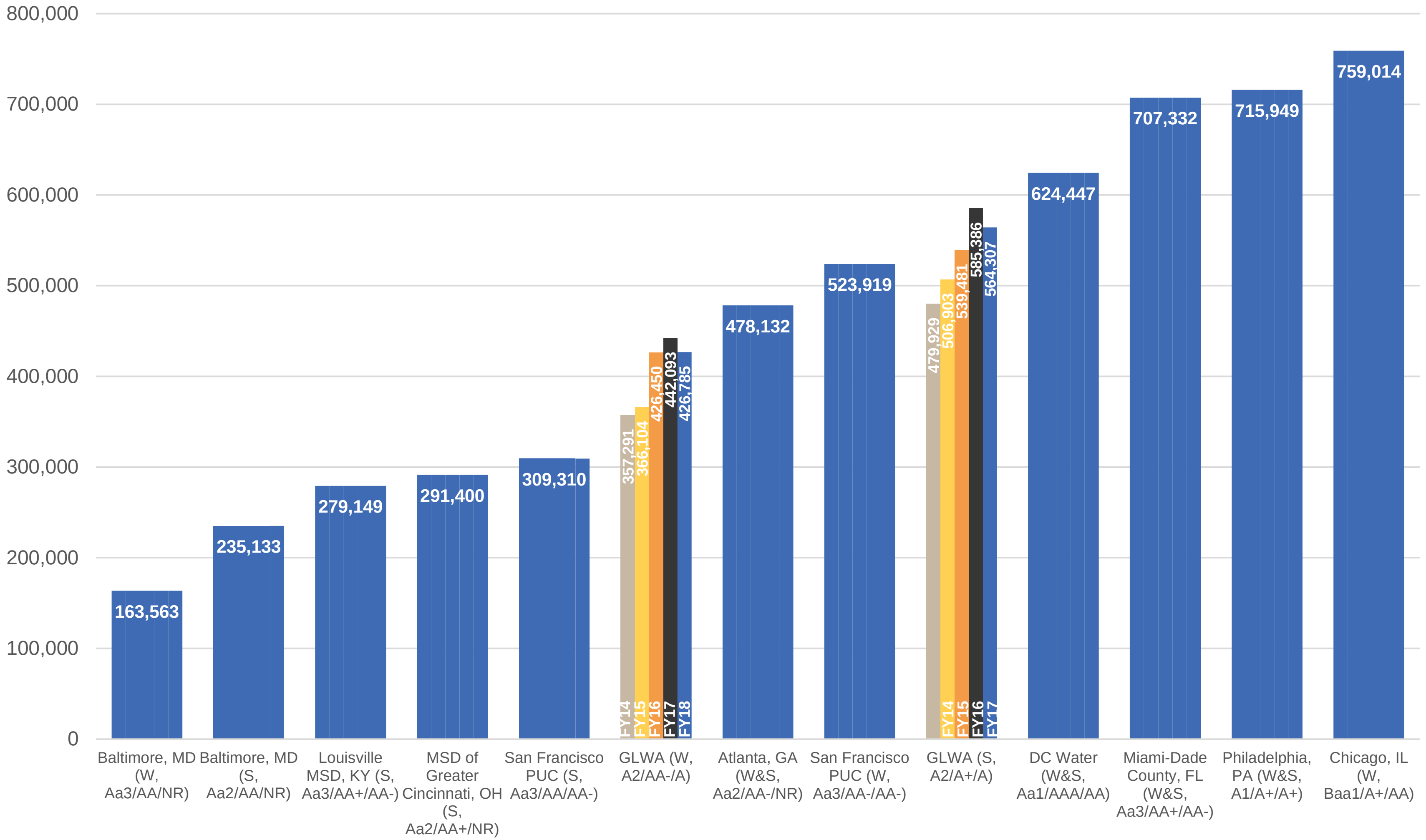



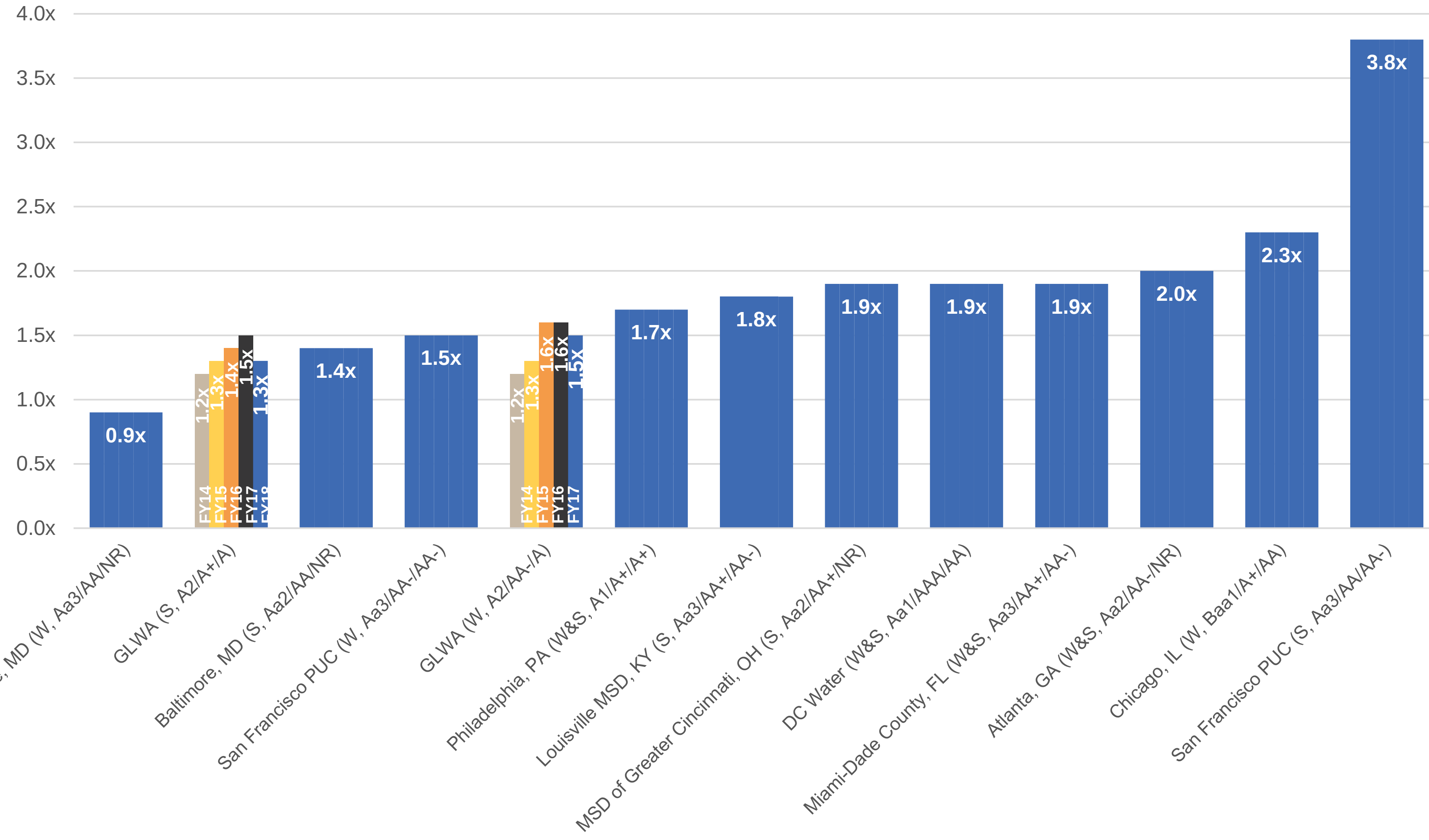

*Note: Fitch median data as provided by Fitch in "2019 Water and Sewer Medians" report, dated November 12, 2018. GLWA figures for All-in Debt Service Coverage, Days Cash on Hand, and Total Debt Services as % of Revenues data as of FY2018 and calculated based on FY2018 financial statements. % CIP Debt Financed data as proposed in FY20 and FY21 Biennial Budget as of February 15, 2019 and is for regional system only, excluding any capital expenditures and bond financings for DWSD.*

# Peer Comparison of Total Operating Revenues



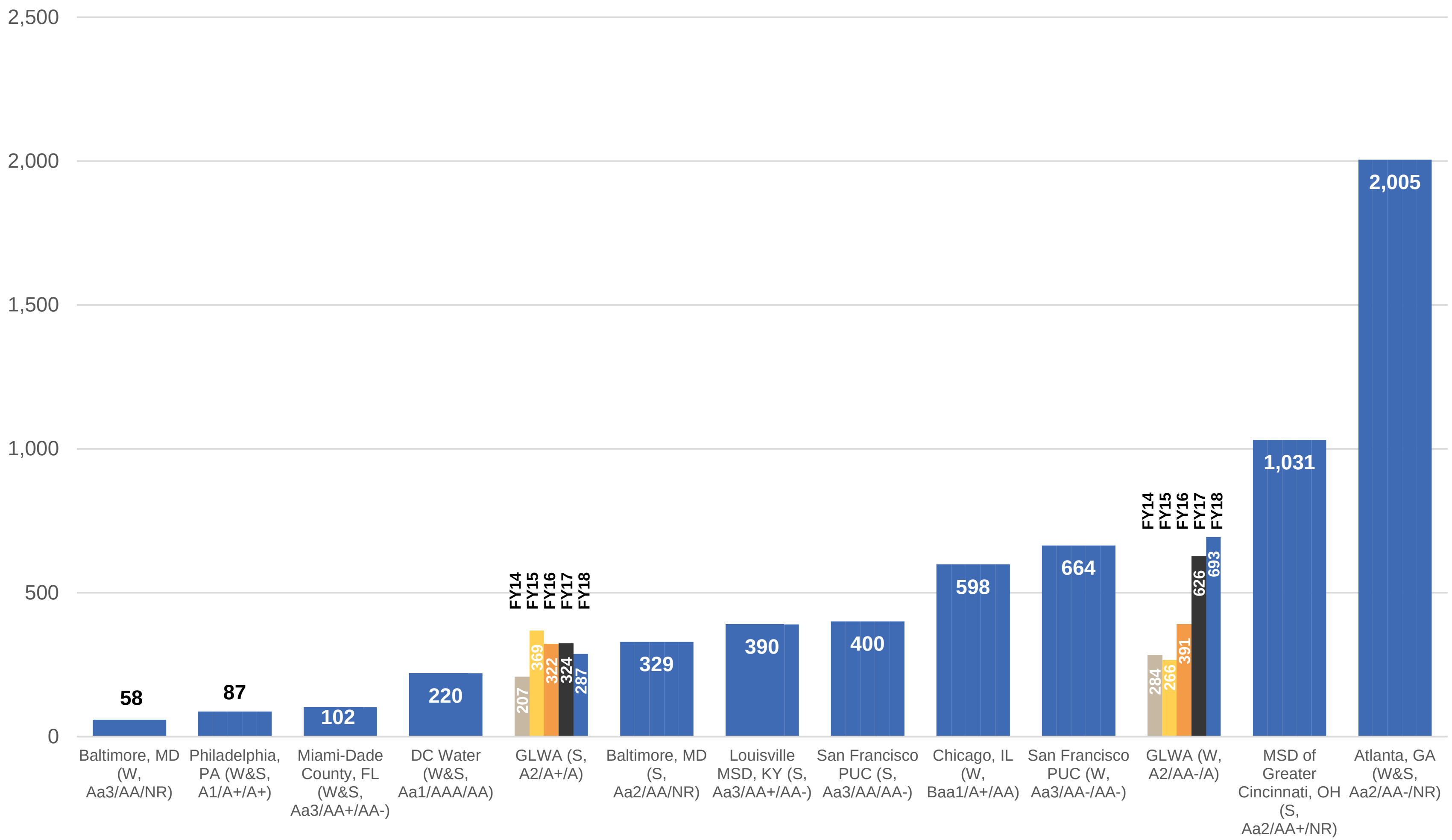

*Source: Moody's Financial Ratio Analysis database, as of February 28, 2019. FY2018 GLWA data calculated based on FY2018 financial statements. Chicago, DC Water, Miami-Dade County, Baltimore Water, Baltimore Sewer, MSD of Greater Cincinnati, and Philadelphia data as of FY2017. All other data as of FY2018. DWSD Data shown as GLWA for FY14-15. FY16 and on includes combined data for GLWA and DWSD.*

# Peer Comparison of Total Debt Service Coverage




*Source: Moody's Financial Ratio Analysis database, as of February 28, 2019. FY2018 GLWA data calculated based on FY2018 financial statements. Chicago, DC Water, Miami-Dade County, Baltimore Water, Baltimore Sewer, MSD of Greater Cincinnati, and Philadelphia data as of FY2017. All other data as of FY2018. DWSD Data shown as GLWA for FY14-15. FY16 and on includes combined data for GLWA and DWSD.*

# Peer Comparison of Unrestricted Days Cash and Investments




*Source: Moody's Financial Ratio Analysis database, as of February 28, 2019. FY2018 GLWA data calculated based on FY2018 financial statements. Chicago, DC Water, Miami-Dade County, Baltimore Water, Baltimore Sewer, MSD of Greater Cincinnati, and Philadelphia data as of FY2017. All other data as of FY2018. DWSD Data shown as GLWA for FY14-15. FY16 and on includes combined data for GLWA and DWSD.*

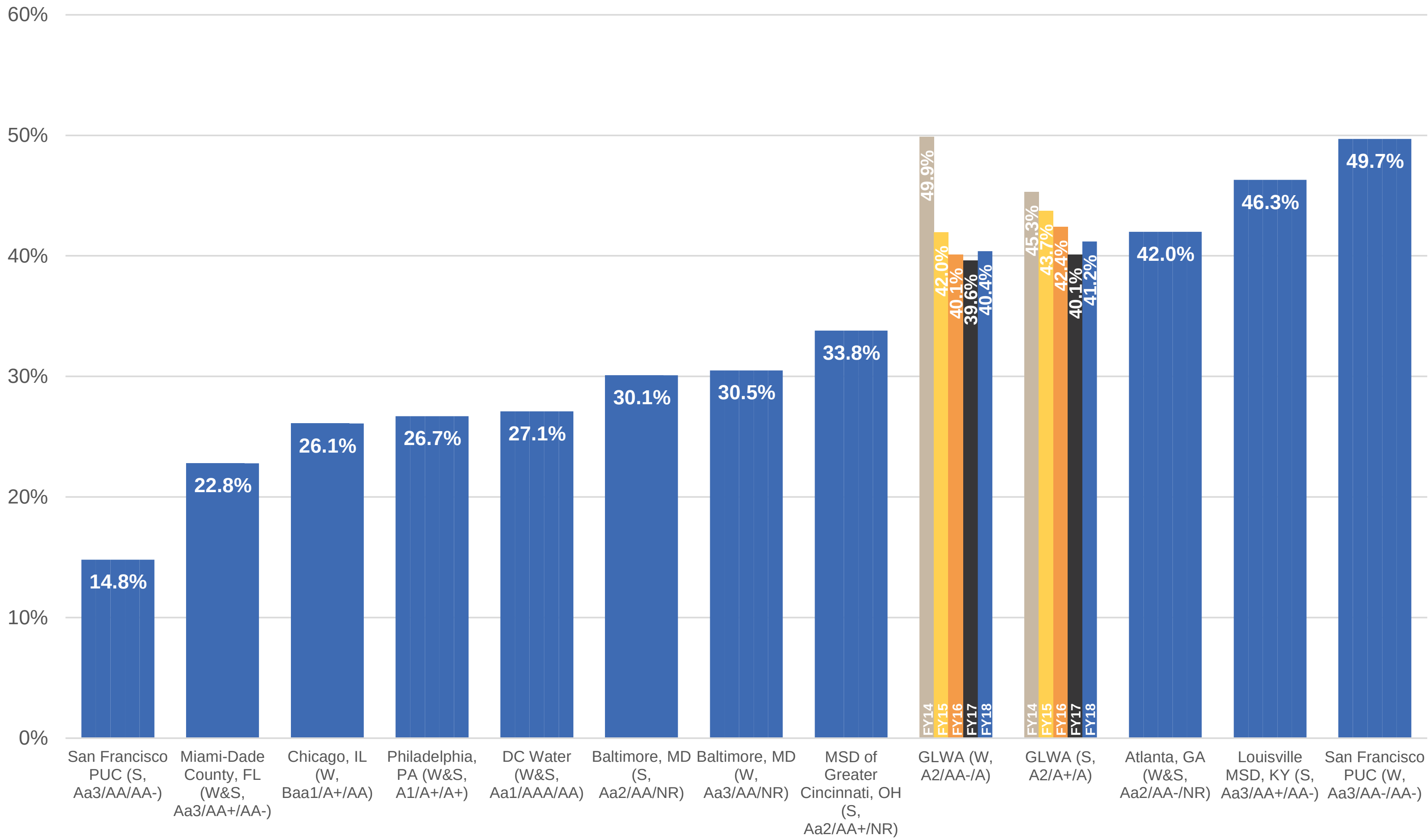
# Summary of GLWA Liquidity (Moody's Methodology)

| | Water System | | Sewer System | |
|---|---|---|---|---|
| Source | FY 2018 Amount | Days Cash & Investments (days) | FY 2018 Amount | Days Cash & Investments (days) |
| Receiving Fund | $36.8 million | 81 | $24.9 million | 34 |
| Operations and Maintenance Fund | $31.9 million | 70 | $77.2 million | 106 |
| Extraordinary Repair and Replacement | $27.5 million | 60 | $44.0 million | 61 |
| Improvement & Extension Account - Regional | $220.8 million | 483 | $62.4 million | 86 |
| **Total Unrestricted Liquidity** | **$317.0 million** | **693** | **$208.5 million** | **287** |

| Operating Expense | FY 2018 Amount | FY 2018 Amount |
|---|---|---|
| Transfer to O&M Fund – Regional | $127.6 million | $201.9 million |
| Transfer to O&M Fund – Local | $39.3 million | $63.4 million |
| **Total Operating Transfers** | **$167.0 million** | **$265.3 million** |

*Source: FY2018 financial statements*
*Note: Moody's Days Cash Calculation includes O&M transfers related to the local system but excludes local system liquidity.*

# Peer Comparison of Debt Service as a % of Operating Revenues




*Source: Moody's Financial Ratio Analysis database, as of February 28, 2019. FY2018 GLWA data calculated based on FY2018 financial statements. Chicago, DC Water, Miami-Dade County, Baltimore Water, Baltimore Sewer, MSD of Greater Cincinnati, and Philadelphia data as of FY2017. All other data as of FY2018. DWSD Data shown as GLWA for FY13-15. FY16 and on includes combined data for GLWA and DWSD.*